The Internationalisation of Mobile Telecommunications

STRATEGIC CHALLENGES IN A GLOBAL MARKET

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Contents

Preface

Many books and articles on mobile telecommunications start by offering alternative hypotheses which are subsequently tested against a variety of data. However, the data that are used are often poor in quality and/or out of date. Surprisingly, perhaps, it is very unusual for the data to be questioned, although it must be acknowledged that readers generally have neither the time nor expertise to check the data for themselves.

In this respect, this book is somewhat radical because it starts with extensive databases and does little theorising. The main justification for this is very straightforward. The book covers the decade from 1998 to 2008, and the term 'volatile' barely does justice to that period from the viewpoint of the mobile telecommunications industry. Only recently can it truly be said that companies have been able to develop strategies that look beyond short-term survival. Hence, the approach taken here is initially to look back at what was done and to attempt to make sense of how companies behaved in respect of their overseas investments as a pragmatic response to the business environment and, secondly, to analyse how the now much more settled environment has triggered new developments in the industry which again are much more to do with pragmatic responses than with theoretical ideals.

This approach is fundamentally dependent upon obtaining relevant data for analysis, and it is extremely important that the databases are as accurate as possible. To this end, one of the authors has spent the past decade building up the databases that are used in this book. They are not bought in and they are not copied from unchecked sources. They are wholly original and unique in their presentation.

This does not mean, however, that they are necessarily error-free since such a concept is almost meaningless when it comes to data on mobile communications. In the first place, it must be borne in mind that in order to compile an up-to-date information base it is essential to use the Internet – official publications often seriously lag real-time events. But the Internet is both blessing and curse. Literally anything can be published by anyone, and accuracy is not its strong point. Hence, everything must be checked and rechecked. This is an intensely time-consuming process and can never be guaranteed to be error-free since sometimes choices must ultimately be made between conflicting data.

A good illustration of this comes in respect of subscriber numbers for mobile operators on which this book is based. Some individual country regulators, trade associations and operators are scrupulous about the publication of accurate and timely data, but others are not. Furthermore, a great deal depends upon reporting methodologies. Thus, for example, some operators lump together several operations while others only list directly-held subsidiaries. Others list only operations that they control, while yet others claim the entire subscription base of networks of which they are only part-owners because they have consolidated them in their accounts.

And all of this assumes that there is such a thing as an agreed definition of what is meant by a 'subscriber', which unhappily is not the case in practice since it is possible, for example, to be flexible about how long a subscriber has been inactive before that person is deleted from the subscriber base. Equally, subscriber numbers and SIM cards in circulation are rather different animals. Penetration levels for mobile are increasingly cited well in excess of 100 per cent of the population, either due to multiple ownership of handsets or because multiple SIM cards are being used in conjunction with a single handset. And, occasionally, operators may be tempted to overstate their subscriber numbers for a variety of reasons or they may include subscribers belonging to MVNOs using their networks.

It is not our purpose to over-egg the pudding, merely to reinforce the point that while the authors cannot guarantee total accuracy, they do guarantee that there is no other source in the public domain that provides as much accurate and timely data relating to the international operations of mobile operators.

It may be noted that the above discussion has concentrated upon subscriber data and there is a very good reason for this, namely that they are the only reliable data than can be collected on a worldwide basis. There have been occasional attempts to analyse the international activities of mobile operators using concepts such as 'share of revenues from overseas activities', but it is notable that such attempts have been limited to the likes of the European Union when it had 15 member states – in other words, to the only countries where the data are more or less available though by no means wholly reliable. This book sets out to be worldwide in its scope and must therefore, of necessity, restrict itself to whatever can be compared reliably on that basis.

In essence this means data on subscribers. It is accepted that there is no absolute relationship between subscriber numbers and revenue streams let alone profitability because, for example, average revenue per subscriber (ARPU) varies from network to network. Nevertheless, telephony is a subscriber-driven business, and it is generally easier to expand the share of revenue flowing from overseas by acquiring more subscribers than to

attempt to do so by extracting a larger revenue from each subscriber. It may be argued that this is beginning to change because high-speed data networks have finally begun to make a noticeable difference to ARPU, but this effect has not been particularly visible over most of the past decade.

In summary, this book accepts the limitations imposed by the need to make valid comparisons between 30 international operators. Hopefully the situation will steadily improve and additional valid indicators will become available, but for now this book should provide a solid underpinning for future research.

Acknowledgements

Although no individual chapter in this book has been published previously in an identical or even near-identical form, several are effectively updated and heavily amended versions of previous work by one or both of the authors. For this reason, the authors wish to declare where this previous work is to be found, and to thank the publishers for permission to reuse some of this work. It should be noted that in every case the previous work was written in its entirety by one or both of the book authors and that no third party has contributed in any way to the writing of this book.

Chapter 1 has its origins in a series of annual articles by Peter Curwen published in *info*, a journal owned by Emerald Publishing. The first of these appeared in Volume 1, Issue 3 of 1999 entitled 'Telcos take over each other – and the world?' and the most recent in Volume 10, Issue 2 of 2008 entitled 'A settled structure for the TMT sector remains a mirage in 2006/07'. The series of articles contains, in total, far more information than Chapter 1 and concentrates upon annual events rather than an overview of the entire decade.

The journal *info* is also the source for other material in the book. For example, some minor elements of Chapter 2 can be found in *info*, Volume 4, Issue 6 of 2002 entitled 'An analysis of the licensing process for third-generation mobile communications' written by Peter Curwen. In addition, an article by Peter Curwen and Jason Whalley in Volume 5, Issue 6 of 2003 entitled 'Licence acquisition strategy in the European mobile communications industry' has been drawn on at various points. The same authors wrote 'An investigation into internationalisation among mobile telecommunications companies in 2003', published in *info* in Volume 7, Issue 4 of 2005, from which the format has been taken that is utilised in Chapter 9, while Chapter 7 draws on certain comments first published in an article by Peter Curwen in *info*, Volume 7, Issue 3 of 2005 entitled 'The prospects for 3G in the USA: the view from Europe'.

Another journal that has been generous in permitting the reuse of material is *Telecommunications Policy*, published by Elsevier. Some material in Chapters 4 and 6 previously appeared on pp. 349–63 of Issue 31 of that journal in 2008, written by Jason Whalley and Peter Curwen and entitled 'Structural adjustment in the Latin American and African Mobile Sectors'. Readers are also directed to an article by Jason Whalley and Peter Curwen

in Volume 30, Issue 10–11 of 2007 entitled 'Third-generation new entrants in the European mobile telecommunications industry'. Elsevier are also the publishers of the *International Business Review* in which the authors published 'Measuring internationalization in the mobile telecommunications industry' in Volume 15, Issue 6 of 2006.

Finally, the figures and certain textual material in Chapter 8 can be found in an article entitled 'Whatever happened to the Baby Bells? Internationalisation and de-internationalisation in the telecommunications industry', written by the authors and published in the *Minnesota Journal of Law, Science & Technology*, Volume 8, Issue 1 of 2007. It is a sign of changing times that were this article to be resubmitted in early 2008 the title would need to be altered to 'Internationalisation, de-internationalisation and re-internationalisation in the telecommunications industry'.

Abbreviations

AMPS	Advanced mobile phone service
ARPU	Average revenue per user
AWS	Advanced wireless services
BOC	Bell operating company
BRS	Broadband radio service
BTA	Basic trading area
BWA	Broadband wireless access
CDMA	Code division multiple access
CEO	Chief executive officer
CEPT	Conference of European Post and Telecommunications Administrations
CMA	Cellular market area
CSEA	Commercial Spectrum Enhancement Act
D-AMPS	Digital AMPS
DE	Designated entity
DECT	Digital enhanced cordless telecommunications
DS-FDD	Direct sequence frequency division duplex
DSSS	Direct sequence spread spectrum
EA	Economic area
EBS	Educational broadband service
E-DCH	Enhanced dedicated channel
EDGE	Enhanced data [rates] for GSM evolution
ERC	European Radiocommunications Committee
ETSI	European Telecommunications Standards Institute
EU	European Union
EV-DO	Evolution-data optimised
EV-DV	Evolution-data and voice
EWC	Enhanced Wireless Consortium
FCC	Federal Communications Commission
FDD	Frequency division duplex
FDMA	Frequency division multiple access
GHz	Gigahertz
GPRS	General packet radio service
GSM	Global system for mobile
HK	Hong Kong

HSDPA	High-speed downlink packet access
HSPA	High-speed packet access
HSUPA	High-speed uplink packet access
HTIL	Hutchison Telecom International
iDEN	Integrated digital enhanced network
IEEE	Institute of Electrical and Electronics Engineers
II	Internationalisation index
IMS	IP multimedia subsystem
ITFS	Instructional television fixed service
ITU	International Telecommunication Union
JMCS	Japanese mobile cellular system
kbps	Kilobits per second
kHz	Kilohertz
LTE	Long-term evolution
M&A	Merger & acquisition
MAN	Metropolitan area network
Mbps	Megabits per second
MDS	Multipoint distribution service
MFJ	Modified final judgement
MHz	Megahertz
MIMO	Multiple input multiple output
MSA	Metropolitan statistical area
MSS	Mobile satellite services
MTA	Major trading area
MTS	Mobile TeleSystems
MVNO	Mobile virtual network operator
NCTA	National Cable and Telecommunications Association
NMT	Nordic mobile telephone
NTIA	National Telecommunications and Information Administration
OFDM	Orthogonal frequency division multiplexing
PAS	Personal access system
PCN	Personal communications network
PCS	Personal communications services
PDC	Personal digital cellular
PHS	Personal handyphone system
RBOC	Regional Bell operating company
REAG	Regional economic area group
RHC	Regional holding company
RSA	Rural services/statistical area
RTT	Radio transmission technology
SAE	System architecture evolution

SBC	Strictly backward compatible
SDMA	Space division multiple access
SIM	Subscriber identity module
SMR	Specialised mobile radio
TACS	Total access communication system
TDD	Time division duplex
TDMA	Time division multiple access
TD-SCDMA	Time division synchronous code division multiple access
TMT	Technology, media and telecommunications
TNI	Transnatonality index
UHF	Ultra-high frequency
UMB	Ultra mobile broadband
UMTS	Universal mobile telecommunications system
UPCS	Unlicensed PCS
UTRA	Universal terrestrial radio access
WAP	Wireless application protocol
W-CDMA	Wideband code division multiple access
WCS	Wireless communications services
WiBRO	Wireless broadband Korea
WiMAX	Worldwide interoperability for microwave access
W-LAN	Wireless local area network
WRC	World Radiocommunications Conference
1G	First generation
2G	Second generation
3G	Third generation
3GPP	Third Generation Partnership Project
4G	Fourth generation

To Leslie Silver, OBE, former university Chancellor and ongoing benefactor, on behalf of those who toil in their garrets to create knowledge for its own sake.

1. The restructuring of the TMT sector: a ten-year perspective

1.1 INTRODUCTION

'Boom and bust' is a well-known expression and has been used in the context of many industries such as the railways since the mid-nineteenth century. It inevitably implies that a fairly radical restructuring of the industry has taken place, in all probability leaving rather fewer companies at the end of the process than were present at its beginning. It is a process that is generally driven by technological progress – new and more efficient ways of producing goods and services. In recent decades, rapid technological progress has been associated with anything digital such as computerisation, but it is fair to say that the one thing most affected has been communications, broadly defined. Communications is a difficult term to pin down since it stretches from, say, the writing of a piece of software to the installation of a fibre-optic network, so it is customary to narrow the field somewhat for analytical purposes by restricting it to so-called technology, media and telecommunications (TMT) although it is still by no means easy to deal with the problem that arises when, say, a large company produces equipment for a variety of different industrial sectors including one or more defined as TMT. Furthermore, a media company may be intimately connected with telecommunications operators in so far as it provides the content that is supplied down their pipes while at the same time providing large quantities of independent material for, say, television.

Nevertheless, irrespective of how we define the sector, it is indisputable that it has spent roughly the past decade undergoing a period of boom and bust followed by a patchy and uneven recovery, and that in the process the sector has undergone a fairly radical restructuring. The one feature that has prevented this restructuring from being even more radical has been the existence of state ownership of major players within the sector which has protected them from the full forces of the open market. However, the forces of liberalisation (opening up of markets to competition) and privatisation which were gathering pace during the early 1990s have recently gathered momentum, because prior to 2000 they were largely restricted to developed countries whereas now they are a worldwide phenomenon. As a result, the

restructuring process is still in full flow and may well remain that way for the remainder of the decade.

This chapter sets out to survey the entire period since the mid-1990s with a view to detailing what has happened to the structure of the TMT sector and presenting some explanatory information.[1] It is a fairly complex and confusing story, not least because of the way in which company names have evolved. When looking, for example, at the current affairs of AT&T, a member of the public could readily be excused for assuming that this is the same AT&T that came into existence after the original company had been broken up as a result of the modified final judgement (MFJ) which came into force in 1984, yet it is, in reality – and somewhat curiously – now more like the pre-MFJ AT&T than the post-MFJ AT&T as a result of several bouts of merger and acquisition (M&A) activity (Whalley and Curwen, 2007).

Within the TMT sector there are only a limited number of wholly independent mobile operators since not only did most such companies start life as subsidiaries of a fixed-wire operator but in very recent times there has been a tendency even for previously (almost) pure wireless operations such as Vodafone to acquire some fixed-wire assets. Nevertheless, it is clear that it is impossible to understand how mobile operators have fared, and hence how they have come to rework their strategies, without some understanding of the TMT sector as a whole.

1.2 RANKING THE COMPANIES

As a first step it is useful to examine the picture presented by the FT500 as set out in Table 1.1. Size is defined here by reference to the market values of the companies listed, the reasons for which can be found in *Financial Times* (2007). Coverage is restricted to companies with a free float – the proportion of shares available in the market – of at least 15 per cent. The table concentrates upon what in 1998 were classified as 'telephone companies' and in 1999 onwards as 'telecoms', but is intended to be representative of all links in the supply chain from the creation of content to the delivery of data, encompassing a sample of the most relevant companies in the broadcasting media, telecommunications equipment and content supply sectors. The choice of companies is necessarily somewhat arbitrary because, as noted above, the telecommunications sector, if defined as TMT, encompasses a range of very different types of business, both 'old economy' and 'new economy', and M&A activity during the period 1998 to 2001 had significant structural consequences. However, our purpose is to examine reasonably broad trends which would not be affected by the inclusion or exclusion of a handful of companies.

Table 1.1 Telecommunications companies in the FT500, December 1997–March 2007

Company	Country	Rank 2006[1]	Rank 2005[1]	Rank 2004[1]	Rank 2003[2]	Rank 2002[3]	Rank 2001[3]	Rank 2000[4]	Rank 1999[4]	Rank 1998[5]	Rank 1997
ADC Telecoms	USA	–	–	–	–	–	–	**364**	–	–	–
Alcatel-Lucent[6]	France	−4	−52	+138	−158	+154	+183	−54	−96	+48	**169**
Alltel [26]	USA	+117	−78	+17	+101	−13	+6	+10	−48	**287**	–
América Móvil [10]	Mexico	−22	−12	−21	−225	+124	**279**	–	–	–	–
AT&T[7]	USA	–	–	+75	+85	+189	+9	+36	+1	−9	**26**
AT&T Wireless[8]	USA	–	–	–	−48	0	+77	**103**	–	–	–
AT&T (SBC)[8] [1]	USA	−32	−8	+4	+6	+17	+1	−6	−7	−5	**35**
BCE [24]	Canada	+26	+84	−6	+65	−125	+78	+138	−114	+16	**19**
Belgacom	Belgium	–	–	**414**	–	–	–	–	–	–	–
Bell Atlantic[9]	USA	–	–	–	–	–	–	–	+19	+4	**29**
BellSouth	USA	–	−8	+22	+19	+17	−6	−1	+19	−23	**58**
Bharti AirTel [21]	India	−187	**443**	–	–	–	–	–	–	–	–
BSkyB	UK	+24	+180	+81	+31	−26	+25	−53	−25	−56	**305**
BT Group [13]	UK	−57	+55	−14	+35	+18	+41	+59	−3	−39	**64**
Cable & Wireless[10]	UK	–	–	–	–	–	–	−10	−10	−34	**187**
C&W Communications[11]	UK	–	–	–	–	–	–	–	−118	**382**	–
C&W HKT[12]	Hong Kong	–	–	–	–	–	–	–	+17	+32	**119**
C&W Optus	Australia	–	–	–	–	–	–	–	**426**	–	–
Canal Plus[13]	France	–	–	–	–	–	–	–	**349**	–	–
China Mobile (HK) [2]	Hong Kong	−22	−26	−3	+1	+7	+25	−17	−147	**198**	–
China Unicom[14]	China	–	–	–	**407**	–	+106	**280**	–	–	–
Chunghwa Telecom [34]	Taiwan	+78	+126	−27	**320**	–	–	–	–	–	–
Ciena	USA	–	–	–	–	–	**207**	–	–	–	–

Table 1.1 (continued)

Company	Country	Rank 2006[1]	Rank 2005[1]	Rank 2004[1]	Rank 2003[2]	Rank 2002[3]	Rank 2001[3]	Rank 2000[4]	Rank 1999[4]	Rank 1998[5]	Rank 1997
Cisco Systems	USA	+4	−3	+16	−13	+4	+18	−2	−15	−32	**51**
Colt Telecom	UK	–	–	–	–	–	–	+158	**182**	–	–
Comcast	USA	−26	+62	−7	+15	−109	+8	0	−82	−234	**453**
Comverse Technology	USA	–	–	–	–	–	–	**306**	–	–	–
Corning	USA	+77	−231	+27	**364**	–	–	−93	**192**	–	–
Cox Communications	USA	–	–	–	+104	−24	+7	−27	−23	**244**	–
Deutsche Telekom[15] [8]	Germany	+21	+35	0	−16	+5	+11[15]	+30	−17	−17	**44**
EchoStar Comms	USA	–	–	–	–	–	–	–	**258**	–	–
Energis	UK	–	–	–	–	–	–	+72	**376**	–	–
Equant[16]	France	–	–	–	–	–	–	–	**248**	–	–
Ericsson	Sweden	+28	−15	+9	−208	+189	+81	+13	−16	**46**	–
Etisalat [29]	UAE	+164	+140	−278	+54	−124	**486**	–	–	–	–
Ettihad Etisalat	Saudi Arabia	–	−9	**484**	–	–	–	–	–	–	–
Exodus Communications	USA	–	–	–	–	–	–	+120	**374**	–	–
France Télécom [9]	France	+5	+55	−14	−69	+16	+77	+10	−46	+18	**57**
Global Crossing[17]	USA	–	–	–	–	–	–	+123	**155**	–	–
GTE[18]	USA	–	–	–	–	–	–	–	+28	−10	**61**
Hutchison Whampoa [15]	Hong Kong	+32	+19	−14	+32	+26	+16	+1	−89	+111	**68**
Japan Telecom[19]	Japan	–	–	–	–	−54	+64	−163	**232**	–	–
JDS Uniphase	USA	–	–	–	–	–	–	−15	**133**	–	–
Juniper Networks	USA	–	–	–	–	–	–	−195	**326**	–	–
KDDI [18]	Japan	−75	+39	+52	−43	−156	+126	+107	**186**	–	–
KPN [22]	Netherlands	−15	+27	+14	+46	−140	+29	+196	−122	+50	**202**

KT Corporation[20]	South Korea	–	–	–	–	+21	+31	**115**	–	–	–
Level 3 Communications	USA	–	–	–	–	–	–	+189	−183	**393**	–
Liberty Media[7]	USA	–	+132	+26	+38	−13	−3	+64	−236	**308**	–
Lucent Technologies[6]	USA	–	–	–	**301**	–	+181	+86	−12	−24	**45**
Mannesmann[21]	Germany	–	–	–	–	–	–	–	−44	−133	**216**
Marconi	UK	–	–	–	–	–	–	+62	−66	−34	**210**
MediaOne[22]	USA	–	–	–	–	–	–	–	−14	−155	**282**
Mobile TeleSystems [33]	Russia	**473**	–	−45	**488**	–	–	–	–	–	–
Motorola	USA	+86	−40	+33	−56	+30	+39	+53	−85	+72	**62**
MTN Group [25]	South Africa	−111	**469**	–	–	–	–	–	–	–	–
Nextel Communications	USA	–	–	−7	−89	**271**	–	+78	**178**	–	–
Nokia	Finland	+16	−8	+24	−1	+1	+18	+1	−51	−46	**108**
Nortel Networks	Canada	–	–	–	−240	+144	+283	−1	−136	**167**	–
NTL	USA	–	–	–	–	–	–	–	**445**	–	–
NTT [7]	Japan	+12	+19	+17	−60	+38	+26	+22	−4	+4	**7**
NTT Data	Japan	–	–	–	−27	+93	+86	+211	−286	+13	**351**
NTT DoCoMo [6]	Japan	−3	+38	+17	+6	+5	−2	**16**	–	–	–
O_2	UK	–	–	−32	**327**	–	–	–	–	–	–
Olivetti[23]	Italy	–	–	–	–	−10	+76	−100	**442**	–	–
Orange[24]	France	–	–	–	–	−62	**133**	–	–	–	–
OTE	Greece	–	–	–	–	–	–	–	+126	−45	**359**
Pacific Century Cyber[25]	Hong Kong	–	–	–	–	–	–	+109	**261**	–	–
Palm	USA	–	–	–	–	–	–	**336**	–	–	–
Portugal Telecom	Portugal	–	–	+74	−33	−81	**496**	–	–	–	–
Qualcomm	USA	+44	−18	−3	−23	−55	+76	+39	**41**	–	–
Qwest Communications[26]	USA	–	–	–	–	–	+265	−139	−173	**371**	–
Reliance Comms [31]	India	**467**	–	–	–	–	–	–	–	–	–
Research in Motion	USA	–	–	**434**	–	–	–	–	–	–	–

Table 1.1 (continued)

Company	Country	Rank 2006[1]	Rank 2005[1]	Rank 2004[1]	Rank 2003[2]	Rank 2002[3]	Rank 2001[3]	Rank 2000[4]	Rank 1999[4]	Rank 1998[5]	Rank 1997
Rogers Comms [28]	Canada	**425**	–	–	–	–	–	–	–	–	–
Saudi Telecom [19]	Saudi Arabia	+188	−32	−33	−59	**181**	–	–	–	–	–
Seat-Pagine Gialli	Italy	–	–	–	–	–	–	−178	**451**	–	–
Singapore Telecom [20]	Singapore	−6	+37	+22	−52	−40	+65	+47	+37	+10	**129**
SK Telecom	South Korea	–	+27	+95	+23	+110	−49	+63	**217**	–	–
Sonera[27]	Finland	–	–	–	–	–	–	+259	**114**	–	–
Sprint Nextel[28] [11]	USA	+70	−95	−160	+4	+18	+55	+145	**107**	–	–
Sprint PCS[28]	USA	–	–	–	–	–	+242	+104	**134**	–	–
Swisscom [30]	Switzerland	+65	+151	+4	+63	−29	−93	+86	**200**	–	–
Sycamore Networks	USA	–	–	–	–	–	–	+243	**243**	–	–
TDC (Tele Danmark)	Denmark	–	–	–	–	–	–	–	−22	**357**	–
Telecom Carso Global	Mexico	–	–	–	–	–	**466**	–	–	–	–
Telecom Italia [12]	Italy	+32	+40	−17	+32	−5	−20	+17	−13	−4	**84**
Telecom Italia Mobile	Italy	–	–	−11	+10	−13	+21	+9	−9	−53	**127**
Telefónica [5]	Spain	−17	+26	−9	−10	−12	+8	+6	−22	−24	**101**
Teléfonos de México [32]	Mexico	+81	+110	+56	+67	+19	+7	−50	−31	−23	**234**
Telekom Malaysia	Malaysia	–	–	–	–	–	–	–	**474**	–	–
Telenor [23]	Norway	−123	+26	−44	**433**	–	–	–	–	–	–
Telewest Comms	UK	–	–	–	–	–	–	–	**456**	–	–
TeliaSonera[29] [17]	Sweden	−31	+55	−47	+2	−193	+97	**334**	–	–	–
Telkom [27]	Sth Africa	**411**	–	–	–	–	–	–	–	–	–
Tellabs	USA	–	–	–	–	–	–	−25	−262	+63	**428**
Telstra [16]	Australia	+16	+100	−2	+5	−12	−7	+45	−9	**79**	–

Terra Networks	Spain	–	–	–	–	–	–	–	**344**	–	–
Time Warner[30]	USA	+20	+39	−2	−9	+24	−5	+20	−129	**145**	–
Time Warner[31]	USA	–	–	–	–	–	–	0	+3	−42	**96**
T-Online International[32]	Germany	–	–	+108	0	−68	+137	−8	**329**	–	–
UPC Communications	Netherlands	–	–	–	–	–	–	–	**320**	–	–
US West[33]	USA	–	–	–	–	–	–	–	+42	−67	**197**
Verizon Comms [4]	USA	+4	+8	+7	+5	+3	−2	+18	**3**	–	–
Vivendi Universal [14]	France	0	+4	−15	−44	+128	+28	**66**	–	–	–
Vodafone Group[34] [3]	UK	+3	+17	0	−1	−4	+9	−16	−57	−145	**226**
VoiceStream Wireless[35]	USA	–	–	–	–	–	–	−299	**482**	–	–
Wanadoo[36]	France	–	–	–	−84	**439**	–	–	–	–	–
WorldCom[37]	USA	–	–	–	–	–	+128	+61	+2	**24**	–
Yahoo!	USA	+47	+36	−52	−72	−184	+92	+284	−253	**293**	–
@Home	USA	–	–	–	–	–	–	–	**399**	–	–
3 Com	USA	–	–	–	–	–	–	–	+5	+141	**208**

Notes:

1. 31 March 2007, 2006, 2005 respectively.
2. 25 March 2004.
3. 28 March 2003 and 2002 respectively.
4. 4 January 2001 and 2000 respectively.
5. 28 September 1998.
6. Alcatel acquired Lucent in 2006.
7. Until 2001 listed as AT&T Liberty Media.
8. AT&T divested AT&T Wireless which was bought by Cingular Wireless in February 2004 and sold AT&T Broadband to Comcast. AT&T was taken over by SBC Communications which renamed itself AT&T. New AT&T took over BellSouth in December 2006.
9. Merged with GTE.
10. C&W Optus acquired by SingTel.
11. Split up and sold.
12. Bought by PCCW.

Table 1.1 (continued)

13. Canal Plus became a subsidiary of Vivendi Universal.
14. The listed arm of China United in Hong Kong.
15. Having acquired VoiceStream Wireless.
16. Bought by France Télécom.
17. Into Chapter 11 bankruptcy.
18. Merged with Bell Atlantic.
19. A former subsidiary of Vodafone.
20. Formerly Korea Telecom.
21. Bought by Vodafone.
22. Bought by AT&T.
23. Merged with Telecom Italia.
24. Restored to being a wholly-owned subsidiary of France Télécom.
25. Acquired C&W HKT.
26. Into Chapter 11 bankruptcy.
27. Taken over by Telia to form TeliaSonera.
28. Sprint FON was divested from Sprint together with Sprint PCS. Sprint FON and Sprint PCS were recombined in April 2004. Sprint acquired Nextel in August 2005.
29. Formed when Telia acquired Sonera at the end of 2002.
30. Prior to 2001, the entry was for America Online only. This then became AOL Time Warner as a result of the takeover by AOL, but in early 2004 the company was renamed Time Warner.
31. Taken over by AOL.
32. Partially divested, the free float was repurchased during 2006.
33. Bought by Qwest Communications.
34. Vodafone bought Mannesmann.
35. Acquired by Deutsche Telekom - now T-Mobile USA.
36. Partially divested but still largely owned by France Télécom. The free float was repurchased during 2005.
37. Into Chapter 11 bankruptcy and emerging as MCI during 2004.

Source: Compiled by the authors from data published annually by the *Financial Times* as the FT500.

Table 1.1 ranks companies at the end of ten successive periods of roughly one calendar year, encompassing the beginning of 1997 to the end of March 2007 inclusive. It is rare, in practice, for a TMT company to return to the FT500 once it has fallen below the minimum size to qualify, and it is of importance for our analysis to include those companies that have ceased to be listed during the period of TMT decline commencing at the beginning of 2000. The first year in which a company appears is given in bold – there may have been a notional entry prior to 1997 but the series had only recently been created in this particular format – so a re-entry has two figures in bold. All subsequent figures represent positive or negative changes, so the actual rank of any company in any one year can be derived simply by taking the starting number and adding or subtracting from right to left.

To facilitate comparisons, the operators are placed in rank order at the end of the period with the rank in brackets after their names. It may be noted that some of these have non-telecoms businesses, some are primarily fixed-wire operators and that not all have an international presence. Hence not all will play a major role in the chapters that follow.

In the table, 45 companies are listed for 2006 (strictly 31 March 2006 to 31 March 2007) while 45 companies are listed for 2005 (strictly 31 March 2005 to 31 March 2006) and 52 companies for 2004 (29 March 2004 to 31 March 2005). Of the 45 companies in March 2007, four were new entries – technically, Softbank was also newly listed in 2006 as a mobile operator, having taken over Vodafone Japan, but in previous years it had been listed as a general retailer and so the longer-term comparison is invalid – while four had disappeared from the 2005 list. In contrast, the new entrants in 2001 were massively outweighed by those departing, which numbered 22 of the 78 listed in 2000 following on from 20 in 1999. Overall, therefore, it is clear that there has been considerable attrition during the period January 1999 to March 2007. However, the process slowed sharply between March 2002 and March 2003, and there was actually a modest net increase in numbers during the ensuing year, only for these gains to be wiped out the following year. There were accordingly signs that an equilibrium of sorts was becoming established in the 50 to 60 company range, yet the total dropped sharply to end up below 50 for the first time in 2005 and it now looks more probable that the equilibrium will be established in the 40 to 50 company range.

Although it is not possible to say for now whether a new 40 to 50 company range has been established, what is happening is somewhat counter-intuitive. Here we have the sector that most people associate with technological progress, the products of which increasingly dominate every-day lives. Yet, on average, the companies in the sector have apparently shrunk sharply in significance compared to those in other sectors. Clearly,

technological progress – which is unremitting in the TMT sector – and financial rewards are poorly correlated, and this is a major factor underpinning structural change.

It is worth observing that only 29 of the 2006 entries appear in the top 250 compared to 37 in 2003 and 66 in 1999. In other words, more than one in four of the most highly-capitalized 250 companies in the world in 1999 were in some way associated with the TMT sector, whereas the figure is currently nearer one in nine – a significant drop overall. It is also notable that 19 companies are listed across all ten years of the table, and a further six are listed over the most recent nine years. On the face of it, this represents only a modest rump of long-term survivors – it is worthy of note that there are 114 companies listed in Table 1.1 of which, irrespective of their entry date in the table, only 45 are listed in 2006 – although the situation has certainly stabilised somewhat. Examination of these samples shows no clear pattern. Of the 19, 13 are telcos while three are equipment vendors (Cisco, Nokia, Motorola), one is a cable operator (Comcast), one a satellite service provider (BSkyB) and one is a conglomerate with extensive telecommunications interests (Hutchison Whampoa). However, 10 of the 13 telcos ended the period with a lower ranking than that with which they began it as did two of the three telcos in the second, smaller sample, so it is fair to argue that the recovery of telcos relative to other types of industrial concerns has been limited. The situation for vendors has generally been worse: Cisco and Nokia have both survived and prospered, but even a spate of M&A activity among the rest of the sector, creating *inter alia* Alcatel-Lucent in 2006, has left the industry in poor shape compared to the 1990s.

Given that there is finally some movement in relation to consolidation, especially in the USA, it must be borne in mind that if this takes the form of M&A activity among the larger companies, then the TMT presence among the FT500 will probably continue to decline, whereas M&A activity involving second-tier companies may create new entrants. However, the most likely source of new entrants is to be found among operators with a very strong presence in their rapidly-growing home markets, especially those with international ambitions. It may be noted that India's Reliance Communications and Russia's Mobile TeleSystems (MTS) appeared for the first time during 2006, although Saudi Arabia's Ettihad Etisalat disappeared from the list.

At the level of the individual company, it is notable that AT&T has shot up the rankings by virtue of takeovers while América Móvil has achieved the same effect via a combination of takeovers and internal growth, and China Mobile (HK) purely via internal growth, so there is clearly no single successful strategy to be followed. Meanwhile, Cisco, Nokia and Vodafone have yet to see their glory years restored, and equipment vendors in general

went backwards during 2006/07. Overall, the impression is that TMT companies did not share equally in the sharp upturn in equity markets during 2006 and 2007.

It is possible to argue that market values by themselves give a distorted view of the health of the sector but there is only limited support for such a view. For example, Total Telecom publish annual data on the top 100 telcos (only) (Total Telecom, 2007). Because of variations in the use of accounting standards and year-end dates, care must be taken in making direct comparisons. However, it is notable that the top 12 telcos by market value at the end of 2006 were with one exception the top 12 telcos as measured by gross revenues – the odd man out was América Móvil, which at the time was valued at rather more than was warranted by its turnover although it was in the top 12 when net profits was used as the measure. In the latter case, it was Sprint Nextel which was the exception, with a net profit rank far below that for its turnover. It is very noticeable that, irrespective of how size is measured, old-style incumbents, whether fixed-wire, mobile or both, dominate the rankings. It accordingly appears to be far more likely that these will mop up the newer kids on the block than that there will be audacious reverse takeovers of the kind that seemed perfectly feasible in the febrile conditions of the late 1990s. Equally, however, it stands to reason that major shifts in the rankings will require more than a strategy of picking up bits and pieces, as recent experience in the USA and in Africa attests. It is appropriate, therefore, to move on now to examine the role of M&A activity.

1.3 MERGERS AND ACQUISITIONS

In terms of the structure and strategy of the mobile communications sector, two primary influences are evident. The first is the impact of M&A activity and the second is the impact of privatisation. It is not possible to tabulate every instance of M&A activity in the TMT sector during the past decade or so, most obviously because of a shortage of space but also because the acquisition of a company worth a few million dollars – used here as a common currency for convenience although it should be borne in mind that its value in relation to other currencies has fluctuated quite widely during the period in question – clearly has no implications for the structure of the sector. Any choice of a minimum value of assets (including debt) taken over – a much preferable measure to the total value of the various companies involved – is necessarily arbitrary, but the chosen figure of $2 billion renders all the listed M&A activity as 'significant' from a structural viewpoint while keeping the table manageable.

Because the emphasis of the book is upon mobile communications, Table 1.2 is selective in the sense that it is intended to give some impression of scale, to include all companies that appear later in the book and to link up with the subsequent section. Analysis of Table 1.2 tells its own story. During the period prior to 1997, large-scale acquisitions – a more descriptive term than mergers since that tends to imply that both parties ended up with (roughly) equal shares in the combined entity which is rarely the case in practice – were thin on the ground and related to restructuring within the USA. The era of incumbent monopolies was still in its final throes elsewhere in the world, including in Europe, and attempting to take over each other was not as yet on the agenda. We have to wait until June 1998 before a non-American acquirer appears (and even then it is North American) while the first European entry appears only in January 1999. As for the rest of the world, we have to await DDI's purchase of KDD and IDO in December 1999. It is also of interest that the M&A activity largely involves telcos, with vendors and the likes of AOL and Yahoo! playing bit parts.

However, the crucial aspect is the sheer number of entries during 1999 compared to previous years. Clearly, a boom was now underway and money was available in unprecedented, not to mention staggering, amounts. The $62 billion offered by SBC to buy Ameritech in May 1998 needs to be seen in context. During that year, only NTT in Japan was worth over $100 billion and only a handful of telcos were valued at over $50 billion even at the year-end. Yet the bar was happily raised above $100 billion during 1999 when MCI WorldCom – at the time considered to be the most successful telco of the modern era – bid for Sprint in October, closely followed by the then Vodafone AirTouch's bid for Mannesmann (since when the Vodafone share price has languished). That this was indeed the start of a boom becomes clear when account is taken of the many entries during 2000, commencing with the yet bigger bid by America Online for Time Warner – with the latter now the parent and AOL its subsidiary! Those happy days (at least from the point of view of investment banks) were never to be seen again – indeed, the $50 billion takeover bid has barely registered since the beginning of 2000.

Table 1.2 shows clearly how rapidly activity altered after September 2000. Not only did the number of deals during 2001 fall away sharply but they were heavily clustered between May and July. During the second half of 2001 there were only three major takeovers, but worse was to come. During the whole of 2002 and 2003 only a handful of mega-bids were tabled. Boom had indeed turned to bust in no uncertain terms. If we take September 2001 as the beginning of the downturn in M&A activity, we can just as easily pinpoint the commencement of the subsequent upturn as February 2004, give or take two and a half years later. This approximates

Table 1.2 Illustrative major[1] mergers[2] and acquisitions, April 1996 to present[3]

Bidder	Target	Date	Value $billion
Bell Atlantic	Nynex	April 1996	25.6*[4]
Southwestern Bell	Pacific Telesis	April 1996	16.5*[5]
WorldCom	MFS	August 1996	12.5
AirTouch	US West cellular	April 1997	2.3 + 2.3 debt
WorldCom	MCI	September 1997	37.0*
WorldCom	Brooks Fiber Properties	October 1997	2.4
AT&T	Teleport	January 1998	11.3
Qwest	LCI International	January 1998	4.4*
SBC	Southern New England	March 1998	4.4
Alltel	360 Communications	March 1998	4.0
SBC	Ameritech	May 1998	62.0*
Nortel	Bay Networks	June 1998	8.0*
Bell Atlantic	GTE	July 1998	53.0* + 14.0 debt
AT&T	TCI	October 1998	37.5* + 11.0 debt
AT&T	IBM Global Network	December 1998	5.0
Vodafone	AirTouch	January 1999	66.5*
Telenor	Telia	January 1999	n/a*[6]
Olivetti	Telecom Italia	February 1999	58.5[7]
Comcast	MediaOne	March 1999	53.0* + 7.0 debt[8]
GTE	Ameritech cellular	April 1999	3.3
Deutsche Telekom	Telecom Italia	April 1999	60.7*[9]
AT&T	MediaOne	April 1999	58.0
Global Crossing	US West	May 1999	31.3*[10]
Qwest	US West	June 1999	41.3* + 10.0 debt[11]

Table 1.2 (continued)

Bidder	Target	Date	Value $billion
Qwest	Frontier	June 1999	13.6 + 1.4 debt[11]
NTL	CWC Consumer	July 1999	9.6 + 3.0 debt
Deutsche Telekom	One-2-One	August 1999	11.0 + 2.8 debt
MCI WorldCom	Sprint	October 1999	115.0* + 14.0 debt[12]
BellSouth	Sprint	October 1999	n/a[13]
Mannesmann	Orange	October 1999	31.3 + 3.1 debt
Vodafone AirTouch	Mannesmann	October 1999	123.0*[14]
Cisco Systems	Pirelli Optical Systems	December 1999	2.2*
Telewest	Flextech	December 1999	3.1*
DDI	KDD/IDO	December 1999	n/a[15]
America Online	Time Warner	January 2000	160.0*
BT	Esat Telecom	January 2000	2.4
BCE	Teleglobe	February 2000	6.6*[16]
France Télécom	Orange	May 2000	46.4[17]
Tele Danmark	NetCom ASA	June 2000	1.7[18]
Telia	NetCom ASA	June 2000	2.6[18]
Deutsche Telekom	VoiceStream Wireless	July 2000	50.7* + 4.2 debt
Deutsche Telekom	Powertel	August 2000	5.8* + 1.2 debt[19]
Wind	Infostrada	September 2000	9.9
Enel	Infostrada	October 2000	9.6 + 0.9 debt
France Télécom	Equant	November 2000	3.0*[20]
Vodafone Group	Eircell	December 2000	4.1* + 0.2 debt
Singapore Telecom	C&W Optus	March 2001	9.0
Alcatel	Lucent	May 2001	23.0*[21]

e-Island	Eircom	June 2001	2.6[22]
Valentia	Eircom	June 2001	2.4[22]
Comcast	AT&T Broadband	July 2001	44.5* + 13.5 debt
Alltel	CenturyTel	July 2001	5.9* + 3.1 debt
WestLB	BT fixed-wire	August 2001	25.6
AT&T	TeleCorp	October 2001	2.3* + 2.3 debt[23]
Telia	Sonera	March 2002	6.5*
Vodafone	Cégétel	October 2002	12.9[24]
Telefónica	Terra Lycos	June 2003	2.3[25]
France Télécom	Orange	August 2003	7.8[26]
Cingular Wireless	AT&T Wireless	February 2004	41.0[27]
Vodafone	AT&T Wireless	February 2004	38.0*[27]
KPN	mmO_2	February 2004	14.4* + 0.5 debt[28]
Telefónica	BellSouth Latin America	March 2004	4.3 + 1.5 debt[29]
T-Mobile USA	Cingular Wireless assets	May 2004	2.3[30]
Apax Partners & others	Auna	July 2004	9.6[31]
Verizon Wireless	NextWave Telecom	November 2004	3.0[32]
Auna	Ono	November 2004	3.0[33]
Private consortium	Wind	November 2004	n/a[34]
Sprint	Nextel	December 2004	35.0*[35]
Telecom Italia	Telecom Italia Mobile	January 2005	19.0[36]
Alltel	Western Wireless	January 2005	4.4 + 1.5 debt
SBC Communications	AT&T	January 2005	16.0*[37]
Time Warner/Comcast	Adelphia Communications	January 2005	17.0
Qwest	MCI	February 2005	6.3 + 4.0 debt[38]
Verizon Communications	MCI	February 2005	6.8 + 4.0 debt[38]
Vodafone	TIW assets	March 2005	3.5 + 0.9 debt[39]
TeliaSonera	Turkcell	March 2005	3.1[40]

Table 1.2 (continued)

Bidder	Target	Date	Value $billion
Alfa Telecom	Turkcell	March 2005	3.2[40]
Blackstone Group et al.	Wind	March 2005	n/a[41]
Weather Investments	Wind	March 2005	n/a[41]
MTN	Celtel	March 2005	2.7
MTC	Celtel	March 2005	3.4[42]
Telefónica	Ceský Telecom	March 2005	3.6[43]
Swisscom	Ceský Telecom	March 2005	3.4[43]
Belgacom	Ceský Telecom	March 2005	2.9[43]
Kohlberg Kravis Roberts	Auna	April 2005	13.6[44]
Telekom Austria	MobilTel	June 2005	2.0
Providence et al.	Amena	July 2005	10.7[45]
Providence et al.	Auna	July 2005	13.6[45]
France Télécom	Amena	July 2005	12.1[45]
NTL	Telewest	October 2005	6.0 + 2.9 debt
Ericsson	Marconi	October 2005	2.1[46]
Telefónica	O_2	October 2005	31.3
Apax Partners et al.	TDC	November 2005	11.5 + 3.5 debt[47]
Sprint Nextel	Alamosa Holdings	November 2005	3.4 + 0.9 debt
Vodafone	Telsim	December 2005	4.6
Sprint Nextel	Nextel Partners	December 2005	6.5[48]
Temasek Holdings	Shin Corp.	January 2006	3.8[49]
Sonae.com	Portugal Telecom	February 2006	12.8
VimpelCom	Kyivstar	February 2006	5.0* + 0.5 debt
AT&T (SBC)	BellSouth	March 2006	67.0* + 17.0 debt

SoftBank	Vodafone Japan	March 2006	14.8 + 0.8 debt[50]
Cerberus/Providence	Vodafone Japan	March 2006	16.4 + 0.8 debt[51]
Alcatel	Lucent	March 2006	13.5* [52]
Telmex	Verizon Latin America	April 2006	3.7
Babcock & Brown	Eircom	April 2006	3.1 + 2.3 debt[53]
América Móvil	Verizon Dominicana	April 2006	2.0
China Mobile	Millicom International	April 2006	5.3[54]
Investcom	Millicom International	April 2006	n/a[55]
MTN	Investcom	May 2006	5.5[56]
Verizon Communications	Verizon Wireless	May 2006	48.0 + 6.0 debt[57]
Macquarie Group	PCCW telecoms/media	June 2006	7.3[58]
TPG Newbridge Capital	PCCW telecoms/media	June 2006	7.6[58]
Providence Equity et al.	NTL	August 2006	10.0 + 10.0 debt[59]
Kohlberg Kravis Roberts	Vivendi Universal	October 2006	51.5[60]
Naguib Sawiris	Weather Investments	December 2006	2.5[61]
Etisalat	TIM Hellas	December 2006	4.9[62]
Turkcell	TIM Hellas	December 2006	4.6[62]
Providence Equity Ptnrs.	TIM Hellas	December 2006	4.4[62]
Telmex	TIM Brasil	December 2006	8.0[63]
Vodafone	Hutchison Essar	December 2006	17.0[64]
Maxis/Texas Pacific	Hutchison Essar	December 2006	13.5[65]
Essar Group	Hutchison Essar	December 2006	11.0[65]
Reliance Comms	Hutchison Essar	December 2006	n/a[65]
Orascom/Qatar Telecom	Hutchison Essar	December 2006	n/a[66]
Hinduja Group	Hutchison Essar	December 2006	n/a[67]
Swisscom	Swisscom Mobile	December 2006	3.5[68]
Weather Investments	TIM Hellas/Q Telecom	February 2007	4.4[69]
Qatar Telecom	Al Wataniya	March 2007	3.7[70]

Table 1.2 (continued)

Bidder	Target	Date	Value $billion
Providence Equity Ptnrs	BTC	March 2007	2.4[71]
Telco consortium	Olimpia	April 2007	4.5
Binariang	Maxis Communications	May 2007	4.6[72]
Goldman Sachs/TPG	Alltel	May 2007	27.5
AT&T	Dobson Communications	July 2007	2.8 + 2.3 debt
OTPP et al.	BCE	July 2007	32.6 + 15.9 debt[73]
Carlyle Group	Virgin Media	July 2007	17.0 + 6.0 debt[74]
Verizon Communications	Rural Cellular	July 2007	0.8 + 1.9 debt
MetroPCS	Leap Wireless	September 2007	5.5* + 2.0 debt[75]
T-Mobile USA	SunCom Wireless	September 2007	1.6 + 0.8 debt
OTE	CosmOTE	November 2007	2.8*[76]
VimpelCom	Golden Telecom	November 2007	4.3
SFR	Neuf Cégétel	December 2007	6.5*[77]
Microsoft	Yahoo!	January 2008	44.6
Telemar	Brasil Telecom	March 2008	4.6

Notes:

* All, or almost all, by way of a stock offer, the value of which varies with the bidder's share price.

1. Valued at over $2 billion including debt taken over. The figures quoted are mostly those that applied at the end of the first day of the offer and hence are often significantly different from the value of the offer when it was finally agreed, let alone when the transaction was completed.
2. Deals involving US companies frequently took place under 'pooling-of-interests' accounting regulations whereby, if they wished, companies could simply 'merge' their assets and earnings. The 'purchase' method, used elsewhere required one company to 'take over' the other. In practice, it has always been a rarity to find a 'merger' where both parties ended up with exactly half of the combined company. The table lists as the bidder the company that ended up with the majority stake in the combined company.
3. Not all bids have yet received regulatory approval.
4. Called Bell Atlantic.

5. Called SBC Communications.
6. Between two state-owned companies (in Norway and Sweden), valuation of which had to await a partial flotation of the merged entity. However, the merger plans collapsed in acrimony in mid-December 1999.
7. Olivetti initially gained acceptances for just over 50% of the shares bid for at a cost of roughly $33 billion.
8. Comcast withdrew its bid on 5 May 1999, upon payment of a $1.5 billion termination fee, in order to leave the way open for the competing offer by AT&T.
9. Dependent upon the Deutsche Telekom share price. The bid was unsuccessful.
10. See counter-bid by Qwest. Global Crossing withdrew its bid on 18 July 1999.
11. Assuming both companies were acquired. The offers were respectively worth $1.1 billion and $0.4 billion less if only the one company was acquired, as proved to be the case when Qwest withdrew its bid for Frontier on 18 July 1999. In March 2000, Deutsche Telekom intervened with an unofficial approach to take over Qwest, with or without US West, but the latter vetoed the deal before it was made public.
12. In June 2000, the bid was vetoed by both the European Commission and the US Department of Justice.
13. The value of the bid was not declared, but was estimated at roughly five per cent below that of MCI.
14. Including Orange.
15. IDO was not a listed company.
16. BCE already held a 23% stake in the target.
17. Consisting of $20.7 billion in cash, $16.9 billion in France Télécom shares, $2.7 billion of debt and $6.1 billion of future liabilities.
18. Tele Danmark already held a 40% stake. In August 2000 Telia acquired Tele Danmark's stake and became sole owner of NetCom.
19. If Deutsche Telekom's existing offer for VoiceStream Wireless had broken down, the offer for Powertel would have reverted to VoiceStream, again on an all-paper basis.
20. For a 54.3% stake yielding full control of the network.
21. Excluding Lucent's 58% stake in Agere Systems.
22. For the non-mobile assets excluding Eircell.
23. For the 77% of the shares not already owned.
24. For details see Curwen and Whalley (2004).
25. For the 62 per cent of the shares not already owned.
26. For the 13.7 per cent of the shares not already owned.
27. Both bidders started at roughly $34 billion. These figures represent the final bids in the auction.
28. The precise sum was never made public as the offer was rejected.
29. Price assumes buying out of all minority shareholders.
30. Dependent upon completion of the AT&T Mobile acquisition by Cingular Wireless.
31. Estimated. The offer was rejected. In November, a second offer was tabled worth roughly $14.3 billion and again rejected.

Table 1.2 (continued)

32. NextWave was undergoing bankruptcy proceedings at the time.
33. The hostile offer was rejected.
34. Not announced officially but in the region of $15 billion. A bid for 70 per cent of Wind was also made by the Blackstone Group. Both were rejected.
35. Technically a merger of equals but designed to give Sprint shareholders 51 per cent of the merged company. The cash element was capped at $2.8 billion.
36. Maximum assuming the purchase of two-thirds of the outstanding ordinary shares and all of the outstanding savings shares.
37. The agreed bid was unlikely to close for over one year from acceptance.
38. The original offer was unofficial and for cash. Subsequently, Qwest offered $8.93 billion while Verizon raised its offer to $7.6 billion and subsequently to $8.4 billion which was accepted despite a higher offer from Qwest.
39. The assets constituted 100% of Oskar in the Czech Republic and 79% of MobiFon in Romania.
40. For a 27% stake that would give TeliaSonera 64% overall and control.
41. In May 2005, Weather was awarded 62.75% of Wind for €3009 million in cash + 26% of Weather which would be given a 50% + one share stake in Orascom Telecom valued at €1960 million. In January 2006, the rest of Wind was transferred for a further €328 million in cash and newly-issued Weather shares. The total value of the transaction is given as €12 140 million.
42. An initial $2.84 billion for an 85% stake followed by a further $520 million for the other 15% within two years.
43. For 51.1%. A bid was also made by a consortium including France Télécom.
44. In April, Apax Partners re-bid in conjunction with CVC Capital Partners and the Blackstone Group, offering $13.6 billion for an 83.5 per cent stake, but subsequently withdrew. This bid by Kohlberg Kravis Roberts and others was claimed to be at a similar level, but they withdrew when France Télécom entered the bidding.
45. The two bids by Providence and others were distinct as there was an associated bid for Auna's fixed-wire assets. However, France Télécom won the bidding for Amena, initially buying 80 per cent for $4.1 billion in cash + $3.6 billion in shares + $2 billion debt taken on – $2 billion in tax credits. The fixed-wire assets were then sold to Ono for $2.2 billion.
46. For assets representing roughly 75% of Marconi's turnover.
47. Apax Partners and others combined as the Nordic Telephone Company allegedly to make an unspecified bid in October which was rejected, but returned formally in November. A second offer failed to come from BC Partners and others.
48. The agreement reached in December was that Sprint Nextel would purchase the outstanding 68% of the shares in Nextel Partners during the first half of 2006.
49. The initial $1.9 billion offer was for the 49.6 per cent stake held by the Thai PM's family, and in March a further 46.7 per cent was acquired via an open offer at the same price per share.
50. The name was subsequently changed to SoftBank Mobile.
51. Vodafone ignored the tabled intention to bid.

52. A so-called 'merger of equals' which involved Alcatel making an offer for Lucent and ending up with 60 per cent of the merged entity.
53. Which would leave Babcock & Brown with 65 per cent and the Employee Share Ownership Trust with 35 per cent. Debt taken on was later quoted as $4.7 billion.
54. Rejected in July.
55. Withdrawn after takeover bid by MTN. Other offers for Millicom have been lodged but no details are available.
56. With an irrevocable acceptance of 70.6 per cent.
57. Alleged. For the 45 per cent outstanding stake. Rejected in principle.
58. Both bids were rejected due to objections from PCCW shareholder China Netcom.
59. Informal. Other members of the bidding consortium included Blackstone, Cinven and Kohlberg Kravis Roberts.
60. The price was tabled but the bid was never made formal.
61. Paid to Enel for the outstanding 26.1 per cent of the company.
62. It was subsequently alleged that the highest bid was €3.2 billion. All were rejected by Apax Partners and Texas Pacific Group.
63. Alleged. Allegedly raised to roughly $10 billion.
64. Vodafone was bidding for the whole of Hutchison Essar but by law could not end up with more than 52 per cent of the company. It eventually proved victorious with an offer of cash worth $11.1 billion + $2 billion of debt for a 67 per cent stake but 15 per cent of this had to be held by Indian nationals.
65. The stake under offer elsewhere was 67 per cent of Hutchison Essar. Essar already held the other 33 per cent. Hutchison Whampoa refused to sell for less than $14 billion. Reliance refused to disclose the terms of its offer.
66. As reported but never made formal.
67. On 3 January 2007, the Hinduja group announced that it wished to acquire a stake of at least 51 per cent.
68. For the 25 per cent outstanding stake.
69. The bid was €3.4 billion.
70. For a 51 per cent stake.
71. For a 90 per cent stake.
72. Ananda Krishnan, via Binariang, offered to buy the outstanding 40% of Maxis not owned by his company Usaha Tegas.
73. The technical buyer was Serefina Holdings, owned 71% by BC Partners. Telus intended to bid but withdrew.
74. Subsequently, an auction was arranged for August but pulled due to adverse market conditions.
75. The unsolicited bid was rejected as too low.
76. For the outstanding 32.17% of the shares by way of a share swap for OTE shares.
77. For the outstanding 49.5% of the shares.

Source: Compiled by the authors.

the period of real boom between January 1999 and July 2001 although it would be unwise to make too much of this symmetry.

What is clear is that the resurgence of the M&A market in February 2004 came with a flourish although there were to be no further truly epic takeover bids until December. It was only during 2005 that M&A activity really came into its own, with roughly twice the number during 2004, but it is of interest that only one single bid exceeded $20 billion during the year, in good part reflecting not merely a more cautious stance on the part of financial intermediaries that had got their fingers burned during the previous boom, but also the much reduced value of TMT companies. As in 1998, $100 billion was a market value rarely to be seen in the sector, although the $50–100 billion band was better represented than in 1998 – partly the result of inflation and the changing value of the dollar.

However, M&A activity still had some way to run, with a record number of bids being tabled during 2006, although it is again noticeable how few of these exceeded $10 billion, let alone $50 billion. In comparison, 2007 was fairly quiet on the M&A front, although that could simply be seen as the inevitable period of drawing breath after a particularly sharp upsurge in activity.

It is also worth reflecting briefly upon the sums committed to takeovers in this single sector – and the table excludes bids worth less than $2 billion, so substantially understates the true totals although it is also the case that not all the bids were consummated and the money handed over. During 1996/97 over $100 billion was committed, rising to over $200 billion in 1998. Then in 1999, over $800 billion – more than the value of many countries – was committed, followed by over $500 billion in 2000. However, in 2002 only a little over $10 billion was committed, rising steadily to a peak of over $400 billion in 2006 – but still representing only half the amount committed in 1999. In all, over $3000 billion has been committed over a period of just over a decade, and that in a context where it is well known that a significant proportion of all M&A activity produces no net benefits to the parties involved.

1.4 PRIVATISATION

The existing structure of mobile operations around the world has also been heavily influenced, as noted, by privatisations – that is, the sale of stakes by governments. Although privatisation has for some time been the norm in developed countries, there still remain numerous less-developed countries where it has been problematic either to sell off all or part of the state-owned incumbent or to introduce competition. The problems typically have taken

the form of political opposition, a shortage of buyers willing to offer an acceptable price, a reluctance to let 'national champions' fall into the hands of foreigners, and the absence of an appropriate legal framework. With the virtues of privatisation and liberalisation finally accepted even in countries previously comfortable with monopoly power, a surge in both primary and secondary privatisations was the inevitable consequence. This process gathered momentum towards the end of 2004, but really took off in the spring of 2005 and continued unabated throughout 2006 and well into 2007. The illustrations from this period that follow alphabetically by country relate to fixed-wire operators with mobile subsidiaries or stand-alone mobile operators.

- The privatisation of Albtelecom of Albania took the form of the sale of a 76 per cent stake to CT Telekom (Çalik Enerji (80 per cent)/Türk Telekom (20 per cent)) in September 2007.
- 10 per cent of Armentel was sold to VimpelCom in April 2007 for €39 million.
- 51.8 per cent of Australia's Telstra was to be sold in late 2006. The plan was to sell more than a third of this stake and to park the rest in the Future Fund for at least two years unless it sold parcels of at least 3 per cent to private equity groups which would themselves then be forbidden to sell on for two years. In November, 4.25 billion shares were sold at A$3.60 to private individuals and A$3.70 to institutions. In total, A$15.5 billion ($11.9 billion) was raised. Additional shares were then sold, reducing the state holding to 17 per cent.
- In December 2004, the state agency, the ÖIAG, sold a 17 per cent stake in Telekom Austria for €1.1 billion subsequent to the government blocking a cash and share offer from Swisscom in August worth €1.3 billion for the same stake (to be followed by the same offer to other shareholders).
- 35.7 per cent of Azercell in Azerbaijan was to be privatised, but the date kept slipping. In September 2007, the government added AzTelecom, BakTelekom, CATEL and AzEurotel to the list of possible privatisation candidates. Fifty per cent of CATEL was sold in January 2008 to Omni-Metromedia Caspian, owner of the other 50 per cent, for $6 million. In February, the Azercell stake was sold to Fintur Holdings.
- The government of Bahrain intends to dispose of the majority of Batelco over a period of three years.
- In October 2004, a 5.3 per cent stake in Belgacom was sold by the government for €535 million, together with a secondary placing of 19.1 million shares at €28.

- 65 per cent of Telekom Srpske in Bosnia and Herzegovina was sold to Telekom Srbija, the Serbian Republic monopolist, for €646 million in January 2007.
- The privatisation of 35 per cent of the Bulgarian Telecommunications Co., comprising the entire state stake excluding a golden share, took place in January 2005 on the local stock exchange.
- 51 per cent of Onatel in Burkina Faso was sold in January 2007 to Maroc Télécom for €220 million.
- 51 per cent of Camtel in Cameroon was to be sold to a strategic partner during 2006 but progress stalled in the face of heavy opposition.
- The Croatian state set out to sell off its 49 per cent stake in T-Hrvatski Telekom in late 2006. Seven per cent was promised to a war veterans' fund and the same amount to employees. In March 2007, a sale of a 20–23 per cent stake was pencilled in for June, but in the face of heavy demand the IPO was raised to 32.5 per cent in September, leaving the state with 2.5 per cent (plus temporarily the stake reserved for employees) and raising $52 million.
- In March 2005, a 51.1 per cent stake in Ceský Telecom (owner of EuroTel Praha) held by the government of the Czech Republic was sold to Telefónica.
- In December 2004, the Finnish government elected to reduce its stake in TeliaSonera from 19.1 per cent to 12.7 per cent.
- A further 5 per cent stake (130 million shares) in France Télécom was sold to banks for €2.65 billion in June 2007, but they were initially only able to place 40 per cent of the shares at €20.40.
- 51 per cent of Gabon Telecom and mobile subsidiary Libertis was sold to Maroc Télécom in February 2007 for $79 million but the deal was suspended by the courts in July.
- In August 2007, the government agreed to sell a 50 per cent stake in Gambia's Gamcel to the Spectrum Investment Group of Lebanon despite the absence of a tender.
- In October 2004, 6.3 per cent of Deutsche Telekom was sold in the open market by the state agency KfW.
- 51 per cent of Ghana Telecom was provisionally sold to France Télécom for roughly $600 million in November 2007.
- 66.7 per cent of Western Telesystems Ltd (Westel) of Ghana was sold to Kinz International Group of the UAE for $250 million in April 2007.
- 20 per cent of OTE was to be sold to a strategic investor from Europe in June 2007 but no offers were forthcoming and the plan was abandoned in October.

- A stake of 41.5 per cent in Jordan Telecom was put up for sale at the end of 2005 but the sale was postponed until July 2006. Thirty-nine per cent was bought by France Télécom/Arab investors for $727 million. A further 2.5 per cent was sold to local investors.
- 49 per cent of Kazakhtelecom's mobile subsidiary, Mobile Telecom Service, was sold in March 2007 to an unnamed investor at an unspecified price.
- 25 per cent of Kenya's Safaricom was to be sold before the end of 2007 but was postponed until 2008 as a result of legal challenges and subsequently by post-election violence. In March 2008, 10 billion shares worth $800 million were duly put on sale.
- 51 per cent of Telkom Kenya was provisionally sold to France Télécom in November 2007. It will be obliged to sell on 11 per cent via an IPO, with the government contributing a further 19 per cent.
- Lattelecom was expected to be bought by Blackstone Group (51 per cent) and its management (49 per cent) in November 2007 after TeliaSonera returned its 49 per cent stake in return for the outstanding shares in mobile operator LMT, but the decision was delayed.
- The Lebanese government intended to sell off mobile operators Alfa and MTC Touch in October 2007 for up to $7 billion but delayed the sale until February 2008 for political reasons. Two-thirds of each will be sold, with part of the rest being privatised later on.
- Both mobile operators in Libya – Libyana and al-Madar – are to be privatised.
- In April 2005, Matáv acquired 67.1 per cent of Telekom Montenegro.
- In November 2004, the government offered a 15 per cent stake in Maroc Télécom for €800 million. Vivendi Universal, which already had a 35 per cent stake, agreed to buy a further 16 per cent stake for €1.1 billion in January 2005. A further 4 per cent was sold for $552 million in July 2007.
- Namibia sold 34 per cent of Mobile Telecommunications Ltd to Portugal Telecom in July 2006.
- A 15 per cent stake in Nepal Telecom was sold in February 2008, 10 per cent to the public and 5 per cent to employees.
- A winning bid by Orascom Telecom for a 51 per cent stake in Nigeria's Nitel/M-Tel – the third time the stake had been offered – was rejected as too low in December 2005. A new shortlist of seven was drawn up in May 2006 for a 75 per cent stake. In July 2006, a $750 million bid was accepted from Transnational Corp. (including Etisalat).
- A 26 per cent stake in Pakistan Telecommunications Corp. was offered, valued at roughly $1.6 billion. Twelve per cent had previously

been floated. The winning bidder in June 2005 was the UAE's Etisalat which offered $2.6 billion, nearly double the next-highest bid.

- A listing of all or part of the state's 46 per cent stake in RomTelecom is pencilled in for 2008Q4.
- The state renationalised Rwanda Telecom in July 2007 and in September offered 80 per cent to a strategic investor. Lap Green Networks of Libya paid $100 million in October 2007.
- 49 per cent of Mobi 63 (formerly MobTel) of Serbia was provisionally sold to Telekom Austria with completion in 2006. However, ownership disputes resulted in this being revoked. Ownership was divided between the state (70 per cent) and the Schlaff Group (30 per cent), and both sold out in an auction raising $1.9 billion in July 2006.
- A two-stage tender for 39 per cent of Telekom Slovenije was to take place in April 2007. However, this was raised to 49.13 per cent in July with a view to a sale by the year-end. However, by March 2008, all bids had been rejected.
- A 14 per cent stake in Telekom Srbija is to be sold during 2008.
- The Swedish government sold an 8 per cent stake in TeliaSonera for $2.7 billion in May 2007, leaving it with a 37.3 per cent stake.
- The government sold two tranches of shares in Chunghwa Telecom of Taiwan concluding in September 2006, which, together with a capital reduction, reduced its stake from 42.2 per cent to 36.1 per cent.
- A 35 per cent stake in Tunisie Télécom was offered to a strategic partner with a decision in July 2006 in favour of Telecom Investments/Dubai Investment Group. A price of $2.25 billion was offered.
- A 55 per cent stake in Türk Telekom was eventually sold in June 2005 to a locally-led consortium (but including Telecom Italia) for $6.55 billion. A further 15 per cent stake is to be sold in May 2008.
- 45 per cent of Yemen Mobile was sold via an IPO in August 2006 when 86.5 million shares were sold at $2.50.

1.5 CONCLUSIONS

Although there are a number of other factors influencing the ownership and strategy of mobile operators other than M&A activity and privatisation – for example private sector IPOs and secondary offers – it is hoped that this chapter has served to put the operators that are discussed in detail in the chapters that follow in some kind of context and that it has demonstrated that the sector is extremely volatile. It is also important to

appreciate that the international strategy of individual operators can be highly variable. Thus, any operator with a massively expanding home market and limited competition (as in China) is unlikely to prioritise international expansion, whereas an operator in a saturated, competitive market (as in most of Europe) has no prospects for growth unless it expands overseas. Equally, operators that have seen international expansion as a means of escaping from regulatory problems in the home market (as in the USA) may subsequently find that domestic expansion (via takeovers) has become a priority and hence that there is a need to unravel their overseas empires.

NOTE

1. For a full review of the period on an annual basis see the series of articles by Curwen referenced below.

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2. Mobile technology: from 1G to 4G

2.1 INTRODUCTION

This chapter is concerned with technological issues and it must be said immediately that there are no universally accepted definitions relating to many of the issues discussed below. We choose to refer throughout to 'mobile' communications in order to contrast this with fixed-wire communications, but it is immediately evident that the latter can possess an element of mobility if a handset can be detached from a cradle and carried around the house. Equally, no network can be entirely mobile. If, for example, one wanted to call a number in France from England then the call would have to cross the channel either via an underwater link or via a satellite link. Finally, it is possible for a network to be created using fixed short-range transmitters, probably within the bounds of a city, which allows mobility only within the defined area.

The terms 'wireless' and 'cellular radio' are often used in describing networks that permit full mobility, but these are treated for the purposes of this book as synonyms for 'mobile'. Hence, the mobile communications market is taken as encompassing services that are provided by connecting two or more mobile devices or terminals via a base station. For the purposes of the discussion below, these devices will for the most part be taken to be handsets since they dominate current usage, although they are constantly evolving both in form and function – Motorola, for example, has taken to referring to 'the device formerly known as the cell phone'. Suffice it to say for now that whatever form such devices may take, including data cards and modems in computers – they are already capable of incorporating the following: blogs, calculator, calendar, camera with flash, clock, diary, digital music player, digital purse, e-mail facility, games, instant messaging, modem, satellite tracking, spreadsheet, television, text messaging, torch, video camera and word processor. For now, however, voice telephony remains the primary function of handsets.

Mobile communications have a long and complex history (Hausman, 2002), and have been commercially available in some form since 1946, although the initial format in the USA involved a single transmitter covering an entire city. Such a network had very little capacity and delivered calls

via a fixed-wire link to the home. Mobile networks only truly developed once a cellular structure was adopted. Modern cellular networks commenced services in the USA in 1983. Interestingly, although the Nordic mobile telephone analogue system – NMT-450 operating in the 450 MHz band, where MHz is short for megahertz or million hertz – was first introduced in Scandinavia as early as 1981, it was not adopted throughout Europe, and there were multiple incompatible standards in use by 1985. Another was the total access communication system (TACS) – at which point the Federal Communications Commission (FCC), the main regulatory body for telecommunications in the USA, was imposing a common analogue (sometimes analog) advanced mobile phone service (sometimes system) (AMPS) technology in the 800 MHz band. However, this situation completely reversed itself when digital networks became feasible. For its part, the US government took the view that competition would determine which standard was best, whereas the European Union (EU) set up, commencing as early as 1982, a process that would produce a single EU-wide digital standard.

Control over technology is one of the issues addressed by a system of licensing. Because spectrum is finite, and certain spectrum bands are subject to excess demand, it has long been the custom to allocate spectrum via licences although defining property rights for spectrum is a complicated matter, especially when considered in an international/supranational context (Faulhaber, 2006). Among the issues to be addressed are:

- the size of the spectrum band to be allocated for each licence;
- the area to be covered by each licence;
- the life span of each licence;
- the uses to which each licence may be put;
- whether each licence is to be transferable or tradeable;
- whether transmission power is to be restricted.

As technology has evolved, so licensing conditions have had to evolve in tandem. Throughout the world, the standard digital technology is currently known as second-generation or 2G. The original, analogue, technology (1G), which uses frequency division multiple access (FDMA) technology such that each user has exclusive use of a specific frequency, is still to be found, but is being phased out wherever possible and the spectrum transferred to 2G networks which, because they are digital, use the spectrum much more efficiently.

2.2 CATEGORISATION OF TECHNOLOGIES

There is considerable disagreement about how to represent the evolution of mobile technologies over time, partly because, for example, the changeover from a circuit-switched to a packet-based digital network can be a long-winded process and hence aspects of the two can coexist for long periods. For example, distinctions can be made in terms of 'generations', commencing with 1G, and they can be made in terms of data transfer speeds. What follows is an attempt to impose some kind of sensible structure, based essentially upon the comparative position of the more common technologies as seen from the modern-day perspective. It is not possible to be precise about data transfer speeds if only because the various trade associations[1] fail to agree on this matter but the crucial aspect is that speeds are always presented as theoretical maxima since network operators prefer it that way, whereas what is actually delivered may be vastly slower. Suffice it to say, therefore, that anything below 50 kbps (kilobits per second) is best treated as 2G, that anything described as 2.5G or 2.75G is probably delivering something between 50 kbps and several hundred kbps, while 3G is probably delivering in the region of 1 Mbps (mega or million bits per second). In theory, it is already possible under laboratory conditions to deliver 1000 Mbps but the fastest (maximum) speed available in early 2008 via a standard network and handset is 7.2 Mbps.

The other major complication is that technology has not developed in a consistent way throughout the world. Hence, there are no absolutely comparable data speeds on offer using different technologies. Table 2.1 accordingly provides the framework that will be followed throughout this chapter. In much of the world, including the whole of Latin America, most of Asia and the whole of Africa, the alternatives on offer are the same as those for North America.

In North America and elsewhere there is no strict equivalent to 2.75G since cdma2000 1×RTT is typically faster than GPRS but slower than EDGE, although it is sometimes (reasonably) referred to as 2.75G or (incorrectly) as 3G. The CDMA route for a given operator is usually a continuous overlay commencing with 2G since the same spectrum is used consistently, although an operator may own spectrum in more than one band and allocate different services to individual bands. It is also worth noting that cdma2000 is a registered trademark of the Telecommunications Industry Association of the USA rather than a generic term, as is CDMA. The spectrum and hardware allocated to cdma2000 1×EV-DO provides a data-only service, whereas other technologies provide both data and voice. Furthermore, 1×EV-DO is optimised for downlink connectivity (at up to 2.4 Mbps) and its uplink connectivity speed in its Release 0 format is

Table 2.1 Technological framework

	1G	2G	2.5G	2.75G	3G	3.5G	4G
Europe	NMT/TACS	GSM	GPRS	EDGE	W-CDMA	HSPA	LTE
North America	AMPS	CDMA	cdma2000 1× RTT	1×RTT	cdma2000 1×EV-DO	EV-DO Rev. A	UMB
	TDMA	GSM	GPRS	EDGE	W-CDMA	HSPA	LTE
		iDEN					
China		CDMA	cdma2000 1× RTT	1×RTT	cdma2000 1×EV-DO	EV-DO Rev. A	Rev. B
		GSM	GPRS	EDGE	W-CDMA	HSPA	LTE
					TD-SCDMA	n/a	n/a
Japan	JMCS	CDMA	cdma2000 1× RTT	1×RTT	cdma2000 1×EV-DO	EV-DO Rev. A	Rev. B
	–	PDC	i-mode	EDGE	W-CDMA	HSPA	LTE

Notes:
The main abbreviations are as follows:
CDMA = Code division multiple access, also known as IS-95 or cdmaOne.
cdma2000 1×RTT (radio transmission technology) is also known as IS-2000.
cdma2000 1×EV-DO (evolution-data optimised).
EDGE = Enhanced data [rates] for GSM evolution.
GSM = Global system for mobile, first launched by Radiolinja on 1 July 1991.
GPRS = General packet radio service.
HSPA = High-speed packet access
iDEN = Integrated digital (sometimes dispatch) enhanced network
JMCS = Japanese mobile cellular system.
LTE = Long-term evolution.
PDC = Personal digital cellular.
TD-SCDMA = Time division synchronous code division multiple access.
TDMA = Time division multiple access.
UMB = Ultra mobile broadband, otherwise known as EV-DO Rev. C.
W-CDMA = Wideband code division multiple access.

Source: Compiled by the authors.

typically only 154 kbps, although Revision A is considerably faster – 3.1 Mbps and 1.8 Mbps respectively. This is why it was deemed to be desirable eventually to move on to 1×EV-DV (data and voice), although this has been discarded in favour of EV-DO Revision A (Rev. A), which is the cdma2000 version of 3.5G.

It is also important to note that an operator such as AT&T started out using IS-54/IS-136 digital AMPS (D-AMPS), which is commonly referred to as TDMA, although TDMA is strictly a technique used in other protocols as well as D-AMPS. D-AMPS/TDMA is a technology using the 824–849 and 869–894 MHz bands that has no direct route through 2.5G to 3G. Hence, what needs to happen is that TDMA is overlaid with GSM (a similar technology) and the GSM route is followed thereafter.

2.3 GROWTH OF MOBILE SUBSCRIPTIONS

Some idea of the growth of mobile subscriptions by technology can be obtained from Table 2.2, which concentrates on the digital technologies that concern us in this chapter. As can be seen, analogue had effectively ceased to play any real role by 2002, during which year the billionth subscription was taken out. 2002 was also the year when 3G technologies first put in an appearance of any consequence. It may also be noted that, because it was much easier to introduce cdma1×EV-DO (an overlay) compared to W-CDMA (which needed new infrastructure), W-CDMA subscriber numbers did not overtake those for 1×EV-DO until 2005. W-CDMA is now growing much faster than 1×EV-DO, which is hardly surprising given the evident dominance of GSM as the world's most popular 2G technology.

2.4 EVOLUTION OF CELLULAR NETWORKS

It is useful briefly to review how a 2G cellular network is configured. At the heart of a modern mobile network are to be found a number of base stations which link call-originating handsets to such mobile and fixed-wire networks as are capable of receiving the transmitted signals. The signals are picked up and passed on by antennae attached to the base stations, each of which sits at the heart of a hexagonal-shaped cell which is adjacent to, and overlaps, other cells, and which covers a specific geographic area. Cells are generally described as 'macro' when the antenna is installed on a mast or building above the average roof level, as 'micro' when the antenna is under the average roof level and as 'pico' when it is installed indoors. Switching

Table 2.2 Subscribers by technology (million), end-year[1,2]

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
GSM	13.0	32.8	71.1	138.4	258.4	456.1	626.2	809.3	1012.0	1296.0	1719.7	2166.4
CDMA	–	1.0	7.4	22.4	52.6	80.3	110.9	104.2	98.9	87.4	41.2	21.1
cdma 1×								36.1	80.1	131.9	233.4	282.9
cdma 1×EV-DO								0.2	4.6	12.3	26.8	50.0
US TDMA	0.7	2.6	6.3	15.9	38.0	67.6	94.1	101.1	100.1	90.0	47.8	20.4
PDC	3.3	13.9	26.8	38.1	44.8	50.8	56.8	56.1	58.1	54.2	46.3	32.1
iDEN	–	0.3	1.4	3.1	5.1	8.2	11.1	11.0	13.4	16.8	22.6	25.6
W-CDMA	–	–	–	–	–	–	–	0.2	2.8	16.3	48.2	97.8
Total digital	17.0	50.6	113.0	217.9	398.9	663.0	899.1	1118.2	1375.7	1704.9	2186.0	2696.1
Total analogue								19.7	12.9	9.2	6.6	3.1
Total wireless								1137.9	1388.6	1714.1	2192.6	2699.2

Notes:

1. There are two series available which are not entirely compatible. The second series breaks down CDMA data as from 2002 and has accordingly been used from that point. It should be noted that a different set of figures for CDMA and derivatives is available at www.cdg.org and a considerably different set of figures is available (patchily) at www.3gamericas.com.
2. Data for 2007 are patchy. GSM including W-CDMA and HSDPA are given as 2844 million representing 86% of total subscribers of 3284 million. The CDG claims 431 million CDMA subscribers, of which 417 million are cdma2000 (of which 90 million are EV-DO). These figures appear more or less to tally.

Source: Derived from data available at www.gsmworld.com/news/statistics/substats.

centres connect up the base stations, keep track of calls and ensure, for example, that if the sender is moving around, the call is picked up by the nearest cell. Base stations connect up to mobile switches either via fibre-optic cable or, if there is line of sight, by a radio link. In turn, a mobile switch may connect up to a fixed-wire switch in order to pick up or deliver a call to a fixed handset.

The size of a cell is dependent upon a number of factors, and in particular the radio frequency in use, since the higher the frequency, the smaller the cell. When a subscriber dials in, he or she is assigned a tiny portion of the available spectrum, and the task of the system is to keep the assigned spectrum connected up, irrespective of the movement of the caller. A further issue of significance is consequently the volume of traffic to be handled since a base station has a finite capacity, and when it is reached, an additional base station will need to be built and the size of cells reduced to compensate. Also, physical features such as buildings or natural aspects of the terrain may need to be circumvented by creating additional cells. In general, urban cells will be located no less than 0.2 km and no more than 0.5 km apart, while rural cells will be ten times as far apart.

Since the spectrum licensed to a specific network is strictly limited, it is important that a particular frequency is utilised efficiently. This is done by taking account of the fact that a signal weakens as it travels, so although it will be strong in the nearest cell to an antenna, it will be very weak two cells further away. Hence, more distant cells can use the same frequency without fear of interference. Increasing the number of cells accordingly increases the number of times a frequency can be used within a geographic area.

The original analogue technology was subject to a number of limitations, most particularly its inability to be compressed without loss of clarity and the fact that, whereas it was satisfactory for voice telephony, it was unsatisfactory for data transmission which had to be converted from a digital to an analogue format prior to transmission and then back again at the receiving end. Digital signals were initially approved during the 1980s.

GSM, which is the common digital system in the European Union, uses the TDMA standard, which allows each call to run along a channel within the available bandwidth and assigns it a fraction of the time available within that channel. In contrast, CDMA assigns a special electronic code to each signal and hence allows the entire frequency band to be occupied simultaneously. This is claimed to provide greater capacity, better sound quality, lower power consumption and a decreased potential for fraudulent use.

Mobile networks have largely changed over from a circuit-switched to a packet-switched basis. Packet-switching divides data up into individual packets of a specified size and in a specified format before sending them along the network. The correct sequence for delivery and the address for

delivery are determined via control information attached to the packets before being sent. As a packet-switched network is permanently available to all data from any source, these inevitably get jumbled up together and may take a variety of routes from any one source to any one destination. However, the control instructions should ensure that the data is reassembled into the correct order before delivery. Since this may be subject to delays, it is advisable to keep voice data – which are time-critical – separate from non-voice data.

It is evident that the system must recognise the identity of individual subscribers, and this is normally achieved via the subscriber identity module (SIM), which comes as a small card to be inserted in a mobile device. It contains a unique International Mobile Subscriber Identity used to identify the subscriber when logging into the system.

Most of the 2G licences in Western Europe were issued between 1992 and 1996, and utilised spectrum in the 900 MHz GSM band. In the 900 MHz band, the uplink is 890–915 MHz and the downlink is 935–960 MHz. This 25 MHz band is divided into 124 carrier frequency channels, each spaced 200 kHz apart, with eight speech channels per frequency channel. The term GSM is also used generically in relation to spectrum in the 1800 MHz band (1710–1785 and 1805–1880 MHz) otherwise known as a personal communications network (PCN). PCN spectrum was typically licensed in Western Europe after 1997, either to existing GSM licensees to ameliorate spectrum shortages as mobile telephony surged in popularity or to permit the entry of new operators. A crucial factor was that the administrative arm of the European Union, the European Commission, enforced the exclusive usage of these two spectrum bands via the auspices of the European Telecommunications Standards Institute (ETSI).

Elsewhere in the world a variety of spectrum bands are in use for 2G. Overall, however, by far the most popular technology is GSM, although outside Europe it is generally used in alternative spectrum bands – typically the 800 MHz band (824–849 and 869–894 MHz) and/or the 1900 MHz band (1850–1910 and 1930–1990 MHz) known in the USA as Personal Communications Services (PCS). The use of GSM is fostered by the factor of international 'roaming' – that is, the ability of a GSM handset owner to take it to another country where it can still be used both internally and to make international calls to other countries where GSM is in use.

Given the use of GSM throughout Europe, as well as its partial use in the USA, there is accordingly an obvious advantage for countries switching from analogue to digital to adopt it. However, some countries adopted one of the alternative standards to GSM before it became so well-established. In particular, the US government made no attempt to enforce a national standard, and hence three different technologies were adopted. In addition

to GSM, there was widespread use of both CDMA transmitting in the 450 MHz, 800/850 MHz, 1700 MHz and 1900 MHz bands (with 2100 MHz under development), and TDMA.

In Japan, the personal handyphone system (PHS) operating in the 1880–1930 MHz band was introduced in 1995 to utilise a dense network of low-powered, and hence cheap, base stations when in mobile mode. PHS handsets can also be used via a connection to a fixed-wire network when in the home or office, and PHS is hence roughly equivalent to the DECT standard used in Western Europe. In 2002, China Telecom, despite the absence of a cellular licence, set up what is usually referred to either as a personal access system or public access service (PAS), or Xiaolingtong, which allows mobile subscribers to switch calls to their handsets through to fixed lines, thereby avoiding the charges made to mobile call recipients. It is technically a fixed-wire technology because it uses fixed-wire infrastructure for its backbone, hence allowing China Telecom to provide competition for China Mobile and China Unicom without acquiring a mobile licence. A significant point is that PAS handsets did not contain SIM cards, hence preventing any kind of roaming.

Third-generation mobile telephony (3G) is essentially an extension of 2G capabilities. The W-CDMA version of 3G, incorporating both terrestrial and satellite components, is known in Western Europe as the universal mobile telecommunications system (UMTS), and that term has increasingly become used in preference to W-CDMA. The official European Commission version is that UMTS is an advance on GSM capable of combining the use of terrestrial and satellite components (Council of the European Communities, 1998 and 1999). 3G utilises a packet-switched network which enables subscribers to have an 'always on' connection to the Internet, and hence one that permits charges to be levied per packet sent rather than according to the time the circuit is open.

2.5G

General Packet Radio Service (GPRS)

GPRS was slow to establish itself, partly because of the somewhat adverse reaction to the prior wireless application protocol (WAP) in Europe. It was always intended to be an intermediate technology but the reality was that GPRS came into its own as the prospects for 3G receded somewhat. The GPRS infrastructure and handsets support 'always-on' data transmission at up to 21 kbps per channel over a maximum of eight channels – that is, a theoretical maximum of around 168 kbps combining several downlink and uplink channels.

Typically, a device will in practice accommodate four downlink and two uplink channels, with the bandwidth divided up between data and voice

according to the strategy of the operator, delivering in the range 60–80 kbps with bursts up to 115 kbps. In some respects, the building out of GPRS networks is the easy part. Once a GSM network is up and running it is necessary only to add two nodes in the core network (Serving GPRS Support Node and Gateway GPRS Support Node) and to add a circuit board to the radio network to allow packets to be transported.[2] The issues that then need to be resolved include maximising the stability of the new network, making arrangements for roaming, and developing applications and services.

cdma2000 1×RTT

The first stage in the development of cdma2000, namely 1×RTT, is being overlaid on virtually all CDMA 2G networks throughout the world. Because the transition to the more advanced 1×EV-DO is relatively simple and inexpensive, it is assumed that the great majority of networks will progress beyond 1×RTT with the added advantage that, unlike with W-CDMA, no additional licence is normally required because no additional spectrum is involved.

i-mode

i-mode, as noted, was developed by DoCoMo in Japan and is, in effect, a Japanese equivalent of GPRS and cdma2000 1×RTT, albeit a rather more sophisticated version. That i-mode, a play on the Japanese word for 'anywhere' – the 'i' stands for 'information' – is a success in Japan is not generally questioned. Commencing on 22 February 1999, it achieved 40 million subscribers in October 2003. However, the end-year figure for 2006 was 47.2 million, indicating a considerable slowing of growth during the previous three years.

Although there is general agreement as to the factors underpinning why i-mode has been a success in Japan, there is much less agreement as to whether these factors can be replicated elsewhere. It is worth observing that not everyone is persuaded by the i-mode story. There are those who argue, for example, that i-mode did not enable DoCoMo to increase average revenue per unit (ARPU) but merely prevented it declining at a time when voice call prices and revenues were in steep decline. Now that KDDI is running a successful cdma2000 1×RTT service based upon flat-rate pricing it makes it impossible for DoCoMo to do anything other than respond in kind, with consequent depressive effects upon ARPU. In addition, in order to tempt i-mode users to switch to FOMA, its 3G service, DoCoMo has been obliged to offer relatively low prices for the latter, thereby eroding its i-mode revenues.

By the end of 2006, the prospects for i-mode outside Japan were looking decidedly patchy. DoCoMo had licensed i-mode primarily to the

third-placed operators in a market who wanted to use it to gain a market advantage, but their limited subscriber numbers were a hindrance to achieving this goal.

2.75G

Enhanced Data [Rates] for GSM Evolution (EDGE)

EDGE is now generally regarded as equivalent to 2.75G. The situation in relation to EDGE, which offers very good spectral efficiency up to 100 kbps – its likely transmission speed in typical circumstances – and does not require a separate licence, remains somewhat unclear. In essence, the advantage of EDGE is that it offers improvements on GPRS by utilising more error-tolerant modulation and coding schemes. Each timeslot is theoretically capable of providing 59.3 kbps, and hence bundling eight timeslots provides a theoretical maximum of 473.6 kbps although, as noted, far less is deliverable in practice. Until the delays with UMTS became severe, few expected EDGE to be introduced other than very occasionally. The reason for this is that EDGE needs its own handsets and possibly new hardware in base stations – the latest GSM/GPRS networks need only changes to radio planning and operational parameters via software upgrades. It should also be borne in mind that EDGE cells are smaller than GSM cells, which are themselves smaller than TDMA cells.[3] Because EDGE was essentially developed as a means for TDMA operators to provide more sophisticated data services, it was thought that it would not be introduced in Europe other than, perhaps, by operators that either failed to acquire, or chose not to bid for, UMTS licences. The early adopters, not surprisingly, were not European.

The current position appears to be that EDGE is not particularly viable for an operator with a GSM network built before 2000. Newer networks have been designed to be upgradable to EDGE simply by altering the software at a cost of roughly $1–2 per person, and in future most operators building out their GPRS networks will become EDGE-capable by default. Given the shortage of W-CDMA networks in the USA, it is hardly surprising that the GSM operators there are among the most enthused about EDGE's potential.

By early 2006 it had become evident that EDGE would increasingly be seen as a means for covering relatively rural areas that were expensive to cover with 3G and which could be left uncovered for some considerable time because the maximum 3G coverage requirements were, typically, around 70 per cent of the population. This appears to be the strategy of operators such as Orange. This may not be too bad a deal in practice since Nokia is expected to launch a faster version of EDGE called EDGE Evolution or Evolved EDGE – work is proceeding to produce a 3GPP

standard for Evolved EDGE via Release 7 (3G Americas, 2006; Cellular-news, 2008a and 2008c). In principle, this uses two simultaneous radio channels compared to the one channel currently used for EDGE, and hence doubles the data download speed. However, it has the potential to double this again – with a theoretical maximum of 1 Mbps downstream – because it uses an enhanced modulation and coding scheme. As ever, there is a delay while compatible hardware is made available on the requisite scale, so a widescale launch is probably not due until 2009. At this point, despite relatively low speeds compared to W-CDMA and HSDPA,[4] an Evolved EDGE upgrade will be a very viable alternative where the cost of a 3G network is deemed to be prohibitive.

As a final comment, it may be noted that these intermediate stages between 2G and 3G may be as far as some carriers wish to go; while GPRS, for example, is strictly a best-effort technology, it works perfectly well for the provision of most services up to and including streaming video. Because of this, some potential bidders were expected to be discouraged from seeking 3G licences although an opposing factor was that some operators were becoming desperate for additional spectrum because the number of subscribers to their existing 2G networks was growing very rapidly, and hence they had no option other than to seek 3G licences. In other cases, it was anticipated that non-licensees could apply to licence holders to become mobile virtual network operators (MVNOs).[5]

2.5 EVOLUTION OF STANDARDS FOR 3G

In late 1997, the International Telecommunication Union (ITU) published a report – *Framework for Modularity and Radio Commonality within IMT-2000* – which advocated the introduction of a standardised system within the context of International Mobile Telecommunications-2000 (IMT-2000) by the year 2002 (Commission of the European Communities, 1997). The idea was that both carriers and equipment manufacturers would be provided with a set of common building blocks with which any third-generation system had to be made compatible. This was a critical aspect since it signified that there was not to be a unique standard but rather a 'family of standards' which would allow all existing networks, with their attendant historic heavy investment, to be modified rather than discarded. The actual equipment could take a variety of forms.

The requirements placed upon a 3G network by the ITU were as follows:

- 2 Mbps in fixed or in-building environments;
- 384 kbps in pedestrian or urban environments;

- 144 kbps in wide area mobile environments;
- variable data rates via satellite.

Technically, a 3G network could utilise almost all spectrum lying between 400 MHz and 3 GHz. Despite this potentially vast spectrum range, it had already been determined, as a result of a decision made in 1992 by the World Radiocommunications Conference (WRC) that the common frequencies in all third-generation systems would be restricted to 1885–2025 MHz and 2110–2200 MHz. This would make international roaming between networks a reality, together with the transmission of data at potentially up to 144 kbps on the move and 2 Mbps while stationary.

In June 1997, the European Radiocommunications Committee (ERC) decided[6] to divide up the WRC frequency bands, allocating 1900–1980 MHz, 2010–2025 MHz and 2110–2170 MHz to terrestrial UMTS as well as 1980–2010 MHz (earth-to-space) and 2170–2200 MHz (space-to-earth) to satellite applications which use a space division multiple access (SDMA) interface,[7] but recognised that this would probably be insufficient and that additional spectrum would almost certainly need to be freed or reallocated by 2005 within the 900, 1800 and 1900 MHz bands used most commonly by 2G systems (Commission of the European Communities, 1998a).

In a further move, the ITU divided the new system into two parts based respectively upon the core network architecture and the radio (air) interface – linking base station and handset and known as the universal terrestrial radio access (UTRA) – and specified common components in each case. The telecoms industry was then left to work out how best to meet the requirements of each. As far as the core architecture was concerned, the choice was fairly limited in practice given the predominance of GSM in Europe, and cdmaOne and TDMA in the USA – the two respective core architectures are generally referred to as GSM-MAP and ANSI-41. The ITU wanted everything to be settled by the end of 1999 so that services could commence in 2002.

Nokia, Ericsson, Alcatel and Siemens, at the time Europe's leading mobile handset manufacturers, announced that they would be backing GSM-MAP for the core architecture. For the radio interface the choice lay essentially between wideband CDMA (W-CDMA – now called 3GSM by the GSM Association to avoid confusion with cdma2000) and a hybrid wideband TDMA/CDMA (W-TD/CDMA). Whereas Japan opted for W-CDMA throughout – effectively the same as for GSM-MAP in the core architecture – the UMTS approach to the radio interface contained elements of W-TD/CDMA.

The issue of compatibility with standards in the USA presented the most awkward problems because Lucent Technologies and Qualcomm wanted

to use cdma2000. The ITU agreed to accept cdma2000 1×EV-DO – known in South Korea as enhanced version-data only and occasionally as evolved-data optimised – as equivalent to 3G in August 2001. As noted previously, in its original Release 0 variant, 1×EV-DO was capable of delivering downlink at up to 2.4 Mbps (although the actual speed was generally in the 300–600 kbps range) while Revision A, approved by the 3GPP in April 2004 and first tested successfully by Nortel Networks and Sierra Wireless in March 2006, upgraded the downlink to a theoretical rate of 3.1 Mbps with a maximum of 1.8 Mbps for the uplink. Although Rev. A only came on-stream towards the end of 2006, and only began to become prevalent during 2007, Revision B will in due course upgrade the downlink to a maximum of 4.9 Mbps.[8]

Radio Interface Modes

The present position is that there are three main radio interface modes within IMT-2000, known respectively as IMT DS (direct sequence or spread), IMT MC (multi-carrier) and IMT TC (time code), which between them are compatible with GSM, CDMA and TDMA. These modes are known more commonly as direct sequence frequency division duplex (DS-FDD – a type of CDMA (W-CDMA) supported by GSM carriers, which uses paired (separated uplink and downlink) spectrum and is sometimes referred to as UTRA FDD); multi-carrier frequency division duplex (MC-FDD – which uses paired spectrum and is based on cdma2000); and time division duplex (TDD – which comes in a version known as UTRA TDD or one harmonised with the new TD-SCDMA standard, both of which use unpaired spectrum for the provision of both uplink and downlink).[9,10] In addition to these, the ITU has established a specification for IMT SC (Single Carrier), also known as UWC-136 (which, like W-CDMA, is a FDD system related to EDGE), and for IMT FT (frequency time), commonly known as DECT.[11]

It is to be noted that FDD/W-CDMA uses a channel spacing of 5 MHz (as compared to 1.25 MHz for cdma2000 1×RTT), and that an operator normally needs either three or four channels to provide an acceptable high-speed service. The standard allocation of spectrum is accordingly 1920–1980 MHz paired with 2110–2170 MHz – that is, 60 MHz paired – providing either 15 MHz paired (four licences) or 20 MHz paired (three licences) per licensee. TDD/SCDMA simply provides 5 MHz of spectrum within the 1900–1920 and 2010–2025 MHz bands. However, it is unusual in practice for seven lots of TDD to be allocated, and TDD spectrum can be paired up if so desired, just as it is possible to get by with a minimum of 10 MHz of paired spectrum (six licences).

WRC 2000

At the World Radiocommunications Conference 2000 (WRC-2000),[12] governments of 150 countries again addressed the issue of spectrum allocation in the hope of agreeing a single global range for further expansion after 2005, essentially consisting of 160 MHz in one continuous band in the 2.5 GHz (2500 MHz) band. However, the best that could be agreed was a choice of three frequency bands, namely 806–960, 1710–1885 and 2500–2690 MHz – the latter heavily favoured by European organisations because it was the only one not currently occupied for 2G. In addition, the bands 1525–1544, 1545–1559, 1610–1625.5, 1626.5–1645.5, 1646.5–1660.5 and 2483.5–2500 MHz could be used for satellite transmission, as well as 2500–2520 and 2670–2690 MHz should the need arise. For its part, the European Commission issued on 9 March 2001 a fourth Mandate to the Conference of European Post and Telecommunication Administrations (CEPT) to harmonise frequency usage in the additional bands identified in 2000. This resulted in a Report and an ECC Decision in line with the scope and tasks given under Mandate 4. The key points included in the adopted EEC Decision, ECC/DEC/(02)06 of 15 November 2002, were:

- designation of the whole 2500–2690 MHz band to IMT-2000/UMTS systems;
- making the whole so-called 'Expansion Band' available for use by 1 January 2008, subject to market demand and national licensing schemes;
- designation of the frequency band 2520–2670 MHz for terrestrial use.

For its part, the USA refused to commit itself to any of the original spectrum bands because much of all this bandwidth was already occupied (Curwen, 2005). This meant that handsets would need to have a built-in capacity to roam between frequencies and would probably be heavier and costlier than was desirable. To ameliorate matters somewhat, the WRC also accepted that 3G networks could be built using existing 2G spectrum although that would either require spare capacity on the 2G network or an upgrade of 2G subscribers to 3G services. In certain cases the spectrum could be in the 450 MHz band (CDMA-450) which would enable large, essentially rural, areas to be covered without building large numbers of base stations. This is because whereas a GSM cell has a maximum 37 km radius, a CDMA-450 cell can 'breathe', and hence cover large but empty territories, a characteristic shared, in practice, by any variant of W-CDMA.[13]

It should be noted that because the chosen frequency bands for the W-CDMA version of 3G are much higher than those used for GSM, this means that a W-CDMA network needs far more cells than a GSM network because the signal range decreases as the frequency rises. Furthermore, higher frequency signals travel in straighter lines, which makes little difference in urban areas but a good deal in open rolling countryside. As a rule of thumb, a W-CDMA network requires twice as many cells as a GSM network, but that ratio may prove to be unnecessarily high in practice, especially if 3G facilities are built on top of 2G base stations.

The issue of standardisation of W-CDMA is currently being addressed by the 3GPP.[14] The initial standards for W-CDMA were completed in April 1999 and became known as Release 1999 (R'99). A major set of specifications was published in mid-December 2000, with amendments agreed in March 2001, which are known as Release 4 (Rel'4). In March 2002, Release 5 (Rel'5) was completed which, *inter alia*, defined the high-speed downlink packet access (HSDPA) channel and introduced the IP multimedia subsystem (IMS) architecture designed to enhance the end-user experience for integrated multimedia applications and to offer operators a more efficient means for delivering such services. Rel'5 also introduced the IP UTRAN concept to realise network efficiencies and reduce network costs. The fact that specifications are constantly being updated is somewhat problematic because of the need for networks developed at different times, in different countries and by different equipment makers, to permit international roaming. This, in turn, has some bearing on realistic deadlines for network roll-outs. However, the Release 5 standard was designed to be backwards compatible with R'99.

UMTS

The deadline for Member States of the European Union to introduce an authorisation system for UMTS was initially specified by the European Commission as 1 January 2000 (Commission of the European Communities, 1998a and 1998b), and for harmonised provision of UMTS services as 1 January 2002. In addition, by February 1999, Member States were expected to devise plans for the provision of such additional spectrum as would be needed.

Towards the end of 2005, there was much discussion as to whether the 900 MHz band, already in heavy use for GSM, could also provide 3G services. The use of this spectrum was first authorised in France where, due to the existence of only three operators, GSM spectrum was relatively plentiful (Cellular-news, 2008b). The potential use of the GSM band was generally thought to be limited to rural areas where GSM usage was less heavy, but in any event the regulatory and spectrum management issues were far

from full resolution – the EU GSM Directive reserved the 900 MHz band exclusively for 2G services – so the UMTS900 band was not going to be used before 2007 at the earliest, not least because of the need to develop the requisite handsets. There is pressure for the GSM Directive to be amended – the Commission officially proposed this in July 2007 – and if it is sanctioned by the various bodies concerned, there may be significant developments during 2008. At the beginning of 2007, the CEPT adopted a decision to permit the use of UMTS900 throughout the EU, subject to authorisation by national regulators.

cdma2000 1×EV-DO

The initial design of 1×EV-DO was created by Qualcomm in 1999 to meet IMT-2000 requirements for a stationary communications downlink that would operate at over 2 Mbps. Originally called high data rate (HDR), it evolved into EV-DO after ratification by the ITU and was allocated the designation IS-856. Although DO initially stood for 'data only', this was altered to 'data optimised', probably because it had more positive connotations. In order to function alongside a voice connection, a further radio channel of 1.25 MHz has to be added.

In practice, there are three main locations for the technology, namely the USA, Asia and South America – it is largely irrelevant in Western Europe. In the former case, the likes of Verizon Wireless and Sprint PCS quickly introduced the technology. Meanwhile, in Canada, Bell Mobility launched a service in February 2002, with Telus following suit in June. In Asia, the second-largest Japanese operator, KDDI, favoured the technology, but was heavily outweighed in aggregate size by the combined W-CDMA adherents DoCoMo and J-Phone (now Softbank). Ironically – given that the two initial 3G licences were for W-CDMA – South Korea initially evolved into a major provider of cdma2000, driven by the need to have something reasonably fast available for the World Cup football tournament in May 2002. By the end of 2001, W-CDMA licensees SK Telecom and KTF were both well on the way to cdma2000 1×EV-DO, with the cdma2000 licensee, the LG Telecom consortium, trailing behind, having uniquely opted to develop 1×EV-DV (albeit only temporarily).

As noted previously, cdma2000 1×EV-DO is undergoing progressive development. Revision (Rev.) A came on-stream in 2006. Revision B has also been ratified by standards body Third Generation Partnership Project 2 (3GPP2). Rev. B is designed to enable dynamic scalable bandwidth capability, potentially enabling operators to combine up to fifteen 1.25 MHz channels capable of 46.5 Mbps downstream, although initially two or three channels will probably be used to provide in excess of the maximum with Rev. A.

Rev. C is already under way. In July 2006, 3GPP2 selected from among 11 different proposals one that was loosely backward compatible (LBC), using OFDMA on the forward link and a combination of CDMA and OFDMA on the reverse link. The strictly backward compatible (SBC) approach favoured by many, which enabled compatibility between legacy and new handsets, was rejected although it may be used as an intermediate step. In December 2006, the CDMA Development Group announced that Rev. C would be known as ultra mobile broadband (UMB) and claimed that it would operate at up to 288 Mbps in a 20 MHz bandwidth. A standard was published in September 2007 with a view to commercial availability in 2009 although no operator had committed to its use by the end of 2007 (Cellular-news, 2007). LBC-based Rev. C will be able to hand-off to the likes of 3G LTE and WiMAX.

3.5G

High-Speed Packet Access (HSPA)

Global W-CDMA (G-WCDMA) is put forward by Nokia as doing for W-CDMA what EDGE does for GSM. In that respect it can be referred to as 3.5G. It enhances the benefits of W-CDMA's inherent economies of scale by recourse to high-speed downlink (sometimes data) packet access (HSDPA) technology, which is a standardised feature in 3GPP Release 5. HSDPA adds a new downlink channel dedicated to carrying data with additional intelligence added to the network to ensure an efficient allocation of channel capacity between users within a cell. The theoretical maximum data transfer speed is currently 14.4 Mbps (with so-called HSPA+ or HSPA Evolution potentially doubling that figure) – although this is optional while a theoretical maximum of 3.6 Mbps is obligatory – which is sufficient to transfer emails with bulky attachments extremely quickly and to allow for high-quality video streaming. A reasonable real-world average will lie (at least initially) between 550 kbps and 1.1 Mbps, although some consider that twice as much should be achievable. But speed is not the only virtue of HSDPA since it also doubles network capacity and much improves quality of service. Nevertheless, although HSDPA is essentially an overlay and hence requires no more than a software upgrade, this is true only for operators that installed 3G infrastructure with built-in HSDPA capability (essentially since 2002). Earlier 3G networks will need some hardware additions such as channel cards and traffic processing units. Furthermore, hardware additions will be needed at customer premises including additional handset memory.

As per usual, the initial launches of HSDPA all involved data cards and were aimed at business users. Needless to say, much depended upon the

arrival of decent handsets, and these did not put in an appearance until early 2006, with the Samsung SGH-Z560 and BenQ-Siemens EF91 designed for use mainly in Europe, and the Samsung ZX20 designed primarily for the USA.

3GPP Release 5 merely specified that the uplink associated with HSDPA should operate at a minimum of 64 kbps. 3GPP Release 6, finalised in April 2005, also contained specifications for high-speed uplink packet access (HSUPA), otherwise known as the enhanced dedicated channel (E-DCH). This permits symmetrical two-way high-speed data communications. It was first demonstrated by Ericsson and 3 Scandinavia in May 2005. It was planned that the Ericsson W-CDMA Enhanced Uplink would be introduced in line with terminal and handset availability, commencing in 2006Q2 with data cards and providing 2 Mbps. Meanwhile, in February 2006, Nortel demonstrated uplink data speeds of 1.4 Mbps using commercially available equipment and announced that it would be launching a complete system in 2007. In conjunction with Option, an alleged 'first live' demonstration of a HSUPA data card with uplink at 1.3 Mbps and downlink at 2.7 Mbps was achieved in October 2006. However, mobilkom Austria also claimed to have made the first live transmission in November and to be the first to launch – in Vienna in February 2007 accompanied by a HSDPA upgrade to 7.2 Mbps (3G Americas, 2007a: 7). In April 2008, the Samsung SCH-M470 was launched in South Korea with the potential to send data at up to 2 Mbps.

4G

The above discussion has already touched upon the issue of 4G in the context of IMT-Advanced. The ITU working definition for 4G is variously reported as a downlink speed of at least 100 Mbps when fully mobile or (according to the ITU which is operating via Working Party 8F) 1 Gbps with limited or local mobilility, although it remains unclear for now exactly how this is to be measured. An alternative definition which would take account of the fact that in practice nothing like 100 Mbps is going to be achieved, no matter what the technical possibilities are, would concentrate upon the existence of an all-IP network capable of delivering in excess of the maximum set for 3G – that is, more than, say, 4 Mbps. In all probability, subscribers will be unable to tell whether data speeds are greater than this in any event. However, 100 Mbps is certainly going to be achievable under highly controlled circumstances, and, indeed, it was first achieved in September 2006 by Samsung in a bus being driven around Jeju Island in South Korea at speeds of up to 38 mph.

The approach based upon a 100 Mbps downlink is also reflected in 3GPP Release 8 (which specifies 50 Mbps on the uplink) although this is

not necessarily referred to as 4G even though it is certainly a significant step beyond HSDPA (3G Americas, 2007b). Networks achieving these kinds of speeds are based upon packet-switched technology combined with a new OFDM air interface and multiple input multiple output antenna (MIMO) technology.[15] The latter means that it is more problematic to step up from HSDPA to what is now generally called long-term evolution (LTE) – but may not continue to be called that in the longer term – than from W-CDMA to HSDPA.

In March 2006, T-Mobile, Orange, KPN and Sprint Nextel set out their joint vision in a White Paper entitled *Next-Generation Mobile Networks. Beyond HSPA & EV-DO*. This led to the formation of the NGMN Forum in June to establish performance targets and deployment scenarios. China Mobile (HK) and DoCoMo and others joined the Forum with a view to creating standards for LTE by the end of 2008 and conducting operator trials during 2009. 3GPP are expected to include the UTRA-UTRAN standard and the standards for the System Architecture Evolution (SAE) which addresses the core network supporting the radio access network as part of Release 8. This timetable would place LTE roughly two years behind WiMAX in terms of development. Meanwhile, it was hoped that suitable handsets would be developed. DoCoMo was keen to pre-empt the discussion, and to this end issued its proposed pre-standard version of LTE called Super 3G. It had behaved in exactly the same way when W-CDMA was being developed, issuing a pre-standard version of Release '99 technology in 2001 and updating its network once 3GPP members agreed a common specification. However, other members of the Forum are not keen on a repetition of this arrangement. As a result, a LTE/SAE Trial Initiative was set up in May 2007 to demonstrate the potential of LTE and SAE through joint tests, including radio transmission performance, early interoperability, field trials and full customer trials. The Initiative is expected to last up to two years.

LTE is expected to utilise existing GSM spectrum together with the 2.5 GHz band. Although LTE removes the need for circuit-switched voice, it is not expected to bring about its immediate demise. However, this does create some opportunities for economies in constructing networks capable of handling LTE, and these will be enhanced if existing spectrum can be utilised, although LTE is also optimised for the 2.5 GHz band. This means that LTE and WiMAX may be rendered interoperable – they use the same basic system architecture – although WiMAX is expected to remain largely the province of operators that do not possess 3G spectrum.[16]

As noted, the Expansion Band is critical to the 4G road map because it offers the opportunity for worldwide interoperability. Because of, *inter alia*, the ongoing squabble over the role of WiMAX in 4G, there are indications that the band will be divided into 70 MHz paired of FDD and 50 MHz (less

a guard band) of TDD. Because TDD is considered to be more spectrally efficient for asymmetric data, it is favoured for WiMAX networks (see below) although cellular networks are all based on FDD. Originally, WiMAX was simply referred to as IP-OFDMA but, as noted above, it is now being submitted for IMT-2000 approval as OFDMA TDD WMAN, generating fears that the best spectrum will be reserved for FDD networks (Brown, 2007).

WRC-07

ITU Radiocommunication Sector Working Party 8F (WP8F) has responsibility for the 'overall radio system aspects of IMT-2000 and beyond'. It was asked by the Institute of Electrical and Electronics Engineers (IEEE) and the WiMAX Forum (see below) to consider adding mobile WiMAX – officially known as 802.16e and based upon IP OFDMA techonology – as a complement to existing 3G technologies with a view to offering operators an additional migration path capable of providing wireless broadband services either by way of additional capacity in urban areas or as a stand-alone in rural areas too expensive to provide for by other means. The spectrum bands for which mobile WiMAX was considered to be best suited were 2.3–2.4 GHz and 3.4–3.6 GHz, while fixed WiMAX was already well established in the 3.5 GHz band.

In June 2007, the International Telecommunication Union (ITU) gave its initial approval to plans to include a specific subset of WiMAX known as orthogonal frequency division multiple access time division duplexing (OFDMA TDD WMAN) as a terrestrial radio interface under IMT-2000, meaning that spectrum will be reserved for this on an international basis (Global Insight, 2007a). Final approval was forthcoming in October with the result that WiMAX can henceforth be rolled out not only in the above bands but in the 1.9 GHz 3G band. It is of interest that in gaining acceptance as a 3G technology, WiMAX in effect gave up its pretensions to be treated as part of the 4G family of technologies despite the high theoretical speeds of which it is capable (Global Insight, 2007b).

In practice, although the use of IMT-2000 frequency bands for mobile WiMAX is particularly contentious, the World Radiocommunication Conference held in October/November 2007 (WRC-07) needed to grapple more broadly with how to find additional spectrum wherever it could for what used to be referred to in the ITU as 'systems beyond IMT-2000' – that is, beyond 3G – but which are now commonly known as IMT-Advanced (Office of Communications, 2007) although officially everything – whether IMT-2000 or IMT-Advanced is henceforth to be known simply as 'IMT'. The ITU Working Party 8F is heavily responsible for progressing this project. The full list of bands under consideration is set out in Table 2.3.

Table 2.3 Candidate bands for WRC-07

Candidate band	Anticipated use	Support	Available
410 to 430 MHz	Coverage extension of existing IMT-2000 networks	Very little	No
450 to 470 MHz	Coverage extension of existing IMT-2000 networks	Limited	No
470 to 862 MHz	Coverage extension and possible IMT-Advanced	Yes, but in 2011	>112 MHz
2300 to 2400 MHz	IMT-Advanced	For mobile WiMAX	No
2700 to 2900 MHz	IMT-Advanced	Very little	No
3400 to 3600 MHz	IMT-Advanced	Considerable	Partly
3600 to 3800 MHz	IMT-Advanced	Considerable	Partly
3800 to 4200 MHz	IMT-Advanced	Limited	Very little
400 to 4990 MHz	IMT-Advanced	Very little	No

Source: Adapted from Ofcom (2007), p. 2.

According to Report ITU-R M.2078 produced by WP8F, IMT would require 1280 MHz of spectrum (as compared to the 580 MHz already identified for IMT-2000) by the year 2020. Hence, in effect, a further 700 MHz of spectrum was being sought in the bands identified in Table 2.3. In this respect, it is worthy of note that the ITU's Radio Regulations contain a table of Frequency Allocations whereby frequency bands are allocated to services such as fixed-wire or mobile. A 'primary' allocation means that protection from interference by other 'secondary' services can be sought. Furthermore, certain frequency bands are identified as suitable for particular uses such as IMT-2000. Although this provides no specific benefits, it does tend to mean in practice that throughout the world the same bands are favoured for specific uses and hence much increases the probability of agreement about such uses at the WRC. So far as Table 2.3 is concerned, it includes many instances where no 'primary' allocation yet exists, so such an allocation would need to be assigned if there was sufficient backing at WRC-07.

As was noted previously, the 2500–2690 MHz band has for some time been set aside as an Expansion Band for 3G. However, as shown in Table 2.3, the 2300–2400 MHz band is favoured for mobile WiMAX, and this technology has also been licensed in some countries in the 2500–2690 MHz band. Led by the GSM Association, there has been much opposition to allowing mobile WiMAX to encroach into the 3G space, but a good many operators would be keen on refarming their 2G networks for 3G use and then using the freed-up 2500–2690 MHz spectrum for mobile WiMAX. Since this would make the latter spectrum considerably more valuable, most regulators were waiting for WRC-07 to (it was hoped) resolve the issue.

WRC-07 concluded in mid-December 2007. The frequency bands identified for use by IMT were:

- 450–470 MHz;
- 698–862 MHz in Region 2 (the Americas) and nine countries in Region 3 (Asia);
- 790–862 MHz in Regions 1 (Europe, Africa, Middle East, former USSR, Mongolia) and 3;
- 2.3–2.4 GHz;
- 3.4–3.6 GHz (on voluntary basis).

However, these bands were made available for IMT services, not IMT-2000, so it is probable that they will be made available for technologies like LTE and UMB not as yet included in IMT-2000. It is also of note that the timing in all cases is left to the discretion of individual countries (CommunicationsDirect, 2007).

2.6 WIRELESS IN THE LOCAL LOOP (WLL)

WLL is a variant of what is generically known as broadband wireless access (BWA) and which also includes WiMAX. WLL is known by a number of synonyms, but for now it is probably most commonly referred to as 'fixed wireless' and sometimes as 'limited mobility'. The reason for this is that it represents a 'last mile' connection via wireless instead of copper wire or fibre optics. However, it does not form part of a conventional cellular network. Usually, WLL is introduced into major conurbations where it is possible to set up a dense network of equipment with limited range, and is self-contained within the conurbation. Hence, it is ideal for potential subscribers who stay for most of the time within the conurbation and simply want to use their handsets while, for example, at work, wandering the streets or pottering about in traffic (as against travelling at high speed).

Because cellular networks have a long history in Western countries, have almost complete population coverage and use PCN/PCS spectrum as well as that in lower spectrum bands, there was never a good economic case for creating a significant WLL presence. However, the situation in less-developed countries was another matter. Since cellular networks there were often either poorly developed in terms of population coverage or simply unable to cope with demand, WLL had a much brighter future. The countries where this was most obviously the case were China and India. In China, despite the extraordinary growth of GSM/CDMA networks, penetration remained low, and much of the population simply wanted something cheap and cheerful for use within their own locality.

2.7 ALTERNATIVE WIRELESS TECHNOLOGIES

Wireless Local Area Networks (W-LANS/Wi-Fi)

What is known technically as 802.11 – a wireless local area network (W-LAN) standard approved by the IEEE – uses the 2.4 GHz spectrum, which is free and unlicensed, in its 802.11b variant now commonly known as Wi-Fi, for which there is a competing technical standard in the form of Bluetooth.[17] 802.11b uses direct sequence spread spectrum (DSSS) to transmit signals at up to 11 Mbps and this provides some protection against interference originating from microwave ovens or cordless handsets. The 802.11b band is typically less than 100 Hz wide, and other radio allocations on either side mean that it is not practical to create a wider band to ensure international consistency.

Wi-Fi is being rapidly adopted in big cities and especially in airports, hotels and cafes as well as on school and university campuses. The crucial aspect of 802.11 is that it recognises that people on the move tend to become stationary before accessing the Internet. However, although the number of users already runs into the millions, it was set up as a data-only system which cannot therefore (at least for now) supplant 3G but rather can be expected to act as a complement to it.[18] The 802.11a variant has become available using spectrum in the 5 GHz band (5–6 GHz) and is theoretically capable of data transmission at up to 54 Mbps although the average speed in practice is roughly 22 Mbps. A competing technology known as high-performance radio local area network type 2 (HiperLAN2) has been introduced in Western Europe. Compared to 2.4 GHz, 5 GHz provides more channels and a higher quality of service, but for the time being issues relating to lack of equipment, regulation and business models are in the developmental stage. The ITU has sanctioned 5.150–5.250 GHz (for indoor use only), 5.250–5.350 GHz (for 'predominantly' indoor use) and 5.470–5.725 GHz (for outdoor use provided 'interference mitigation' techniques are employed) as suitable for this purpose.[19] Similar speeds to 802.11a are becoming possible on the 2.4 GHz band by switching to 802.11g, which is interoperable with 802.11b and was approved by the IEEE in June 2003, but for the moment the slower technology is sufficient for most purposes. 802.11n, which uses MIMO technology, is currently in development, backed by the Enhanced Wireless Consortium (EWC), and received the approval of the IEEE in January 2006. Capable, in principle, of speeds up to 540 Mbps, it is supported by the likes of Broadcom. However, the initial chipsets were rejected by the IEEE in May 2006 and the standard was not expected to obtain final approvals until 2007 or even later.[20]

For the time being there are a variety of technical problems to overcome – especially concerning interference and security – before 802.11's role in relation to 3G is clarified. Furthermore, while the use of unlicensed spectrum for private purposes is regarded as acceptable, annexing it for public applications such as LANs and charging for services provided may well instigate regulatory interference – for example, it is illegal to use W-LAN frequencies for profit in some countries – possibly prompted by complaints from 3G licensees. Problems of congestion may anyway induce self-imposed limits on use of the spectrum, and suppliers of broadband services are not enthusiastic about multiple access to their networks.

However, even assuming away many of these difficulties, there appears to be a difference in approach between Western Europe and the USA, since the dominance of mobile operators in Europe tends to favour their rolling up the development of W-LANs into the provision of GPRS/UMTS. Arguably, the development of W-LANs in Europe is being held back by the

need to roll out 3G networks, but operators do appear to be aware that they cannot afford to cede control over W-LANs to other parties. Nevertheless, it is important not to get carried away with hotspot numbers running into the thousands. Wi-Fi operates over a short range at a relatively high frequency, hence it must be borne in mind that if a typical mobile network involves several thousand base stations, the equivalent number of hotspots is extremely large.

The European Commission has taken action to prepare for what it sees as a coming 'explosion' of Wi-Fi users by allocating 5150–5350 MHz and 5470–5725 MHz specifically to meet that demand. It required all Member States to allocate the spectrum by 31 October 2005.

So far, companies seeking to create viable businesses based on the provision of W-LAN services have not been successful. At heart, the primary difficulty is that prospective customers will only pay fees to access a network with sufficient coverage, yet different locations are generally controlled by different operators and this forces users to set up multiple accounts and passwords while travelling around. As ever, some 'amateur' enthusiasts are willing to provide access to all-comers via the simple expedient of erecting a Wi-Fi antenna and entering an availability listing on an online directory, but whereas this has the virtue of providing free access to passers-by, it lacks any kind of controlling mechanism and hence is open to abuse. The latest thinking is to provide an aggregation service which can provide access to a large number of networks via a single account, with the aggregator sharing revenue with the network operators. Alternatively, any Wi-Fi-enabled PC can have free software installed that turns it into a hotspot linked up to other hotspots on the same network. Achieving the necessary scale to attract subscriptions is then the difficult bit if commercial viability is to be achieved.

WiMAX

Another way forward is encapsulated in the worldwide interoperability for microwave access (WiMAX) Forum which is behind the IEEE 802.16 standard first published in April 2002. This is a data-only standard – not strictly a technology as such – that initially came in variants 802.16a and 802.16c of the common 802.16 *fixed* standard – the former covering the 2 GHz to 11 GHz band, making it suitable for connection to Wi-Fi hotspots, and the latter covering the 56 GHz to 66 GHz band – as well as the original variant designed for the intervening bandwidth which tends to be already occupied and hence of limited practical use. 802.16 has evolved into 802.16-2004 which was previously known as 802.16d (OECD, 2006).

With a peak range of at least 50 kilometres – and hence suitable for metropolitan area networks (MANs) – and a peak shared data rate of 70

Mbps, 802.16 certainly appears to offer an attractive prospect for areas currently not covered at all, or poorly covered, by other types of network. However, these sort of outstanding numbers reflect the optimum channel size, power and best-case modulation, and take no account of the network overheads. In fact, roughly 30 per cent of the bandwidth is needed for error correction and encoding, and what is left – roughly 50 Mbps – covers both directions of data transfer given that WiMAX is a TDD system. Hence, with equal directional flows, each could carry only 25 Mbps, and a further 10 per cent is needed for other purposes. What is left – 20 Mbps upstream and downstream – is accordingly rather less than the original amount claimed, but on the other hand it is a lot faster than 3G.

Significantly, this standard defines neither the frequency bands nor channel width, and if the channel is as wide as 28 MHz, then speeds of up to 130 Mbps are possible. However, being a multi-point system, the capacity must be shared between however many customers as are logged on at any one time. A *mobile* variant with a 5 km radius from a base station known as Wireless Broadband Korea (WiBRO or 802.16e) – but occasionally as Wide Broad Internet – has been developed by Samsung and LG Electronics in South Korea. This uses a 10 MHz channel in the 2.3 GHz band but it has not been a success, and in Europe there are significant differences in the approach taken by different Member States (Ballon, 2007; Taafe, 2007). Originally seen as a regional competitor to WiMAX – because it permits handover between cells it can, unlike WiMAX, be used in vehicles moving at up to 120 kph – the IEEE 802.16e Task Group approved the specifications for worldwide 802.16e, often referred to as mobile WiMAX, in December 2005. It is expected to be capable of delivering 30 Mbps, but this translates into a real-world speed of up to 10 Mbps under normal operating conditions which is not a huge step forward relative to the speeds expected from HSPA in the reasonably near future. Unfortunately, there is no agreement as yet on a single spectrum band to be used on a worldwide basis; the USA and Asia-Pacific countries favour 2.5 GHz, while Europe and Latin America favour 3.4–3.6 GHz. Should the disparity continue, business travellers would need to have their laptops configured to deal with both bands.

At the end of the day, mobile WiMAX was seen as a real contender to take on 3G in good part because of its relative speed, but its real-world performance is now thought to be comparable to that of HSDPA which accordingly is likely to be preferred due to its lower cost (TelecomWeb, 2007).

NOTES

1. Such as the CDMA Development Group and the GSM Association.
2. See www.cellular-news.com/gprs.
3. See Parker (2003). A brief history of EDGE is to be found at www.cellular.news.com of 18 July 2003. See also www.gsacom.com for a list of adopters; Pearson and Rojas (2003); and *Wireless Business Review: 3GSM World Congress 2004 Edition* pp. 60–62 at www.gsmworld.com.
4. For a recent review of HSPA see, for example, Harrowell (2006).
5. MVNOs do not need to buy a licence or build a network. However, to be successful they probably need to have an existing relationship with a customer base that they can exploit, a well-known brand, a distinct set of charges, and their own distribution channels and billing systems.
6. See European Radiocommunications Committee (1997).
7. 'Commission decision of 14 February 2007 on the harmonised use of radio spectrum in the 2 GHz frequency bands for the implementation of systems providing mobile satellite services', *Official Journal of the European Union*, L 43/32, 15.2.2007 stipulated that, because of the threat of harmful interference, the spectrum should be allocated to MSS 'on a primary basis' and that Member States should allocate the spectrum on that basis as from 1 July 2007.
8. See entry for Evolution-Data Optimized at http://en.wikipedia.org/wiki/EVDO.
9. For a concise discussion of the history of GSM see Pelkmans (2001). There is a discussion of technology at www.itu.int/newsarchive/press/releases, www.ida.gov.sg/Website/IDAConten, www.cellular-news.com/3G and www.umtsworld.com. FDD is a technique whereby the uplink and downlink are at different frequencies, whereas with TDD they are on the same frequency. The 5 MHz unpaired TDD slots have been more problematic. The current view is that three technical options are available. The first is to put it to the use originally envisaged for it, namely for high-capacity, short-range 'femtocells' – smaller and less expensive than enterprise-focused 'picocells' – in locations such as railway stations and airports. The second is to use it for wireless broadband. The third is to use it for tdTV as developed by IPWireless.
10. For a discussion of the component parts of a mobile network see the Nokia White Paper *Mobile Network Transmission*, available at www.totaltele.com.
11. Unlike DECT, PHS – also a TDD-based TDMA cordless access technology – was not submitted for consideration as 3G. The idea that one can pick up a fixed-wire handset and wander around within a limited range from the cradle is nothing new, although reception may still be patchy.
12. The WRC meets every two or three years – it met, for example, in 1995, 1997, 2000 and 2003. Its conferences are organised by the International Telecommunication Union, a specialised agency of the UN – see www.itu.int/ITU-R/conferences/wrc. The WRC's job is to review and, where necessary, revise the Radio Regulations – the international treaty obligations governing the global use of the radio spectrum and of satellite orbits.
13. The obvious justification for exploring the use of CDMA-450 (often CDMA450) is that one base station provides roughly the same coverage as 25 UMTS base stations, and a CDMA-450 network is roughly 30 per cent cheaper than a CDMA-800 network and up to 70 per cent cheaper than a CDMA-1900 network. However, the absence of a facility to roam out of the 450 MHz band has been a problem.
14. 3GPP is an international standardisation initiative concerned with GSM and its derivatives. 3GPP periodically produces a complete current list of its specifications in a sequence of Releases. The central problem being addressed by 3GPP's core network technical specification group, TSG-CN, is that Internet protocols allow largely free services to be provided over 'best effort' quality of service (QoS) networks, whereas 3G operators require a very high QoS if subscribers are to be willing to pay much higher fees than for 2G. The other two groups are concerned with the radio access network (RAN), terminals and service and systems aspects (see www.3GPP.org). Much of the history can be traced

via publications of 3G Americas, notably *The Evolution of UMTS – 3GPP Release 5 and Beyond*, a White Paper first published in June 2004 and updated in November 2004, and *The Evolution of UMTS/HSDPA – 3GPP Release 6 and Beyond*, a White Paper published in July 2005. 3GPP2 is the equivalent of 3GPP but applied to derivatives of CDMA. Its working groups are concerned with access network interfaces, cdma2000, services and systems aspects and intersystem operations (see www.3GPP2.org).

15. In practice, while the downlink is based on OFDMA, the 3GPP specifies SC-FDMA for the uplink. For a discussion of the complexities of introducing LTE technology see 'LTE: a testing environment – fast forward', available at www.mobileeurope.co.uk of 31 January 2007.
16. See Morris (2006). A brief review of LTE is to be found on the www.gsacom.com website.
17. Bluetooth is technically IEEE standard 802.15.1 with a range of 10 metres – see www.Bluetooth.com.
18. For this reason, equipment manufacturers are concentrating upon effecting seamless hand-off between W-LANs and 3G networks. A crude comparison between Wi-Fi with 3G would suggest the following, *inter alia*, is true for the time being:
    - both are wireless technologies;
    - both need to be connected to a fixed-wire backbone;
    - both provide broadband connections;
    - 3G is normally licensed; Wi-Fi is unlicensed;
    - 3G is designed to carry voice and data; Wi-Fi to carry data only;
    - 3G is introduced as a cohesive, monolithic system; Wi-Fi grows piecemeal;
    - 3G is designed to cover large areas; Wi-Fi to cover small areas;
    - 3G requires huge expenditures; Wi-Fi is relatively cheap;
    - 3G heavily favours wireless incumbents; Wi-Fi is more entrepreneurial;
    - a much higher QoS can be guaranteed for 3G (e.g., less interference, more security).
19. The 2003 World Radiocommunication Conference (WRC-03) was principally concerned with the allocation of spectrum in the 5 GHz band. In total, 455 MHz was allocated in the band even though, since the spectrum is normally unlicensed, international allocations are not strictly necessary. Nevertheless, most advanced countries were anxious that the spectrum bands be harmonised to ensure interoperability and also that developing countries with no history of unlicensed spectrum should legitimise the unlicensed use of the bands as agreed at the WRC.
20. See Clark (2006), 'New Wi-Fi IEEE 802.11n standard suffers further delay', available at www.telecomdirectnews.com of 16 August 2006 and 'Wi-Fi Alliance rushes in with 'pre' 802.11n certification', available at www.telecomdirectnews.com of 30 August 2006.

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3. Structural and strategic adjustment in Asia-Pacific mobile telecommunications

3.1 INTRODUCTION

Chapter 1 has shown that in the aftermath of the meltdown of 2000/02 there has been an unprecedented surge in structural and strategic adjustments in the worldwide mobile telecommunications industry. Mobile operators have bought and sold stakes in one another, entered some markets while exiting others and, less frequently, consummated mergers with one another. Although such adjustments are clearly evident in many regions as later chapters will demonstrate, they are less visible in the Asia-Pacific region.

It is not immediately obvious why this is the case. In the first place, Asia-Pacific contains a number of very large individual networks and mobile operators, in part due to the result of the relatively late privatisation and liberalisation.[1] In addition, foreign direct investment between contiguous countries, encouraged by cultural affinities, might be expected. However, although Ronen and Shenkar (1985) demonstrate that some countries in the region do share cultural affinities, others like India and Japan are best treated as culturally independent, while the Pacific Rim is heavily biased towards 'Anglo' culture (Curwen and Whalley, 2006).

Thirdly, many countries in the region are developing countries. This results in relatively low average incomes, with correspondingly low mobile penetration rates.[2] As a consequence, there has been, and often remains, enormous growth potential by the standards of other regions such as Europe or North America. As a result, mobile operators based in the Asia-Pacific region have understandably focused their attentions on developing their home markets rather than on expanding overseas, although this is beginning to change as penetration rates rise and domestic competition intensifies. Given the region's attractions, it is surprising that mobile operators based elsewhere have failed to develop, or alternatively have chosen to dispose of, portfolios of assets in the Asia-Pacific region. This chapter explores why this is the case, but before it does it is necessary to comment

on how internationalisation in the mobile telecommunications industry can be measured. This discussion will be picked up again in detail in Chapter 9 where data from individual regions are combined to present a worldwide picture.

3.2 MEASURING INTERNATIONALISATION

There is no shortage of suggestions as to how internationalisation may be measured. Dörrenbächer (2000) and Sullivan (1994) both suggest three broad categories of possible internationalisation indicators. The first of these is structural. Structural indicators are, according to Dörrenbächer (2000), those that provide a snapshot of the international engagement of the company at any given point in time. One such indicator would be the number of countries in which the company is present, while another is foreign assets as a percentage of total assets. A third structural indicator is the ratio between domestic and foreign employment.

The second broad category of internationalisation indicators are performance indicators, which measure how well the company is doing overseas. Dörrenbächer (2000: 120) identifies two such indicators, turnover and operating income, whereas Sullivan (1994: 331) notes three: R&D intensity, advertising intensity and export sales as a percentage of total sales. Although Gerpott and Jakopin (2005) prefer to use different terminology, they draw attention to foreign income as a percentage of total income.

Attitudinal indicators form the third broad category of internationalisation measurement indicators. These measure the relationship between the home country of the company and its overseas operations. Sullivan (1994: 332) notes the difficulties of measuring attitudinal indicators before suggesting that determining the cumulative international experience of senior managers could be used as a measure. Recognising these difficulties, Dörrenbächer (2000) suggests drawing on Perlmutter (1969) which identified a range of headquarter/subsidiary relationships. In all, four different relationships are identified – ethnocentric, polycentric, regiocentric and geocentric – and as the company moves through these in turn, internationalisation will increase (Dörrenbächer, 2000).

A second attitudinal measure is the psychic dispersion of the international operations of a company. Johanson and Wiedersheim-Paul (1975: 308) define psychic distance as those 'factors preventing or disturbing the flows of information between firm and market' and offer examples that include language, culture and political systems. These create information asymmetries and thus uncertainties and risks for inward investors. With this in mind, Johanson and Vahlne (1977) argue that internationalisation is

incremental. Companies initially favour foreign markets that are close in terms of psychic distance to their home market before expanding into more distant ones, and when they enter each market their investment increases over time. While there has been some discussion as to the usefulness of the concept and how it may be measured,[3] one widely-used approach was suggested by Kogut and Singh (1988) who draw on Hofstede (1980) to rank countries relative to a given country. An alternative methodology is to use the ten country clusters identified by Ronen and Shenkar (1985), with a company having a presence in, say, five of the ten country clusters being credited with a score of 50 per cent (Sullivan, 1994).

It is clearly possible to argue that the use of the individual aforementioned indicators provides an incomplete picture of internationalisation. For example, although a company may have a presence in 20 countries, these investments may only generate a small fraction of the company's overall revenues or account for a low proportion of its employees. As a consequence, some authors have sought to develop composite indices of internationalisation that combine several hitherto separate indicators. Ietto-Gillies (1998), for example, proposed a composite index that combines the ratio of foreign to total assets, sales and employment with a measure of how many countries the company could be present in if it so wished. UNCTAD (2007) uses these measures, but in two separate indices of internationalisation: a transnationality index (TNI) and an internationalisation index (II). The former is the average of the ratio of foreign to total assets, sales and employment while the latter is calculated by dividing the number of foreign affiliates by the number of all affiliates. While this approach has its attractions, the inclusion of companies from small countries is likely to distort the indices since, according to Hassel et al. (2003: 721), they have a greater proportion of their operations abroad. In other words, the indices do not control for country size.

Sullivan (1994) combined nine measures – five performance, two structural and two attitudinal – into a composite index of internationalisation. The identification of relevant measures, and their subsequent combination into a composite index, is, however, by no means straightforward. By demonstrating the range of measures that are available, Dörrenbächer (2000) also highlights how different indicators have been developed to measure ostensibly the same phenomenon. Assuming that agreement can be reached on which measures are to be chosen, problems emerge when they are combined into a composite index. For example, Sullivan (1994) proposes to combine nine measures to ascertain the degree of internationalisation of a company. Although Ramaswamy et al. (1996) welcome the move away from a single measure of internationalisation that Sullivan (1994) represents, they argue that internationalisation is more complex

than the index implies (Ramaswamy et al., 1996: 176). It is not clear, they argue, how the various index components relate to one another, and this point, when coupled with their own criticisms, allowed them to conclude that the move to an index measure of internationalisation was premature. Predictably, Sullivan (1996) responded to Ramaswamy et al. (1996) by arguing that they had misunderstood his original article and that the index was not premature.

Although the literature does provide a wide array of possible ways through which internationalisation could be measured, some are easier to implement than others. A key factor that determines which measures can and which cannot be used is the availability of data. By no means do all mobile operators describe their international operations in detail. As a consequence, it is often difficult to determine, for example, the exact size of their investment or how many subscribers the mobile operator has in any given year. A company may report an aggregate capital expenditure figure without stating how this was divided between its various businesses at home and abroad. In addition, data may be inconsistent between years. Mobile operators restate their accounts to reflect changes in accounting rules as well as the sale and purchase of businesses, complicating any attempt to undertake a longitudinal analysis of internationalisation. One way to counter such inconsistency is to opt for data that are published regularly at both the individual investment and parent company level.

Using data that are available at the individual investment level contributes to negating the problems that emerge from data aggregation. When data are aggregated by line of business, geographical region or parent company, the performance of individual international investments is obscured. For example, although UNCTAD (2007) identifies France Télécom as being the second-most-internationalised telecommunications operator, its reliance on France and the UK as sources for mobile subscribers is not made explicit. Moreover, the choice of the parent company as the unit of analysis by UNCTAD can potentially obscure the internationalisation of any telecommunications-based subsidiaries. UNCTAD (2007) identifies nine telecommunication companies among the top 100 non-financial companies ranked by assets. Not only does this overlook the mobile telecommunication internationalisation activities of Hutchison Whampoa, which is classified as 'diversified' by UNCTAD (2007), but it also ignores the significant handset business of Samsung Electronics as well.

The performance of individual investments is also obscured when partially owned operations are consolidated with those that are wholly owned. Financial data are frequently aggregated and consolidated with the result that there is insufficient detail to determine the revenues and profits of

specific investments. Dassler et al. (2002) and Gerpott and Jakopin (2005) are only able to conduct their financial analyses of operators because they limit their samples to American, European and Japanese companies whose financial reporting requirements are comparatively onerous and thus provide relatively detailed data.

As a consequence of the limited availability of data, there is a tension between the comprehensiveness of the analysis and its level of detail. Being comprehensive will increase the number of mobile operators included within the analysis, and thus provide a better picture of internationalisation within the industry, but will do so at the expense of detail. In contrast, greater detail provides a richer understanding of internationalisation but for fewer companies. In so doing, however, the ability of the analysis to comment on changes at an industry-wide level is inevitably limited. Not only may the mobile operators examined represent a fraction of the internationally minded operators active in the industry, but the analysis will exclude those companies based in countries where accounting and regulatory report requirements are less strict than in Europe or the United States.

In this chapter a form of comprehensive approach has been adopted. Data have been collected on the geographical location of each network, the ownership of the network in terms of how its equity is distributed between shareholders, and the number of subscribers that the network has been able to attract at the end of a given year. Although these data form the basis of our analysis, other data sources such as the amount spent on acquiring licences or stakes in networks are drawn on as available. As a result, the analysis will include as many internationalised mobile operators as possible and thus provide a more comprehensive picture of the industry's structure.

3.3 SETTING THE SCENE IN THE ASIA-PACIFIC REGION

There is inevitably some room for disagreement about where Eastern Europe, the Middle East and Asia begin and end for the purposes of examining operators' strategies. In this case, we have chosen to include certain of the ex-Russian Republics on the grounds that they cannot readily be described as European, and to exclude Turkey even though a significant part of it could be said to be Asian. Table 3.1 also excludes countries/islands (hereafter 'countries') where there is a monopoly provider that is wholly state-owned or where subscriber numbers are too small to warrant inclusion on the grounds that such countries are (necessarily) of little interest to internationalising operators. This produces a sample set of 35 countries for the Asia-Pacific region.

Table 3.1 Location of networks: main Asia-Pacific operators, 31 December 2006 and 31 December 2007[1,2]

Country	Hutchison Whampoa	Maxis	QTel	NTT[3]	Orascom	Singapore Telecom	SK Telecom	Telekom Malaysia	Telenor	Vodafone
Afghanistan	–	–	–	–	–	–	–	–	–	–
Australia	Y	–	–	–	–	Y	–	–	–	Y
Bangladesh	–	–	–	–	Y	Y	–	–	Y	–
Bhutan	–	–	–	–	–	–	–	–	–	–
Brunei	–	–	–	–	–	–	–	–	–	–
Cambodia	–	–	**Y**	–	–	–	Y	Y	–	–
China	Y	–	–	–	–	–	Y[4]	–	–	Y
Fiji	–	–	–	–	–	–	–	–	–	Y
Guam	–	–	–	Y	–	–	–	–	–	–
Hong Kong	Y	–	–	Y	y	–	–	–	–	y
India	Y [N]	Y	–	–	y [N]	Y	–	Y	–	Y
Indonesia	**Y**	Y	**Y**	–	**y**	Y	–	Y	–	–
Japan	–	–	–	Y	–	–	–	–	–	–
Kazakhstan	–	–	–	–	–	–	–	–	y	–
Kyrghyzstan	–	–	–	–	–	–	–	–	–	–
Laos	–	–	**Y**	–	–	–	–	–	–	–
Macau	Y	–	–	–	y	–	–	–	–	–
Malaysia	–	Y	–	–[5]	–	–	–	Y	Y	–
Maldives	–	–	**Y**	–	–	–	–	–	–	–
Mongolia	–	–	–	–	–	–	Y	–	–	–
Myanmar	–	–	–	–	–	–	–	–	–	–
Nepal	–	–	–	–	–	–	–	–	–	–
New Zealand	–	–	–	–	–	–	–	–	–	Y
North Marianas	–	–	–	–	–	–	–	–	–	–
Pakistan	–	–	–	–	Y	**Y**	–	–	Y	**y**
Philippines	–	–	–	Y	–	Y	–	–	–	–

Singapore	–	–	**Y**	Y	–	Y	–	Y	–	–
South Korea	–	–	–	Y	–	–	Y	–	–	–
Sri Lanka	Y	–[6]	–	Y	y	–	–	Y	–	–
Taiwan	–	–	–	Y	–	–	–	–	–	–
Tajikistan	–	–	–	–	–	–	–	–	y	–
Thailand	Y	–	–	–	y	Y	–	–	Y	–
Turkmenistan	–	–	–	–	–	–	–	–	–	–
Uzbekistan	–	–	–	–	–	–	–	–	y	–
Vietnam	**Y**[7]	–	–	–	**y**	–	Y	–	–	–
Total 2006	7	3	0	8	2 (7)	7	5	7	4 (7)	6
Total 2007	**8**	**3**	**5**	**8**	**2 (8)**	**8**	**5**	**7**	**4 (7)**	**7**

Notes:

1. The entries during 2007 are listed in bold while an agreed (even if yet to be executed) exit is listed as 'N' in bold.
2. The entries in lower case are subsidiaries of operators in which a minority stake is/was held as follows (the extended totals are given in the brackets):
   - Orascom had a minority stake in Hutchison Telecom International (HTIL) – sold in 2007.
   - Telenor has a minority stake in Russia's VimpelCom.
3. Certain of NTT's stakes are held via majority-owned subsidiary NTT DoCoMo.
4. Technically, the stake was initially held in the form of convertible bonds rather than equity, but was certain to be converted – taking place in August 2007 – so is included for 12/06.
5. A 16.5% stake in newly licensed 3G operator U Mobile was bought in December 2007. To this can be added an indirect stake of 1.7% held via KTF of South Korea. No launch as yet.
6. A stake transfer was agreed during 2007 but subsequently held up, perhaps for good.
7. Hutchison does not technically own the shares but obtains a specified share of the profits.

Source: Compiled by the authors from a wide variety of (mainly operators') websites.

There are huge differences in the current subscriber bases of Asia-Pacific countries. As of 31 December 2007, the 13 largest markets in descending order of size were China (530m.), India (212m.), Japan (102m.), Indonesia (86m.), Pakistan (77m.), Philippines (54m.), Thailand (53m.), South Korea (44m.), Vietnam (36m.), Bangladesh (35m.), Malaysia (23m.), Taiwan (22m.) and Australia (21m.). China accounted for roughly 40 per cent of the region's subscribers and India for a further 15 per cent – with the former crossing the 500 million barrier and the latter crossing the 200 million barrier in September 2007. The non-Asia part of the region is quite small and largely accounted for by Australia and New Zealand, although these markets are once again growing relatively quickly due to the launch of 3G networks. However, the fastest-growing markets of any size in the region are currently Bangladesh, Cambodia, India, Indonesia, Pakistan and Vietnam.

Table 3.1 contains data on the ten international operators that were most active in the Asia-Pacific region at the end of 2006 with their situation updated to the end of December 2007. It specifies the location of networks in which a majority or minority stake is owned either directly or indirectly via another operator linked via an equity investment. No attention is paid to the size of equity stakes as such on the grounds that it is subscribers that count (because they generate financial flows), and a small stake in a large operator can generate as many subscribers as a large stake in a small operator. However, where the investment consists of a minority stake in another operator which, in turn, holds stakes in further operators, the complete lack of control that is implied by such an arrangement is acknowledged via the use of the lower rather than the upper case.

If we look at the 35 countries according to the number of these operators that were present via a direct investment at the end of 2007, no operators were present in ten cases, one was present in nine cases, two were present in five cases, three were present in five cases, four in five cases and five in one case. On the whole, this does not indicate a great deal of head-to-head competition in the region between international operators, with no competition present in Japan once Vodafone had exited and with China presenting a deceptive picture in that the three companies listed as present all have very small stakes in Chinese operators. While India is clearly (and increasingly) a target market for internationally minded operators, it is also evident that they have been willing to sell out of the market if the price was right – in addition to Hutchison Whampoa in 2007, France Télécom sold out in December 2004 and AT&T Wireless in September 2005.

3.4 UPDATE TO 2007

Table 3.1 is by its nature static in so far as it illustrates the position on 31 December 2006 and 31 December 2007 respectively, although a comparison of the two dates provides an element of dynamism. A more dynamic picture is shown in Table 3.2, which covers a four-year period commencing in January 2004. Table 3.2 lists all operators with at least 2 million proportionate (equity-adjusted) subscribers in the Asia-Pacific region at the end of 2007 and where operators have had at some point during the period at least three networks including that in the home market (and hence contains more operators than Table 3.1). It is of no small interest that only seven regionally-based operators qualify for inclusion, representing a mere six countries. In addition, there are four operators based in Western Europe (although one does not operate there), one in Russia (of which a large part geographically is strictly in Asia), two in the Middle East and one in Africa. There are no US-based operators listed.

It may further be noted that at the end of 2007, six operators effectively obtained 100 per cent of their proportionate subscribers from the Asia-Pacific region where they were based. The only exception was Hutchison Whampoa, which is based on a relatively small island that until very recently was controlled by the UK and hence has strong historic trading relationships outside the Asia-Pacific region. Only one operator based outside the region relied upon it for over half of its proportionate subscribers and that, interestingly, was Orascom Telecom Holdings of Egypt, which is controlled by Weather Investments II, a vehicle of the Sawiris family. However, it may be noted from Table 3.1 that Orascom had only two direct investments in the region – in Bangladesh and Pakistan – and that Orascom sold its residual stake in HTIL in early 2008.

The changes in the table are accounted for as follows (cf. Table 3.1):

- Etisalat acquired 26 per cent of PTCL including mobile operator Ufone in April 2006. It acquired 16 per cent of Indonesia's Excelcomindo and launched in Afghanistan in 2007.
- Hutchison Whampoa has held a 1.6 per cent stake in China Unicom for many years. HTIL launched in Indonesia and Vietnam in 2007 while selling out to Vodafone in India.
- Maxis entered Indonesia in 2005 and India in 2006.
- Millicom departed Vietnam in 2005 and Pakistan in 2007.
- NTT departed the Netherlands and the UK but entered South Korea in 2005 and entered Guam/North Mariana Isles in 2006.

Table 3.2 Main mobile operator presence in the Asia-Pacific region, 31 December 2004 to 31 December 2007

Mobile operator	Home market	Countries 31/12/04[1]	Countries 31/12/05[1]	Countries 31/12/06[1]	Countries 31/12/07[1]	Asia-Pacific mobile subscribers[2]	Asia-Pacific as % total subscribers
Singapore Telecom	Singapore	6	7	7	8	61 948 000	100.0
Vodafone	UK	5	6	6	7	41 744 000	16.8
Telenor	Norway	4	6	7	7	40 696 000	51.0
Orascom	Egypt	2	7	7	8	38 048 000	65.6
NTT[3]	Japan	6	7	8	8	38 031 000	100.0
SK Telecom	South Korea	4	4	6	6	34 050 000	99.9
Telekom Malaysia	Malaysia	4	6	7	7	28 260 000	99.6
Maxis	Malaysia	1	2	3	3	16 698 000	100.0
Telstra[4]	Australia	2	2	2	3	9 904 000	100.0
Etisalat	UAE	0	0	1	3	7 053 000	37.8
Hutchison Whampoa	Hong Kong	7	7	7	8	5 868 000	30.3
VimpelCom	Russia	1	2	3	3	4 624 000	9.4
TeliaSonera	Sweden	1	1	2	4	3 348 000	6.5
Qatar Telecom	Qatar	0	0	0	5	2 909 000	32.9
Millicom	Luxembourg	5	4	4	3	2 243 000	12.3

Notes:
1. This column takes account only of all actual transfers of assets up to the specified date.
2. As of 31 December 2007. By subscribers we refer here not to gross subscriber numbers but to 'proportionate' or 'equity' subscribers: that is, the gross figure is weighted according to the proportion of the equity held by the company in question.
3. NTT largely operates internationally via majority-owned subsidiary DoCoMo.
4. Telstra has a 3G licence in New Zealand where it is a reseller of Vodafone services.

Source: Compiled by the authors from a wide variety of (mainly operators') websites.

- Orascom acquired a 19.3 per cent stake in HTIL in December 2005. It agreed to sell it – mostly back to HTIL – in 2007 with the actual transfer taking place in January 2008.
- Qatar Telecom entered Cambodia, Laos, Indonesia, the Maldives and Singapore in 2007.
- Singapore Telecom entered Bangladesh in 2005 and Pakistan and Taiwan in 2007.
- SK Telecom entered Cambodia and China where it acquired 6.7 per cent of China Unicom via convertible bonds in 2006 and converted them in 2007.
- Telekom Malaysia entered Indonesia and Singapore in 2005 and India in 2006.
- Telenor entered Pakistan in 2005 and Tajikistan and Uzbekistan (indirectly via VimpelCom) in 2005 and 2006 respectively.
- TeliaSonera entered Tajikistan (indirectly via MegaFon) in 2006 and Uzbekistan and Afghanistan in 2007.
- VimpelCom entered Tajikistan in 2005 and Uzbekistan in 2006.
- Vodafone entered India in 2005 and departed Japan in April 2006.

3.5 THE THREE BIGGEST MARKETS

It is an unusual characteristic of the strategic overview of the Asia-Pacific region that it must begin by examining operators that are *not* present in Tables 3.1 and 3.2. Although the region is highly populated, two countries stand out in terms of their potential for mobile subscriptions, namely China and India, and hence we must begin by looking at the situation there.

The two largest individual operators in Asia by number of proportionate subscribers, with 369 million and 160 million respectively at the end of 2007, were China Mobile (Hong Kong) and China Unicom, the two listed cellular operators based in China (although they are listed in Hong Kong). However, it is China Communications, rather than its subsidiary China Mobile (HK), that has several times attempted to break out into the wider world, albeit so far with little success despite its size. It initially acquired People's in Hong Kong, which is technically now part of China and a highly competitive market with rather low subscriber numbers. In May 2007, it acquired what is now CM Pak – the former Paktel – from Millicom but again this was a relatively small operator with 1.3 million subscribers at the end of 2006 (Luk, 2007). Against these successes must be set its failure to see through the acquisition of Millicom in July 2006 when it ran into serious opposition in some of the countries where Millicom had networks, and its failure to acquire the three network stakes held by MCT Corp. in

June 2007. There are rumours of potential links with India's Reliance Telecom and HKT-CSL in Hong Kong and it has cast its eye over 3 Italia, but China Mobile is hardly a Vodafone in the making (Dean, 2007) despite a cash bank approaching $10 billion. The CEO admitted in August 2007 that while the intention was to focus on emerging markets, 'Unfortunately, it is a bad time for buyers in emerging markets because [assets] are very expensive' (Mitchell and Bowring, 2007). The priorities for 2008, driven by the government's 'go global' policy, are to try to enter markets in Africa and the Middle East, and possibly to set up a European MVNO serving the Chinese community there. As for Unicom, it is alleged to be seeking a stake in Taiwan's Asia Pacific Broadband Wireless, but it did not even bid for a 3G licence in Hong Kong, and its international strategy is clearly not a priority.

India is the only other market with comfortably more than 100 million subscribers. It differs significantly from China in that licences are allocated for a series of 'circles' such that regional rather than national operations have always been the order of the day (although some operators aspire to go national). In addition, there is a significant private sector presence and competition is very intense (see http://coai.in for details). Bharti Airtel, the largest operator, ended 2007 with 55 million domestic subscribers but few international aspirations of any significance, and in Asia its only success so far has been to win the fifth mobile licence in Sri Lanka in January 2007. Currently, it is actively seeking to acquire a stake in Telkom Kenya and has expressed a desire to enter Germany. As for Reliance Telecom, the third-largest with 35 million subscribers at end-2007, it has acquired no other assets in Asia so far, having failed in its attempts to enter the markets of Bhutan and Sri Lanka. It is currently also interested in Telkom Kenya but its efforts to internationalise appear to be rather half-hearted for now.

Not surprisingly, India is attracting considerable interest from international operators despite a cap on foreign ownership, and a complex restructuring is currently taking place that has led, *inter alia*, to the departure of Hutchison and its replacement by Vodafone which already had a stake in another network (Bharti) that it has as a consequence partly sold off (Yee and Leahy, 2007). Maxis has a majority stake in Aircel while Russia's Sistema, which is perhaps best viewed as an investor rather than as an operator, has recently taken a majority stake in Shyam TeleLink. For the time being, however, Indian networks remain in good part under the control of domestic owners who have negligible interest in doing anything other than taking advantage of opportunities to expand the home market.

Turning to the third-largest market, Japan, we find a further situation with significantly different features. In the first place, DoCoMo, the majority-owned subsidiary of NTT – the only major operator in the world

that has yet to repurchase its part-floated mobile subsidiary – has always been the dominant operator in a market that is currently largely served by 3G rather than 2G technology. Its main rival is another domestic operator, KDDI, which has no evident desire to become an international player. The third network is currently also owned by a Japanese company, Softbank, which bought it from Vodafone in April 2006 and which also appears for now to want to concentrate upon developing the network (Tanner, 2006). It is of no small interest that Vodafone failed to make a success of the former Japan Telecom – a failure that has often been ascribed to its attempt to apply strategies that had succeeded in Europe and elsewhere to a culturally different market (AFX News Limited, 2005).

3.6 OPERATOR STRATEGIES

In the light of the above, let us now turn to consider the strategies of individual operators listed in Tables 3.1 and 3.2, commencing with Singapore Telecom (SingTel). SingTel has so far represented a classic example of an operator sticking to what it knows best, which is how to operate successfully in the Asia-Pacific region. However, given its modest home market it has not surprisingly been forced to internationalise rather more than its peers. Its recently expressed interest in the third mobile licence in Saudi Arabia is unusual in that respect although it has expressed some ambiguous comments about operating outside its core markets (Guevarra, 2007a). More significantly, however, it has also recently expressed an interest in buying part of Thailand's TOT, Taiwan Mobile and (in May 2007) Pakistan's Warid Telecom (Tucker, 2007) – in which it successfully won a provisional 30 per cent stake in June 2007 (Guevarra, 2007b) – as well as in bidding for the fifth mobile licence in Sri Lanka. In addition, it arranged to acquire a 4 per cent stake in Taiwan's Far EasTone in December 2007 via an asset swap (Jannarone and Guevarra, 2007). It has expressed a general interest in Vietnam and was keen to acquire the stake in Bharti Telecom that Vodafone subsequently sold back to the Bharti Group as it was already a shareholder in the Indian operator. Overall, therefore, it is evident that SingTel is a major force in the Asia-Pacific region, that it intends to continue to concentrate on that region (Ruan, 2006) and that it is in acquisition mode even if it has not had all that much success so far.

Unlike its neighbour, SingTel, Telekom Malaysia has long aspired to operate on a more global stage. However, this has produced little beyond a dalliance in various parts of Africa which, subsequent upon the disposal of a stake in South Africa's Vodacom during 2004, has produced only very modest numbers of proportionate subscribers. By comparison, its entry

into India and Indonesia has bolstered its credentials as a significant force in the Asia-Pacific region despite a previous failure to enter the former country and to acquire a stake in Pakistan. In March 2007, Telekom Malaysia denied that it was interested in True Corp. of Thailand, but that country remains high on its list of targets for entry as it already provides non-mobile services there. The others comprise Laos, Myanmar and Vietnam (Cellular-news, 2008).

Maxis Communications has always been overshadowed by Telekom Malaysia. However, it has ambitions to expand internationally, provided, on the evidence so far, the targets are located in the Asia-Pacific region. In addition to recent entries into India and Indonesia, it bought 25 per cent of NTT's stake in Sri Lanka's Mobitel in May 2007 only for the largest shareholder, the state, to suspend the transaction in June. It is of interest that Telekom Malaysia is present wherever Maxis is (intending to be) operational. The fact that state-controlled Saudi Telecom acquired significant stakes in Maxis holdings in Malaysia and Indonesia in June 2007 will have consequences for future strategy since Saudi Telekom had no previously expressed interest in the Asia-Pacific region, although precisely what consequences is hard to predict.

We have already commented on NTT in the context of Japan. NTT operates internationally partly via the auspices of DoCoMo, which means that it has far fewer proportionate subscribers than its subsidiary (roughly 60 per cent of DoCoMo's total). In the past, NTT had extensive international ambitions, underpinned in good part by its desire to establish i-mode as the post-second-generation technology of choice throughout the world. These ambitions proved to be somewhat unwise, and NTT was forced to withdraw from the USA (when AT&T Wireless was taken over in 2004), the Netherlands and the UK (both in 2005) having lost roughly $9 billion, leaving it operational exclusively in the Asia-Pacific region. However, in August 2005, the company indicated that it was once again ready to look overseas (Nakamoto, 2005); in October there was talk of investing in an unnamed Chinese operator; and in November the strategy had been refined to investigating stakes in regional operators having no relationship with foreign rivals (BWCS, 2005).

What transpired in practice was for DoCoMo to take a 10 per cent stake in KTF of South Korea in December 2005 and for NTT to buy two networks in Guam and the North Mariana Isles in November 2006, neither of which has impacted much on NTT's overall operations. In addition, NTT sold to DoCoMo part of its 15 per cent holding in PLDT of the Philippines and is currently seeking with some success to build up the combined stake via DoCoMo (Turner, 2007; Coyle, 2007). It is also interested in Vietnam, although as with China it intends to start by taking modest stakes

(Sanchanita, 2007). In November 2007, DoCoMo declared that it wanted to enter Indonesia, Malaysia, Thailand and New Zealand via the purchase of a minimum 10 per cent stake (Kim, 2007) and in December it duly acquired an 18.2 per cent direct plus indirect stake in 3G new entrant U Mobile in Malaysia. It is of interest that its investment strategy has been based upon technology leadership and past experience as well as cash, but emerging markets are unsuited to the kinds of high-end handsets on the back of which it has established its dominant position in Japan.

Prior to the beginning of 2006, South Korea's SK Telecom was effectively a one country operator. True, it had modest operations in Mongolia and Vietnam, but these were heavily overshadowed by its roughly 20 million domestic subscribers. This was barely affected by the launch of a tiny operation in Cambodia in 2006, but the acquisition of a 6.7 per cent stake in China Unicom via convertible bonds which were converted in August 2007, albeit very much a minority, still represented the equivalent of nearly 10 million additional proportionate subscribers by the end of 2006. The only other country that it seems very eager to enter is, understandably, India, but competition to acquire assets there meant that SKT failed to acquire a stake either in Tata Teleservices in 2005 or in Shyam Telelink in 2006. However, it was alleged to have bid for a stake in an unspecified operator in Pakistan in October 2007. Perhaps curiously, its only excursion outside the Asia-Pacific region has been to take a stake in HELIO, a US-based MVNO.

Hutchison Whampoa, which owns part but by no means all of its international telecoms assets via HTIL, has not surprisingly been heavily dependent upon the Asia-Pacific region for subscribers. However, its profile is undergoing a significant change. In the first place, Hutchison has finally begun to acquire substantial numbers of 3G subscribers in Europe – most notably in Italy and the UK. Secondly, it has sold down its stake in HTIL although it recently acquired an additional 9.2 per cent from Orascom and currently holds roughly 60 per cent. Thirdly, it sold its stake in Hutchison Essar, which provided over 6 million proportionate subscribers in 2006, to Vodafone. Fourthly, although it has entered Vietnam and Indonesia, the latter is a greenfield operation and hence cannot be expected to compensate for the loss of Hutchison Essar for years to come. Overall, therefore, despite its interest in CURE, a new 3G licensee in the Philippines, Hutchison must be considered to be a declining force in the region.

Orascom's unusual situation has already been mentioned. It originally wanted to make further inroads into the region via an enlarged stake in HTIL, but pending any progress on that front it attempted unsuccessfully to acquire the majority of Hutchison Essar in collaboration with Qatar Telecom. Parent Weather Investments has irons in many fires outside the

region, so it is highly unlikely that Orascom will now look to the region for its main source of growth.

Vodafone is the most internationally minded of all mobile operators with a primary foothold in Europe. Nevertheless, it had ventured into parts of the Asia-Pacific region – Australia, China, Japan and New Zealand – where its main European rivals feared to tread and at the end of 2007 it had 30 million proportionate subscribers in the region, representing 17 per cent of the total. The departure from Japan – effectively imposed upon it by its main shareholders as a response to its poor performance there – has certainly damaged its credibility in the region (as well as removing 14 million proportionate subscribers from its books), but it has not given up its aspirations to become a regional 'heavy hitter'. Its willingness to outbid the strong competition for a controlling stake in Hutchison Essar in 2007 is undeniable evidence of this (Vodafone, 2007), and it has expressed an interest in taking stakes in Pakistan's Warid Telecom (where it was outbid by SingTel), Taiwan Mobile, Telekom Malaysia and Vietnam's MobiFone. However, Vodafone is something of an opportunistic buyer with no particular commitment to any one region compared to others (Parker, 2006), so whether the future opportunities in the region will prove more alluring than those in other emerging markets is a difficult question to answer. One indication may lie in its expression of interest in a 30 per cent stake in Aktel of Bangladesh in January 2008 where it admitted that it really wanted a new licence but since that was not going to be forthcoming it might have to settle for a minority stake in an operator controlled by a rival, Telekom Malaysia.

It is surprising to find Nordic operator Telenor playing any significant role in the region, but the reality is that it has more stakes and more proportionate subscribers there than in any other region including Western Europe. Leaving aside its indirect stakes held via Russia's VimpelCom, it operates in some of the most competitive markets in the region (and tried unsuccessfully to enter Indonesia in 2004). It has recently shown no sign of wanting to alter its asset portfolio in the region other than acquiring a stake in Vietnam, but there is talk of a merger with TeliaSonera which would, if executed, affect both companies' worldwide strategies.

TeliaSonera may indeed end up merged with Telenor (or possibly some other, larger, European operator if rumours in May 2008 are to be believed) but, unlike the latter, it has not until recently shown more than passing interest in the Asia-Pacific region where it operates one network via majority-owned Fintur Holdings and another indirectly via Russia's MegaFon, which it views as 'Eurasian'. It sold its stake in People's Telephone in April 2004 but has expressed an interest in buying into India's Shyam TeleLink. Although in July 2007 it was announced that TeliaSonera had bought the stakes held by MCT Corp. in Afghanistan, Tajikistan and

Uzbekistan, these, like the Tajik network, will bring with them relatively few subscribers (Global Insight, 2007).

Mobile TeleSystems has so far restricted itself to investment in the various republics split off from the former USSR although it has ambitions to become one of the ten largest operators by market value by 2012, which might necessitate taking stakes in the Asia-Pacific region.

Millicom is unusual in that none of its individual stakes yields much over one million proportionate subscribers. It ceased to operate in Vietnam in 2005 and sold one of its networks in Pakistan the following year, only to sell off the other one, as noted above, to China Mobile Communications in February 2007. Hence, it would not appear to be particularly attached to its networks in the Asia-Pacific region.

Viewed from a worldwide perspective, the region from which domestic operators are currently expanding internationally is understandably the Middle East; it has small markets and lots of petro-dollars. Although Middle Eastern operators are mostly interested in Africa, one among them, Qatar Telecom, may prove to be an exception. At the end of 2006, QTel owned mobile networks only in Oman and Qatar, yet during 2007 it acquired (admittedly in all cases minority) stakes in Cambodia, Indonesia, Laos and Singapore as well as a 51 per cent stake in Kuwait's al-Wataniya which owns a small network in the Maldives. The size of the stakes means that QTel remains for now far removed from being a heavy hitter in relation to the Asia-Pacific region, but there may be further significant developments during 2008.

Etisalat is also a relative newcomer to the region, with a single operational asset in the form of a minority stake in Pakistan obtained in 2006 although this yields more proportionate subscribers than any other market bar its home market. It acquired a licence in Afghanistan in May 2006 and has expressed an interest in India, but its assets are geographically widespread, and the Asia-Pacific region does not appear to be a particular priority. In addition to Etisalat, fellow Middle Eastern operator Warid Telecom recently entered Pakistan (via a new licence) and Bangladesh, where it launched in May 2007. In June 2007, as noted above, the Saudi Telecom Co. provisionally acquired stakes in two Maxis networks for $3 billion (Hatoum and Nakhoul, 2007). However, it is probably fair to say that operators in this region are likely to remain focused on Africa (Curwen and Whalley, 2005 and 2008).

3.7 DISCUSSION

The Asia-Pacific region contains some of the largest countries in the world and also the two largest individual mobile operators. In terms of

subscribers, it is much the largest region, accounting for well over one-third of the world total and more than Western and Eastern Europe added together. It is also relatively poor in terms of average incomes when averaged across the entire region, although inter-country differences are enormous in this respect, and hence penetration levels are relatively low in most cases. These features alone explain why operators within the region have shown some reluctance to move outside their own borders since they have been able to enjoy a period of rapid expansion on a purely internal basis.

Unsurprisingly, politics has also been a significant factor. Although there are political alliances within the region, there is nothing remotely comparable to the European Union, which has served to reduce barriers between Member States and has freed up the movement of capital, although there are still problems when it comes to cross-border takeovers of telecommunication companies, as manifested in the recent case of Telecom Italia. Within the Asia-Pacific region there is far more resistance to cross-border investment, and even where it is permitted the proportion of a telecommunications operator that can be acquired by a foreign investor is frequently restricted, sometimes to a minority stake. Hence, if internal opportunities to expand are available, and other countries in the region do not necessarily welcome any intrusion, operators are going to step warily onto the international stage.

Nevertheless, it is important to understand that in a region as large as the Asia-Pacific there will be quite a variety of different circumstances. On the one hand, for example, there is China, the largest market, which actively discouraged inward investment prior to the flotation of China Mobile (HK) and China Unicom on the Hong Kong stock exchange, a move necessitated by the enormous amount of capital needed to roll out digital networks across the whole of China. This presented an opportunity for international mobile operators to buy stakes, but the high cost of so doing combined with a reluctance to appear threatening has kept these stakes below 10 per cent, at least for now.

On the other hand there is Japan, another large market but one characterised by technological superiority that its former monopoly operator NTT wished to translate into world standards. To achieve this it chose – though generally via its mobile subsidiary DoCoMo – to invest internationally, largely outside the region, albeit via a strategy of taking minority stakes. This strategy was a failure as both Europe and the USA were unwilling to accept proprietary technology from outside their own regions, and NTT, lacking control over its foreign operations, was forced to withdraw, suffering heavy losses in the process. NTT, as noted, is once again interested in investing overseas, but this time it is largely being driven by market saturation and increased competition in the home market. Furthermore, it is

looking to invest within the Asia-Pacific region with China, India and Vietnam its primary targets.

This is a critical point. The world's most international operator is Vodafone, which has stakes in 35 mobile networks worldwide as shown in Table 9.1. The first operator based in the Asia-Pacific region to register in Table 9.1 (in ninth place) is Hutchison Whampoa, with 16 worldwide networks, followed by Telekom Malaysia (in eighteenth place) with 9. Only five Asia-Pacific-based operators have five or more operations in total including the home market, and Hutchison is the only one with a significant number outside the region.

But this does not explain why mobile operators based outside the region have so few investments in the region. If we examine the list of the 30 most international operators at the end of 2007 (Table 9.1) we discover that between them they had stakes in 413 networks, of which 88 were located in the Asia-Pacific region. Interestingly, the comparable figures for end-2005 and end-2006 were 68 and 77 respectively (although the end-2003 figure was 55 because Verizon Communications exited the region during 2004). This significant advance over a short period nevertheless reflected a number of small changes by individual operators (as shown in Table 3.2) with the one exception when Orascom took its stake in HTIL, so there is no evidence of a rush into the region from outside.

This is understandable for a number of reasons. In the first place, there has until fairly recently been room for expansion even in the highly-penetrated region of Europe and, in terms of under-developed mobile communications needing investment, Africa lags well behind most of the Asia-Pacific region and has the further advantage that the scarcity of fixed-line connectivity provides better opportunities for mobile. Secondly, countries in most of the Asia-Pacific region – barring the 'Anglo-Saxon' corner – are often very different from those in Europe in terms of politics, culture and religion, although there are closer affinities to the Middle East which has very recently emerged as a source of investment. Thirdly, restrictions on the scale of inward investment have been off-putting, especially if they have prevented the taking of majority stakes. Finally, the experience of Vodafone in Japan – in some respects a mirror image of the situation for NTT – has reminded international operators that however successful they may be in their own region, they invest outside it at great risk.

3.8 CONCLUSIONS

Looked at from a structural perspective, the Asia-Pacific region differs significantly from the other two developing regions, namely Latin America

and Africa. In the former case, the key characteristic is the now dominant role of two mega-operators, América Móvil and Telefónica, while in the latter it is the constant ongoing process of takeover activity involving both indigenous and externally-based companies, the outcome of which is hard to predict. The Asia-Pacific region, by contrast, is notable for the *absence* of seismic events, with both indigenous and externally-based operators either unwilling or unable radically to disturb the status quo.

The first question to be answered is whether the tendency for intra-regional investment is set to continue and on what scale. As we have demonstrated, operators based in the Asia-Pacific region do not have much of a record of successful extra-regional investment and do not appear to be at all comfortable in regions where political, cultural, linguistic and other differences are significant. Currently, there are a few signs of resurgent interest in investing outside the region, but after the DoCoMo debacle and the antagonistic response to China Communications' proposed foray into other regions via the takeover of Millicom, it would be a huge surprise if the prevailing attitude was anything other than very cautious. Almost by default, therefore, investment will remain essentially intra-regional.

But will there be an upsurge in inward investment? Obviously, regionally-based operators are not the only ones to have observed the potential in Asia-Pacific markets with low levels of mobile penetration (Curwen, 2007), but as soon as interest is expressed by international operators the cost of stakes shoots up – in March 2006, for example, Hutchison Essar had an enterprise value of $5.5 billion but by the time it was acquired by Vodafone this figure had more than tripled (Curwen, 2007) – and that is a game to be played only by those with deep pockets and a strategy that can conjure up value even at inflated prices. As Table 3.2 demonstrates, the Asia-Pacific region is not strategically important to external operators other than Vodafone and Telenor and even Vodafone is not dependent upon it in terms of proportionate subscribers. Hence, although a large number of operators have expressed an interest in India in particular, the intra-regional operators are almost certain to mop up almost everything of a significant size that comes onto the market.

There is nevertheless one proviso, which is that previously unseen predators may emerge in the region by taking stakes in the region's main operators. The clearest example is in respect of Saudi Telecom which invested in Maxis as a means of diversifying away from its increasingly competitive home market even though Maxis was itself doing the same. It is evident that this behaviour will be associated exclusively with Middle Eastern operators as illustrated above, and its future scale is difficult to predict especially since Africa has so far proved to be the main focus of operators seeking to emerge out of the Middle East. In so far as the Asia-Pacific region is

targeted, the countries of particular interest appear to be Bangladesh, India, Indonesia and Pakistan.

Finally, it may be asked whether any among the regional operators have the potential to become regional powerhouses. In principle, China Communications is a candidate, and is alleged to hold massive cash reserves (Dickie and Lau, 2006), but in the short term there is an impending major restructuring of the Chinese telecommunications industry, which in turn is linked to the award of 3G licences and the (costly) roll out of 3G networks. For its part, SingTel cannot expand internally so can be expected to look to opportunities elsewhere. It may be noted, however, that the company remains majority state-owned and many countries are simply unwilling to countenance the entry of such an operator, especially if their domestic operators are privatised, since they would end up with de facto state control but exercised by another state. NTT is arguably the only other candidate with the requisite resources, but again the state is heavily involved and it is not culturally all that close to its (near) neighbours.

So we may ask in conclusion whether the Asia-Pacific region will remain something of a backwater in terms of worldwide M&A activity with the obvious exception of Vietnam which has so far remained almost entirely state-controlled but where a large-scale privatisation process has been set in motion during 2008. There are those who argue that the recent drop in share prices in the Asia-Pacific region represents an opportunity for predatory moves, but the general consensus is that prices have fallen rather less than in other regions, few operators are in need of refinancing and most are growing satisfactorily. Hence, any move by an indigenous or international operator is almost certain to set off a spiral of competitive bidding that will produce price–earnings ratios that are extremely difficult to justify.

There are currently a reasonable number of operators seeking strategic investors such as BPL Mobile (India), Idea Cellular (India), Sun Cellular (Philippines), True Move (Thailand) and MobiFone, Viettel and Vinaphone (all Vietnam), and rumours abound concerning Vodafone's long-time intentions in Australasia, but none of these represent dramatic structural change. In conclusion, therefore, while the term 'backwater' may prove to be an understatement, the region is unlikely to find itself prominently placed on the map of telecoms M&A activity.

NOTES

1. ITU (2001) paints a mixed picture of privatisation and liberalisation in the Asia-Pacific region. Whilst some countries have privatised their incumbent fixed operators and made commitments to liberalise under the WTO, others have not. However, more recent reports (such as ITU, 2004 and 2007) demonstrate the spread of competition across the

Asia-Pacific region. This change has contributed to the growth of competition more generally, with around 90 per cent of all mobile markets now being competitive (ITU, 2007: 11).

2. For details of subscriber rates across Asia-Pacific see, for example, ITU (2004) or ITU (2006). ITU (2004: A-9) clearly shows that growth rates for 'lower income' Asia-Pacific countries over the period 1998 to 2003 have been significantly faster than for the 'upper income' and 'developed' countries in the region.
3. See, for instance, Sullivan and Bauerschmidt (1990) or Petersen and Pedersen (1997), for a discussion of Johanson and Vahlne (1977). For a broader discussion of psychic distance see, among others, Ellis (2008), O'Grady and Lane (1996) or Shenkar (2001).

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4. Structural and strategic adjustment in African mobile telecommunications

4.1 INTRODUCTION

With market penetration at very high levels, especially relative to incomes, in most of Europe and increasingly in Asia and the Americas, the attention of mobile network operators was bound to be drawn towards the low penetration levels typically found in African countries.[1] While certain individual countries such as China and the USA currently have more mobile subscribers than the whole of Africa, this is set to change as African mobile markets enjoy rapid growth. Mobile subscriptions in the whole of Africa passed the 200 million mark during 2007Q1, having added 60 million during the year to end-March 2007. The overall growth rate during calendar year 2006 is estimated at 45 per cent, well ahead of the 30 per cent recorded in the Middle East and the 38 per cent recorded in the Asia-Pacific region, although such rapid growth is unlikely to be sustainable (Lennighan, 2007a).

Western Africa is the fastest-growing sub-market but still has a fairly low overall penetration rate especially compared to Southern Africa. Algeria and Tunisia reached roughly 80 per cent penetration during 2007 – a rate comparable to developed countries in many other parts of the world – but Africa remains a continent of contrasts, with the likes of Sudan and Libya expected to struggle to exceed 20 per cent penetration.[2]

Notwithstanding such differences, the ever-wider prevalence of mobile communications across Africa has contributed significantly to improving tele-density levels. Indeed, mobile now underpins the improvement in the continent's tele-density. In 2003 there were 6.2 mobile subscribers per 100 inhabitants compared to just 3 per 100 inhabitants for fixed (ITU, 2004: 1), a gap that is certain to widen given the differential growth rates of fixed and mobile networks. This same report also draws attention to the commercial side of increasing African mobile penetration rates, that is, to revenue growth on the one hand and operator expansion into fresh markets on the other (ITU, 2004: 5ff). The remainder of this chapter focuses on this latter

area, namely, the emergence of mobile network operators with a presence in multiple African markets.

4.2 THE SAMPLE SET

Fifty-five countries and islands (henceforth 'countries') are included in our definition of Africa as enumerated in Table 4.2. This is a large number relative to other continents and there are huge disparities in terms of historical development, so we would expect the state of play for mobile communications to be somewhat complex, as indeed it is. Using 31 December 2007 as our point of calculation, and limiting ourselves to round numbers as the subscriber count is less than perfect in most cases, we discover that there are only a handful of countries with large subscriber bases; in descending order we have Nigeria (41 million – in April 2008 the regulator reduced the number of 'active' subscribers from the 'registered' total of 55 million), South Africa (40 million), Egypt (31 million – up from 17 million one year previously), Algeria (27 million) and Morocco (20 million). Kenya (where Safaricom grossly overstates its active subscribers since everyone who has ever signed up is counted) allegedly had 12 million while Tunisia and Tanzania had over 8 million and Côte d'Ivoire, Ghana and the Sudan had between 7 and 8 million. Otherwise, only the DR Congo and Libya had in excess of 5 million. Growth rates were rarely below 25 per cent, with Madagascar even exhibiting a more than doubling of subscribers. However, there were still quite a few countries with fewer than a million subscribers. This suggests, *inter alia*, that there is plenty of potential for subscriber growth which is nevertheless likely to remain constrained by income levels despite the likes of Nokia and Motorola producing a new range of very simple and cheap handsets.

Next consider which operators are present in the 55 countries sampled. Table 4.1 identifies mobile operators with a substantive investment in Africa at the end of one or more of 2003, 2004, 2005, 2006 and 2007. It is important to emphasise the use of the term 'substantive' since there is an element of double-counting involved where, for example, a European operator has a stake in an African operator, which in turn has multiple investments in Africa as with Vodafone and Vodacom.

It is useful to remind ourselves that with the exception of Zain (the former MTC), MTN, Orascom, Vodacom and Vodafone, the number of subscribers controlled by each of the companies identified in Table 4.1 at the end of 2007 was quite modest. In some respects this was only to be expected given that mobile telephones came late to Africa, and the position will undoubtedly change in the future as the rapid expansion in penetration is reflected in the number of subscribers.

The first observation that can be made is that roughly one-half of the most internationalised mobile operators identified by Curwen and Whalley (2006) were present in at least one African country. As Table 4.1 demonstrates, the number of countries in which these operators were present varied considerably, ranging from 17 to none by the end of 2007. Those companies with very small numbers of African subscribers have sometimes focused their attention on other regions; for example, the limited African presence of Telefónica – owning only a direct minority stake in Morocco – contrasts with its substantial investments in South America, although it does have an additional indirect presence in six African countries via its minority stake in Portugal Telecom.

A second observation is that the companies are currently drawn from a wide range of home markets in Europe, the Middle East and Asia, but not the Americas. The European involvement is not unexpected from a historical perspective, and largely explains the specific countries where France Télécom's African investments are to be found (see Table 4.2). However, Vodafone originally emerged as a competitor to the analogue incumbent in the UK and looked primarily to grow in other developed countries.[3] Hence, its direct presence in Africa was limited to just three investments in South Africa, Kenya and Egypt. As noted, it also has an indirect presence in a further four African markets via Vodacom and a peripheral indirect presence in two island countries via its stake in France's SFR. The remaining European involvement in Africa was relatively small-scale other than for Celtel International and Millicom International, but as both were based in Europe but operated elsewhere they were European in name only and, in practice, Celtel has recently been acquired by an operator based in the Middle East. Millicom, despite coming under offer by various parties during 2006, remains independent for now (see below).

Some additional light can be shed on this matter by comparing the number of African investments with the overall number of international investments. In a good many cases – for example, Atlantique Télécom, Celtel, MTN, Vodacom and now Etisalat and Zain – the clear majority of all investments are in Africa, whereas for the likes of Vodafone (35 overall in 2007), France Télécom (40 overall) and Millicom (16 overall), the African section of their portfolios is of much less significance.

What is of particular interest is the relatively recent appearance of Middle Eastern investors in Africa. Although there are many reasons why African markets could be attractive to these investors, a key factor would appear to be the differential growth rates that exist between their home markets and Africa. Quite simply, Africa is more populous as a region and it is growing faster as a market than the Middle East.

Table 4.1 Mobile operator presence in Africa, 31 December 2003 to 31 December 2007

Mobile operator	Home market	Countries as of 31 December					African subscribers[2]	African as % total subscribers
		2003[1]	2004[1]	2005[1]	2006[1]	2007[1]		
MTN	South Africa	7	7	11	17[3]	17	40 733 000	84.7
Vodacom	South Africa	5	5	5	5	5	29 894 000	100.0
Vodafone	UK	9	9	9	9	9	27 864 000[4]	11.2
Zain [MTC]	Kuwait	0	0	14[5]	15[5]	15	24 338 000	80.9
Orascom	Egypt	8	7	5	5	5	19 830 000	34.2
France Télécom	France	11	11	11	11	14	12 730 000	13.7
Vivendi Universal	France	4	3	4	4	6	7 563 000	42.6
Millicom	Luxembourg	5	5	7	7	7	5 450 000	29.9
Portugal Telecom	Portugal	6	6	6	6	6[6]	2 897 000	14.6
Comium	Lebanon	0	1	2	2	4	n/a	100.0
Qatar Telecom	Qatar	0	0	0	0	2	2 577 000	29.2
Telefónica	Spain	6	6	6	6	6	2 386 000[7]	1.7
Etisalat	Emirates	2	2	8[8]	8	8	1 330 000	7.1
Telekom Malaysia	Malaysia	8	2	1	1	–	–	–
Econet Wireless[9]	Botswana	–	–	–	4[9]	–[9]	n/a	n/a
al-Wataniya	*Kuwait*	*2*	*2*	*2*	*2*	*2*	*5 047 000*	*79.4*
Atlantique Télécom	*Côte d'Ivoire*	*6*	*6*	*6*[8]	*6*	*n/a*	*n/a*	*n/a*
Celtel International	*Netherlands*	*13*	*13*	*14*[5]	*n/a*	*n/a*	–[5]	–
Investcom	*Lebanon*	*5*	*4*	*5*	*n/a*[3]	*n/a*	–[3]	–

Notes:

1. This column takes account of all agreed transfers of assets up to the specified date. These had not necessarily taken place in practice by that point due to such matters as approvals by the relevant company boards and regulators. It should also be borne in mind that MTN acquired Investcom during 2006 as explained in the text.
2. As of 31 December 2007. By subscribers we refer here not to gross subscriber numbers but to 'proportionate' or 'equity' subscribers: that is, the gross figure is weighted according to the proportion of the equity held by the company in question.
3. MTN acquired 100% of Investcom in August 2006 at which point it operated six networks.
4. Including 35% of the total for Vodacom. However, the active subscribers in Kenya are significantly over-stated.
5. In March 2005, the then MTC made an agreed offer for 85% of Celtel, with the other 15% to follow within two years. The subscribers attributed to MTC were therefore 85% of the total for Celtel. In May 2007, the stake was raised to 100%.
6. The situation is a bit confusing. Portugal Telecom has a management contract for Mascom in Botswana (not counted) and appears to have a 3.1% stake in a licence in DR Congo after selling most of its stake in October 2007. There is considerable doubt as to the legitimacy of its stake in Guinea-Bissau's Guinée Telecom which it lists as an asset but gives no subscriber data in its annual accounts.
7. Including 8.3% of the total for Portugal Telecom.
8. The six additional networks were the result of taking a 50% stake in Atlantique Télécom in April 2005. The stake was raised to 70% in 2007. There is doubt about a further network in the Central African Republic.
9. See text.

Source: Compiled by the authors.

4.3 LOCATION OF NETWORKS

At this point it is useful to identify where the main African operators (with three or more networks) had their networks at the end of 2007, as set out in Table 4.2. Given that there are 55 countries in the sample, it is perhaps less than surprising that these operators have largely kept out of each other's way – either deliberately or, more probably given the random issuance of licences – by default. What is most surprising, perhaps, is that there has been so little competition among these companies in the largest African markets outside South Africa, namely Algeria, Egypt, Kenya, Morocco, Nigeria and Tunisia.

On the face of it, inspection of the companies in Tables 4.1 and 4.2 suggests that Africa could until the end of 2007 be described as a tale of two groupings; one the Africa 'specialists' such as MTC/Celtel, Etisalat/Atlantique, MTN/Investcom and Vodacom, and the other a heterogeneous group of international telcos with a limited interest in Africa relative to elsewhere. However, this is somewhat illusory. For example, as shown in the final column of Table 4.1, Etisalat, despite its stake in Atlantique Télécom, still depends upon Africa for less than 10 per cent of its proportionate subscribers while Orascom, despite its intention to reduce its reliance upon Africa, still registered a 34.2 per cent dependence. Meanwhile, al-Wataniya was able to register a 79.4 per cent dependence in good part because its home market of Kuwait was quite small, although in terms of majority owner QatarTelecom this became a more modest 29.2 per cent. It is also worth noting that there are some fairly insignificant specialists such as Comium, and that much of Africa remains a tale of small networks mainly financed by local interests.

4.4 OPERATOR STRATEGIES

Given the mix of operators now present in Africa and the timing and speed of their entry, it would be surprising if their strategic interests overlapped to any great extent. Certainly, it would be unwise to assume that the great majority are significantly influenced by other operators' strategies, although MTN and Vodacom, both based in South Africa, are clearly concerned by their relative standing as Africa specialists. It is worth observing that this does not necessarily mean they are 'African' in the true sense of the word since MTN is largely financed by overseas investors while Vodacom is half-owned by Vodafone.

Etisalat has signalled its intention to expand outside of its home market by establishing a dedicated international subsidiary and stating that it will

Table 4.2 Location of networks: Main African operators, 31 December 2006[1] and 31 December 2007[2]

Country	No. of licences[3]	al-Wataniya[4]	Comium	Econet	Etisalat[5]	France Télécom	Zain	MTN	Millicom	Orascom	Portugal Telecom[6,7]	Vivendi Universal	Vodacom	Vodafone
Algeria	3	Y	–	–	–	–	–	–	–	Y	–	–	–	–
Angola	2	–	–	–	–	–	–	–	–	–	Y	–	–	–
Benin	4	–	–	–	Y	–	–	Y	–	–	–	–	–	–
Botswana	3	–	–	Y	–	Y	–	Y	–	–	–	–	–	–
Burkina Faso	3	–	–	–	Y	–	Y[8]	–	–	–	–	**y**	–	–
Burundi	4	–	–	Y	–	–	–	–	–	–	–	–	–	–
Cameroon	2	–	–	–	–	Y	–	Y	–	–	–	–	–	–
Cape Verde Is.	1	–	–	–	–	–	–	–	–	–	Y	–	–	–
Cen. Af. Rep.	4	–	–	–	Y	**Y**	–	–	–	–	–	–	–	–
Chad	2	–	–	–	–	–	Y[8]	–	Y	–	–	–	–	–
Comoros Isles	1	–	–	–	–	–	–	–	–	–	–	–	–	–
Congo-Brazz	2	–	–	–	–	–	Y[9]	Y	–	–	–	–	–	–
Côte d'Ivoire	4	–	**Y**	–	Y	Y	–	Y	–	–	–	–	–	–
Djibouti	1	–	–	–	–	–	–	–	–	–	–	–	–	–
DR Congo	5	–	–	–	–	–	Y[9]	Y	Y	–	**Y**	–	–	y
Egypt	3	–	–	–	**Y**	Y	–	–	–	Y	–	–	Y	Y
Equat. Guinea	1	–	–	–	–	Y	–	–	–	–	–	–	–	–
Eritrea	1	–	–	–	–	–	–	–	–	–	–	–	–	–
Ethiopia	1	–	–	–	–	–	–	–	–	–	–	–	–	–
Gabon	3	–	–	–	Y	–	Y[9]	–	–	–	–	**y**	–	–
Gambia	3	–	**Y**	–	–	–	–	–	–	–	–	–	–	–
Ghana	4	–	–	–	–	–	–	Y	Y	y	–	–	–	–
Guinea	4	–	–	–	–	**Y**	–	Y	–	–	–	–	–	–

Table 4.2 (continued)

Country	No. of licences[3]	al-Wataniya[4]	Comium	Econet	Etisalat[5]	France Télécom	Zain	MTN	Millicom	Orascom	Portugal Telecom[6,7]	Vivendi Universal	Vodacom	Vodafone
Guinea-Bissau	2	–	–	–	–	**Y**	–	Y	–	–	–	–	–	–
Kenya	5	–	–	**Y**	–	–	Y[10]	–	–	–	–	–	–	Y[11]
La Réunion	3	–	–	–	–	Y	–	–	–	–	–	Y	–	y
Lesotho	2	–	–	Y	–	–	–	–	–	–	–	–	–	y
Liberia	4	–	Y	–	–	–	–	Y	–	–	–	–	Y	–
Libya	2	–	–	–	–	–	–	–	–	–	–	–	–	–
Madagascar	3	–	–	–	–	Y	Y	–	–	–	–	–	–	–
Malawi	2	–	–	–	–	–	Y[8]	–	–	–	–	–	–	–
Mali	2	–	–	–	–	Y	–	–	–	–	–	–	–	–
Mauretania	2	–	–	–	–	–	–	–	–	–	–	Y	–	–
Mauritius	3	–	–	–	–	Y	–	–	Y	–	–	–	–	–
Mayotte	3	–	–	–	–	Y	–	–	–	–	–	Y	–	y
Morocco	3	–	–	–	–	–	–	–	–	–	Y	Y	–	–
Mozambique	2	–	–	–	–	–	–	–	–	–	–	–	Y	y
Namibia	2	–	–	–	–	–	–	–	–	–	Y	–	–	–
Niger	3	–	–	–	Y	–	Y[8]	–	–	–	–	–	–	–
Nigeria	11	–	–	–	–	–	Y[8]	Y	–	–	–	–	–	–
Rwanda	2	–	–	–	–	–	–	Y[10]	–	–	–	–	–	–
São Tomé	1	–	–	–	–	–	–	–	–	–	Y	–	–	–
Sénégal	2	–	–	–	–	Y	–	–	Y	–	Y	–	–	–
Seychelles	2	–	–	–	–	–	–	–	–	–	–	–	–	–
Sierra Leone	5	–	Y	–	–	–	Y	–	Y	–	–	–	–	–
Somalia	4	–	–	–	–	–	–	–	–	–	–	–	–	–

South Africa	3	–	–	–	–	–	–	Y	–	–	–	–	Y	Y
Sudan	5	–	–	–	–	–	Y[8]	Y	–	–	–	–	–	–
Swaziland	1	–	–	–	–	–	–	Y	–	–	–	–	–	–
Tanzania	4	–	–	–	Y	–	Y[10]	–	Y	–	–	–	Y[11]	y
Togo	2	–	–	–	Y	–	–	–	–	–	–	–	–	–
Tunisia	6	Y	–	–	–	–	–	–	–	Y	–	–	–	–
Uganda	5	–	–	–	–	–	Y[10]	Y[11]	–	–	–	–	–	–
Zambia	3	–	–	–	–	–	Y	Y	–		–	–	–	–
Zimbabwe	3	–	–	Y	–	–	–	–	–		–	–		–
Total	162	2	4	5	9	14	15	17	7	5	6	6	5	9

Notes:

1. The entries in lower case are subsidiaries of operators in which a minority stake is held as follows:
   - Orascom – in Ghana via stake in Hutchison Telecom International.
   - Vivendi – in Burkina Faso via stake in Maroc Télécom.
   - Vodafone – in DR Congo, Lesotho, Mozambique and Tanzania via stake in Vodacom, and La Réunion and Mayotte via stake in SFR.
2. An entry in bold denotes a network launch during 2007.
3. There is some uncertainty about the number of licences in several countries, and not all licencees have as yet launched their networks.
4. al-Wataniya was taken over by Qatar Telecom, which previously had no other African networks, in 2007.
5. Including Atlantique Télécom.
6. During 2006, Portugal Telecom bought a licence in DR Congo, but there is uncertainty about the launch of this network.
7. In Guinea-Bissau the government appears to have taken over the network previously owned by Portugal Telecom so it is not counted.
8. These networks were added to the 'One Network' in December 2007.
9. These networks were added to the 'One Network' in June 2007.
10. These networks were joined together in a seamless roaming venture called 'One Network' in September 2006.
11. These networks were joined together in a seamless roaming venture in February 2007.

Source: Compiled by the authors from a wide variety of (mainly operators') websites.

invest $10 billion overseas by 2008 (McSheehy, 2005). In April 2005, the company expanded its presence into western Africa by acquiring half of Atlantique Télécom – this was rased to 70 per cent in April 2007. Subsequently, despite losing out in the pursuit of a stake in Tunisie Télécom/Tunicell in March 2006 and withdrawing from the bidding for a 3G licence in Morocco, it won a 66 per cent share of the third mobile licence (including 3G) in Egypt in July 2006 via the Nile Telecom consortium. The network was launched in April 2007. The Transnational Corporation consortiun in which Etisalat was an initial participant won 75 per cent of Nitel/M-Tel in Nigeria in July 2006, but Etisalat subsequently withdrew. Subsequently, in January 2008, Etisalat became the nominated operator for new licensee Mubdala Development, taking on a 40 per cent stake. Etisalat also sold its small, indirect stake in the Sudan in February 2006 although it has a 37 per cent stake in fixed-wire operator Canartel and through this has an option on a mobile licence without needing to enter an auction (Telegeography, 2007b). In Benin, there is an ongoing dispute with Sarci-Benin over the relative stakes in their joint venture – Etisalat wants to end up with 68 per cent. While Etisalat has also expressed an interest in licences and/or stakes available in Algeria and Libya, the bottom line is that Africa is not really important compared to Pakistan, Saudi Arabia and the UAE, and Etisalat will be perfectly happy to pick up licences and networks outside Africa if they are easier to come by.

In March 2005, Celtel agreed to a takeover by Kuwait-based Mobile Telecommunications Co. (MTC) which until recently co-branded with Vodafone even though the latter had no equity stake. In total, this two-stage deal valued Celtel at $3.4 billion (Odell, 2005). The takeover of the initial 85 per cent stake was completed in May, with MTC emphasising how it contributed to its key strategic objective of becoming a global operator (MTC, 2005). Prior to purchasing Celtel, MTC only operated in the Middle East. However, post-Celtel it agreed to buy 65 per cent of Nigeria's Vmobile in April 2006 with an option to purchase the rest and is engaged in talks to buy a Madagascan operator, probably Madacom. It is uncertain whether it tabled a bid for Millicom International, but even if it did it was not successful. MTC has now changed its name to Zain, and has rebranded most of its networks with this name, although the situation remains rather confusing because both MTC and Celtel are still used in many public domain announcements. It may be noted that Zain has a so-called 3×3×3 strategy – a nine-year three-phase strategy moving it from regional to international to global status. In January 2007, it branded this strategy as 'ACE' (Acceleration, Consolidation, Expansion) with targets of a $30 billion market value and 70 million subscribers by 2011. This will seemingly be partly realised via what was previously Celtel which intended (but failed) to

launch in Liberia during 2006 and has declared its desire to enter Angola and Ethiopia via stakes in operators as well as in Ghana and Sénégal via new licences. In December 2007, it acquired a 75 per cent stake in Ghana's Westel which was confirmed in December. Interestingly, it was the then MTC which bought 61 per cent of Sudan's Mobitel in May 2006 even though Celtel already owned the other 39 per cent. MTC completed the purchase of the outstanding 15 per cent stake in Celtel in May 2007. In July, a spokesman declared that 'Africa's going to be the next major growth area for us' (Lennighan, 2007b) although Celtel failed to win the third moble licence in Sénégal in September 2007.

For its part, Orascom is technically African.[4] It is, however, commonly perceived as a Middle Eastern operator although it is not behaving in a similar manner to the likes of Etisalat despite increasing its holdings in Algeria and Tunisia during 2005. In mid-2005 it had a presence in seven African countries, but it had already sold off its assets in the Côte d'Ivoire in April 2004, following on from the sale of stakes in nine other African countries to Atlantique Télécom and the Gloria Trust during 2003, and it subsequently disposed of stakes in Congo-Brazzaville and DR Congo during the latter half of 2005. The stake in Sotel Chad was suspended by the government in July 2004, but it did at least receive compensation in June 2007. Furthermore, the acquisition of Italy's Wind for €12.1 billion in May 2005 by Weather Investments, owned by the Sawiris family which controls Orascom Telecom Holding, suggests that its attention is no longer tightly focused upon Africa. This view was fostered by its decision to acquire licences in Bangladesh and Iraq and by its current lack of interest in acquiring African licences and/or assets subsequent upon its failure to acquire either Nitel/M-Tel or Millicom in 2006. It expressed an ambition to merge with, or at least to increase its existing 19.3 per cent stake in, Hutchison Telecom International (HTIL) which primarily operates in Asia and Europe. However, when this came to nothing and HTIL sold its Indian 'jewel-in-the-crown', Hutchison Essar, it altered its strategy to monetising part of its stake and duly sold 3 per cent in October 2007, a further 2 per cent in November (Telegeography, 2007c; Totaltelecom, 2007) and the remainder provisionally in December 2007 (Global Insight, 2007).

These comings and goings necessarily attract most attention, but a further factor worth remembering is that in the future, as the rapid expansion in penetration serves to grow the number of subscribers, the dependency of the internationalising mobile operators on their home markets will be lessened. For example, just over one-half of MTN's subscribers were to be found in South Africa at the end of 2005 (compared to two-thirds one year previously), but as the company was growing relatively rapidly in Nigeria, easily its second-largest market accounting for one-third of its

subscribers in 2005, this dependency on a single market was rapidly being reduced. Nevertheless, MTN was struggling to expand since it failed to acquire either Celtel or half of Atlantique Télécom in 2005; failed to win 51 per cent of Nigeria's Nitel/M-Tel in December 2005; failed to buy 35 per cent of Tunisie Télécom in March 2006; failed to buy 34 per cent of Namibia's MTC in March 2006; and failed to win a licence in Egypt in July 2006.

However, in early May 2006 it appeared to have put these disappointments behind it when it bid successfully to take over Investcom – there were no overlaps in their respective country coverage – receiving an irrevocable acceptance for an initial 70.6 per cent stake which was subsequently raised to 100 per cent in August. Nevertheless, Investcom conributed only 4 million of the combined 31.6 million proportionate African subscribers at the end of 2006, with MTN's results reflecting both across-the-board subscriber growth as well as increased stakes in Nigeria and Uganda during 2007. MTN is interested in taking a stake in Zimbabwe, but by and large 2007 proved to be a year of consolidation rather than expansion. In early 2008, MTN announced that it wanted to buy a stake in Egypt's MobiNil – probably that owned by Orascom – so 2008 may prove to be busier on the acquisitions front.

One irony of the above was that in May 2006, Investcom had just been declared to be the provisional highest bidder for Millicom International which had put itself up for sale earlier in the year. Not surprisingly, Investcom withdrew its offer and it remained to be seen who would acquire Millicom, although the clear favourite was China Mobile. However, discussions broke down and Millicom decided to remain independent. It is not currently pursuing any further interests in Africa.

As for Vodacom, given that it obtained 87 per cent of its proportionate subscribers from its home market in 2005, it stood to benefit from rapid growth in Tanzania – its only other market with over one million proportionate subscribers – and elsewhere, but was likely to find it much harder to bring this percentage down unless it made further acquisitions. However, it had terminated its interest in buying Nitel/M-Tel in December 2005 because it only wanted the mobile operations and rejected the offer of a 51 per cent stake in Vmobile of Nigeria in February 2006 as too expensive. Until well into 2006, its only remaining interest was in gaining a licence in Angola, but this mainly reflected the fact that Vodafone was in a position to veto ventures in northern Africa where Vodafone operated on its own behalf. When this restriction was lifted in November 2006, Vodacom announced that it would also be looking at opportunities in Algeria, Ghana and Nigeria. Nevertheless, at the year-end, things had understandably not shown much improvement over end-2005, with proportionate subscribers

up by only 30 per cent and a home market ratio of 83 per cent. When 51 per cent of M-Tel became available in May 2007 this seemed to present an ideal way to make progress, but the difficulty was that any payment would have to be made direct to parent Nitel, and hence Nitel would be in a position to sow confusion as to whether part of Nitel, M-Tel or both had been aquired. Subsequently, in October 2007, Vodacom failed to acquire RwandaTel and withdrew from the bidding for Ghana's Westel, while in November it was outbid for a controlling stake in Ghana Telecom.

Vodafone itself had a slightly awkward strategy in Africa in that its stake in Vodacom, which it raised from 35 per cent to 50 per cent in 2006, yielded most of its proportionate subscribers in the region, yet it wanted Vodacom to restrict itself geographically while Vodafone itself invested in Egypt and Kenya. It will eventually benefit from Vodacom's enhanced freedom to invest – or, quite possibly, it will buy a further stake (Stafford, 2007) although talks with Telkom fell through in November 2007 (Stewart, 2007) – but it is unlikely that Africa will ever provide a significant percentage of its proportionate subscribers so it is slightly ironic that, directly plus indirectly, it is one of the largest investors on the continent.

At the other end of the scale, Comium, an operator with its headquarters in Beirut, is an active, albeit small-scale operator with two established networks and a further two that were launched during 2007. It does at least have the advantage of being more straightforward than the Econet Wireless Group whose website (www.econetwireless.com) is less than informative. It is extremely difficult to assess the Group's importance as a specialised African operator owing to the fact that certain operations are owned via Econet Wireless International (EWI) rather than by EW Holdings in Zimbabwe – where EWI is a company that is 49 per cent owned by India's Essar Communications – together with an ongoing dispute over the Group's right to reclaim a 65 per cent stake in what is now Vmobile in Nigeria, not to mention a further dispute in Kenya where it will be taking on two well-established incumbents and operational problems in Zimbabwe. It is certainly ambitious, and is currently seeking a licence in Malawi, but if it fails to launch its Nigerian network it looks set to remain a markedly second-tier operator.

Change is also afoot at Portugal Telecom which bought 34 per cent of Namibia's MTC in March 2006 and obtained a licence in DR Congo in February 2006 via a minority stake in a consortium. It expressed a general interest in acquiring additional African assets/licences – Tunisia was understandably favoured – or possibly in setting up MVNO operations with a base in Angola where it might possibly sell its existing stake if it was prevented from increasing its size. However, in August 2007 it embarked upon a more grandiose project, setting up a holding company called Africa

Holding for its African assets (including fixed-wire) and selling a 22 per cent stake in this to Helios Investment Partners for $171 million (Wise, 2007). Further stakes may be sold off in 2008 providing it is left with control. In early October, while emphasising its primary commitment to Brazil, a spokesman also reiterated that potential mobile licences and assets in Africa were being assessed, commencing with the privatisation of Ghana Telecom (Cunha, 2007) although in that particular case it was unsuccessful. Its primary interest appears to lie in certain very large markets.

Another active player is France Télécom (partly via wholly-owned subsidiary Orange). Although it bid unsuccessfully for a stake in Burkina Faso in December 2006, after effectively marking time for several years France Télécom initially moved into three new markets during 2007 – the Central African Republic directly and Guinea and the Guinea Republic via 42 per cent-owned subsidiary Sonatel. France Télécom is in general no longer interested in markets where it does not have control or is not one of the largest operators, so it is not surprising that it is acquiring certain additional African assets via an indirect route. That it currently has direct/indirect interests in more African networks than any operators other than Zain and MTN is, however, somewhat surprising, but far from showing an interest in pruning its direct holdings it has recently expressed the desire to expand on its own behalf. Having previously agreed to acquire 51 per cent of Telkom Kenya which will be awarded a mobile licence when the deal is completed, it found itself to be the preferred bidder for a controlling stake in Ghana Telecom in November 2007. However, the government subsequently rejected its bid as too low, so the outcome is unclear. France Télécom also led the consortium that was awarded a licence in Niger. In December, the CEO compared its relationship with Africa to that of Telefónica in Latin America although this seemed at best far-fetched given that France Télécom obtained a meagre 3 per cent of its turnover from its African operations (Jones and Parker, 2007).

The other French operator in Africa is Vivendi Universal which is, however, heavily dependent upon its 51 per cent stake in Maroc Télécom for its proportionate subscribers as its other direct investments are in the overseas French Island Départements of La Réunion and Mayotte. Maroc Télécom is expanding in its own right, having added to its indirect stake in Mauretania by acquiring direct 51 per cent stakes in Burkina Faso and Gabon during 2007. However, the latter, acquired via a privatisation, was suspended by the Constitutional Court in July (Telegeography, 2007a) although Vivendi has consolidated the stake in its accounts.

Nevertheless, as with Orascom, not quite everyone is seeking to build up African assets. For example, Telekom Malaysia – which had previously sold out of Vodacom parent Telkom at the end of 2004 – reached an agreement

with the government of Ghana to hand over its assets there once they had been repurchased in instalments, sold out of the Republic of Guinea in December 2005 and in early 2007 sold its stake in TNL Malawi to its partner. Nevertheless it tried, but failed, to win a licence in Egypt, which given its cost was perhaps just as well.

The final operator worthy of note is another based in the Middle East, The National Mobile Telecommunications Co. of Kuwait, better known as al-Wataniya. Based in the northern markets of Algeria and Tunisia, it has experienced such rapid growth there that it now derives more proportionate subscribers from Africa than from the Middle East. However, it failed to win either a 2G/3G licence in Egypt or a 3G licence in Morocco (in July 2006) and is clearly not prepared to overpay in order to extend its foothold on the continent. It is now majority owned by Qatar Telecom which had no previous assets in Africa and hence it is somewhat unclear how this change in ownership will affect strategic behaviour in the coming year(s).

4.5 DISCUSSION

The previous sections have shown that, in respect of mobile telecommunications, Africa appears to be undergoing a significant process of structural change as certain operators either become, or cease to be, African 'specialists'. As it is frankly rather difficult to understand why some of the non-specialists started out in Africa, the first observation that we can make is that one would expect some of them to have taken advantage of relatively buoyant equity markets and credit conditions during 2006 to sell investments outside of the 'big five' markets to the specialists. These would appear to have a clear interest in expansion over the medium term, although financing that expansion where billions of dollars are involved may still be problematic, especially in the case of the private companies – for example, Orascom's offloading of its Telecel subsidiaries was in order to reduce its indebtedness.

A second observation is that Africa has attracted considerable foreign direct investment from outside the continent (Southwood, 2006). Of particular significance here has been the appearance of Middle Eastern operators such as Etisalat and Zain and Qatar Telecom whose expansion has been driven by oil revenues far in excess of those needed to fund domestic investment. These operators have behaved aggressively and appear to view their entry into Africa, where unlike Latin America there are an unusually large number of licences available as well as assets for sale, as a component in their quest to become world-class players in the industry. Prior to 2005, consolidation had been relatively limited, though the takeover activity of

the then MTC and Etisalat suggested strongly that this was about to change because scale had become such an important determinant of competitiveness. This expectation is clearly turning out to be true. Now that MTN has been successful in acquiring Investcom, it has established itself as the regional powerhouse and it will be of interest to see how arch-rival Vodacom responds to its new freedom to invest, especially since it has been curiously inactive of late on the acquisition front.

The evidence suggests that any other major regional operators are likely to end up being based elsewhere, most likely in the Middle East, but these operators will have a lot of ground to make up unless they move into the handful of markets where the numbers of subscribers are relatively large – which is why the 2G/3G licence on offer in Egypt had so many potential bidders. It is probable that the largest market at the end of 2007 was Nigeria, athough the number of inactive accounts there (and often elsewhere in Africa) renders most subscriber numbers fairly inaccurate. It is notable that the other three large markets – Algeria, Egypt and Morocco – are in the north so there is a huge geographic gap between the big four in the north and South Africa. In between are many countries with big populations such as the DR Congo with 64 million, but it is difficult to predict whether these will remain sufficiently peaceful to restore their economic fortunes sufficiently for mobile telephony to take off.

Related to the above observation of Africa attracting considerable foreign direct investment from outside the continent has been the sudden emergence, and then disappearance, of China Mobile. Although it can be argued that commencing a programme of overseas asset acquisitions by buying a package based around emerging markets was sensible, the fact that the governments of several countries where Millicom was active did not want China Mobile to enter may curb its ambitions for some time to come.

The ambitions of China Mobile and any other investor are also likely to be curbed by the simple fact that African assets and licences are no longer cheap – indeed, quite the opposite in the larger, high-growth markets. MTC paid $3.4 billion in cash for Celtel, $1.3 billion for 61 per cent of Mobitel in Sudan and $1 billion for 65 per cent of Vmobile in Nigeria, while Etisalat paid $1.9 billion for its 66 per cent share of the 2G/3G licence in Egypt.

Whether the cost of these licences and stakes will come back to haunt their purchasers is a moot point, but what is evident is that prices of this magnitude are deterring the long-standing African investors. Indeed, as noted, Orascom, which was widely regarded as a future African powerhouse, now has other ambitions. As a consequence, it is likely that the non-African investors will continue to play a key role in restructuring. Regardless of who actually invests in Africa, the fact that mobile operators

are prepared to invest considerable sums in what are often highly volatile markets suggests that would-be investors view the risks that they face as being acceptable.[5] Having said this, while some of the acquisitions have involved the purchase of outright control, many of the recent investments have taken the form of a joint venture or consortium. Not only does this distribute some of the risk among the partners but it also enables a local company to be involved to offset the information asymmetries faced by the foreign investors. It is worth noting, however, that although they are joint ventures or consortia, one company, the foreign investor, is generally either the majority or largest single shareholder.

A final observation is that because of the huge disparities between the size of various African markets, operators do not need to be present in a large number of countries to be among the top tier of operators when measured by subscribers. Indeed certain operators that are widely present, such as France Télécom, are nevertheless in the second tier where subscribers are concerned. The footprint of France Télécom is, in part, due to the residual effect of Africa's colonial heritage since operators based in France and the UK had an incentive to invest in Africa. Although the traditional colonial presence is still there, its influence is fading as indigenous African and Middle Eastern operators expand across the continent.

4.6 CONCLUSIONS

As can be seen from the above discussion, African mobile telecommunications has spent the last two to three years undergoing an extensive process of restructuring. The liberalisation of telecommunication markets initially created the opportunity for inward foreign direct investment. Operators, both from within and from outside the continent, used this opportunity to enter new markets and thus expand their geographical footprints. Subsequent rounds of restructuring have seen some of these operators exit markets whereas others have expanded into additional markets or consolidated control over their various operations.

As the various rounds of restructuring have been played out, two broad categories of operators have emerged. On the one hand there are those operators based in Africa which have used the opportunity presented by liberalisation to expand into other markets in the home continent. On the other hand, African liberalisation has attracted foreign direct investment from operators based elsewhere which probably have deeper pockets when it comes to acquiring the remaining assets that have the potential to add instant scale to a collection of African assets. Where Middle East-based operators are concerned, it can somewhat simplistically be argued that they

are spending oil money, are not so bothered about profitability and prefer to stick to neighbouring regions.

It is difficult to predict when the process of restructuring will come to a halt. Since the turn of the century, the attempt to liberalise the previously monopolistic markets of much of Africa, together with collections of assets in the hands of operators quite happy to sell out to anyone willing to pay an inflated price, has made Africa a highly volatile continent. But now that most of the (worthwhile) licences have been auctioned and so many assets have been transferred, a period of consolidation should soon become the order of the day. It must be borne in mind that operators such as Zain and Etisalat face numerous challenges as they seek to become global operators and they will need to devote a substantial part of their limited managerial resources to integrating all the companies and stakes that they have acquired.

It is nevertheless difficult to be certain that consolidation will not erupt into a further round of restructuring. While those governments thinking of selling stakes and licences will undoubtedly welcome the likely continuation of high prices,[6] it raises several related questions. In the first place, it may be asked whether they will be tempted by the opportunity to offer further licences where there is insufficient demand to justify them, thereby creating discord among existing licensees. Secondly, there is the possibility that some operators will over-extend themselves and subsequently be forced to retreat in order to focus on a smaller number of potentially more lucrative markets. If so, this is likely to benefit the well-established operators such as MTN and Vodacom. In other words, the current high prices for stakes and licences may lead to another round of African restructuring in a few years' time with the major difference from the current round being that the resulting market structure will become stabilised around a smaller number of larger operators.

NOTES

1. According to a recent study, the African mobile penetration rate is the lowest of the five regions for which data are collected (ITU, 2006: 4). Africa accounted for just 4 per cent of mobile subscribers in 2004, the most recent year for which ITU data are available, while Europe accounted for 33 per cent, Asia for 41 per cent, the Americas for 21 per cent and Oceania for 1 per cent respectively.
2. A comprehensive picture of the differences that exist across Africa in terms of mobile and fixed telecommunication penetration levels can be found in ITU (2004) and ITU (2006). These sources also include other information and communication technologies such as access to the Internet, broadcasting and computers.
3. See Curwen and Whalley (2004: 129–53) for a description of how Vodafone expanded from the UK into other markets.
4. See Bonaglia and Goldstein (2006: 117–20) for a description of the origins of Orascom.

5. The risks faced by foreign direct investors in Africa include political and institutional instability; corruption, foreign exchange; economic instability; inflation; high interest rates, lack of financial markets; inadequate regulation; poor corporate governance and unpaid bills.
6. As is true elsewhere in the world, licence prices are highly variable, but it is notable that Orascom paid roughly $46 per inhabitant for its 2G licence in Tunisia in 2002 while Etisalat paid $36 per head for a 2G/3G licence in Egypt and Chinguitel paid $32 per head for a 2G/3G licence in Mauretania, both in 2006. Prices are, naturally, much lower in many other countries where penetration is poor and average incomes very low, but there has nevertheless been a more than doubling on average comparing the current decade (so far) with the 1990s.

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5. Structural and strategic adjustment in European mobile telecommunications

5.1 INTRODUCTION

On 1 May 2004, the European Union (EU) witnessed its single largest expansion when ten countries joined. The accession of these ten countries – Cyprus (South), Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia – not only irrevocably changed the EU but shifted the whole concept of 'Europe' further to the East and gave rise to speculation as to how far it could eventually encroach into parts of the world previously considered to be in some obvious senses 'Asian'. Historically, the term 'Eurasia' was sometimes used and still is in some quarters, but it cannot be said to encompass a discrete region for the purposes of this book. At the time, the EU was already committed to welcoming two additional members into the fold, namely Bulgaria and Romania, and this duly took place on 1 January 2007. These countries will not be the last to join the EU – although Kosovo is excluded for now since not all EU countries accept its independent status – since there is still a queue of prospective entrants, but from the point of view of telecommunications there is no longer any useful purpose to be served in differentiating the EU from Europe as a whole. This chapter accordingly takes the view that Europe is a moveable feast that is moving constantly eastwards and south-eastwards. This makes it difficult to draw a line in the sand – for example, parts of Russia are clearly European while most of the country lies in Asia. However, a line of sorts must be drawn if only to limit the scope of the chapter; therefore Russia and Turkey are included primarily because they are of considerable importance to the international strategies of the operators analysed in what follows and of far less significance to the operators discussed in the chapter on the Asia-Pacific region.

In the main sections that follow, the ownership of mobile communication licences across the whole of Europe will be described and the geographical footprint of the most internationally active operators will be established. Their strategic view of Europe will then be considered in detail. Conclusions will be drawn in the final section.

5.2 MOBILE LICENCE DISTRIBUTION IN WESTERN EUROPE

At the heart of the analysis of the implications of European expansion on the strategies of mobile communications companies is the information contained in Table 5.1. This table depicts networks using second-generation (2G) technology – known generically in Europe as the Global System for Mobile (GSM) – and third-generation (3G) technology – known in Europe as the Universal Mobile Telecommunications System (UMTS).[1]

Table 5.1 encompasses mobile licence ownership across the 51 'countries' that formed part of Europe (by our definition) on 31 December 2007. In essence, 2G represents a digital technology whose main purpose is to carry voice telephony while also accommodating low-speed data transfer as exemplified by the short message service (SMS), while 3G is capable of much higher speeds of data transfer suitable for large data files and still and video photography. In Europe, UMTS has until very recently required the licensing of different spectrum from that used for GSM, but there are also two intermediate technologies, known as the General Packet Radio Service (GPRS) and Enhanced Data rates for GSM Evolution (EDGE) that can operate at higher speeds than GSM while using the same spectrum, as well as a recently launched technology, High-Speed Downlink Packet Access (HSDPA), capable of even higher speeds than UMTS over the same spectrum bands. Within the last few months the first licences to provide 3G services over 2G spectrum have been issued, but this is as yet insufficiently widespread to merit further discussion.

Table 5.1 builds on Whalley and Curwen (2003) in several ways. In the first place, the table differentiates between the two bandwidths used for what is generically called GSM, namely GSM900 and GSM1800 (PCNs). Secondly, the table identifies when each mobile service was launched. Thirdly, the table details the number of subscribers that each operator had as of 31 December 2007. By detailing the number of subscribers that a company has in each country, the table helps to differentiate between a simple presence in a country where the company is not a significant player and a presence where the company is actually (one of) the largest in the market in terms of number of subscribers.

Using Table 5.1 as our starting point, it is possible to make a series of preliminary observations about the mobile markets of Europe. In the first place, 2G licences had been issued in all countries as of 31 December 2007. In total, 257 national licences were extant – although not quite all had been launched – comprising 136 GSM900 and 121 GSM1800 licences (of which all bar 20 had been issued to GSM900 licensees). However, the number of licensees in each country varied between one and six. Predictably, perhaps,

only one licence existed in Andorra, Gibraltar and Monaco, although this is not all that easy to equate with the three licences in the equally small Isle of Man, Guernsey and Jersey. Equally, while there are instances of six licences and the Netherlands originally issued five, it takes only a fairly cursory examination of the data to conclude that the optimum number of 2G licences for a European country, regardless of its size, appears currently to be either three or four. It is finally worth noting that whereas there is an ongoing process of consolidation underway which is reducing the number of licensees in some countries, there is an offsetting process of new licence issuance in other countries so the overall picture is unlikely to change all that much for the time being.

Secondly, nearly all European countries – in practice, all bar eight – had issued 3G licences by the end of 2007 although certain others had as yet no operational networks. Of the countries without 3G licensees, the most surprising was probably Turkey, but in fact licences were offered there, and one was actually awarded to Turkcell in September 2007. However, as it was the only applicant, the government decided subsequently to annul the licence award. Overall, although some countries had attempted to expand the number of operators by issuing more 3G licences than 2G licences (Whalley and Curwen, 2006), because not all of the licences on offer had actually been awarded while others had been returned, revoked or sold on, the number of operators with 3G licensees, at 134, was smaller than the number of 2G licensees. Not surprisingly, the 2G and 3G licensee groups heavily overlap, leaving 16 3G-only operators and, within the countries that had issued 3G licences, 19 2G operators without (so far) a 3G licence, of which a significant number were themselves un-launched GSM licensees.

Thirdly, the situation with respect to HSDPA (sometimes referred to as 3.5G) is worthy of note. Prior to 2005, almost nothing was expected from this technology given the emphasis placed upon UMTS. However, although there was the exceptional launch during 2005 such as that of T-Mobile Austria, 2006 by comparison witnessed a positive tidal wave of launches. HSDPA is essentially a software overlay – that is, it utilises existing networks and does not require new spectrum – and hence, crucially, does not necessitate a new licence, which accounts for its rapid adoption compared to UMTS. As shown in Table 5.1, virtually every European network was HSDPA-enabled by the end of 2007, and most had gravitated from an initial maximum data transfer speed of 1.8 Mbps to a maximum of 3.6 Mbps or even occasionally of 7.2 Mbps. 2007 also witnessed the first half-dozen launches of HSUPA which significantly raised the speed of the uplink.

Table 5.1 European mobile networks based on GSM, 31 December 2007 (000s of subscribers)

Country	GSM[1]			PCNs[1]			UMTS[2,3]		
Albania	AMC	05/96	1195	–	–	–	–	–	–
	Eagle Mobile	nyl	–	–	–	–	Eagle Mobile	nyl	–
	Vodafone	08/01	1128	Vodafone	–	–	–	–	–
Andorra	STA	03/95	72	–	–	–	STA	nyl	–
Austria	–	–	–	–	–	–	Hutchison 3G*	04/03	513
	mobilkom	12/93	3210	mobilkom	–	–	mobilkom*	04/03	750
	–	–	–	ONE	10/98	1595	ONE*	12/03	435
	T-Mobile	07/96	2840	T-Mobile[15]	–	–	T-Mobile*[16]	12/03	433
Belarus[4]	BeST	01/06	274	BeST	–	–	–	–	–
	MDC (Velcom)	04/99	3059	MDC	–	–	–	–	–
	MTS	06/02	3800	MTS	–	–	–	–	–
Belgium	–	–	–	Base	03/99	2855	KPN Mobile 3G	nyl	–
	Mobistar	08/96	3180	Mobistar	–	–	Mobistar*	09/06	178
	Proximus	01/94	4395	Proximus	–	–	Proximus*	04/04	225
Bosnia	Eronet	09/00	433	–	–	–	–	–	–
	GSM BiH	10/96	1198	–	–	–	–	–	–
	Mobilna Srpske	07/99	804	Mobilna Srpske	–	–	–	–	–
Bulgaria[5]	BTC	11/05	981	BTC	–	–	BTC*	04/07	6
	GloBul	09/01	3806	GloBul	–	–	GloBul*	09/06	67
	MobilTel	09/95	4980	MobilTel	–	–	MobilTel*	03/06	121
Croatia	Tele2	10/05	470	–	–	–	Tele2	nyl	–
	T-Mobile	07/95	2300	–	–	–	T-Mobile	06/06	85
	VIPnet	07/99	2060	–	–	–	VIPnet*	01/05	120
Cyprus (South)	CyTA	04/95	1121	CyTA	–	–	CyTA	03/06	n/a
	Investcom	10/03	113	Investcom	–	–	Investcom	12/04	n/a

Czech Repub.[5]	Telefónica O_2	07/96	4926	Telefónica O_2	–	–	Telefónica O_2*	12/05	200
	T-Mobile	09/96	5271	T-Mobile	–	–	T-Mobile[17]	12/06	n/a
	Vodafone	01/00	2658	Vodafone	–	–	Vodafone	nyl	–
Denmark	–	–	–	–	–	–	Hi3G Denmark*	11/03	267
	Sonofon	07/92	1450	Sonofon	–	–	Sonofon*	06/06	230
	TDC	07/92	2690	TDC	–	–	TDC	10/05	247
	TeliaSonera	06/97	1449	TeliaSonera	–	–	TeliaSonera*	12/07	–
Estonia	Elisa	01/95	296	Elisa	–	–	Elisa*	07/06	27
	EMT	01/95	604	EMT	–	–	EMT*	10/05	161
	–	–	–	–	–	–	ProGroup	nyl	–
	Tele2	09/96	534	Tele2	–	–	Tele2*	11/06	5
Faroe Islands	Føroya Tel	10/98	35	–	–	–	–	–	–
	Kall-GSM	11/02	17	–	–	–	–	–	–
Finland	Elisa	12/91	1865	Elisa	–	–	Elisa*	11/04	470
	Suomen 2G	01/01	1030	Suomen 2G	–	–	Suomen 2G*	12/05	215
	TeliaSonera	06/92	1820	TeliaSonera	–	–	TeliaSonera*	10/04	629
France	Bouygues Tél	05/96	9230	Bouygues Tél	–	–	Bouygues Tél*	05/07	25
	Orange	07/92	23 342	Orange	–	–	Orange*	02/04	2300
	SFR	07/92	14 651	SFR	–	–	SFR*	06/04	4115
Georgia[6]	Geocell	12/96	1244	Geocell	–	–	–	–	52
	Magti	09/97	873	Magti	–	–	Magti	07/06	200
	–	–	–	Mobitel	02/07	73	–	–	–
	–	–	–	–	–	–	Telecom Invest	nyl	–
Germany	–	–	–	E-Plus	05/94	13 877	E-Plus	06/04	930
	–	–	–	Telefónica O_2	10/98	10 702	Telefónica O_2*	06/04	1770
	T-Mobile	07/92	32 077	T-Mobile	–	–	T-Mobile*	01/04	2820
	Vodafone	06/92	28 605	Vodafone	–	–	Vodafone*	01/04	5315
Gibraltar	Gibtel	01/95	25	–	–	–	–	–	–

Table 5.1 (continued)

Country	GSM[1]			PCNs[1]			UMTS[2,3]		
Greece	CosmOTE	01/98	6050	CosmOTE	–	–	CosmOTE*	06/04	218
	Vodafone	07/93	4916	Vodafone	–	–	Vodafone	08/04	528
	Wind Hellas	06/93	4160	Wind Hellas	–	–	Wind Hellas*	01/04	187
Guernsey	AirTel	nyl	–	–	–	–	AirTel	nyl	–
	C&W	03/96	50	–	–	–	C&W	nyl	–
	–	–	–	Wave Telecom	07/04	15	Wave Telecom	07/04	3
Hungary	Pannon	03/94	3277	Pannon	–	–	Pannon*	10/05	100
	T-Mobile	03/94	4753	T-Mobile	–	–	T-Mobile*	08/05	100
	Vodafone	11/99	2204	Vodafone	–	–	Vodafone*	12/05	100
Iceland	–	–	–	Amitelo	nyl	–	–	–	–
	–	–	–	IceCell	nyl	–	–	–	–
	–	–	–	IMC Iceland	07/02	25	–	–	–
	–	–	–	–	–	–	Nova*	12/07	neg.
	Og fjarskipti	04/98	120	–	–	–	Og fjarskipti	nyl	–
	Síminn	08/94	182	–	–	–	Síminn*	09/07	neg.
Ireland	–	–	–	–	–	–	H3G*	07/05	208
	Meteor	02/01	952	Meteor	–	–	Meteor	nyl	–
	Telefónica O_2	03/97	1132	Telefónica O_2	–	–	Telefónica O_2*	03/05	514
	Vodafone	06/93	1412	Vodafone	–	–	Vodafone*	07/04	853
Isle of Man	C&W	07/07	7	–	–	–	C&W	07/07	1
	–	–	–	Cloud9	03/07	n/a	Cloud9	nyl	–
	Telefónica O_2	09/96	71	–	–	–	Telefónica O_2*	11/05	2
Italy	–	–	–	–	–	–	H3G*	03/03	8111
	TIM	04/95	30 170	TIM	–	–	TIM*	05/04	6118
	Wind	03/99	13 680	Wind	–	–	Wind	10/04	1848
	Vodafone	09/95	22 560	Vodafone	–	–	Vodafone*	02/04	7077

Jersey	AirTel	06/07	neg.	AirTel	–	–	AirTel*	06/07	neg.
	C&W	05/06	n/a	C&W	–	–	C&W	09/06	neg.
	Jersey Telecom	12/94	108	Jersey Telecom	–	–	Jersey Telecom	06/06	neg.
Latvia[7]	Bité	09/05	112	Bité	–	–	Bité*	09/06	n/a
	LMT	01/95	910	LMT	–	–	LMT*	12/04	105
	Tele2	03/97	969	Tele2	–	–	Tele2	12/05	50
Liechtenstein	mobilkom	09/00	5	mobilkom	–	–	mobilkom*	02/07	neg.
	–	–	–	Orange	08/00	8	Orange*	02/07	neg.
	Tele2	03/00	12	–	–	–	Tele2	nyl	neg.
	TeleNet	04/00	4	TeleNet	–	–	TeleNet*	06/07	neg.
Lithuania	Bité	08/95	990	Bité	–	–	Bité*	06/06	79
	Omnitel	03/95	1890	Omnitel	–	–	Omnitel*	06/06	122
	Tele2	12/99	1751	Tele2	–	–	Tele2	n/a	–
Luxembourg[8]	EPT	06/93	321	EPT	–	–	EPT*	06/03	42
	LuXcom	05/05	54	LuXcom	–	–	LuXcom	05/05	21
	Tele2	05/98	211	Tele2	–	–	Tele2	07/04	19
Macedonia	CosmoFon	05/03	593	–	–	–	CosmoFon	nyl	–
	T-Mobile	06/96	1213	–	–	–	–	–	–
	Vip	09/07	141	Vip	–	–	–	–	–
Malta	–	–	–	Go Mobile	12/00	162	Go Mobile*	03/06	n/a
	Vodafone	04/97	196	–	–	–	Vodafone*	08/06	5
	–	–	–	–	–	–	3G Telecoms	nyl	–
Moldova[9]	Eventis	07/07	36	Eventis	–	–	–	–	–
	Moldcell	04/00	504	–	–	–	–	–	–
	Orange	10/98	1160	–	–	–	–	–	–
Monaco	Monaco Tel	02/94	39	–	–	–	Monaco Tel	06/06	n/a
Montenegro	m:tel	07/07	246	m:tel	–	–	m:tel*	07/07	3
	ProMonte	07/96	422	ProMonte	–	–	ProMonte*	06/07	neg.
	T-Mobile	07/00	409	–	–	–	T-Mobile*	06/07	neg.

Table 5.1 (continued)

Country	GSM[1]			PCNs[1]			UMTS[2,3]		
Netherlands	KPN	07/94	8270	–	–	–	KPN*	07/04	1122
	–	–	–	KPN (Telfort)	10/98	–	KPN (Telfort)	nyl	–
	–	–	–	T-Mobile	02/99	4640	T-Mobile*	01/06	255
	Vodafone	09/95	3012	Vodafone	–	–	Vodafone*	02/04	1030
Norway[10]	–	–	–	–	–	–	Hi3G Access	nyl	–
	Mobile Norway	nyl	–	–	–	–	Mobile Norway	nyl	–
	–	–	–	MTU T3	nyl	–	–	–	–
	NetCom	09/93	1100	NetCom	–	–	NetCom*	06/05	477
	Telenor	05/93	2130	Telenor	–	–	Telenor*	12/04	726
Poland	CenterNET	nyl	–	–	–	–	–	–	–
	Mobyland	nyl	–	–	–	–	–	–	–
	Orange	03/98	14 060	Orange	–	–	Orange*	01/06	120
	–	–	–	–	–	–	Netia P4*	03/07	700
	Polkomtel	02/96	13 180	Polkomtel	–	–	Polkomtel*	09/04	279
	PTC	02/96	12 800	PTC	–	–	PTC*	08/04	138
	–	–	–	Tele Kolejowa	nyl	–	–	–	–
Portugal	Optimus	08/98	1692	Optimus	–	–	Optimus*	06/04	585
	TMN	10/92	4806	TMN	–	–	TMN*	04/04	1455
	Vodafone	10/92	3951	Vodafone	–	–	Vodafone*	02/04	1160
Romania[11]	CosmOTE	04/00	3616	CosmOTE	–	–	–	–	–
	Orange	06/97	9390	Orange	–	–	Orange*	06/06	423
	–	–	–	–	–	–	RCS&RDS	12/07	neg.
	–	–	–	–	–	–	TeleMobil	nyl	–
	Vodafone	03/97	8190	–	–	–	Vodafone*	04/05	618

Russia[12]	MegaFon	08/01	35 656	MegaFon	–	–	MegaFon*	10/07	neg.
	MTS	08/94	57 430	MTS	–	–	MTS	nyl	–
	VimpelCom	06/97	42 221	VimpelCom	–	–	VimpelCom	nyl	–
San Marino	San Marino Tel	08/07	neg.	–	–	–	–	–	–
Serbia	Mobilkom	07/07	509	mobilkom	–	–	mobilkom	07/07	neg.
	Telekom Srbija	08/98	5310	Telekom Srbija	–	–	Telekom Srbija*	12/06	92
	Telenor	10/96	2860	Telenor	–	–	Telenor*	03/07	64
Slovakia	Orange	01/97	2450	Orange	–	–	Orange*	03/06	414
	Telefónica	02/07	565	Telefónica	–	–	Telefónica	nyl	–
	T-Mobile	02/97	2367	T-Mobile	–	–	T-Mobile*	01/06	n/a
Slovenia	Mobitel	06/96	1077	Mobitel	–	–	Mobitel*	12/03	186
	Si.mobil	03/99	497	Si.mobil	–	–	Si.mobil*	nyl	–
	–	–	–	Tusmobil	10/07	30	–	–	–
	–	–	–	–	–	–	T-2	nyl	–
Spain	Orange	01/99	9486	Orange	–	–	Orange*	10/04	1605
	Telefónica	07/95	19 370	Telefónica	–	–	Telefónica*	02/04	3470
	Vodafone	10/95	10 966	Vodafone	–	–	Vodafone*	02/04	4844
	–	–	–	–	–	–	Xfera	12/06	427
Sweden	–	–	–	–	–	–	Hi3G*	04/03	633
	Spring Mobile[14]	02/04	n/a	–	–	–	–	–	–
	Tele2	09/92	2604	Tele2	–	–	Tele2*[18]	03/04	495
	Telenor	09/92	1070	Telenor	–	–	Telenor*	02/04	785
	TeliaSonera	11/92	4172	TeliaSonera	–	–	TeliaSonera*[18]	03/04	635
Switzerland	Orange	06/99	1315	Orange	–	–	Orange*	09/05	195
	Swisscom	03/93	4310	Swisscom	–	–	Swisscom*	07/04	700
	TDC Schweiz	12/98	1180	TDC Schweiz	–	–	TDC Schweiz*	12/05	344

Table 5.1 (continued)

Country	GSM[1]			PCNs[1]			UMTS[2,3]		
Turkey	AVEA	03/01	9870	AVEA	–	–	–	–	–
	Turkcell	03/94	35 793	–	–	–	–	–	–
	Vodafone	05/94	16 116	–	–	–	–	–	–
UK	Telefónica O_2	01/94	15 882	Telefónica O_2	–	–	Telefónica O_2*	09/04	2500
	–	–	–	Orange	04/94	13 842	Orange*	07/04	1800
	–	–	–	T-Mobile	09/93	16 341	T-Mobile*	05/04	970
	Vodafone	07/92	15 187	Vodafone	–	–	Vodafone*	04/04	3260
	–	–	–	–	–	–	3 UK*	03/03	4100
Ukraine[13]	Astelit	01/05	7600	Astelit	–	–	–	–	–
	Beeline	10/98	1941	Beeline	–	–	–	–	–
	–	–		Golden Telecom	12/96	n/a	–	–	–
	Kyivstar	12/97	23 604	Kyivstar	–	–	–	–	–
	MTS	09/97	20 021	MTS	–	–	–	–	–
	Ukrtelecom	11/07	neg.	–	–	–	Ukrtelecom	11/07	neg.

Notes:
n/a = not available.
neg. = negligible.
nyl = not yet launched.

1. The entries, which refer only to national licensees, consist of name of operator, the month when its service was first launched and the number of subscribers in thousands on 31 December 2007. Where an operator provides both GSM (900 MHz band) and PCN (1800 MHz band) services, the subscriber data are provided for both services together in the GSM column. Subscriber data often differ depending upon the source, but such differences tend not to be significant in the context of European countries. There is, however, some controversy over the counting of 'inactive' customers which may be done differently by individual operators. It is also widely believed that subscriber numbers are heavily overstated in, for example, Russia and the Ukraine. It should also be noted that the subscriber numbers for MVNOs are not separated out from those of the licensees that host them. Most MVNOs have fairly modest numbers of subscribers, but there are some large ones such as debitel in Germany which had 13.2 subscribers (as well as 900 000 in the Netherlands).

2. UMTS is the name used for W-CDMA technology in the EU. It is also known as 3GSM. The licensees on 1 January 2008 are listed but not all have yet launched. The term 'launch' in the context of UMTS can mean many things, but normally refers to the launch of a service for corporate customers via data cards inserted in laptops. A consumer service via handsets – sometimes referred to as a 'commercial' launch – usually follows months later but may be simultaneous or even come first. Launch dates vary widely across sources because of such differences. This table lists the first relevant date even if not 'fully commercial'. Where subscriber data are known they are included in this column and the total deducted from the total number of subscribers to derive the total for GSM.
3. Operators marked with an asterisk have launched high-speed downlink packet access (HSDPA).
4. BelCel launched cdma2000 1×RTT in February 2003 and 1×EV-DO (approximating to somewhere between UMTS and HSDPA) in June 2006. Subscriber numbers are less than 100 000.
5. In Bulgaria, Radiotelecommunication Co. (BTC) was given a CDMA450 licence in December 2007. In the Czech Republic, MobilKom (U:fon) launched cdma2000 1×RTT and 1×EV-DO Rev. A in the 410–430 MHz band in May 2007.
6. The situation in Georgia is confusing. Iberiatel launched cdma2000 1×RTT in the 450 MHz band in December 2003. Mobitel was awarded a PCN licence in December 2003 but nothing happened until it was part-acquired by VimpelCom in 2006, eventually launching in February 2007. Argotex won a W-CDMA licence in April 2006, but transferred it to Magti in November. There are references to a launch of a '3G' network by Geocell in 2006 but it does not appear to have a licence.
7. Telekom Baltija launched cdma2000 1×RTT/1×EV-DO in November 2005. Megacom launched cdma2000 1×RTT in May 2004.
8. Astralis was awarded a 'convergent satellite UMTS' licence in May 2006.
9. Moldtelecom launched cdma2000 1×RTT in December 2005 and 1×EV-DO in March 2007. InterDnestrCom operates a cdma2000 1×RTT network with 150 000 subscribers at the end of 2007.
10. Nordisk MobilTelefon launched cdma2000 1×RTT and 1×EV-DO in the 450 MHz band in June 2006.
11. TeleMobil (Zapp Mobile) launched cdma2000 1×RTT in December 2001 and 1×EV-DO in October 2004 in the 450 MHz band. It had roughly 600 000 subscribers at the end of 2007.
12. Only the three near-national operators are listed. Tele2 also has a large operation. Active subscriber numbers are heavily overstated.
13. PEOPLEnet launched cdma2000 1×RTT and 1×EV-DO in February 2007. MTS launched cdma2000 1×EV-DO Rev. A in November 2007 in the 450 MHz band. Active subscriber numbers are heavily overstated: for example, Astelit had 39% inactive subscribers in 2007Q4.
14. Spring Mobile was initially launched for corporate users in February 2004. Tele2 acquired a 49% stake in October 2006.
15. Formerly known as tele.ring.
16. Including the former tele.ring.
17. A very limited service using TDD spectrum was first provided in October 2005.
18. Svenska UMTS, the licensee, is a 50/50 joint venture between Tele2 (the original licensee) and TeliaSonera which initially operated as a MVNO.

Source: Details obtained from a wide variety of regulators' websites, company websites and media and Internet websites.

5.3 MARKET STRUCTURE

Across the enlarged EU in 2004, the incumbent fixed-wire operator owned the largest mobile operator as measured in terms of subscribers in 19 of the 25 Member States: Austria, Belgium, Cyprus (South), Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia (minority stake), Luxembourg, Netherlands, Portugal, Slovenia, Spain and Sweden. By 1 January 2007, the Czech Republic had disappeared from the list and both of the two new entrants qualified, albeit via a minority stake in Romania, so it was now a case of 21 among 27. This observation can also be expressed informatively in a slightly different fashion; that is, in just two of the 15 'old' Member States of the EU the incumbent operator did not own the largest mobile operator either in 2004 or during the subsequent two years. The exceptions were Ireland and the UK. In the case of Ireland, Eircom, the incumbent fixed-wire operator, divested its mobile subsidiary, Eircell, in May 2001 and Vodafone subsequently acquired Eircell for €4.5 billion in December 2001. BT also divested its mobile arm, known at the time as mmO_2 (which has recently become part of Telefónica). In November 2001, BT spun off mmO_2 in order to ease the financial problems that it was facing in the aftermath of acquiring 3G licences and buying out its partners in its British, Irish, Dutch and German mobile businesses. Moreover, mmO_2 was not at that time the largest mobile operator in the UK and had not been for many years. This accolade had alternated between Orange, a subsidiary of France Télécom, and Vodafone. As of December 2003, all four GSM network operators had at least 13 million subscribers and only 900 000 subscribers separated the largest company, Vodafone, from the smallest, mmO_2. No other Member State has ever had anything like such consistent equality between so many operators, although Lithuania in 2006 produced virtual equality between three much smaller operators.

In 2004 this left four Member States – all accession countries – where the incumbent fixed-wire operator did not own the largest mobile operator. In all of these – Lithuania, Malta, Poland and Slovakia – the largest mobile operator was partially owned by foreign investors. In Lithuania, the incumbent fixed-wire operator did not own a stake in any mobile operator, while in the case of the other three countries the incumbent owned a stake in the second-largest mobile operator. Subsequently, Ceský Telecom sold its mobile subsidiary, EuroTel Praha, to what is now Telefónica O_2 Czech Republic. Meanwhile, in Bulgaria, BTC eventually got around to launching a GSM network in November 2004 and, in Romania, RomTelecom continues to own a minority stake in CosmOTE Romania.

Related to the above is the observation that those mobile operators with multiple licences across the EU were frequently not stakeholders in the

largest operator outside the home market. It is possible to determine the market position of operators in EU Member States if we assume that an operator is present provided it has a stake in any operator outside its home market. The precise size of most of these stakes is set out in the discussion that follows, and it may be observed that some are controlling stakes – which is not necessarily the same thing as majority stakes – while others are not, and that in certain cases there is multiple ownership of the same operator by companies listed in the table. With two exceptions – Tele2 and Telefónica subsidiary O_2 (the former mmO_2) – each company identified below was the largest operator in its home market. Tele2 was the second-largest operator in Sweden after TeliaSonera while O_2 was the second-largest of the four second-generation network operators in the UK.

If we had turned our attention to those mobile operators that had stakes in the largest operators in a foreign country just four years previously, then a common trait was that those foreign markets where they were the largest were comparatively small. However, this was no longer the case by the end of 2007 (see Table 5.2). It remained true, for example, that TeliaSonera was the largest mobile operator in two of the three Baltic States which were numbered among the smaller EU markets, while Vodafone was dominant in Ireland and Malta. In contrast, however, Deutsche Telekom had a stake in the largest operator in the Czech Republic and Hungary, and France Télécom in Poland and Romania.

5.4 MARKET CONCENTRATION

Drawing on the subscriber information contained in Table 5.1, it is possible to calculate the percentage of the mobile market controlled by the largest (two/three) mobile operator(s) as of 31 December 2007. As can be observed from Table 5.3, it was commonly the case – basically reflecting the advantage of GSM incumbency – that the largest mobile operator controlled at least 40 per cent (but generally less than 50 per cent) of the market although, clearly, the figure always exceeded 50 per cent in the case of duopolies. Nevertheless, in five countries – Germany, Greece, Latvia, Montenegro and Poland – the largest operator accounted for only between 30 per cent and 40 per cent of all subscribers, while in the UK the figure was a mere one-quarter, indicating fierce competition.

One explanatory factor is clearly the existence of a fourth operator, although only in Germany and the UK (plus tiny Liechtenstein) do these control more than 10 per cent of the market, and it has to be said that even attaining 10 million subscribers in the largest markets may not prove to be economic in the medium term.

Table 5.2 Market position, 31 December 2007

	Deutsche Telekom	France Télécom	KPN	mobilkom	OTE	TDC	Telefónica O_2	Telenor	Tele2	Telia Sonera	Vodafone
Albania					2						1
Andorra											
Austria	2	3		1					mvno		
Belarus				2							
Belgium		2	3								
Bosnia	3				2						
Bulgaria				1	2						
Croatia	1			2					3		
Cyprus (S)											
Czech Rep.	1						2				3
Denmark						1		2		3	
Estonia									2	1	
Faroe Isles											
Finland										2	
France		1							mvno		2
Georgia								3		1	
Germany	1	mvno	3				4				2
Gibraltar											
Greece					1						2
Guernsey											
Hungary	1							2			3
Iceland											
Ireland							2				1
Isle of Man							1				

Italy							1				2
Jersey											
Latvia									1	2	
Liechtenstein		2		3					1		
Lithuania									2	1	
Luxembourg		3							2		
Macedonia	1			3	2						
Malta											1
Moldova		1								2	
Monaco											
Montenegro	1				3			2			
Netherlands	2		1						mvno		3
Norway						mvno		1	3	2	
Poland	3	1				2					2
Portugal		3					1				2
Romania		1			3						2
Russia								2	n/a	3	
San Marino											
Serbia				3	1			2			
Slovakia	2	1					3				
Slovenia				2							
Spain		3					1			4	2
Sweden								3	2	1	
Switzerland		3				2			mvno		
Turkey										1	
UK	3	4					2				1
Ukraine								1		3	

Source: Calculated by the authors from data in Table 5.1.

Table 5.3 Mobile market concentration, 31 December 2007

Country[1]	Total subscribers (000s)	% market share: largest operator	% market share: largest 2 operators	% market share: largest 3 operators
Albania	2 323 000	51.4	100.0	100.0
Andorra	72 000	100.0	100.0	100.0
Austria	9 776 000	40.5	74.0	94.8
Belarus	7 133 000	53.2	96.2	100.0
Belgium	10 833 000	42.6	73.6	100.0
Bosnia	2 435 000	49.2	82.2	100.0
Bulgaria	9 961 000	51.2	90.1	100.0
Croatia	5 035 000	47.4	88.7	100.0
Cyprus (South)	1 234 000	90.8	100.0	100.0
Czech Republic	13 055 000	40.4	79.6	100.0
Denmark	6 333 000	46.3	72.9	95.8
Estonia	1 466 000	41.2	78.0	100.0
Faroe Isles	52 000	67.3	100.0	100.0
Finland	6 029 000	40.6	79.3	100.0
France	53 663 000	47.8	82.8	100.0
Georgia	2 442 000	53.1	97.0	100.0
Germany	96 096 000	36.3	71.6	87.0
Gibraltar	25 000	100.0	100.0	100.0
Greece	16 246 000	38.6	72.1	92.1
Guernsey	68 000	73.5	100.0	100.0
Hungary	10 534 000	46.1	78.1	100.0
Iceland	327 000	55.7	92.4	100.0
Ireland	5 071 000	44.7	77.1	95.9
Isle of Man	84 000	86.9	96.4	100.0
Italy	89 564 000	40.5	73.6	90.9
Jersey	110 000	n/a	n/a	100.0
Latvia	2 146 000	47.3	94.8	100.0
Liechtenstein	29 000	41.4	69.0	86.2
Lithuania	4 832 000	41.6	77.9	100.0
Luxembourg	666 000	62.3	92.8	100.0
Macedonia	1 947 000	62.3	92.8	100.0
Malta	363 000	55.4	100.0	100.0
Moldova	1 700 000	68.2	98.5	100.0
Monaco	39 000	100.0	100.0	100.0
Montenegro	1 080 000	39.1	77.0	100.0
Netherlands	18 329 000	51.2	77.9	100.0
Norway	4 433 000	59.1	100.0	100.0
Poland	41 337 000	34.3	66.9	98.3

Table 5.3 (continued)

Country[1]	Total subscribers (000s)	% market share: largest operator	% market share: largest 2 operators	% market share: largest 3 operators
Portugal	13 649 000	45.9	83.3	100.0
Romania	22 327 000	44.0	83.4	99.9
San Marino	30 000	100.0	100.0	100.0
Serbia	8 835 000	61.1	94.2	100.0
Slovakia	5 796 000	49.4	90.3	100.0
Slovenia	1 790 000	70.6	98.3	100.0
Spain	50 098 000	45.5	77.0	99.1
Sweden	10 394 000	46.2	76.1	93.9
Switzerland	8 044 000	62.3	81.2	100.0
Turkey	61 779 000	57.9	84.0	100.0
UK	73 882 000	25.0	49.8	73.3
Ukraine	56 166 000	42.0	77.7	91.2

Note: 1. Russia is excluded due to inconsistent methods of counting used by operators.

Source: Calculated by the authors from data in Table 5.1.

If the calculation is extended to include the second-largest mobile operator in each market, then in a bare majority of countries the mobile market was, to all intents and purposes, a duopoly with the percentage standing in excess of 80 per cent. Elsewhere, the two largest mobile operators still tended to control over 70 per cent of the market, with the only exceptions being Liechtenstein and Poland (both narrowly) and the UK. Where three or more mobile operators had been licensed, a considerable gap often existed between the number of mobile subscribers controlled by the second-largest operator and the number of subscribers controlled by the third-largest operator. In the Czech Republic, for example, the third-largest was almost exactly half the size of the second-largest, but the real anomaly was the UK, with four almost equal-sized operators plus a respectably-sized 3G operator (3 UK). It may also be noted that, in the majority of countries, the most recent mobile operator to launch its service was also the one with the fewest subscribers.

5.5 EFFECTS OF EASTWARD MOVEMENT OF EUROPE

The first issue to address at this point is the extent to which mobile operators were Europe-centric in respect of their geographical footprints, distinguishing in particular between operators with a heavy presence in the then 15 Member States of the EU and those with a presence in the 12 accession countries since the latter represented the most obvious indication of an eastwards movement of Europe.

Table 5.4 is drawn up so as to include those operators with licences in at least two accession countries. This is a modest enough total, but reflects the fact that only one operator, Vodafone, was present in more than four of the 12. Even here, however, there is a need to distinguish carefully between operators with licences and those companies operating under other arrangements. For example, it is possible for an operator to act as a mobile virtual network operator (MVNO) by leasing spare capacity on an incumbent's network (Shin and Bartolacci, 2007). Technically, the definition of an MVNO requires an operator to own its own switches and sell under its own brand, although there are also less rigorous ways to operate, such as an enhanced service provider or simply as a reseller of another operator's branded service. Historically, the primary advocate of the MVNO approach has been Tele2 (Curwen and Whalley, 2007) although, as Table 5.4 shows, it has tended to prefer direct investment in networks in accession countries while operating as a MVNO in more established markets. For its part, Vodafone has preferred to negotiate Partner Network Agreements involving no investment,[2] whereby the network in question is usually re-branded with the original operator's name hyphenated to that of Vodafone. By this means, Vodafone has enjoyed brand recognition without needing to lay out huge sums of money, and has been able to introduce its Vodafone live! portal with associated roaming benefits, while the network owner has enjoyed improved subscriber numbers and reduced churn because the Vodafone brand is more attractive than its own. In practice, therefore, Vodafone has a much greater brand recognition factor in accession countries than any other operator, and is absent only in Slovakia.

The next in line is Deutsche Telekom's wholly-owned subsidiary, T-Mobile (see Table 5.5). This is not surprising since the geographical position of Germany clearly lends itself to investment in countries close to its borders, many of which are accession countries (with possibly even more to come). It may also be noted that T-Mobile is present in the relatively large accession markets of the Czech Republic, Hungary and Poland. This is an important point because it is immediately noticeable that three of the big five EU incumbent mobile operators, Telefónica, O_2 (its subsidiary)[3] and Telecom Italia

Table 5.4 Operators present in at least two accession countries, 31 December 2007

	Vodafone	T-Mobile	Tele2	Telia Sonera	Orange	mobilkom	OTE
Austria	[1]	■	■[2]		■	■	
Belgium	[1]				■		
Bulgaria	[1]					■	■
Cyprus (S)	[1]						
Czech Rep.	■	■					
Denmark	[1]			■			
Estonia	[1]		■	■			
Finland	[1]			■			
France	■		■[2]		■		
Germany	■	■					
Greece	■						■
Hungary	■	■					
Ireland	■						
Italy	■			[3]			
Latvia	[1]		■	■			
Lithuania	[1]		■	■			
Luxembourg	[1]		■		■		
Malta	■						
Netherlands	■	■	■[2]		■		
Poland	■	■			■		
Portugal	■				■		
Romania	■				■		■
Slovakia		■			■		
Slovenia	[1]					■	
Spain	■			■	■		
Sweden	[1]		■	■			
UK	■	■			■		
Total accession	5+6[1]	4	3	3	3	2	2
Total	14+12[1]	8	8	7	11	3	3

Notes:
1. Via Partner Network Agreement not involving direct investment.
2. Trading as a MVNO.
3. 3G licence only. No network.

Source: Calculated by the authors from data in Table 5.1.

Mobile (TIM – which became a wholly-owned subsidiary of Telecom Italia in June 2005) do not appear in Table 5.4. For Telefónica in particular, this is ultimately a question of history, culture and language. Telefónica Móviles (and/or occasionally its parent although there is no longer any difference since it is currently a wholly-owned subsidiary) has long operated overseas, primarily in Latin America, with the only exception prior to the end of 2004 being Morocco, its immediate southern neighbour. In other words, apart from a minor reciprocal stake in Portugal Telecom and some toying with 3G licences that had so far resulted in nothing other than fairly substantial write-offs, Telefónica had zero interest in the EU, let alone in accession countries. This strategy, it must be said, had served it well up to that point in time.

However, the Brazilian operation, Vivo, half-owned by Portugal Telecom, has struggled to show a profit (Cellular-news, 2006b) – and is in the process of being switched from CDMA to GSM at great expense – so Telefónica has decided to diversify back into Europe. It began with the acquisition of an initial 51.1 per cent stake in EuroTel of the Czech Republic in April 2005 (Roman and Rousek, 2005) – subsequently raised to 69.4 per cent. In March 2006, it completed the purchase of O_2 (which also has an independent network in the Isle of Man) (Telefónica, 2006) and thereby brought its proportionate subscriber numbers – that is, total subscribers multiplied by the ownership stake expressed as a percentage – within and outside Latin America into rough equivalence. Subsequently, it won a combined GSM/UMTS licence in Slovakia (Telegeography, 2006c) and launched over its own network in August 2007 (Cellular-news, 2007b). Most significantly, it bought a 6.9 per cent stake in Telecom Italia via the Telco consortium (Parker and Michaels, 2007; Associated Press, 2007).

As for O_2 (changed from mmO_2 in March 2005), both prior to and after its divestment from what is now the BT Group, it had spent a period of retrenchment involving the shedding of minority interests such that it remained operational in only Germany, the Netherlands and the UK (plus the Isle of Man). Even so, it has to be said that in its earlier life it was never really interested in the accession countries, preferring to get involved in South-East Asia and North America.

Telecom Italia and its then 56.1 per cent subsidiary TIM also had a fairly significant presence in Latin America at the end of 2004 although the great majority of proportionate subscribers were to be found in Brazil. Elsewhere, its presence in a single accession country, the Czech Republic, merely represented a tiny stake in the operator controlled by T-Mobile, and was the least significant of its overseas holdings bar Cuba. The stake was accordingly sold in March 2005 and the sale of its Greek operation shortly thereafter means that Telecom Italia is currently present in Europe only in its home market – it also sold out of Turkey in 2007.

It is also useful for the purposes of clarification to examine briefly the operations of mobile companies in what used to be termed Eastern Europe, since only some of its constituent countries have (so far) become accession countries. As of 31 December 2003, four EU incumbents had a significant presence involving investment in Eastern Europe, namely Telenor, OTE, T-Mobile and TeliaSonera. OTE, interestingly, had stakes in Albania, Armenia, Bulgaria, Macedonia, Romania and Serbia, so it had not profited so far from accession nor was it about to do so during 2004, although it proved to be the main beneficiary in 2007. TeliaSonera's accession stakes were in practice entirely in the Baltic countries but its stakes to the east, in Azerbaijan, Georgia, Kazakhstan, Moldova and Russia were also in line to miss the accession boat. For its part, Telenor had 12 overseas interests but, interestingly, it was not focused upon the Nordic/Baltic area, being present in only Denmark, Norway and Sweden (as a MVNO), whereas it had stakes in Albania, Montenegro, Russia and the Ukraine in respect of which it would miss out on accession. T-Mobile accordingly stood out because it had stakes in four prospective accession countries, of which three (Czech Republic, Hungary and Poland) generated more than 2 million proportionate subscribers during 2003. In addition, it owned stakes in Belarus, Bosnia, Croatia, Macedonia and Russia. Given its limited overseas stakes within the EU at the time (consisting of Austria, the Netherlands and the UK), accession would serve to enlarge significantly its EU coverage even if the USA comfortably generated the third-largest number of proportionate subscribers after Germany and the UK (with Russia in fourth place).

What the above suggests is that there is a useful distinction to be made between the Baltic and Eastern European aspects of the 2004 accession – Cyprus (South) and Malta are of little significance because of their size and the lack of potential for the entry of major operators. Taking the three Baltic accession countries as a whole, the eight operators listed in Table 5.4 generated eight entries but only three operators among them accounted for this – Tele2, TeliaSonera and TDC – although account should also be taken of Vodafone's three Partner Network Agreements. In contrast, the five broadly Eastern European countries generated ten entries. This was not a significant difference, so it is worth asking whether it resulted from the companies sampled. To answer this, we can return to the data in Whalley and Curwen (2003) which encompassed 13 major European operators, and these reveal that increasing the sample size makes almost no difference when compared to Table 5.4. Of the ten accession countries, only two are affected at all by the altered size of the sample, namely Hungary, where Telenor had a substantial stake, and the Czech Republic, where TIM had a very small stake. It is also possible to establish whether any significance can

be attributed to the fact that two Nordic countries – Iceland and Norway – were not members of the EU. In practice, Iceland was not significant since the only EU operator there was Vodafone via a Partner Network Agreement, but in Norway we find (predictably) both Telenor and TeliaSonera (trading as NetCom GSM) as incumbents, with Tele2 as a MVNO (although it had returned its 3G licence).

In summary, accordingly, the situation was as follows at the time of the 2004 accession: Vodafone had invested in accession countries in the former Eastern Europe (Group A) but had been keen to extend its footprint to the Baltic accession countries (Group B) without investing heavily. T-Mobile had heavily invested in Group A but was wholly disinterested in Group B. Orange was less involved in Group B but equally indifferent to Group A. TDC was slightly interested in both, while both TeliaSonera and Tele2 were heavily invested in Group B while wholly disinterested in Group A. Curiously, Telenor (not in Table 5.4) was the only Nordic operator acting in a wholly non-Nordic manner where accession was concerned.

The 2007 accession added one large operation in Romania to the EU holdings of both Orange and Vodafone but these operators were already EU-centric in terms of subscribers. OTE, as noted, gained two EU operations, but one, CosmOTE in Romania, was very small, while mobilkom gained the largest operator in Bulgaria, MobilTel.

5.6 EXPANSION AND CONSOLIDATION

Given the aforementioned differences in the countries in which the mobile operators identified in Table 5.4 chose to invest prior to the 2004 accession, an inevitable question to ask is whether the accession of twelve new Member States either has resulted so far, or is expected to result, in changes in their strategic priorities. In the first sub-section the focus is on T-Mobile, Orange and Vodafone, whose ability to expand further is to a degree interlinked, while the second sub-section concentrates on those other European mobile companies either having, or lacking, a presence in the accession countries.

T-Mobile, Orange and Vodafone

If we begin with T-Mobile, then the strategic importance of the Eastern European countries to the company is clear for all to see in Table 5.5. Indeed, the CEO Kai-Uwe Ricke, basking in predictions of massive cash inflows during 2004, stated in May 2004 that 'Taking into account the EU's enlargement towards the east, we are placing a special focus on this region'.

It is possible to calculate the importance of this region to T-Mobile as at 31 December 2003 when it had in total 68.7 million proportionate subscribers. Of these, 26.3 million were in Germany and 43.9 million in total in the pre-accession EU. Accession transferred a further 7.7 million to that total, yielding 51.6 million in the post-accession EU. The rest were largely accounted for by the USA (12.8 million) and Russia (3.4 million), with Croatia and Macedonia adding 0.8 million between them.

T-Mobile had a choice between moving into new countries and expanding into existing ones. In both cases, much depended upon the identity of existing shareholders and their willingness to sell. Faced with a cash offer above the market price, many shareholders might have been expected to succumb, but Deutsche Telekom's own shareholders were unlikely to sanction using up cash reserves to support a move into the likes of Moldova. Predictably, T-Mobile was not willing to fight for the 2G licence issued in Bulgaria in May.

Hence, the probability was that T-Mobile would prefer to increase its existing stakes. In some cases, the purchase of additional equity would consolidate its existing control over the operator while in other cases the purchase could allow T-Mobile to take control of the operator for the first time. T-Mobile was particularly keen to acquire the 51 per cent of PTC it did not own in Poland, if only to keep one step ahead of Vodafone in a country with a modest penetration rate. Thus, its existing stakes provided T-Mobile with ample incentives and opportunities to continue its Eastern European-focused investment strategy. However, one intriguing prospect lay in the Czech Republic where, despite its majority stake in an incumbent, T-Mobile was alleged to be interested in acquiring EuroTel Praha via a bid for parent Ceský Telecom. Presumably, if it did so it would be forced to dispose of its existing network which was almost the same size, but this would get around the problem of trying to obtain full ownership of T-Mobile CZ.

It is fair to say that, by 2005, many major European operators had decided that non-controlling stakes were often more trouble than they were worth. This would be particularly true of stakes in countries such as Russia where the rule of law could best be described as shaky. Hence, Deutsche Telekom's decision to sell its 10.2 per cent stake in Russia's MTS – and with it its indirect stakes in the likes of Belarus, the Ukraine and Uzbekistan – which was completed in September 2005, was not unexpected. Its travails in Poland, where it embarked upon an immensely long-winded trawl through the law courts of Europe in order to determine whether Vivendi Universal or itself could lay claim to the other half of the shareholding in PTC, were not entirely of its own choosing but did, however, appear to have turned out well in the end, since it was able to take control of the shares at

Table 5.5 T-Mobile and Orange: European stakes, 31 December 2007

T-Mobile			Orange		
Country	Stake %	Proportionate subscribers	Country	Stake %	Proportionate subscribers
Austria	100.0	3 273 000	Austria	35.0	711 000
Bosnia	25.4	110 000	Belgium	50.2	1 636 000
Croatia	51.0	1 216 000	France	100.0	25 642 000
Czech Rep.	60.8	3 205 000	Germany	1.0[2]	56 000
Germany	100.0	34 897 000	Liechtenstein	100.0[3]	8 000
Hungary	59.2	2 873 000	Luxembourg	46.8	35 000
Macedonia	28.3	343 000	Moldova	94.3	1 094 000
Montenegro	51.3	210 000	Poland	43.9	6 640 000
Netherlands	100.0	4 895 000	Portugal	19.2	437 000
Poland	49.0[1]	6 368 000	Romania	96.8	9 499 000
Slovakia	51.0	1 207 000	Slovakia	100.0	2 864 000
UK	100.0	28 683 000	Spain	79.3	8 795 000
			Switzerland	100.0	1 510 000
			UK	100.0	15 642 000
Total world		105 202 000	Total world		92 140 000

Notes:
1. A long series of court cases concerning the ownership of the network was (apparently) finally resolved in T-Mobile's favour, and the network was fully consolidated as 97.0% owned. However, the matter does not yet seem to be wholly resolved from a legal standpoint. It has to be noted that 6 million subscribers are at issue.
2. A residual stake in MVNO MobilCom.
3. Held via the Swiss subsidiary.

Source: Compiled by the authors from operator and other websites.

well below their market value in November 2006 – although Vivendi has yet to accept this apparent fait accompli (Cellular-news, 2006a, 2006c and 2007a).

In 2005 there was other activity in the EU and prospective accession countries, but to less good effect. For example, talks about a joint bid for O_2 with KPN fell through, and Deutsche Telekom declined to make a bid for Türk Telekom. In August, the CEO stated that the operator was not actively seeking new acquisitions, but would continue to evaluate any opportunities arising within its existing footprint. These proved to be fairly plentiful during 2006 when Deutsche Telekom failed to win Serbia's Mobi 63 and expressed an interest in a licence in Romania, while its Hungarian subsidiary expressed an interest in acquiring stakes in Bosnia, Romania, Serbia and the Ukraine. More recently, Deutsche Telekom indicated that it was interested in bidding for a 20 per cent stake in OTE which was scheduled to be privatised during 2007 although it would not be prepared to overpay for a minority stake. This was especially the case given that, in late January, Deutsche Telekom had announced its second profit warning in six months and embarked upon a massive cost-cutting exercise (Williamson, 2007). Nevertheless, despite many trials and tribulations along the way, Deutsche Telekom did agree terms for the purchase of the OTE stake in March 2008 (Telegeography, 2008c), having previously acquired Orange Netherlands in August 2007 (Telegeography, 2007b) with a view to merging it with the existing operation, and it indicated that it was interested in the various operations of Hutchison Whampoa in Europe and particularly that in Italy.

But would any of the other mobile operators identified in Table 5.4 follow T-Mobile and respond to accession by increasing their geographical coverage? Vodafone had a presence of one kind or another in all but three of the ten accession countries at the beginning of 2004, but given that it had chosen to use Partner Network Agreements as a substitute for direct investments in many cases, the scope for it to invest in more of these markets was actually quite limited. Of the markets where Vodafone was not active as an investor, the most significant was the Czech Republic. Of the three Czech GSM operators, two – Ceský Mobil and EuroTel Praha – were potential acquisitions. The third operator, T-Mobile CZ, was majority-owned by Deutsche Telekom and thus unavailable unless, as noted above, T-Mobile was forced to sell it. In principle, EuroTel Praha could also be dismissed as an acquisition target of Vodafone since it was possibly being targeted by T-Mobile and, in any event, was a subsidiary of the incumbent PTO which was most unlikely to want to be split off from its mobile operations. However, Vodafone had recently indicated that it was willing, and had the financial resources, to acquire the entire operation.

Ceský Mobil was owned by Telesystem International Wireless, which was possibly prepared to sell its 96.4 per cent stake if the price was sufficiently attractive. Nevertheless, it remained to be seen whether Vodafone's shareholders would be prepared to countenance the comparatively expensive acquisition of the smallest of the Czech Republic's GSM operators. Given the existing investment, and the 16 per cent market share of Ceský Mobil, a more attractive course of action looked to be to enter into a Partner Network Agreement. However, Vodafone duly bought 99.9 per cent of Ceský Mobil in May 2005, which it has re-branded as Vodafone CZ.

As for Latvia and Slovakia, both were comparatively small. As a consequence, it was more likely that Vodafone would enter these markets through the use of Partner Network Agreements rather than an equity investment. However, this assumed that the existing GSM operators would enter into such an arrangement. As far as Latvia was concerned, this was highly unlikely given who owned the two existing operators; Baltkom was owned by Tele2, while LMT was jointly owned by the Latvian state (51 per cent) and TeliaSonera (49 per cent). It seemed inconceivable that either Tele2 or TeliaSonera would sign a Partner Network Agreement with Vodafone as this would expand the brand recognition of their main competitor in the Baltic States. In practice, Vodafone achieved its aim indirectly when Bité GSM, the Lithuanian subsidiary of TDC and a Partner Network of Vodafone, launched a network in Latvia in 2005 (Vodafone, 2006a).

The situation in Slovakia was a little more complicated, not least because Vodafone's ability to enter this market was also dependent on the strategic priorities and intentions of Orange. Orange had only a limited exposure to the mobile markets of the ten accession countries, with a presence across the EU that was increasingly skewed in favour of Western Europe. Orange already possessed two accession country mobile investments; in Poland, where it – or strictly its then parent France Télécom – was a majority shareholder in PKT Centertel, and Slovakia where it owned 63.9 per cent of Orange Slovensko, the largest operator. These two investments were, however, somewhat detached from the other investments that Orange had made. Their relative peripherality was further reinforced when subscriber numbers are taken into account; Poland and Slovakia accounted for less than 10 per cent of the wider European subscriber base of Orange. Orange had also invested in Romania, a country that expected (correctly) to be among the next wave of accession countries, though when these subscribers were also included, the three countries still only accounted for roughly 17 per cent of the European subscriber base. In contrast, France and the UK, which were the two largest mobile markets of Orange, accounted for over 75 per cent of its European subscriber base.

However, given that Orange was committed to consolidation based upon countries where it held majority stakes and hence control, preferably in conjunction with a top-two ranking, and that parent France Télécom's short-term need for cash had abated somewhat, a wholesale withdrawal from the former Eastern Europe no longer seemed likely. Indeed, Orange moved to mop up the minorities in Romania (Middleton, 2005) and Slovakia (Cellular-news, 2006d) during 2005 although the situation in Poland was much harder to disentangle despite a re-branding to Orange in August (France Télécom, 2005; Halaba, 2005; McQuaid, 2005). Nevertheless, Orange was not successful in building up any further presence in accession/potential accession countries: in March 2005, it was part of a consortium that bid unsuccessfully for 51.1 per cent of EuroTel Praha; it withdrew from the bidding for Turkey's Telsim in December 2005; and it failed to win Mobi 63 of Serbia in July 2006. Subsequently, it has achieved little in Europe other than the disposal of its network in the Netherlands, although it did acquire an indirect interest in Luxembourg via Mobistar's acquisition of VOXmobile in 2007. The full set of assets is shown in Table 5.5.

Vodafone would potentially have been interested in acquiring in the majority of Orange Slovensko owned by Orange, had Orange been forced to sell it. However, Vodafone's shareholders were unlikely to be willing to support an acquisition that would add a comparatively small number of subscribers in a market where growth expectations were limited – Slovakia's population was only 5.4 million and already heavily penetrated – but there were attractive investments with more potential elsewhere. One such was Romania, where Vodafone was already a minority shareholder in Connex and whose population was four times that of Slovakia. Telesystem International Wireless (TIW), holder of a 63.6 per cent stake, agreed in July 2004 to buy all or part of the 14.4 per cent stake held by Deraso Holdings. In May 2005, Vodafone acquired this entire stake (Krosnar, 2005a), raising its total holding to 99.1 per cent and subsequently to 100 per cent before re-branding as Vodafone Romania in May 2006. Outside of such an acquisition, Vodafone was unlikely to expand into new markets other than through Partner Network Agreements.

The remaining accession country of interest was Poland, where Vodafone already held a 19.6 per cent stake in Polkomtel (Plus GSM) as did TDC and various local partners. Vodafone attempted to acquire a further 23 per cent stake in July 2005 (Total Telecom, 2005) but without success, and also expressed interest in the TDC stake when it was put on the market in December 2005, although this has degenerated into yet another legal battle over who has what rights in relation to the sale (Telegeography, 2006a).

In September 2005, Vodafone CEO Arun Sarin stated that he was now broadly happy with the company's European profile but would be bidding

to buy Turkey's Telsim at the year-end (Krosnar, 2005b). However, in October, Vodafone agreed to sell its 100 per cent stake (yielding 1.5 million subscribers) in Sweden to Telenor (replacing it with a Partner Network Agreement) (Vodafone, 2005). It followed up with the sale of its 25 per cent stake in Belgacom and its 25 per cent stake in Swisscom to their majority owners in November 2006 and December 2006 respectively (Smith and Ionian, 2006; Vodafone, 2006b). Neither accounted for a lot of subscribers, but it is of interest that the overall effect was to re-balance Vodafone's European holdings towards the accession countries, a factor enhanced by the purchase of Telsim in May 2006 (Boland and Edgecliffe-Johnson, 2005) given Turkey's pressure to become an accession country. Subsequently, Vodafone failed to buy Orange Netherlands, and apart from new Partnership Network Agreements in Guernsey, Jersey and Serbia, it has been conspicuously uninterested in Europe.

Other Operators

A further company mentioned in Table 5.6 with a presence in the accession countries is Tele2. Although Tele2 operated in nine EU Member States at the end of 2006 – it subsequently sold its mobile operation in Denmark to Telenor in May 2007, set about the negotiation of its assets in France (which ran into regulatory difficulties) and finally disposed of its Austrian operation in March 2008 (Telegeography, 2008a; Tele2, 2008) – it has made just three investments in the accession countries, namely in Estonia, Latvia and Lithuania, and all prior to the 2004 accession. In other words, as a factor in its basic strategy rather than on account of accession per se, Tele2 has invested in the Baltic States that geographically complement its presence in the nearby Nordic States, although only Lithuania yields significant numbers of subscribers. Table 5.6 also draws attention to a second characteristic of Tele2's historic investment strategy; namely its tendency to use MVNO arrangements to enter new markets. Among the mobile investments in the post-accession EU set out in Table 5.6, almost half were initially as a MVNO, although it currently prefers to own its own networks and to behave more like a conventional operator. Among the networks owned by Tele2, only one, in Luxembourg, could be found outside Sweden and the Baltic States. Thus, the geographical preference in terms of ownership is marked as is the preference for control; only in Sweden, where it has an 87.3 per cent stake, does Tele2 not own the entire company, although it only has a 51 per cent stake in Croatia, a potential accession country. In addition to the above, it may be noted that Tele2 failed to acquire 3G licences in Hungary (2004) and Bulgaria (2005) and to buy Serbia's Mobi 63 in July 2006.

Table 5.6 Vodafone and Tele2: European stakes, 31 December 2007

Vodafone			Tele2[1]		
Country	Stake %	Proportionate subscribers[2]	Country	Stake %	Proportionate subscribers
Albania	99.9	1 127 000	Austria	100.0	108 000
Czech Rep.	100.0	2 658 000	Croatia	93.0	437 000
France	43.9	8 238 000	Estonia	100.0	539 000
Germany	100.0	33 920 000	France	100.0	n/a
Greece	99.8	5 438 000	Latvia	100.0	806 000
Hungary	100.0	2 304 000	Liechtenstein	100.0	12 000
Ireland	100.0	2 265 000	Lithuania	100.0	1 75 100
Italy	76.9	22 791 000	Luxembourg	100.0	230 000
Malta	100.0	201 000	Netherlands	100.0	n/a
Netherlands	99.9	4 038 000	Norway	50.0	1 610 000
Poland	19.6	2 638 000	Russia	100.0	8 560 000
Portugal	100.0	5 111 000	Sweden	87.3	3 143 000
Romania	100.0	8 808 000	Switzerland	100.0	40 000
Spain	100.0	15 810 000			
UK	100.0	18 447 000			
Total world		248 761 000	Total world		17 236 000

Notes:

1. Tele2 does not itself issue subscriber data for all individual countries but rather by region. France + Switzerland are combined as are Liechtenstein, Luxembourg and the Netherlands; Sweden and Norway. Hence, a certain amount of guesswork and extrapolation has been used in this case.
2. Vodafone's own data, which appear here, appear in general to be rather higher than those attributed to the company elsewhere.

Source: Compiled by the authors from operator and other websites.

What of the other companies identified in Table 5.4? For different reasons, neither TDC nor TeliaSonera was likely to expand its geographical footprint as a result of EU expansion. At the end of 2003, TDC had only two remaining investments in accession countries – in Bité in Lithuania and Polkomtel in Poland – having sold in the course of that year its holding in the Czech Republic (as well as in the Ukraine). Hence, it did not appear to see the former Eastern Europe other than as providing opportunities for financial investments. In any event, any additional investments by TDC in accession countries could be ruled out until the uncertainty over its own future was resolved. In mid-2004, SBC Communications Inc. sold 32.1 per cent of the 41.6 per cent of TDC that it owned, but to financial institutions rather than to another operator. Pending the completion of this sale, TDC stated that it would not enter into any negotiations regarding potential partnerships or strategic transactions at Group level. Moreover, these would only resume once the new board had been able to conduct a strategic review of the company.

Its subsequent strategy has been less than clear-cut. For example, in May 2005 Lithuania's Bité acquired a licence in Latvia and launched its network in September, but TDC also failed to win the 3G licence in Hungary in December 2004 and withdrew from the bidding for EuroTel Praha in 2005, so it clearly has no particular interest in the accession countries per se. Indeed, Bité was provisionally sold to Mid Europa Partners in January 2007 in line with the view expressed by the CEO in November 2006 that 'everything outside of Denmark isn't core business . . . if somebody comes with a price, and the price is right, it will be sold' (Total Telecom, 2006). Furthermore, the (so far frustrated) desire to sell its stake in Poland has been mentioned previously, so taken with its strong interest in expanding in Finland, Norway and Sweden, it is fair to say that TDC is, if anything, retreating back to its Nordic roots. Indeed, according to its website, 'all activities outside the Nordic region are financial investments that are for sale for the right price'.

For its part, TeliaSonera has for many years been one of the most widespread operators in the mobile world, deriving more proportionate subscribers from Russia and Turkey than from Sweden at the time of the 2004 accession – see also Table 5.7. With the exception of the three Baltic States, none of which understandably produced large numbers of subscribers, TeliaSonera had no other mobile investments in accession countries in 2004, nor did it gain any in 2007, although with its stake in Turkcell and, via jointly-held Fintur Holdings, in countries to the east of the former Eastern Europe, it might end up with further EU holdings during the next stages of accession.

Telia and Sonera, prior to their merger, did take advantage of the 3G licensing process to enter Germany, Italy and Spain, three of the largest

Table 5.7 TeliaSonera and TDC: European stakes, 31 December 2007

TeliaSonera			TDC		
Country	Stake %	Proportionate subscribers	Country	Stake %	Proportionate subscribers
Denmark	100.0	1 449 000	Denmark	100.0	2 937 000
Estonia	58.3	446	Norway	100.0	14 000
Finland	100.0	2 449	Poland	19.6	2 638 000
Georgia	61.6	1 296 000	Switzerland	100.0	1 524 000
Latvia	60.3	612 000			
Lithuania	100.0	2 012 000			
Moldova	74.0	504 000			
Norway	100.0	1 577 000			
Russia	43.8	15 617 000			
Spain	76.6	327 000			
Sweden	100.0	4 807 000			
Turkey[1]	37.3	13 453 000			
Ukraine	37.3	2 834 000			
Total world		51 252 000	Total world		7 273 000

Note: 1. Together with Northern Cyprus which is not recognised as an independent country.

Source: Compiled by the authors from operator and other websites.

Western European markets. However, there followed a period of post-merger repentance involving the writing off of the investments in all three markets, and these barely signify in Table 5.7. Interestingly, despite its widespread empire, TeliaSonera tended to think of itself as the Nordic and Baltic telecommunications leader, but although this might simply have been an appropriate description of its market position in these two regions, and given the absence of a 'local' partner to offset the risk inherent in investing in the non-Baltic 2004 accession countries, it became possible that TeliaSonera would sell some of its overseas investments, leaving it predominantly as a Nordic/Baltic operator. The April 2004 offer by TeliaSonera to take outright control of Eesti Telekom, although unsuccessful (Brown-Humes, 2004), together with the acquisition of the outstanding 10 per cent of Lithuania's Omnitel in August 2004 (Total Telecom, 2004), the purchase of Orange Denmark in October 2004 and the subsequent sales of stakes in Hong Kong and Namibia, reinforced the feeling that its strategic priorities lay in the Nordic/Baltic Member States and not elsewhere. Nevertheless, TeliaSonera was set to be debt-free by the end of 2004, and had a substantial war chest for acquisitions, so a contraction of its international footprint was not a foregone conclusion (George, 2004).

It is worth noting that the Finnish government appeared to have agreed to the effective takeover of Sonera by Telia on the understanding that TeliaSonera would pursue a strategy of growth. Ultimately, because TeliaSonera stated in June 2004 that its ambition was to take majority control of its foreign investments, and given the size of the proportionate subscribers involved, its strategy was dependent primarily upon its relationship with its main partners. For example, the relationship between TeliaSonera and Turkcell's largest shareholder, Çukurova, had at times been fraught (Ostrovsky and Bergstrom, 2005; Telegeography, 2005a and 2005b; Cellular-news, 2008) – Çukurova's stake was confiscated by the government in 2003 as collateral against debts and was about to be returned in stages commencing in July 2004 – and the situation in Russia was permanently unsettled. Such problems are usually addressed either via a takeover or a withdrawal. It is significant that, in late June 2004, the Finnish deputy CEO of TeliaSonera, with responsibility for pursuing the purchase of majority stakes in Turkcell and MegaFon, was dismissed by the Swedish CEO (George, 2004). At the very least, this indicated that TeliaSonera would not 'overpay' to take control, but to remain a permanent minority investor hardly seemed an attractive proposition, as TeliaSonera was prepared to acknowledge.

In the event, TeliaSonera has acted in a somewhat conservative manner of late. It has been engaged in negotiations seemingly forever to achieve a 100 per cent ownership of LMT and may finally have succeeded (Kaza

and Hansson, 2006; Telegeography, 2006b and 2008b), but it failed to win the third GSM licence in Slovakia in August 2006 and withdrew from the bidding for Mobi 63 in July 2006. Against all the odds, not to mention analysts' reservations, TeliaSonera finally decided to go ahead with its launch of Xfera, its 3G licensee in Spain, in June 2006 (Roman and Hansom, 2006). The CEO of TeliaSonera explained that this was really not a dramatic change from before when TeliaSonera was exclusively looking for acquisitions in, or close to, its existing markets in the Nordic, Baltic and Eurasian regions (Hansson, 2006). Rather, with an extension into continental Europe, the company was 'expanding our thinking a bit'. However, it is unlikely that this will turn out to mean that TeliaSonera intends to buy stakes in the non-Baltic accession countries – its sights seem to be fixed on what is sometimes known as 'Eurasia' somewhat further to the east – although there is currently much discussion surrounding a possible merger with Telenor, which has networks in Hungary, Montenegro, Norway, Serbia and Sweden.

As shown in Table 5.8, mobilkom Austria has always tended to look to the east for overseas acquisitions, of which it had three at the end of 2003; among these only Croatia provided more than a modest number of proportionate subscribers. However, since the 2004 accession its record of expansion has been patchy. On a positive note, parent Telekom Austria exercised an option to buy the whole of Bulgaria's MobilTel in July 2005 (Telecomdirectnews, 2006a), and won the third GSM licence in Serbia in November 2006 (McDonald, 2006). In addition, in Slovenia it was able to raise its stake from 75 per cent to 92.2 per cent and then to 100 per cent in May 2006. In contrast, mobilkom made an unsuccessful bid for 51 per cent of Telekom Montenegro (owner of Monet) in March 2005 and, although mobilkom then provisionally agreed to acquire a 49 per cent stake in Serbia's Mobi 63, the deal fell through, and mobilkom was also unsuccessful when the stake was re-offered in July 2006. Furthermore, mobilkom failed to win a 65 per cent stake in Telekom Srpske in Bosnia in 2006 and to win a licence in Slovakia in July of that year.

Despite these setbacks, mobilkom continues to aspire to become the leading player in south-eastern Europe (Lenningham, 2005; Simonian and Yuk, 2006) and to that end managed to win the third GSM licence in Macedonia in February 2007 (Telegeography, 2007a) – albeit by virtue of being the sole bidder – with a network launch in September. However, it subsequently failed to win the second licence in Kosovo in January 2007 and was unable to take on Deutsche Telekom for the available stake in OTE, causing it to withdraw. Overall, therefore, while a minor player during the 2004 accession and a relatively significant one in 2007, it may be that mobilkom will play a more important role in future accessions.

Table 5.8 Mobilkom and OTE: European stakes, 31 December 2007

Mobilkom			OTE		
Country	Stake %	Proportionate subscribers	Country	Stake %	Proportionate subscribers
Austria	100.0	3 959 000	Albania	80.0	956 000
Belarus	70.0	2 141 000	Bosnia	13.0	105 000
Bulgaria	100.0	5 101 000	Bulgaria	90.7	3 513 000
Croatia	100.0	2 180 000	Greece	90.7	5 701 000
Liechtenstein	100.0	5 000	Macedonia	90.7	538 000
Macedonia	100.0	141 000	Montenegro	10.2	25 000
Serbia	100.0	509 000	Romania	79.7	2 882 000
Slovenia	100.0	497 000	Serbia	20.0	1 080 000
Total world		14 533 000	Total world		14 797 000

Source: Compiled by the authors from operator and other websites.

Nevertheless, it lacks the resources to take on the bigger players so must content itself with picking up relative scraps in European terms.

As for OTE, it has always been strategically focused on the Balkans, as shown in Table 5.8. Hence, although the 2007 accession coincidentally meant that OTE was now present in two accession countries and three Member States, this was not the result of strategic decisions related to accession. Given its profile, OTE may end up with further accession candidates since it is indirectly acquiring stakes in the likes of Bosnia and Montenegro via Serbia's Telekom Srbija, but it has recently been using its spare resources to acquire total ownership of mobile subsidiary CosmOTE, finally achieved in March 2008.

Telefónica has been discussed in detail above. All that needs to be added – reflecting its status as a potential predator – is the growing list of operators in which it has fairly recently been obliged to deny any interest in acquiring, namely Bouygues Télécom, E-Plus, OTE, KPN, Telenor and TeliaSonera.

Telenor, which also appears in Table 5.9, is in a quite different situation since there is talk, as previously mentioned, of it being merged with TeliaSonera, although 'taken over by' might be a more apt description. Alternatively, a strategic relationship with Vodafone would make sense as there is minimal overlap between their respective network coverage. Telenor is something of an oddity in European terms in that it is a small operator on the periphery of Europe – based in a country that has rejected membership of the EU – with its eyes turned to the east rather than to the west. Although it acquired Mobi 63 of Serbia in July 2006, its energies are largely absorbed by its operations in Asia and its interminable squabbles with Altimo, the other main shareholder in Russia's VimpelCom.

For a good many years, KPN has been the most unusual kind of mobile company, namely one based entirely in Europe as shown in Table 5.10. Restricted since mid-2005 to its three current networks, its failure to acquire Austria's ONE during 2007 appears to have directed its thoughts towards acting as a MVNO rather than as a network operator when attempting to expand either in existing or new European markets. In January 2008 it launched a SIM-only MVNO branded as 'Simyo' in Spain, and in March acquired a majority stake in Ortel Mobile, a MVNO with just under a million subscribers in Belgium, Germany and the Netherlands.

Hutchison Whampoa is arguably even more unusual in that telecommunications is not its main activity, and such operations as it owned were historically based in the Asia-Pacific region. Hence, it chose to enter Europe via the acquisition of 3G licences rather than existing networks (Whalley and Curwen, 2003, 2005 and 2006). Not only was this a costly process, but 3G networks had to be rolled out from scratch. Hutchison accordingly

Table 5.9 Telefónica O_2 and Telenor: European stakes, 31 December 2007

Telefónica O_2			Telenor		
Country	Stake %	Proportionate subscribers	Country	Stake %	Proportionate subscribers
Czech Rep.	69.4	3 557 000	Denmark	100.0	1 680 000
Germany	100.0	12 472 000	Hungary	100.0	3 377 000
Ireland	100.0	1 646 000	Montenegro	100.0	422 000
Isle of Man	100.0	73 000	Norway	100.0	2 856 000
Italy	6.9	4 437 000	Serbia	100.0	2 924 000
Portugal	8.3	520 000	Sweden	100.0	1 855 000
Spain	100.0	22 770 000	Ukraine	56.5	13 336 000
Slovakia	100.0	565 000	*VimpelCom*[1]	33.6	14 487 000
UK	100.0	18 382 000			
Total world		147 354 000	Total world		79 778 000

Note: 1. Russia: 14 186 000; Georgia: 9000; Ukraine: 652 000.

Source: Compiled by the authors from operator and other websites.

Table 5.10 KPN and Hutchison Whampoa: European stakes, 31 December 2007

KPN			Hutchison Whampoa		
Country	Stake %	Proportionate subscribers	Country	Stake %	Proportionate subscribers
Belgium	100.0	2 855 000	Austria	100.0	513 000
Germany	100.0	14 807 000	Denmark	60.0	160 000
Netherlands	100.0	9 392 000	Ireland	100.0	208 000
			Italy	90.0	7 299 000
			Sweden	60.0	379 000
			UK	100.0	4 100 000
Total world		27 054 000	Total world		19 380 000

Source: Compiled by the authors from operator and other websites.

intended to float minority stakes in the more promising networks, but its ongoing failure to meet financial targets has caused this plan to falter – the Italian flotation was pulled at the last minute (Guerrera and Lau, 2006; Michaels, 2006). At the end of 2006, many commentators were touting the prospect that Hutchison might either exit the European market or merge with incumbents (Telecomdirectnews, 2006b). However, Hutchison Whampoa remains defiantly optimistic (Mitchell, 2007), although rumours of a trade sale of 3 Italia to either T-Mobile or Vodafone refuse to die down.

5.7 CONCLUSIONS

The above discussion has largely focused on the ownership of mobile licences in the enlarged EU. In the course of this a distinction has been made between the original 15 Member States and the 12 accession countries that joined in May 2004 and January 2007. Drawing such a distinction allowed those mobile operators with a presence in the accession countries to be differentiated from those that did not.

The first conclusion that can be drawn is that the largest multiple owners of mobile licences identified by Whalley and Curwen (2003) have, with the exception of Vodafone, only a limited presence in the mobile markets of the 12 accession countries. Both Tele2 and TeliaSonera have focused on the Baltic States, while Deutsche Telekom has concentrated its attention on those Eastern European markets that either border, or are close to, its home market. This is not particularly surprising since liberalisation offered so many opportunities to expand into the other Member States of the pre-accession EU, and the costs of licence acquisition plus network roll-out were extremely burdensome.

Ten of the 12 accession countries applied to join the EU between 1994 and 1996, with Cyprus South and the Czech Republic being the two exceptions that applied much earlier, in this case 1990.[4] The adoption of EU legislation by the applicant countries liberalised their telecommunications markets so that on the one hand foreign investment was possible, while on the other they instituted a regulatory regime that would reassure investors that they would not be discriminated against. As a consequence, the formal accession date did not trigger a wave of foreign investment by mobile operators, as they had already responded to inward investment opportunities as they arose. Thus, the second conclusion that can be drawn is that the expansion of mobile operators into accession countries began before they formally joined the EU.

That said, it was reasonable to expect that once the formal accession dates had been announced, the strategic interest of operators could have

been refreshed. However, not only were opportunities comparatively limited due to the aforementioned pre-accession inward investment but many operators were struggling with the fall-out from the TMT collapse that became very marked in 2002. Few accordingly had the wherewithal, let alone the will, to expand into the accession countries. One possible expansionary candidate was Vodafone, given its resources and strategy based on its international footprint, while alternative contender Orange was forced to retrench to the point that it became, to all intents and purpose, a Western European-focused operator with a presence in an increasingly scattered set of markets.

While the need to raise capital for its parent has abated, Orange, like TeliaSonera, is no longer interested in playing bit parts and wants to be either a major player or to exit. Exit is nevertheless easier said than done because of the shortage of buyers. In so far as stake-building is concerned, it does appear to be far more likely that operators will seek to consolidate their positions in existing markets through purchasing additional equity in companies where they already own a stake. Taken together, these points suggest a third conclusion, namely that little change can be expected in accession countries, as those operators wishing to exit for whatever reason are unlikely to find buyers, while those wishing to consolidate their position in existing markets will be unwilling to pay the premium sought.

The limited future scope for structural change has implications for the competitiveness of mobile telecommunications markets. Most accession markets are effective duopolies, with the largest two operators controlling 70 per cent or more of the market between them. One consequence of this is that the ability of the third or fourth operators in the market to bring about the competition-derived benefits associated with liberalisation is limited, while another is that any would-be investor in the market is stuck with the choice either of investing in one of the smaller operators or to become part of the duopoly. Neither is an attractive option, though for different reasons: the revenue and growth potential of the former is likely to be limited while the latter will involve paying a premium.

The unattractiveness of the investment decision may also be compounded by the relatively small size of many accession countries and, by extension, their mobile telecommunication markets. In this respect, it is significant that although Vodafone is present in seven accession countries, it does not own a network in all seven markets. Indeed, Vodafone owns a network in just two markets – Malta and Poland – and is present in the other five through the use of Partner Network Agreements. Those markets where Vodafone has used these Agreements are all characterised by their small size. The Agreements have enabled Vodafone to offer its services in

new markets independently of owning a network and to retain a presence in those markets like Sweden that it has exited. As such, they are a key component of Vodafone's pan-EU footprint. When this observation is combined with the propensity of Tele2 to use MVNO arrangements to enter markets, a final conclusion is that multiple licence owners are using a wider variety of entry modes than was previously the case.

It may be pointed out in conclusion that consolidation has for a good many years been a theme in relation to European operators. Although we have noted that three or four networks appear to be the optimal number for most countries, this does not mean that ownership is necessarily a constant, even if that structure already applies. It is evident that most relatively large international operators are not keen on holding minority stakes nor in owning either the third or fourth-largest network if it is much smaller than the market leaders. Hence the sale of smaller networks to the owners of the larger ones is likely to be an ongoing phenomenon subject to regulatory controls.

But one additional factor is worthy of comment. Up until 2005, it appeared that the main predators would be private equity firms. These could not be expected to acquire majority stakes in the likes of Deutsche Telekom, although Blackstone's purchase of a 4.5 per cent stake was seen temporarily as a precursor of something on a much larger scale. However, private equity firms were certainly thought to be capable of swallowing up the relative minnows – governments willing – as evidenced by an Apax Partners-led consortium acquiring TDC in December 2005. What is of interest is that this did not trigger further activity, and the very recent events in the financial markets appear to have put paid to aggressive bidding by private equity firms during the next year or two.

It now looks as though the large international operators will take up the slack. On the whole, the political fall-out from attempted acquisitions of one part-state-owned incumbent by another part-state-owned incumbent – cf. Deutsche Telekom and Telecom Italia – appeared to have deterred such behaviour, yet when the turmoil surrounding yet another attempt to take over Telecom Italia began to clear towards the end of 2007, it was Telefónica that was accepted as a partner in the consortium that held indirect control. However, it may be argued that although there have been allegations that Telefónica hopes to take over Telecom Italia one day, that day is probably a long way off.

More recently, the Greek government's search for a strategic investor in OTE appeared to have finally borne fruit when Deutsche Telekom agreed to buy a 20 per cent stake for €2.5 billion – incidentally acquiring the stake from a private equity firm, the Marfin Investment Group. The German operator wanted to increase its stake to 30 per cent in order to become the

largest shareholder – the Greek state owned 28 per cent – and initially the issue of who would take management control of OTE held up proceedings with the purchase (Hope, 2008). Although the fact that the OTE unions immediately declared a strike indicates that Deutsche Telekom is not entirely popular in the Balkans, negotiations have resulted in a predictable compromise – each party left with 25 per cent plus one share subject to regulatory authorisation – given that the two operators' assets in the Balkans are complementary.

What is finally clear is that there is widespread support for a restructuring of the European mobile industry. Perhaps for that reason there has been a recent upsurge in potential takeover rumours. On the one hand, Telenor is said to be considering a merger with TeliaSonera (Global Insight, 2008) while on the other hand France Télécom is said to be considering a (friendly) takeover of TeliaSonera and/or Telenor (Hall and Anderson, 2008). The problems, as indicated above, include, *inter alia*, the scarcity of operators with the wherewithal to proceed with takeovers, the currently febrile financial environment, the difficulty of dealing with national champions and the attitude of antitrust authorities. Hence, while rumours increasingly go the rounds, the reality may turn out to be less exciting.

NOTES

1. GSM is a generic term encompassing an uplink at 890–915 MHz combined with a downlink at 935–960 MHz and an uplink at 1710–1785 combined with a downlink at 1805–1880 MHz, where the latter are also known as PCNs. PCNs were typically licensed after 1997 either to ameliorate spectrum shortages in GSM900 or to permit the entry of new operators. Fortunately, what was then Eastern Europe chose almost universally to adopt the same spectrum bands and technologies as were being enforced across the EU. Eastern European countries also chose UMTS for 3G, which initially required the use of 1885–2025 MHz combined with 2110–2200 MHz, although other spectrum bands have subsequently been added. However, there are a few cases, noted in Table 5.1, where the competing cdma2000 technology has been adopted.
2. See, for example, the newsletter released by Vodafone on 22 February 2006 relating to its new Agreement with Bulgaria's Mobiltel.
3. BT was certainly the mobile incumbent in respect of analogue telephony but, somewhat surprisingly, Vodafone was the first operator to launch a GSM service (in July 1992) and hence has a claim to be known as the GSM incumbent. mmO_2, as it was known after being hived off from BT, launched only in January 1994 and the close proximity of the other three launches after that of Vodafone explains why, uniquely, the UK has four mobile operators of roughly the same size.
4. For details of the application and subsequent progress of the 12 accession members states see, for example, ec.europa.eu/enlargement.

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6. Structural and strategic adjustment in Latin American mobile telecommunications

6.1 INTRODUCTION

Latin America is generally held to comprise the countries lying south of the US border (together with the Falkland Islands). However, there is no clear separation between these countries and what is generically described as the Caribbean, which comprises roughly 25 (groups of) islands. Of the latter, few have large numbers of mobile subscribers – although the Dominican Republic has over 5 million – and hence the discussion that follows is essentially concerned with events in the main countries.[1] Nevertheless, since the main thrust in what follows is to investigate the strategic behaviour of a small number of operators, it is where they operate that dictates the sample set of countries and islands, and as a consequence certain Caribbean islands have a significant role to play.

The pivotal event occurred in March 2004 when Telefónica tabled a bid for the Latin American assets of BellSouth at a cost of $4.5 billion in cash plus $1.5 billion of inherited debt – the withdrawal of US operators from overseas ventures is detailed in Chapter 8. BellSouth's withdrawal from Latin America was, nevertheless, a touch ironic, since it had entered during the 1980s when the prevailing opinion was that it was a part of the world best shunned because of its dubious economic performance, and it was now withdrawing at a time when Latin American mobile markets were growing very rapidly.

6.2 BACKGROUND

Through until the end of 2003, BellSouth was a major player in the Latin American mobile market, ranking third behind Telefónica Móviles and América Móvil, which had been spun off from Mexico's Telmex and which remained under the tight control of Carlos Slim. The precise status of Telefónica Móviles is slightly problematic in relation to Latin America

since it must be borne in mind that, until July 2006, Telefónica and Telefónica Móviles were not identical; the parent owned only 92.5 per cent of its mobile subsidiary. Furthermore, the assets were not held consistently by either company. Nevertheless, they can be treated as synonymous for our purposes in this chapter. In fourth place, superficially a long way behind, was Telecom Italia Mobile (TIM), although here again it should be borne in mind that it had recently increased its stake in Venezuela, and its parent independently had several stakes in Latin America. The only other operator to have significant multiple stakes in Latin America was Millicom International, which had five, but these produced only 1.73 million proportionate subscribers (total subscribers multiplied by ownership stakes) in December 2003.

The tendency for media reports to cite gross rather than proportionate subscriber numbers was a significant factor in explaining why a seriously misleading impression was given of developments in Latin America at this time. Proportionate data demonstrate that, at the end of 2003, América Móvil derived revenue from roughly 40 million subscribers, while Telefónica Móviles (TEM) did so from a mere 12.5 million. Meanwhile, BellSouth had a further 8 million and TIM had 5.7 million. Hence, we note that the reality was that the merger between Telefónica and BellSouth would still leave América Móvil twice as large as the merged entity in economic terms, although there strictly also needs to be an adjustment for differences in average revenue per user (ARPU). Meanwhile, TIM would be left trailing a very long way back in third place. On the other hand, América Móvil had only 16 million proportionate subscribers in the seven Latin American markets in which it operated outside Mexico at the end of 2003, almost exactly the number applicable to a post-merger Telefónica Móviles if Mexico were excluded. Furthermore, the latter would be operating in 13 countries, almost twice as many as América Móvil.

An additional factor was that Telefónica had an even bigger struggle on its hands than the simple numbers indicated. In the first place, it was obliged to achieve regulatory permission in every single country where it was acquiring assets, and there was no guarantee that all regulators would be accommodating. Certainly, where the acquisition would result in multiple networks in the same country, there would be a potential need to sell some assets – probably in the form of spectrum – with América Móvil in most cases the obvious buyer. Prices in the event of forced sales were likely to be very poor, and would badly affect the retrospective return on investment of the companies concerned. Secondly, there was a branding problem given that BellSouth had tended to co-brand, thereby creating the likes of Móvicom BellSouth in Argentina. Rebranding all the networks to the TEM brand, Móvistar, would not only be expensive but could lead to churn

among previously loyal BellSouth subscribers. Thirdly, TEM was primarily a mass-market operator, whereas BellSouth had targeted high-ARPU subscribers. Fourthly, TEM was already committed to the use of both GSM and CDMA technologies in different countries. This was anyway less than fully efficient, but BellSouth was a CDMA-only operator, so the balance between TEM's use of technologies would be disturbed. In particular, its tactic of extolling the virtues of GSM where appropriate was going to prove problematic. Fifthly, where networks could potentially be amalgamated, the obvious source of economies, namely redundancies, was likely to be heavily resisted by both trade unions and, indeed, governments.

6.3 THE POSITION IN 2004

Table 6.1 illustrates the position at the end of 2004 when the consequences of structural changes agreed earlier had largely worked their way through the system, although some of the issues discussed above in respect of Telefónica Móviles had yet to be fully resolved. At this time, Telecom Italia was still in control of just over one half of TIM, but it had already been agreed that a merger of the companies would take place during 2005, and so for convenience and comparability we will use parent Telecom Italia in what follows. As can be seen, Telecom Italia, either directly or via TIM, is present in eight countries, the same number as in 2003, while América Móvil has added Honduras and Uruguay, to bring its total up to ten. Not surprisingly, Telefónica has shown considerably more expansion as a result of the BellSouth acquisitions, adding Colombia, Ecuador, Nicaragua, Panama and Uruguay to bring its total country presence to 14.

The effect upon the number of proportionate subscribers was fairly dramatic when combined with the rapid growth in existing markets plus the fact that Telefónica now had more than one network in certain countries. At the end of 2004, as shown in Table 6.2, Telefónica could claim a total of 32.3 million proportionate subscribers (including those derived from its minority stake in Portugal Telecom). However, despite rapid growth at its existing networks, América Móvil could only claim a rise of 40 per cent in its proportionate subscriber base. América Móvil was not exactly under threat of being overtaken, but it was understandably concerned with bulking up to achieve economies of scale. Taking the three parent companies together, they accounted for 98.4 million proportionate subscribers, or 56.8 per cent of the total for Latin America as a whole.

Based upon Table 6.2 it is possible to make a series of observations. Firstly, when compared to América Móvil, Telefónica had far fewer proportionate subscribers in Brazil where it was popularly thought to play a

Table 6.1 Presence of international operators in Latin America,[1] 31/12/04 and 31/12/05

Country	América Móvil		Telecom Italia		Telefónica		Others*	
	31/12/04	31/12/05	31/12/04	31/12/05	31/12/04	31/12/05	31/12/04	31/12/05
Argentina	Y	Y	Y	Y	Y	Y	BS, HW, NII	HW, NII
Belize	–	–	–	–	–	–	–	–
Bolivia	–	–	Y	Y	–	–	AL, MI	AL, MI
Brazil	Y	Y	Y	Y	Y	Y	PT, NII	PT, NII
Chile	–	Y	Y	–	Y	Y	–	–
Colombia	Y	Y	–	–	Y	Y	–	–
Costa Rica	–	–	–	–	–	–	–	–
Cuba	–	–	Y	Y	–	–	–	–
Ecuador	Y	Y	–	–	Y	Y	–	–
El Salvador	Y	Y	–	–	Y	Y	MI	MI
Guatemala	Y	Y	–	–	Y	Y	MI	MI
Honduras	Y	Y	–	–	–	–	MI	MI
Mexico	Y	Y	–	–	Y	Y	NII	NII
Nicaragua	Y	Y	–	–	Y	Y	–	–
Panama	–	–	–	–	Y	Y	CW	CW
Paraguay	–	Y	Y	Y	–	–	HW, MI	MI
Peru	–	Y	Y	–	Y	Y	NII	NII
Puerto Rico	–	–	–	–	Y	Y	VC	VC

Uruguay	Y	Y	–	–	Y	Y	–	–
Venezuela	–	–	Y	Y	Y	Y	VC	VC
Total	10	13	8[2]	6	14	14		

Notes:
* AL = Alltel (acquired Western Wireless, the previous owner, in 2004); BS = BellSouth; CW = Cable & Wireless; HW = Hutchison Whampoa; MI = Millicom International; NII = Nextel International; PT = Portugal Telecom; VC = Verizon Communications.
1. Defined so as to fit the purpose of the narrative.
2. Four networks were directly owned and four indirectly controlled via 56.1%-owned subsidiary TIM.

Source: Compiled by the authors.

Table 6.2 Latin American[1] proportionate subscribers, end-2004

	América Móvil	Telecom Italia	Telefónica[2]	Country Total
Argentina	3 587 000	455 000	3 050 000	13 292 000
Belize	–	–	–	78 000
Bolivia	–	585 000	–	1 831 000
Brazil	13 657 000	5 139 000	8 352 000	64 845 000
Chile	–	1 789 000	3 066 000	9 448 000
Colombia	5 767 000	–	3 046 000	10 400 000
Costa Rica	–	–	–	1 028 000
Cuba	–	25 000	–	85 000
Ecuador	2 326 000	–	1 038 000	3 544 000
El Salvador	493 000	–	326 000	1 570 000
Guatemala	1 293 000	–	693 000	2 730 000
Guyana	–	–	–	209 000
Honduras	198 000	–	–	926 000
Mexico	28 851 000	–	4 794 000	38 228 000
Nicaragua	448 000	–	264 000	738 000
Panama	–	–	576 000	1 236 000
Paraguay	–	78 000	–	1 255 000
Peru	–	618 000	2 611 000	3 908 000
Puerto Rico	–	–	76 000	1 910 000
Suriname	–	–	–	230 000
Uruguay	5000	–	188 000	592 000
Venezuela	–	785 000	4 215 000	9 049 000
Total Latin America[1]	56 625 000	9 474 000	32 295 000	173 095 000

Notes:
1. Defined so as to fit the purpose of the chapter.
2. Including pro rata stake in Portugal Telecom.

Source: Compiled by the authors.

dominant role. However, since its network, Vivo, was jointly held with Portugal Telecom and at this time there were significant minority shareholders in the individual regional networks that collectively made up Vivo – something that most commentators overlook – this was indeed the case. Secondly, it is also of interest to consider the relative importance of Latin America for the three parent companies. In the case of América Móvil, the only asset outside Latin America was an operation in the USA (TracFone) largely designed to allow immigrants from Latin America to phone home. Although TracFone provided over 4 million proportionate subscribers, this

constituted well below 10 per cent of the total. Telefónica's situation was quite different since it had a further 20 million proportionate subscribers in Spain (primarily), Portugal and Morocco, representing 40 per cent of its aggregate total. TIM, for its part, had over 26 million in Italy alone, so even adjusting for Telecom Italia's stake in TIM, the parent company had more proportionate subscribers outside Latin America than within.

Thirdly, an added factor is that aside from Brazil, Telecom Italia's Latin American holdings did not yield that many subscribers, and it was facing increasing competition from the two regional heavyweights. With its attention directed towards its imminent and costly merger with TIM, it was no real surprise that Telecom Italia was intent upon a streamlining operation which would involve the shedding of non-core assets both in Latin America and elsewhere – initially, the Czech Republic and Greece. Obviously, Brazil had to be retained, but nothing else was strictly essential. Indeed, it had already increased its stake in Venezuela from 67 per cent to 100 per cent in July 2004 with a view to an agreed takeover by fixed-wire operator CANTV, but, unfortunately, despite agreement being reached between the parties in November, the regulator had misgivings and was unwilling to sanction the deal before the year-end. Thus, the situation at the end of 2004 was accordingly far from stable. Crucially, América Móvil wanted to grow bigger to retain its role as regional leader, while Telecom Italia was keen to sell up. Regulators willing, this was a potential marriage made in heaven.

6.4 DEVELOPMENTS DURING 2005

The position at the end of 2005 in terms of countries supplied is illustrated in Table 6.3. As can be seen, Telefónica still served 14 countries, although this was somewhat deceptive. In the first place, the last of the acquisitions from BellSouth had finally been sanctioned by regulators at the beginning of the year, so it had more than one network in several countries. As a consequence, Telefónica merged its multiple networks in Chile and Peru but also had to dispose of some spectrum in a small number of cases to satisfy regulatory concerns. The process of rebranding as many networks as possible to achieve a common brand across Latin America was set in hand, but the relationship between parent and mobile subsidiary remained a little convoluted. Assets were periodically being transferred, as in Argentina, and it was not immediately obvious why a parent owning 92.4 per cent of its mobile subsidiary should not place all of the mobile holdings under one roof.

Meanwhile, despite the obvious symmetry between Telecom Italia's desire to sell and América Móvil's desire to buy, only one asset was actually

transferred. While Telecom Italia did sell out in Peru in August, it arranged to sell its Chilean stake to Almendral in January and its Bolivian stake to Cotas, a local co-operative, in July, subject to regulatory approvals – but the latter was not executed. América Móvil had anyway got around its lack of a Chilean network by buying SmartCom PCS in August, one month after agreeing to acquire Hutchison Whampoa's network in Paraguay, although Bolivia remained uncovered. The reason for this is apparent if one bears in mind that in 2003 its only holding below 90 per cent was in El Salvador, a situation that was remedied in August 2004 when this was increased to 95.2 per cent. Hence, acquisition of the half share held by Telecom Italia in Bolivia would have been contrary to América Móvil's desire to have virtually complete control over its subsidiaries. The three acquisitions discussed above resulted in the number of networks controlled by América Móvil rising to 13 by the end of 2005.

The proportionate subscriber numbers in Table 6.3 tell their own story. At the end of 2004, America Móvil, Telecom Italia and Telefónica accounted for 32.7 per cent, 5.5 per cent and 18.2 per cent of the total respectively and 56.4 per cent overall. One year on, they accounted for 37.2 per cent, 8.0 per cent and 20.6 per cent respectively and 65.9 per cent overall. Hence, despite a 34 per cent overall increase in the size of the Latin American market, these three operators had increased their combined market share by nearly 10 per cent. Even so, the disparity in the size of the three operators remained very large.

6.5 DEVELOPMENTS DURING 2006

Given the above, there was not expected to be much M&A activity in the first half of 2006. However, this expectation proved to be somewhat unfounded when, in April, América Móvil and its parent Telmex provisionally acquired from Verizon Communications its assets in the Dominican Republic (28.5 per cent of CANTV), Puerto Rico (52 per cent of TELPRI) and Venezuela (100 per cent). América Móvil was expected to attempt to raise its initial stake in CANTV to a majority and to purchase further shares in TELPRI. The retreat of the formerly acquisitive US operators from their 'backyard' was accordingly largely complete although this latest stage was destined not to run smoothly. Although América Móvil was authorised to buy the CANTV stake in December, the FCC delayed the authorisation for TELPRI until 2007Q1 while the Venezuelan government announced that it intended to renationalise CANTV, thereby forcing América Móvil/Telmex to withdraw in January 2007 (Barkley, 2007).

Table 6.3 Latin American[1] proportionate subscribers, end-2005

	América Móvil	Telecom Italia	Telefónica[2]	Country Total
Argentina	6 627 000	780 000	7 251 000	21 432 000
Belize	–	–	–	120 000
Bolivia	–	777 000	–	2 534 000
Brazil	18 246 000	15 430 000	10 208 000	86 950 000
Chile	1 884 000	–	4 875 000	11 270 000
Colombia	13 664 000	–	5 574 000	21 847 000
Costa Rica	–	–	–	1 099 000
Cuba	–	28 000	–	119 000
Ecuador	4 100 000	–	1 741 000	6 246 000
El Salvador	822 000	–	492 000	2 333 000
Guatemala	1 895 000	–	962 000	4 117 000
Guyana	–	–	–	282 000
Honduras	427 000	–	–	1 261 000
Mexico	35 914 000	–	5 844 000	46 626 000
Nicaragua	742 000	–	344 000	1 120 000
Panama	–	–	781 000	1 690 000
Paraguay	172 000	85 000	–	1 778 000
Peru	1 950 000	–	3 385 000	5 583 000
Puerto Rico	–	–	64 000	2 064 000
Suriname	–	–	–	274 000
Uruguay	168 000	–	387 000	1 155 000
Venezuela	–	1 700 000	6 050 000	12 677 000
Total Latin America[1]	86 611 000	18 790 000	47 958 000	232 577 000

Notes:
1. Defined so as to fit the purpose of the chapter.
2. Including pro rata stake in Portugal Telecom.

Source: Compiled by the authors.

Meanwhile, Telecom Italia finally disposed of its Venezuelan subsidiary to Telvenco in January 2006, and in September it was widely believed that it would be selling out of Brazil – possibly to Telefónica – as part of a restructuring designed to turn itself into a media company (Mocenni and La Monica, 2006). As for Telefónica, it seemed to be tiring of having too many eggs in a Latin American basket and was devoting its spare resources to developing O_2, which it finally acquired in full in March 2006. Nevertheless, it was unlikely to pass up the opportunity to buy Telecom Italia's assets in Brazil and there were rumours that it had made an

Table 6.4 Latin American[1] proportionate subscribers, end-2006

	América Móvil	Telecom Italia	Telefónica[2]	Country Total
Argentina	10 071 000	1 172 000	11 199 000	30 024 000
Belize	–	–	–	130 000
Bolivia	–	721 000	–	2 914 000
Brazil	23 618 000	20 028 000	10 057 000	100 820 000
Chile	2 372 000	–	5 680 000	13 094 000
Colombia	19 364 000	–	7 760 000	29 763 000
Costa Rica	–	–	–	1 444 000
Cuba	–	41 000	–	159 000
Dominican Rep.	2 140 000	–	–	4 449 000
Ecuador	5 657 000	–	2 490 000	8 461 000
El Salvador	1 213 000	–	839 000	3 571 000
Guatemala	2 573 000	–	1 491 000	6 184 000
Guyana	–	–	–	314 000
Honduras	736 000	–	–	2 290 000
Mexico	43 190 000	–	8 553 000	56 765 000
Nicaragua	1 268 000	–	553 000	1 808 000
Panama	–	–	939 000	1 920 000
Paraguay	376 000	109 000	–	3 246 000
Peru	3 369 000	–	5 053 000	8 772 000
Puerto Rico	–	–	48 000	2 099 000
Suriname	–	–	–	295 000
Uruguay	428 000	–	773 000	2 154 000
Venezuela	–	–	9 373 000	18 782 000
Total Latin America[1]	116 375 000	22 071 000	64 808 000	299 458 000

Notes:
1. Defined so as to fit the purpose of the chapter.
2. Including pro rata stake in Portugal Telecom.

Source: Compiled by the authors.

unofficial offer for these towards the end of 2006 – Telecom Italia admitted that it had received, and rejected, a bid in October without naming the bidder. However, it seemed much more likely that the bidder was América Móvil – a figure of $7.7 billion was widely quoted – despite the high probability of regulatory intervention (Stewart, 2006).

In terms of proportionate subscribers, as shown in Table 6.4, América Móvil had comfortably exceeded the 100 million mark by the year-end and Telefónica had maintained its relative position (at 56 per cent). However,

Telecom Italia now claimed less than 20 per cent of the total for América Móvil and was fast becoming a relatively insignificant player other than in Brazil. At the end of 2006, América Móvil, Telecom Italia and Telefónica accounted for 38.9 per cent, 7.3 per cent and 21.6 per cent of the total respectively and 67.8 per cent overall. Hence, despite a 29 per cent overall increase in the size of the Latin American market, these three operators had increased their combined market share yet again. Even so, the disparity in the size of the three operators remained very large, and Telecom Italia was clearly in (possibly permanent) retreat.

6.6 DEVELOPMENTS DURING 2007 AND EARLY 2008

América Móvil remained active, although it was now particularly interested in acquiring cable assets in order to offer bundled services as well as mobile networks. As noted, Telecom Italia no longer appeared to be willing to sell its Brazilian assets (Maxwell, 2007), and even went so far as to term them 'strategic' (Zampano, 2007), but early in 2007, it became evident that an 18 per cent controlling stake in Telecom Italia held by a company called Olimpia, itself 80 per cent owned by Pirelli, would be put up for sale (Zampano, 2006).

Telefónica, meanwhile, was also trying to decide how to resolve the situation in Brazil. One obvious approach was to buy out Portugal Telecom's half share in Vivo, possibly trading it against the 10 per cent stake in Portugal Telecom that Telefónica had built up by this time. Unfortunately for this plan, however, Portugal Telecom was itself interested in buying out Telefónica. As an alternative, Telefónica could also join in the bidding for part of the Olimpia stake, a strategy that the Italian government supported in February despite its determination not to allow control of Telecom Italia to pass into the hands of foreigners.

Telefónica allegedly tabled an initial offer for a 30 per cent stake in Olimpia (Michaels and Parker, 2007) but later withdrew, citing a lack of financial benefits. By early April, it became evident that Pirelli was in exclusive talks with América Móvil and AT&T which itself held an 8 per cent stake in América Móvil (Michaels, 2007). However, partly motivated by governmental antipathy towards foreign operators, AT&T withdrew in mid-April, in the process effectively terminating any further interest from América Móvil (Michaels and Parker, 2007). This left the door open for the return of Telefónica, and the outcome of further Byzantine negotiations resulted in Telefónica taking a 6.9 per cent indirect equity stake in Telecom Italia via the 'Telco' consortium (Total Telecom, 2007). The response of the Brazilian regulator was eventually favourable subject to the qualification that Vivo and TIM Brazil had to remain independent as distinct corporate

entities with separate business plans, could not share licences, infrastructure and technologies nor make joint marketing agreements (Lennighan, 2007a). The Telco stake also meant that Telefónica acquired a 1.8 per cent stake in Telecom Argentina (Saitto, 2007).

In early July, Telefónica offered Portugal Telecom an alleged €3 billion ($4.1 billion) for its stake in Vivo and demanded an answer by the end of August (Parker and Crawford, 2007), but the reply was predictably negative. Return of the Telefónica stake held in Portugal Telecom – by now 11 per cent but to be reduced back to no more than 10 per cent – would probably have formed part of the deal which was stated by Telefónica's chairman to be its main strategic priority. However, even if the offer had succeeded, Vivo would not have been merged with TIM Brazil in order to avoid regulatory issues. Rather, the two operators would have ended up sharing infrastructure.

In early August, Vivo announced that it had reached an agreement with Telpart to buy 22.7 per cent of Telemig Celular (with 3.5 million subscribers in Minas Gerais state) and 19.3 per cent of Amazônia Celular (with 1.3 million subscribers) for €465 million, to be followed by an offer for up to 80 per cent of the ordinary shares and up to one-third of the preferred shares (Cunha, 2007). Assuming the offer was fully successful, Vivo would end up with 58.2 per cent of Telemig Celular and 54.6 per cent of Amazônia Celular at a total cost of €1.1 billion and would achieve population coverage of 84 per cent. The regulator approved the Telemig purchase in October but did not rule on that of Amazônia Celular (Global Insight, 2007). The Amazônia stake – consisting of 51.9 per cent of ordinary shares and 0.1 per cent of preferred shares – was sold on to Tele Norte Leste (Oi) in December 2007 for $67 million subject to regulatory approval (Jelmayer, 2007), thereby avoiding regulatory issues arising from the fact that Vivo already held licences in the region.

Telefónica suffered a setback in September when NewComm Wireless Services, its joint venture in Puerto Rico, was finally sold off as part of Chapter 11 bankruptcy proceedings (Fitzgerald, 2007) although the loss of subscribers was trivial. This was compensated by the winning of lot 22 (at a cost of $7 million) in a 2G licence auction run by the Brazilian regulator, Anatel, shortly thereafter, since it thereby gained coverage in the north-east where it had previously held no licences (Stewart, 2007). It subsequently announced that it intended to restrict its future acquisition activity to Brazil, Mexico and Germany and that it would be investing between €14 billion and €16 billion in Latin America through 2010 – amounting to one-half of its total investment (Lennighan, 2007b).

Meanwhile, Telecom Italia had further issues to address. In late January, Bolivia's President announced that he intended to renationalise Entel, and

a decree to that effect was issued in April (Telegeography, 2007). On 30 April, Telecom Italia notified the government that it wanted to undertake a six-month obligatory attempt at reconciliation. On a more positive note, Telecom Italia announced that it intended to make use of a call option to take control of Telecom Argentina.

There was also the issue of how best to use Brasil Telecom – now 62 per cent owned by Techold[2] – as a means of creating more competition in the Brazilian market. In early 2008, the Communications Minister eventually came out in favour of a merger with Oi, thereby in principle creating a Brazilian-owned operator with sufficient clout to compete with Telefónica and América Móvil (Rumsey, 2008). December 2007 finally witnessed the much-delayed auction of 3G licences in Brazil. Altogether, 44 licences were on offer comprising four in each of eleven zones. Competition was fierce, with winning bids coming in at prices well above the reserves. Not surprisingly, the 'big 3' together with Oi took the bulk of the spoils (37 licences in all) although Nextel proved to be the only unsuccessful bidder among the eight making bids (Stewart, 2007).

But what of América Móvil? It had turned out to be the unsuccessful bidder competing with Vivo for the Brazilian assets discussed above, but it rebounded at the year-end by acquiring Oceanic Digital's assets in the Dominican Republic, El Salvador and Jamaica. However, the deal was inconsequential, involving a few hundred thousand subscribers in total and two countries in which América Móvil was already present.

In terms of proportionate subscribers, as shown in Table 6.5, América Móvil had nearly reached the 100 million mark by the year-end and Telefónica had more than maintained its relative position (at 57.1 per cent) because of its stake in Telecom Italia. However, Telecom Italia now claimed only one-sixth of the total for América Móvil and was becoming a relatively insignificant player other than in Brazil. In contrast, at the end of 2007, América Móvil and Telefónica accounted for 39.2 per cent and 22.4 per cent of the total respectively, and hence, despite a further 23 per cent overall increase in the size of the Latin American market, they continued to keep up with market growth.

At this point it is appropriate to say a brief word about the other operators as shown in Table 6.1. Because we have been concentrating upon the 'big 3', we have not paid much attention to the countries and islands where they have no presence. If all of these are added in, then the total subscriber numbers for the entire Latin American plus Caribbean region amounted to roughly 375 million at the end of 2007, an increase of roughly 22 per cent on 2006. It may be noted that this increase is effectively the same as for the 'big 3', which is not surprising since they are present in all of the main markets. Of the other operators in Table 6.1, only Millicom had

Table 6.5 Latin American[1] proportionate subscribers, end-2007

	América Móvil	Telecom Italia	Telefónica[2]	Country Total
Argentina	13 119 000	2 006 000	14 014 000	38 619 000
Belize	–	–	–	149 000
Bolivia	–	867 000	60 000	3 680 000
Brazil	30 228 000	21 200 000	14 264 000	120 980 000
Chile	2 672 000	–	6 283 000	14 438 000
Colombia	22 335 000	–	8 370 000	32 300 000
Costa Rica	–	–	–	1 432 000
Cuba	–	52 000	4 000	199 000
Dominican Rep.	2 515 000	–	–	5 436 000
Ecuador	6 936 000	–	2 583 000	9 924 000
El Salvador	1 162 000	–	1 114 000	5 097 000
Guatemala	3 394 000	–	1 977 000	8 778 000
Guyana	–	–	–	556 000
Honduras	1 114 000	–	–	3 812 000
Jamaica	250 000	–	–	2 706 000
Mexico	50 011 000	–	12 535 000	67 797 000
Nicaragua	1 668 000	–	731 000	2 412 000
Panama	–	–	1 080 000	2 503 000
Paraguay	519 000	206 000	14 000	4 434 000
Peru	5 455 000	–	8 007 000	13 745 000
Puerto Rico	2 416 000	–	–	2 249 000
Suriname	–	–	–	328 000
Uruguay	761 000	–	1 157 000	3 176 000
Venezuela	–	–	10 430 000	23 689 000
Total Latin America[1]	144 555 000	24 331 000	82 623 000	368 439 000

Notes:
1. Defined so as to fit the purpose of the chapter.
2. Including pro rata stakes in Portugal Telecom and Telecom Italia.

Source: Compiled by the authors.

made a concerted effort to increase its presence, accounting for 10 518 000 proportionate subscribers although this still represented a tiny percentage of the overall market. For its part, Nextel International (NII) has continued to grow steadily using its iDEN technology mainly in the enterprise market, achieving just over 4.5 million subscribers at the end of 2007 shortly after launching its fifth service in Chile. However, in terms of (primarily) the Caribbean, Digicel remained the most visible operator since it

had acquired a presence (stakes and/or licences) in 25 countries/islands by the end of 2007 even if the launched networks individually were mostly very small.

6.7 DISCUSSION

As noted above, there are no prospects of any other international operators moving into the Latin America mobile market other than as peripheral players. The existence of a colonial heritage meant that non-indigenous operators from America, Italy, Portugal and Spain historically invested in Latin America. There is a widespread desire by operators to enter less-developed markets, but that is not a particularly apt description to apply to Latin America, and competition is already strong. Furthermore, although some familiar names outside the 'big 3' are present, these are all fairly modest operations, and the rest of the networks are controlled locally. On the whole, departures are as likely to take place as entries among international operators, with their assets being sold off to local companies.

The 'big 3' – no longer expected to become the 'big 2' as Telecom Italia continues to restructure while declaring its commitment to Latin America, so the 'big 2.5' might be a more apt description – are unlikely to play such an important role as asset buyers in the future for a variety of reasons. In the first place, as noted, América Móvil is only interested in controlling stakes. It remains interested in Bolivia and Panama (where it qualified to bid for a licence in December 2007) in particular, and to a lesser extent in Costa Rica, but may have to be patient. The simple fact is that there is a lack of quality assets left to buy – hence the Oceanic Digital deal. Secondly, although regulators have largely been accommodating so far, in part because the number of willing and able buyers has been short on the ground, they are unlikely to be sanguine at the prospect of an effective duopoly in their respective countries and will generally try to ensure that such smaller operators as remain are not driven out of business or acquired by one of the big two. The enthusiasm for the development of Oi as a wholly domestically-owned yet effective competitor to the big three in Brazil is indicative of this process.

The prospects for competition have undoubtedly been damaged by the withdrawal of the large US operators. As noted, this had a short-term rationale in the need to raise funds for the takeover of AT&T Wireless, but there are those who believe that there is also a longer-term underlying issue that has affected the likes of Verizon Communications, namely, the introduction of pre-paid tariffs by Telecel in 1996. The US mobile market was traditionally based upon contracts and credit, with little interest being shown in

expansion based on pre-paid. The advent of pre-paid undermined the traditional model, necessitating a change in strategy on the part of American operators that was funded, at least in part, by the proceeds of asset sales overseas.

A further factor that may influence who stays and who leaves Latin America is the very low level of data revenues once SMS is stripped out. This is to be expected given the relatively recent arrival of high-speed networks and the relatively low levels of average income, but it does need addressing in the medium term since it has required a huge investment to upgrade analogue networks first to 2G (GSM/cdmaOne) and then to 2.5/2.75G (GPRS/cdma2000 1×/EDGE) and occasionally to 3G (cdma2000 1×EV-DO/W-CDMA/HSDPA). The need to make such large-scale network investments has, in part, discouraged those international operators with limited cultural ties to Latin America, such as Vodafone and Deutsche Telekom, from entering the market. Latin America has long been regarded as the hegemony of American or Spanish/Portuguese-speaking operators.

Until fairly recently Telefónica focused its internationalisation efforts on Latin America. However, it began to widen its geographical footprint, acquiring a small stake in Portugal Telecom, all of O_2 and a majority stake in the Czech Republic as well as a 2G/3G licence in Slovakia. There is also a suggestion that Telefónica may be interested in South-East Asia. One possible interpretation of these developments was that heavily-indebted Telefónica would exit Latin America where it was losing money and redeploy the capital elsewhere. Hence it was reasonable to ask whether América Móvil would face a less-focused competitor.

Although Telefónica has made little headway in Mexico, América Móvil's home market, it probably has too much capital invested in Latin America to afford to take its eye off the ball there and hence, far from withdrawing, it is keen to generate further economies of scale by buying Portugal Telecom's half share of Vivo as it has already done by taking an indirect stake in Telecom Italia. A related issue is that GSM is making considerable headway against CDMA in Latin America with the consequence that Telefónica has recently decided to sink a huge sum of money into switching many of its Latin American assets over to GSM, and as a consequence its return on capital is bound to be depressed for some time.[3] The pursuit of additional, increasingly poor subscribers is unlikely to present the optimum way forward for either operator, and hence there is likely to be a period of consolidation with an emphasis upon making money out of the high-speed networks which are being put in place.

6.8 CONCLUSIONS

The history of international operators in Latin America is unique among the regions. There were only ever very small numbers of European and American companies interested in entry, and not all of them were truly committed for the long term. Partly as a result, an indigenous operator, América Móvil, spun out of Mexico's Telmex in 2000 and controlled by an extraordinarily astute businessman who is arguably now the world's wealthiest man, was able to build up a dominant position which cannot now be other than marginally eroded. In effect, with BellSouth and, to a lesser extent, Telecom Italia pulling out, only América Móvil and Telefónica were in a position to take up the slack.[4] Telecom Italia is now unlikely to exit from Brazil, but the situation there remains unsettled with both Telefónica and Portugal Telecom vying to take control of Vivo.

Overall, therefore, it looks as though the excitement generated by ongoing structural change is going to be found in other regions during the rest of the decade.

NOTES

1. The Caribbean islands are currently served primarily by Digicel and Cable & Wireless although Orange (France Télécom) also has a strong localised presence.
2. TIM Brazil was and remains a subsidiary of TIM, but Telecom Italia also owned 38 per cent of Solpart which in turn owned 51 per cent of fixed-wire/mobile regional operator Brasil Telecom. As a result of regulatory disputes arising from overlapping licences in the two operators, Brasil Telecom was transferred into a blind trust called Brasilco (Clark, 2006). In December 2007, Telecom Italia finally sold the stake to Techold for $515 million.
3. See, for example, www.telecomdirectnews.com/do.php/18368?/tpl=/look of 14 June 2006.
4. In October 2006, Telefónica pledged €10 billion investment in Latin America up to the end of 2009 to add to the €45 billion previously invested there.

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7. Domestic structural and strategic adjustment in the USA

7.1 INTRODUCTION

In the previous four chapters the focus has been on structural and strategic change at a regional level. In contrast the focus here is on a single country, albeit one that is large and structurally significant, namely, the United States. The internationalisation of US operators is characterised by steady expansion followed by rapid contraction, which inevitably raises the question as to why this is the case. In essence, there are two main answers to this question: restructuring of the domestic US market and the associated changes to the regulatory framework. Central to the latter has been a programme of licensing that has encouraged the creation of national operators on the one hand and consolidation on the other. As it is not possible to understand the internationalisation strategies of US operators without understanding their domestic context, this chapter will focus on structural and strategic adjustment within the United States while the following chapter will concentrate on the internationalisation of the Baby Bells.

7.2 NATIONAL LICENSING

Truly national networks have not been the historic norm in the USA. Initially, the customary practice was for the Federal Communications Commission (FCC) to issue two cellular licences in each designated area, one to the incumbent Baby Bell – often referred to as a regional Bell operating company (RBOC) – and one to a competitor via a tender.[1] In such a world, licence ownership was necessarily fragmented and roaming arrangements rather complicated. Indeed, it took approximately a decade for automated roaming to be implemented. In the mid-1990s, this system was subjected to significant pressure for change. In part, this stemmed from the 1996 Telecommunications Act, but, in addition, the commencement of a series of auctions for PCS (1900 MHz – specifically, 1850–1919 and 1930–1990 MHz) spectrum provided the Baby Bells with an opportunity to expand outside their initial boundaries. Importantly, they were not the only

ones to benefit since the long-distance operators such as AT&T could also now attempt to build extensive mobile networks.

One of the predictable consequences was for a number of operators to attempt to buy their way to something like national coverage. However, while this could theoretically be done directly via licence acquisition, it often appeared to be more rational to acquire companies that already possessed licences because suitable licences were not always available in the auctions or were too costly because of competitive bidding in metropolitan areas. AT&T (as it then was), for example, accordingly pursued both strategies, combining the purchase of the outstanding 80 per cent of McCaw Cellular in 1994 to form AT&T Wireless with that of 'A' and 'B' block metropolitan licences in 1995 and 'D', 'E' and 'F' block local licences in 1997, at which point it could in principle reach a population of 250 million.

The Baby Bells initially set out to ensure full coverage of their domestic regions, but subsequently expanded via mergers, acquisitions and joint ventures both among themselves (for example, SBC/Pacific Telesis forming SBC Communications), with non-Baby Bells (for example, Bell Atlantic/GTE forming Verizon Communications), with foreign operators (for example Verizon Communications wireless/Vodafone forming Verizon Wireless) or with smaller local operators (for example, SBC/Comcast Cellular). Meanwhile, existing mobile operators concentrated upon acquiring more spectrum in the auctions – hence leading to the apparent debacle in the 'C' licence auction when NextWave and Omnipoint were unable to pay for their licences. Omnipoint was subsequently swallowed up by VoiceStream Wireless, itself spun off Western Wireless, another bidder in the auction, only for VoiceStream itself to become T-Mobile USA, a subsidiary of the German incumbent Deutsche Telekom.

Some attempt has been made to address the roaming issue via a distinction between 'on-net' and 'off-net' roaming. In the former case, a Verizon Wireless customer in one area can, for example, interconnect with a Verizon customer in another area without the payment of an interconnection fee. Despite this, smaller operators may need to pay interconnection fees to larger operators even in their home regions if they do not have complete coverage. The ability to keep prices down by eliminating interconnection fees is obviously a major incentive for operators to achieve national coverage.

However, there is an additional factor to take into account. Within Europe, mobile telephony has developed as a form of premium-priced product subject to much less regulatory control than incumbents' (initially monopolised) long-distance and local fixed-wire networks. In comparison, the distinction is not regarded as very relevant in the USA where local calls are generally provided free and, in any event, people sometimes keep their

mobile handsets shut off to avoid being charged for incoming calls. As a consequence, there is a lower profit margin in mobile telephony in the USA and, if high roaming charges are levied, these cannot readily be passed on to subscribers, thereby eroding even these margins. At the same time, local operators have no incentive to reduce interconnection charges to larger operators seeking a national footprint since they are not in a position to offer national roaming themselves.

One possible way for such smaller operators to at least give the impression that a national footprint exists is to provide services under the umbrella of a common brand such as Cellular One. However, even this is problematic to organise unless the individual companies are all subsidiaries of a handful of companies. The biggest operators also tend to link up with affiliated companies in the PCS market, often using them as bidders in auctions where preference is given to new entrants. Some of these may also be swallowed up over time (as in the case of TeleCorp by AT&T Wireless in October 2001).

Hence, in summary, the issue as to whether an operator provides national coverage is difficult to pin down even setting aside the awkward issue of 'dead zones' which can result from local opposition to the erection of base stations. Certainly, the kind of national coverage encountered in Europe has not traditionally been provided, although it is fair to say that no individual European market is anything like the size of the USA, and pan-European coverage cannot be provided by any single operator without roaming agreements.

However, it could be argued that by the end of 2003 there were six potential candidates that could reasonably be referred to as national operators, namely AT&T Wireless, Cingular Wireless (owned 60 per cent by SBC and 40 per cent by BellSouth), Nextel Communications, Sprint PCS, Verizon Wireless and T-Mobile. It may be noted that the latter is European-owned and that Verizon Wireless is minority-owned by Vodafone. More significantly, AT&T Wireless was acquired by Cingular Wireless in October 2004 subject to certain divestitures, leaving five candidates of which two, Verizon Wireless and Cingular Wireless, were now much larger than the others. Then, in December, Sprint – now once again an integrated operator – and Nextel agreed a 'merger of equals' which eventually led to the creation of Sprint Nextel in August 2005, at which point there was a 'big three', with T-Mobile trailing well behind.

In addition, Alltel (with roughly 8.5 million subscribers) took over Western Wireless (with roughly 1.5 million subscribers) and Midwest Wireless, and although Alltel remained only half the size of T-Mobile, it had a total network voice and data roaming agreement with Sprint Nextel that gave both parties virtual nationwide coverage. However, both the now

enlarged Alltel – which subsequently divested its fixed-wire operations to become a pure wireless operator and was itself taken over via a bid worth $24.7 billion from TPG Capital and GS Central Partners in November 2007 – and T-Mobile soon found themselves to be at an even further disadvantage when, on 29 December 2006, AT&T – the former SBC which had acquired AT&T and adopted its name – was finally authorised to acquire BellSouth, thereby bringing Cingular Wireless under single ownership (FCC, 2006b). Cingular has been rebranded as AT&T, which should, if nothing else, cause considerable confusion among those unfamiliar with the history of telecommunications in the USA. In addition, AT&T made an agreed bid worth $5.1 billion for Dobson Communications in July 2007 which was completed in November. Not to be outdone, Verizon Wireless promptly made a provisional agreed bid of $2.67 billion for Rural Cellular (with 716 000 subscribers) (Taylor and Pimlott, 2007). However, despite this substantial restructuring, the FCC remains confident that the mobile market remains effectively competitive and that none of the remaining competitors has a dominant share of the market.[2,3] In an attempt to bulk up, T-Mobile itself agreed to buy SunCom Wireless in September 2007, thereby strengthening its position in the south-east as well as entering Puerto Rico and the US Virgin Islands. This left only US Cellular (6 122 000 subscribers), MetroPCS (3 963 000 subscribers) and Leap Wireless (2 864 000 subscribers) as independent operators with more than one million subscribers at the end of 2007.

7.3 REVIEW OF THE MOBILE MARKET

Although there were 160 million mobile subscribers in the USA at the end of 2003, this was only equivalent to a 54 per cent penetration rate at a time when a typical European figure was over 80 per cent. However, this had risen to 62 per cent (185 million) by the end of 2004 – the number of mobile subscriptions first exceeded the number of fixed-wire connections in July 2005 – and to 71 per cent (213 million) by the end of 2005. When the FCC first permitted customers to switch their home phone number to a mobile handset in November 2003, it was assumed that there would be a positive flood of transfers. However, this did not happen, evidently because landlines are still needed for Internet connectivity; landline subscriptions are often so cheap that there is no real incentive to terminate them; mobile coverage is patchy in many areas; and there are no telephone directories containing mobile numbers. By the end of 2007 penetration had risen to a more respectable 80 per cent (equivalent to 242 million subscribers), but by that time European penetration levels were often above 100 per cent

(FCC, 2008). It should be borne in mind, however, that figures provided by the US Cellular Telephone Industry Association differ considerably from those published by the FCC, in good part because data are hard to come by from the hundreds of local operators.

Although, as noted above, handset owners sometimes leave their handsets switched off, termination charges have become so low that this is becoming increasingly unusual. When switched on, handsets are used very heavily, with the typical user averaging in the region of 600 minutes of use a month during the second half of 2004, well over twice the European norm of 140, even after allowing for double-counting (of both caller and receiver) of mobile-to-mobile calls in the USA. This figure is rising steadily – growth is being driven by family plans in the contract market although even these lag behind the growth of pre-paid – but even so a significant proportion of the 'free' minutes available on monthly plans typically go unused. Because handset subsidies are pervasive, one-third of all subscribers obtain their handset free of charge and a remarkable 85 per cent pay less than $100. There is less immediate pressure than in Europe to switch spectrum over to more sophisticated uses. For example, the FCC stated in August 2002 that it intended to provide for the closure of analogue networks after a minimum five-year transition period, eventually fixing on end-February 2008, with Alltel being the first to commit to closure at that time.

The big five operators at the end of 2004 accounted for just under 80 per cent of subscribers, and a further 10 per cent was accounted for by eight regional operators; Alltel, Centennial, Dobson Communications, Leap Wireless (currently fighting off an unsolicited offer from MetroPCS), Qwest (which signed a Mobile Virtual Network Operator (MVNO) agreement to use the Sprint PCS network in August 2003 and sold its licences and networks to Verizon Wireless in March 2005), Rural Cellular, US Cellular and Western Wireless (which received regulatory approval to be acquired by Alltel in July 2005 subject to certain divestments). In addition, as noted, there are large numbers of operators that serve part of a state. Smaller operators tend to survive on the basis of roaming revenues accrued from their bigger brethren, but a substantial number are affiliates of the national carriers and resell the latter's more sophisticated data services under the national brand name. iPCS, the largest affiliate of Sprint, filed for Chapter 11 bankruptcy in February 2003, claiming that the roaming rate was insufficient for survival. Leap Wireless and Horizon PCS, another Sprint affiliate, also filed for Chapter 11 during 2003. Restored to some semblance of health, iPCS acquired Horizon PCS in July 2005. Other Sprint affiliates include(d) UbiquiTel, US Unwired (bought in August 2005), Shenandoah Telecommunications, Swiftel International and Alamosa Holdings (which acquired AirGate in February 2005 and was itself

acquired by Sprint Nextel in February 2006 for $3.4 billion. The Sprint Nextel merger raised a question mark over their future, and Sprint and Nextel have effectively been forced to attempt to acquire their affiliates. Accordingly, in addition to US Unwired and Alamosa Holdings, Sprint Nextel also acquired Gulf Coast Wireless and IWO Holdings (not long emerged from Chapter 11) in October 2005 for $211 million and $192 million respectively. It subsequently bought Enterprise Communications in January 2006 for $77 million and 94 per cent of non-affiliate Velocita Wireless Holding in February for $157 million, acquiring the rest in May. In April, it paid $1.3 billion for Ubiquitel and bought Northern PCS in September 2007 for $312 million. Only three affiliates now remain. In addition, it was agreed in December 2005 that Sprint Nextel would purchase during 2006 for $6.5 billion the 68 per cent of the shares of Nextel Partners that it did not already own, and this received unconditional regulatory approval from the FCC in June 2006.

7.4 SPECTRUM MANAGEMENT

Responsibility for spectrum management in the USA is divided between the National Telecommunication and Information Administration (NTIA) for federal government users and the FCC for everyone else. These two bodies have divided the usable radio spectrum (3 kHz to 300 GHz) into roughly 800 frequency bands, and have allocated the bands to 34 radio services including mobile and satellite. Of this spectrum, 1.4 per cent is exclusively the preserve of the federal government, 4.8 per cent is exclusive to the private sector and the rest is shared. Limiting the spectrum range to that below 3.1 GHz alters these figures to 14.1 per cent, 31.7 per cent and 54.2 per cent respectively. It is of no small importance, as discussed below, that the federal government has invested over $250 billion in the latter spectrum range, and in particular that it has invested much the greater part of this in the spectrum lying between 1750 MHz and 2300 MHz which encompasses that most commonly chosen for 3G elsewhere in the world.

The most obvious difference between the USA and Europe is the plethora of different technologies either in use or under development, including AMPS, iDEN, TDMA, cdmaOne, cdma2000 1×RTT and 1× EV-DO, GSM, GPRS, EDGE, W-CDMA and HSPA. There is some residual analogue provision which is being terminated in early 2008 and TDMA is also being phased out so the main operators fall into two camps, namely GSM (AT&T/T-Mobile) and cdmaOne (Sprint Nextel/Verizon Wireless). The various technologies use a variety of spectrum bands, but primarily the 850 MHz and 1900 MHz bands.

In the 850 MHz band (specifically, 824–849 and 869–894 MHz, which is in some cases referred to as the 800 MHz band), each operator (A or B) is allocated a total of 25 MHz (12.5 MHz paired) although this involves more than two blocks. The 850–868 MHz band is reserved for public safety systems, specialised mobile radio (SMR) and air-to-ground systems as well as for the likes of iDEN technology.

The PCS band spans 140 MHz of spectrum mainly divided into blocks A to F consisting either of 5 MHz paired or 15 MHz paired. Blocks A and B are assigned on the basis of 51 major trading areas (MTAs) – of which 47 cover the 50 states and the District of Columbia plus Guam and the Northern Mariana Isles, Puerto Rico, the US Virgin Isles, and American Samoa. It is also possible that one operator can possess licenses for more than one block within a specified geographical area. The 1910–1930 MHz band is reserved for unlicensed PCS (UPCS) but the FCC is considering the introduction of a G-block comprising 5 MHz paired.

In 1996, a law was passed in the USA with the laudable intention of encouraging a shift from analogue to digital TV. Unfortunately, as it transpired, it specified that the 137 TV stations occupying UHF channels 60–69 were not obliged to return their analogue frequencies until the later date of either the end of 2006 or when 85 per cent of their customers had switched over to digital, while collecting, for free, a great deal of new, highly valuable, spectrum. This effectively meant that most of the relevant spectrum would remain in the hands of a group of technologically backward companies which would have little incentive to hand it back even though it would earn them very little by way of direct revenues or profits. This was because so long as its analogue signal was broadcast, a broadcaster was entitled to a free channel on the local cable network as a consequence of FCC rules that required cable subscribers to be able to access all local channels.

As a consequence, a band of spectrum that could have been used for 3G in the USA – the 700 MHz band – was occupied by broadcasters, while 1710–1860 MHz was heavily occupied by the military, 2110–2150 MHz was used by schools and health care centres, and 2500–2690 MHz was reserved for the multipoint distribution service (MDS) and the instructional television fixed service (ITFS). This meant that when the FCC came to auction spectrum specifically designated for 3G services, it would be obliged to offer it 'encumbered' in most areas. The winners – assuming anyone wanted it in the first place – would then have to persuade (that is, bribe) the owners to release it, but if they proved unwilling to do so because, for example, in the case of broadcasters this would cause them to lose their cable channel and hence, in effect, go out of business, the spectrum would remain useless for 3G for years to come.

7.5 THE 'C' AND 'F' LICENCE AUCTION

It is evident that, within reason, spectrum already in use for 2G and/or 2.5G can also be used for 3G, especially if it consists of cdma2000 technology. Hence, the acquisition of additional spectrum in the 1900 MHz band would be important for an operator wishing to avoid the complications of opening up new spectrum bands.

In December 2000 there was an auction (Auction 35) for regionally based spectrum in the 1900 MHz PCS band. Four hundred and twenty two 'C' and 'F' block licences were on offer – with 90 confiscated mainly from NextWave Personal Communications, as well as NextWave Power Partner and Urban Comm North Carolina, for non-payment in an earlier auction (subject to a legal appeal). One hundred and seventy licences were reserved for entrepreneurial companies such as Salmon PCS and Alaska Native Wireless. This auction allowed five of the then six major operators – AT&T Wireless, Cingular Wireless, Sprint PCS, Verizon Wireless and VoiceStream Wireless (at the time under offer from Deutsche Telekom) to fill in gaps in their networks, and, in conjunction with spectrum swaps, to provide (near) national coverage. In the event, Verizon Wireless won 67 licences for $8.5 billion, AT&T Wireless/Alaska Native Wireless won 28 licences for $2.7 billion, Cingular Wireless/Salmon PCS won 30 licences for $2.2 billion and VoiceStream Wireless in conjunction with Cook Inlet Region won 19 licences for $777 million.

However, after a series of setbacks in the courts, NextWave finally obtained a positive judgement from the Court of Appeals for the District of Columbia in June 2001 which ruled that the FCC had violated the provision of the bankruptcy code prohibiting government bodies from revoking licences solely because a licensee had failed to pay debts dischargeable in bankruptcy. The FCC launched an appeal in the Supreme Court on the understanding that if this failed it would be obliged to return the licences to NextWave or pay NextWave compensation out of the auction proceeds. Alternatively, the appeal launched by three operators – including Verizon Wireless, which had acquired 67 ex-NextWave licences and hence had a great deal to lose – on the grounds that NextWave had not been properly qualified to bid for licences in 1998, and was not properly qualified to reacquire them, had some hopes of success, albeit not very high. However, NextWave secured $5.5 billion of financing, sufficient to pay all of its creditors in full, and petitioned to be released from bankruptcy proceedings. This led the thwarted licensees to table a proposal whereby they would pay $10.1 billion to the FCC and $5.75 billion to NextWave to resolve the issue.

The FCC eventually opened an appeal case before the Supreme Court in October 2002, which ruled in January 2003 that NextWave was entitled to

hang on to its licences. It was subsequently rumoured that NextWave's bankruptcy reorganisation plan would include the sale of a significant number of its licences, primarily to Cingular Wireless. In early August 2003, NextWave accepted a $1.4 billion cash offer from Cingular for licences in 34 markets. The deal was eventually approved by the FCC in February 2004. Verizon Wireless appeared to have lost interest, having in the meantime acquired 50 licences from Northcoast Communications for $750 million. Eventually, in April 2004, the FCC came to a final settlement with NextWave. In effect, NextWave would end up paying $1.6 billion in cash for the licences that it originally offered to buy for $2.4 billion. Of these licences, 10 per cent would be retained by NextWave subject to making a payment to the government should it sell or lease any of them prior to 14 February 2007, 18 per cent would be sold to Cingular Wireless and 72 per cent in 60 markets would be returned to the FCC for resale – the provisional date was January 2005. In June, NextWave petitioned the bankruptcy court to dispose of PCS licences of 10 MHz in six markets. In July it sold 10 MHz in New York to Verizon Wireless for $930 million and 20 MHz in Florida to MetroPCS for $44 million, handing over $400 million to the FCC. However, the real surprise came in November when Verizon Wireless made an agreed takeover bid for the whole of NextWave Telecom as it would emerge from bankruptcy – that is, with its only assets in the form of 10 MHz and 20 MHz licences in 23 markets. The agreed price was in the region of $3 billion, and with the deal requiring the approval of the Bankruptcy Court, the FCC (granted in March) and the antitrust authorities, it was not completed until mid-April 2005.

7.6 SPECTRUM CAPS

Despite its potential use for cdma2000, the 'C' and 'F' licence spectrum was generally regarded as inferior to spectrum in the 700 MHz band – where licences with potentially nationwide coverage would at some point be on offer with no caps on the amount of spectrum that could be obtained by any one operator – since there was at the time a 45 MHz cap (including cellular, PCS and SMR) in a major city market and a 55 MHz cap in a rural market. When the auction of the 700 MHz spectrum eventually transpired, it was expected to provide two licences in each of six regions – one set providing 10 MHz paired, thought to be sufficient for W-CDMA, and the other 20 MHz paired. Nevertheless, divided up among the major operators, the amount of spectrum available in the 1900 MHz band and such part of the 700 MHz band as could be cleared for 3G provision was unlikely to prove anywhere near adequate for a full range of competing 3G networks.

The FCC accordingly began a review of the spectrum caps knowing that, if these were lifted, there was a distinct possibility that there would be consolidation among the six main competitors in the mobile market. The FCC duly announced in November 2001 that the spectrum cap in urban markets would be lifted to 55 MHz as of February 2002 and that all spectrum caps would be eliminated on 1 January 2003.

7.7 MEANWHILE, BACK IN WASHINGTON

In a further blow to 3G prospects the FCC published its 'Final report. Spectrum study of the 2500–2690 MHz band: the potential for accommodating third generation mobile systems' at the end of March 2001. This concluded that the 2500–2690 MHz band was not used consistently throughout the USA but was heavily used in metropolitan areas and hence could not easily be cleared for 3G use. This was followed immediately by 'Final report. The potential for accommodating third generation mobile systems in the 1710–1850 MHz bands: federal operations, relocation costs, and operational impacts' from the NTIA which concluded that it would be equally difficult to shift defence operations occupying 1710–1860 MHz to other frequencies. This was something of a self-fulfilling prophecy since the US Army and Navy promptly refused to vacate the spectrum under any circumstances, while the Air Force demanded compensation of $3.2 billion. Interestingly, the likes of AT&T Wireless and Sprint PCS remained fairly unperturbed, arguing that they could anyway manage to cover most of the population using existing spectrum.

There were signs that the various agencies were finally realising the need to use 'financial persuasion' to resolve the deadlock over occupied spectrum. In February 2002, for example, the Bush administration announced the intended creation in the 2003 Budget of a $715 million fund to reimburse federal agencies willing to vacate airwaves due to be auctioned for 3G. Payments would be made between 2004 and 2009. It was also proposed for a second time – Congress exercised a veto first time around – that the FCC be permitted to delay the depositing of the proceeds of auctioning channels 60–67 in June 2002 until the end of September 2004 and of channels 52–59, due to take place in September, until the end of September 2006.

It came as something of a surprise when, in July 2002, an inter-agency working group including the FCC and NTIA was able to announce that it had been able to persuade the Department of Defense to vacate 45 MHz of spectrum in the 1710–1755 MHz band paired with 45 MHz in the 2110–2155 MHz band in return for spectrum elsewhere. The Commercial Spectrum Enhancement Act (CSEA), which gave effect to the reallocation

of spectrum and which was now supported by the Administration and Department of Defense, was expected to find its way on to the statute books later in 2003. In November, the FCC released a 'Report and Order' that finalised the service rules for the so-called advanced wireless services (AWS) bands.

Despite the fact that no real progress had been made in clearing the spectrum, the FCC felt obliged under the terms of the 2002 Auction Reform Act to proceed in late August 2002 with the auction (Auction 44) of 740 rural licences covering the 18 MHz of spectrum within channels 52–59 referred to above. Predictably, this was something of a failure with the major operators refusing to participate – partly because the spectrum on offer was not adjacent to that on which they were operating at the time – and low bids being placed by the likes of Aloha Partners, DataCom Wireless, MilkyWay Broadband and Vulcan Spectrum. In the event, 484 licences were sold for $88.7 million, with Aloha picking up 77 licences for $43.3 million and Vulcan winning 24 licences for $15.1 million. Left-over spectrum was disposed of in subsequent Auctions 49 and 60.

At the end of August, the FCC announced the setting up of the Spectrum Policy Task Force. Its report in November recommended that Congress should consider giving the FCC the authority to conduct spectrum exchanges and permit licensees to put up for sale any spectrum adjoining that being auctioned. It also recommended that spectrum suitable for satellite services should be auctioned rather than allocated by the FCC as at present. Further, the report supported the creation of a fund that would use the proceeds from spectrum auctions to compensate federal agencies for vacating the airwaves needed for 3G – an idea translated into a legislative proposal in the House of Representatives in March 2003.

Further and more concrete progress was forthcoming at the end of January 2003. Most importantly, the FCC reallocated 30 MHz of spectrum from mobile satellite services (MSS) to fixed and mobile wireless services, arguing that 40 MHz was now sufficient given the pattern of transmission that was evolving (FCC, 2003). This meant that 1990–2000, 2020–2025 and 2165–2180 MHz would be reallocated, leaving MSS with 2000–2020 and 2180–2200 MHz. It may be noted that of the 30 MHz reassigned, 14 MHz had never been allocated and the rest had been forfeited by licensees not meeting the terms of their licences, so the amount of disruption was minimal.[4] The FCC also sought further comments on the use of the 1910–1920 MHz band, available for unlicensed PCS asynchronous (generally data) applications but not in use. Half or all of this band could potentially be paired with half or all of the 1990–2000 MHz band for AWS – effectively terrestrial 3G services – or used as a depository for licensees cleared from other spectrum. The FCC further sought advice as to the potential best uses

Table 7.1 IMT band licensing in the USA, December 2003

Block	MHz	Paired	Area covered
A	20	1710–1720 + 2110–2120	Economic area (EA)
B	20	1720–1730 + 2120–2130	Regional economic area grouping (REAG)
C	10	1730–1735 + 2130–2135	Regional economic area grouping (REAG)
D	10	1735–1740 + 2135–2140	Cellular market area (CMA)
E	30	1740–1755 + 2140–2155	Regional economic area grouping (REAG)

Source: Adapted by the authors from FCC documents.

for the 2155–2160/62 MHz band, occupied at the time by the MDS (subsequently renamed the broadband radio service (BRS)). This, together with the contiguous 2160–2165 MHz band, would potentially provide 10 MHz for AWS in addition to the 2110–2155 MHz band. However, the FCC denied a petition to reallocate the entire 2 GHz MSS band for terrestrial 3G.

At the end of 2003 the position was clarified in respect of spectrum within the main IMT-2000 bands (see Table 7.1) which, as previously discussed, was to be cleared of previous users. There would be a mixture of licence sizes and geographical coverage to accommodate different operators with licences running for 15 years subject to a 10-year renewal period. Licensees would have to show that they had provided 'substantial service' by the end of the initial licence term (with no interim obligations). Licensees would be able to aggregate spectrum as well as partition and disaggregate their licences. However, the whether, when and how the spectrum would be encumbered remained for now a matter of uncertainty.

The geographic typology in Table 7.1 merits comment. The standard cellular licensing system uses geographic areas designated as metropolitan statistical areas (MSAs) and rural services areas (RSAs) but with the retention of some of the historical regulations for individual site licensing. For their part, PCS licenses are arranged in major trading areas (MTAs) and basic trading areas (BTAs). However, AWS band licensing involves, as shown in Table 7.1, economic areas (EAs), regional economic area groups (REAGs), and MSAs/RSAs in respect of smaller areas.

7.8 RECENT DEVELOPMENTS

Corporate

After a lengthy period during which the need to restructure the market was a constant topic of discussion, there were two potentially significant moves in early 2004. First, in February, Cingular Wireless made an agreed takeover bid for AT&T Wireless, in the process out-bidding the Vodafone Group which had negotiated its potential release from Verizon Wireless. Not only did this leave Vodafone as a minority investor in a CDMA operation and without any obvious means to create an American network of its own capable of carrying GSM/GPRS/W-CDMA, but also its roaming from its GSM networks elsewhere in the world relied upon the T-Mobile network in the USA which Deutsche Telekom was in no mood to sell. Subsequently, and partly as a reaction, Sprint decided to recombine Sprint FON with Sprint PCS in April. This left Nextel as the only independently quoted wireless operator in the USA, but also one that was arguably unlikely to become involved in M&A activity because of its incompatible technology.

By mid-June attention was focused upon a band of spectrum – 2500–2690 MHz – which, as noted previously, had been reserved for the BRS and the ITFS (renamed the educational broadband service (EBS)). It was widely accepted that this spectrum was underused and that it could, in part, be reassigned for mobile Internet services. The core issue was whether schools should be allowed to sell their allocations within the 120 MHz bequeathed to educational institutions for instructional video services. The business community was anyway permitted to lease 95 per cent of this spectrum, but schools were in general opposed to any spectrum sales although there were few objections to reconfiguration of the band to enable more efficient usage by splitting it into part for educational use and part for mobile Internet use.

Nextel, however, had other ideas. It owned spectrum in the 800 MHz band that was causing interference to public safety radio which shared the band. Nextel accordingly offered to almost double the amount of spectrum – from 2.5 MHz to 4.5 MHz – that it was willing to give up in the band, together with the 762–764 MHz and 792–794 MHz bands, in return for the only remaining nationwide spectrum in the 1900 MHz band. Other operators and certain members of the FCC much preferred to exchange the spectrum for less valuable spectrum in the 2.1 GHz band. In late June 2004, the FCC Chairman recommended that Nextel be granted the spectrum as requested, but Verizon Wireless immediately threatened litigation on the grounds that the FCC was not entitled to allocate spectrum by private treaty

rather than auctioning it off in the usual manner. In July, the FCC unanimously agreed to award Nextel the 10 MHz of requested spectrum (the Consensus Plan) in return for the spectrum in the 700 MHz and 800 MHz bands, meeting the cost of reorganising the 800 MHz band over a three-year period and ensuring the public safety equipment worked properly after the spectrum swap. If the total costs incurred by Nextel amounted to less than the $4.8 billion valuation placed upon the 1900 MHz band spectrum, Nextel would be obliged to make up the difference to the US Treasury – less an additional $452 million that was added to the value of the surrendered spectrum in December 2004. This matter partially resolved the destination of spectrum in the 1900 MHz band with further progress dependent upon the auction of the 155 licences returned by NextWave, as noted above. Nextel formally accepted the Consensus Plan in February 2005.[5]

Altogether, 242 licences were scheduled to be sold on 26 January 2005 via Auction 58, providing a grand total of 2400 MHz of spectrum (FCC, 2004a).[6] One hundred and nineteen of these were reserved for designated entities (DEs) that had to show gross revenues of less than $125 million in each of the previous two years and total assets not exceeding $500 million. Although 49 applications were made, only 35 operators qualified to bid, depositing $325 million in down payments. At the end of day 1 of the auction, bids worth $974 million had been made for 177 licences. The auction lasted for 91 bidding rounds and raised $2.25 billion or $2.04 billion net of bidding credits. Two hundred and seventeen licences were acquired by 24 bidders, with Verizon Wireless bidding $365 million for 26 licences and affiliate Vista PCS bidding $332 million for 37 licences. The results were widely regarded as disappointing, representing as they did less than $1 per megahertz per inhabitant, but reflected in part the expectations of further auctions in 2006 (see below), consolidation among operators and the introduction of cdma2000 1×EV-DO using existing spectrum.

Just what role the major operators would play in the auction was not only clouded by the takeover of AT&T Wireless but by the announcement in December 2004 that Sprint and Nextel had agreed to merge. Given their roughly equivalent sizes, a 'merger of equals' was technically required (and also had tax advantages) although one party would, inevitably, have to conduct a takeover bid in practice. This logically had to be Sprint as Nextel faced huge bills to upgrade its network to 3G standards and there would accordingly be much to gain from an upgrade to cdma2000 1×EV-DO alongside Sprint which, only days earlier, had announced that it intended to spend $3 billion over the next three years to achieve a network wholly based upon the range of cdma2000 technologies. For this reason, Nextel shareholders were offered 1.3 Sprint shares plus a small cash payment (not exceeding $2.8 billion overall) to ensure that Sprint

shareholders would hold a roughly 51 per cent majority of the combined entity's stock, trading as Sprint Nextel, post-merger. However, the merger would not be completed until well after the January 2005 auction, and would necessarily involve the disposal of overlapping spectrum, so the precise map of spectrum holdings to be expected by the end of 2005 was even harder to forecast. There was also a question mark over the future of Sprint affiliates since they might continue as before, be bought out by Sprint Nextel or be asked to buy additional spectrum owned by Nextel. Nextel itself has a 32 per cent stake in Nextel Partners and regulatory permissions for this to be raised to 100 per cent were finally granted in February 2006.

As noted above, the takeover of BellSouth by AT&T was authorised by the FCC at the very end of 2006. Among the many conditions imposed upon AT&T was one relating to wireless. This stipulated that the merged entity would be obliged to assign and/or transfer to an unaffiliated third party all of the 2.5 GHz BRS/EBS spectrum currently licensed to or leased by BellSouth within one year of the closing date. It also specified that the merged entity had agreed, prior to 21 July 2010, to offer services in the 2.3 GHz band to 25 per cent of the population in the service area of the merged entity's wireless communications services (WCS) licences (except Alaska), for mobile or fixed point-to-point services, or to construct at least five permanent links per one million people in the service area of the merged entity's licences, for fixed point-to-point services.

Regulatory

In announcements towards the end of 2004 (FCC, 2004b; Financial Times, 2004) the FCC clarified some of the issues discussed above. In the first place, it rejected further discussion of the reallocation of the 90 MHz of spectrum listed in Table 7.1 and of the spectrum reallocated from MSS use in the 1990–2000 MHz, 2020–2025 MHz and 2165–2180 MHz bands. It also clarified the rules governing the relocation of Fixed Service (FS) licences in the 2110–2150 MHz and 2180–2200 MHz bands. Secondly, it allocated and paired 5 MHz blocks of spectrum at 1915–1920 MHz with 1995–2000 MHz and 2020–2025 MHz with 2175–2180 MHz for AWS use (to be known henceforth as AWS-2 to distinguish it from the spectrum specified in Table 7.2, which is referred to as AWS-1).

With the CSEA – covering the 216–220 MHz, 1432–1435 MHz, 1710–1755 MHz and 2385–2390 MHz bands – making provision for the Spectrum Relocation Fund finally signed into law by President Bush on 23 December 2004, there were now definite plans to auction the 1710–1755 MHz and 2110–2155 MHz bands during the second half of 2006.

There were also some signs that the FCC was keen to break the deadlock over spectrum in the 700 MHz band. In June 2005, the FCC issued a waiver to Aloha Partners allowing it to launch a pilot high-speed data network in Tucson even though incumbent broadcasters had yet to vacate the spectrum. It also set the date of 20 July 2005 for the commencement of Auction 60 covering the 'lower 700 MHz band C block' (710–716 + 740–746 MHz) for which there were five qualified bidders.[7] Subsequently, the DTV Act of 2005 established a number of changes to the transition to digital TV and the reclamation of the 700 MHz spectrum. The transition was now to be completed by 17 February 2009 while the remaining spectrum was to be auctioned no later than 28 February 2008 and the proceeds were to be deposited in the Digital Television Transition and Public Safety Fund no later than 30 June 2008.

Given the ease with which the European Commission had dealt with most of the 2G/3G licensing issues, the complexity of the situation in the USA was mind-numbing. Furthermore, despite the above progress, matters remained far from concluded. For example, in yet another update of ET Docket No. 00-258, by now over ten years in the pipeline, the FCC in September 2005 continued its 'ongoing efforts to promote spectrum utilization and efficiency with regard to the provision of new services, including AWS'. The core purposes of this document were: to reallocate the 2155–2160 MHz band for fixed and mobile service; to designate the 2155–2175 MHz band for AWS use; to seek comment on the specific relocation procedures applicable to BRS operations in the 2150–2160/62 MHz band which the FCC had decided to relocate to the newly restructured 2495–2690 MHz band; and to seek comment on the specific relocation procedures applicable to Fixed Microwave Service operations in the 2160–2175 MHz band.

Auction 66

At the end of January 2006, the FCC published a document inviting comments on procedures for auctioning off the 1122 AWS-1 licences (734 CMA, 352 EA and 36 REAG) which was scheduled to take place on 29 June (FCC, 2006a). It may be noted that there were changes relative to Table 7.2 especially in terms of the areas covered and the spectrum bands. The revenue accruing from the sale of the licences in the 1710–1755 MHz band would have to exceed 110 per cent of the relocation costs of those using the spectrum if the auction was to be valid.[8] One innovation for auctions beyond May 2006 was that the discounts available to smaller operators would no longer be awarded if major incumbents used them to make bids on their behalf as was previously the custom.[9]

Table 7.2 AWS-1 licensing in the USA

Block	MHz	Paired	Area covered	No.
A	20	1710–1720 + 2110–2120	Cellular market area	734
B	20	1720–1730 + 2120–2130	Economic area	176
C	10	1730–1735 + 2130–2135	Economic area	176
D	10	1735–1740 + 2135–2140	Regional economic area grouping	12
E	10	1740–1745 + 2140–2145	Regional economic area grouping	12
F	20	1745–1755 + 2145–2155	Regional economic area grouping	12

Source: Adapted by the authors from FCC documents.

T-Mobile was short of spectrum and hence was expected to bid aggressively while the other three major incumbents were under far less pressure. Hence, there was the clear prospect of non-traditional bidders such as Google entering the fray. It was decided to postpone the auction until 9 August to leave time to clarify various issues and, by the end of July, 168 companies had qualified to bid. The biggest up-front payment – nearly $1 billion – was made by a consortium (Wireless DBS) including satellite operators EchoStar and DirecTV. A consortium of cable operators (SpectrumCo) was also a major depositor. As there was so much interest, the FCC decided that it was unnecessary to conduct a 'blind' auction whereby bids were placed anonymously to prevent collusion.

The auction commenced on 9 August. The auction concluded on 18 September after 161 rounds on 28 bidding days with 104 bidders winning 1087 licences. The gross total raised was $13.879 billion. Five operators were particularly active from a financial perspective although they did not necessarily acquire a large number of licences. These were T-Mobile (120 licences: $4.182 billion gross), CellCo Partnership (13 licences: $2.809 billion), SpectrumCo (137 licences: $2.338 billion, shared between Comcast ($1.290 billion), Time Warner Cable ($632 million), Cox ($248 million) and Sprint Nextel ($117 million) with Sprint Nextel selling out in August 2007), MetroPCS (8 licences: $1.391 billion) and Cingular (48 licences: $1.335 billion). In contrast, AWS Wireless bought 154 licences but paid only $115 million. All bar one of the licensees were approved by the FCC in May 2007.

Corporate Post-Auction 66

Auction 66 had the most material effect upon T-Mobile USA. Having spent over $4 billion, acquired 120 new licences and doubled its spectrum in the top 100 markets, it was now in a position to roll out a W-CDMA/HSDPA

service. In October, it accordingly announced that it would be investing a further $2.7 billion over a three-year period with a view to the provision of services that subscribers were already using – and hence excluding mobile TV.[10] However, sceptics have pointed out that there are no 3G devices for the 1700 MHz band; that the W-CDMA 2.1 GHz band is configured somewhat differently in Europe so European 3G devices may not work properly in the USA; and that the network will be expensive to build since it will require many more base stations than one based on the 850 MHz band (TelecomWeb, 2006b). For its part, Comcast revealed that it had provided more than half of the finance for the SpectrumCo bids.

One interesting consequence of the auction was that the licences obtained by MetroPCS and Leap Wireless were located such that the big three now faced one or other of these low-cost operators in every major market. During the year to end-June 2007, MetroPCS subscriber numbers grew by 1.1 million (46.8 per cent) and those of Leap Wireless by 0.8 million (45.7 per cent), totally eclipsing the growth at the big four although T-Mobile predictably performed better than the others, with growth at 30.5 per cent. In September 2007, MetroPCS made an unsolicited takeover bid for Leap Wireless, which partly reflected these metrics (Taylor and Politi, 2007) but it was rejected as too low and was withdrawn in early November.

Auction 69

At the end of August the FCC announced that Auction 69 would take place on 7 February 2007. This would involve two 3-megahertz blocks, each consisting of 1.5 MHz paired in the 1392–1395 MHz and 1432–1435 MHz bands offered in each of six regional economic area groupings, together with one 2-megahertz block in the 1390–1392 band offered in each of 52 metro-based major economic areas. Given that some of this spectrum was already occupied, the need to negotiate relocations/sharing with the NTIA might be necessary. The spectrum was said to be suitable for any combination of fixed and mobile applications including local loop Internet access, high-speed data transmission or advanced two-way mobile services. The winners were CCTV Wireless and Port LLC, which paid a net total of $123.6 million (TelecomWeb, 2006a; FCC, 2007a and 2007b).

Latest Developments in the 700 MHz Band: Auctions 73 and 76

At this juncture, given the complexity of the above, it is advisable to renew our acquaintance with the 700 MHz band – technically 698–806 MHz although the public safety spectrum beyond 794 MHz (channels 68 and 69) need not concern us here. In Table 7.3 the first row denotes the spectrum

Table 7.3 Lower 700 MHz

698–704	704–710	710–716	716–722	722–728	728–734	734–740	740–746
A	B	C	D	E	A	B	C
52	53	54	55	56	57	58	59

Source: Adapted by the authors from FCC documents.

Table 7.4 Upper 700 MHz

746–752	752–758	758–764	764–770	770–776	776–782	782–788	788–794
60	61	62	63	64	65	66	67

Source: Adapted by the authors from FCC documents.

band in MHz, the second row denotes the block number and the third row denotes the channel number. There is no middle row in Table 7.4; see the explanatory text on the blocks below.

Altogether, there are four blocks plus an allocation for public safety as follows:

- Block A: 746–747 MHz and 776–777 MHz. Guard bands sold largely to Pegasus and Access Spectrum in 2000/01.
- Block B: 762–764 MHz and 792–794 MHz. Guard bands sold to Nextel in 2000/01. These were returned to the FCC as part of the 2004 public safety spectrum swap as noted above.
- Block C: 747–752 MHz and 777–782 MHz.
- Block D: 752–762 MHz and 782–792 MHz.
- Public Safety Band: 774–776 MHz.

As can be seen, there is a rough equivalency between blocks and channels other than in respect of the guard bands. Blocks C and D were to be auctioned.

Somewhat confusingly, perhaps, Auction 73, which covers both bands, is not structured using the block letters as in the tables – which would anyway be duplicated – but rather is structured according to Table 7.5 (FCC, 2007c: 7).

According to the FCC, the A, B, D and E licences would use the standard simultaneous multiple-round format, while licence C would use hierarchical package bidding. Should any licence fail to reach its reserve price

Table 7.5 Auction 73

Block	Spectrum MHz	Bandwidth MHz	Pairing MHz	Geographic area type	Number of licences
A	698–704 + 728–734	12	2 × 6	EA	176
B	704–710 + 734–740	12	2 × 6	CMA	734
E	722–728	6	Unpaired	EA	176
C	746–757 + 776–787	22	2 × 11	REAG	12[1]
D	758–763 + 788–793	10	2 × 5	National	1[2]

Notes:
1. Open access.
2. Subject to conditions respecting public/private partnership licence.

Source: Adapted by the authors from FCC documents.

then it would be assigned to a subsequent auction, designated Auction 76. The auction rules would include provisions for:

- anonymous bidding;
- package bidding, to enable bidders trying to combine multiple C block licences to place bids on packages of those licences;
- block-specific aggregate reserve prices, to help ensure that the public recovers a portion of the value of the spectrum resource;
- prompt subsequent bidding in Auction 76.

With the end-January 2008 deadline looming of sorts, the inevitable jockeying for position began in earnest in May 2007 when the National Cable & Telecommunications Association (NCTA) called on the FCC to reject proposals that would exclude cable operators and local exchange carriers from participating in the auction. The NCTA had been stirred to action by the suggestion – purporting to originate from the FCC Chairman – that bidders should be encouraged to propose a national broadband service using the spectrum on offer. The NCTA was also at pains to dismiss the claim that cable operators would warehouse spectrum, although it was pointed out that SpectrumCo had yet to indicate what it intended to do with spectrum won in Auction 66 (Lightreading, 2007).

In July, the FCC Chairman circulated proposals that reflected the desire expressed by Google and others not to be shut out from the auction. In effect, the proposal stated that among the 62 MHz on offer, two 11 MHz chunks of spectrum – in six separate pieces which could potentially be combined to form a national licence – would have 'open access' conditions

attached to them. These conditions would prevent the winners from restricting the type of handsets or software used on the resultant network. A further 10 MHz would be reserved for a public/private partnership set up to provide the emergency services with a broadband link. A strict roll-out within ten years condition would be enforced. However, an obligation to force the winner to provide wholesale services was not included (Boles, 2007a). The residual 30 MHz was broken up into several hundred pieces designed to appeal to rural or smaller operators.

Subsequently, Google stated that it was prepared to bid at least $4.64 billion – the reserve price for Block C – but only if the auction rules forced the winners of the open access spectrum to sell wholesale access on non-discriminatory commercial terms. However, the FCC was not willing to go along with this and contented itself with applying the open access conditions (Waters and Kirchgaessner, 2007). Nevertheless, incumbents were unhappy, claiming that these conditions would force them to build out a separate network that could not be integrated with existing networks.

In August, the FCC, having noted the fears expressed by public safety experts that if large bidders were forced to choose between the 11 MHz blocks and the 10 MHz block they would choose the former, declined to prohibit any cellular operator from bidding for both 11 MHz blocks (Boles, 2007b). In September, Verizon Wireless filed a court case in the District of Columbia opposing the open access condition but withdrew it in late October when the case was refused a speedy hearing. However, the CTIA immediately filed a similar suit.

Also in October, AT&T made an agreed offer worth $2.5 billion for the 12 MHz of licences acquired by Aloha Partners which had itself taken over the other major holders of 700 MHz spectrum acquired in 2001 and 2003, covering in total 196 million people in 281 markets (Cellular-news, 2007b). The deal was authorised by the FCC in February 2008.

Comcast and Time Warner Cable announced that they would not be bidding, but 266 bidders were happy to file intents to bid (with a surprising number – 170 – failing to complete the forms correctly and being asked to resubmit) (TelecomWeb, 2007). Two hundred and fourteen bidders eventually qualified, but Frontline Wireless, a start-up which had been the favourite to construct the private/public network (Block D), withdrew because it could not raise the minimum $1.33 billion bid set by the FCC (Schatz, 2008). During the first four rounds of bidding, the licence attracted only a single bid of $473 million, but competition was strong for the other licences.

After 16 rounds of bidding, $11.57 billion had been committed, and the following round saw the minimum bid needed to trigger open access for Block C. By round 30, the value of the bids for the regional components of

Block C exceeded the value of the best individual offer for the entire block. The auction concluded on 18 March after 261 rounds, with bids totalling a record $19.6 billion. Verizon Wireless proved to be the biggest winner, acquiring six Block C licences, more licences than any other bidder in Block A, and 77 licences in Block B, at a total cost of $9.63 billion. Echostar, bidding via Frontier Wireless, won almost enough licences in the A and E blocks to provide national coverage at a cost of $711 million. AT&T won numerous small licences at a cost of $6.64 billion, but Google went away empty-handed, later admitting that its only purpose in entering the auction had been to ensure that the open access condition was triggered. Block D remained unsold.

7.9 CONCLUSIONS

Through changes to the regulatory framework and consolidation between operators, the US mobile telecommunications landscape has been transformed. After the initial allocation of licences that fragmented the marketplace, merger and acquisition activity on the one hand and licensing on the other have led to the emergence of a handful of national operators. Any operator could achieve national coverage through acquiring either other operators or additional licences as they became available. Not surprisingly, in practice, operators like AT&T and Verizon Wireless have employed both routes as they have moved beyond their regional origins to become national players.

However, this has not been a straightforward process. While a great many mobile operators have been bought and sold over the years, numerous operators remain, with the larger national operators being complemented by a wide range of smaller operators with limited geographical focus. The above discussion has clearly demonstrated that the consolidation process has been costly, with even small operators being acquired for considerable and arguably excessive amounts. Operators of all sizes have participated in the licensing rounds run by the FCC, with here again some of the sums spent on the licences looking to be excessive. As a consequence, the larger operators have sought to offset these burdens by redeploying their existing capital away from slower-growing or non-core businesses towards those that are faster-growing and central to their strategies. The rebalancing of the business portfolio that this implies can be seen in the internationalisation and de-internationalisation of the Baby Bells which is discussed in the following chapter.

NOTES

1. Licensing took place between 1982 and 1991. The USA was divided into 734 cellular market areas (CMAs) comprising 305 metropolitan statistical areas (MSAs), 428 rural statistical areas (RSAs) and the Gulf of Mexico. Each licensee was awarded 25 MHz in the 800 MHz band.
2. Every year, the Federal Communications Commission publishes a review of the mobile market. The Tenth Report released on 30 September 2005 as WT Docket No. 05-71 (Terminated) can be found at www.fcc.gov. In the executive summary (para. 2), the FCC stated that 97 per cent of the total US population lived in counties with access to three or more different mobile operators compared to 88 per cent in 2000. The Eleventh Report released on 29 September 2006 as WT Docket No. 06-17 (Terminated) revealed that 98 per cent of the population now lived in counties with at least three operators, 93.8 per cent in counties with at least four operators and 50.8 per cent in counties with at least five operators. For the latest published data see FCC (2008).
3. Alltel appeared to be intent upon getting itself taken over by one of its bigger brethren, although none of these showed much enthusiasm (Total Telecom, 2007). Surprisingly, given that (a) the operator was financially in good shape and (b) its share price had risen by one-third between December 2006 and May 2007, it was a Goldman Sachs/Texas Pacific Group consortium that acquired the company for $27.5 billion in cash, thereby outbidding two other private equity groups (Financial Times, 2007).
4. At the end of April, the FCC introduced a new rule obliging successful satellite licence applicants to deposit between $5 million and $7.5 million as a way of ensuring that they meant to use rather than hoard their spectrum and to use it efficiently. The deposit would be forfeited if roll-out milestones were missed. Furthermore, there would be a limit on the number of outstanding applications per prospective licensee.
5. However, the FCC was forced to intercede in May 2007 in the face of unacceptably slow progress in resolving interference problems (Cellular-news, 2007a). It intervened again in September.
6. At the end of October 2004, the FCC rejected an appeal against the reservation of large amounts of spectrum for small enterprises. The full results of the auction are available at www.fcc.gov.
7. See FCC (2005a and b). Three bidders won five licences but paid only $460 000 gross.
8. In February 2006, the US budget forecast contained an estimated $25 billion from the sale of wireless spectrum during financial years 2007, 2008 and 2009 ($9.95 billion, $12.24 billion and $2.87 billion respectively) on top of up to $15 billion before October 2006.
9. Historically, although Verizon Wireless bid on its own behalf, Cingular used Salmon Wireless, AT&T Wireless used Alaska Native, and T-Mobile used Cook Inlet. Currently, a company eligible for discounts which sold or leased more than one half of a licence to another operator would have to make repayments to the FCC and lose its special status.
10. See www.moconews.net/t-mobiles-planned-3g-network-needs-new-handsets of 10 August 2006.

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8. International strategic adjustment: the case of the Baby Bells

8.1 INTRODUCTION

The previous chapter has drawn attention to the changing nature of the US telecommunications industry. Intense competitive pressures have emerged as regulatory and technological developments have encouraged industry consolidation and substantial infrastructure investments. In contrast to the previous chapter, the focus here is on the international activities of the US-based Baby Bells.[1] Whilst it may be tempting to consider the domestic and international strategic adjustments in isolation from one another, they are in fact two sides of the same coin. They are, in other words, interrelated with the regulatory framework under which they laboured initially, encouraging their internationalisation and more recently their de-internationalisation.

By recognising that the domestic and international are linked and adopting a longitudinal approach to the analysis, we are able to make an assessment of Baby Bell internationalisation that is more accurate than previously has been the case. Chan-Olmstead and Jamison (2001), echoing earlier commentators such as Hausman (1993), Kupfer (1991) and Watson (1993), argued that they had developed significant international holdings while Ratner (2001) suggested that the Baby Bells were abandoning their international markets in favour of the United States. Ratner proved to be the more accurate of the two assessments, though the extent to which they de-internationalised was underestimated. With this in mind, the chapter begins by offering a brief overview of the Baby Bells before turning its attention to their internationalisation and subsequent de-internationalisation.

8.2 THE BABY BELLS

In early 1982, the chairman of AT&T announced that it had settled its long-running dispute with the Department of Justice.[2] This settlement, which technically altered AT&T's 1956 Consent Decree with the consequence that it was called the Modified Final Judgement (MFJ), required

Table 8.1 The Baby Bells, January 1984

Baby Bell	Revenues $bn	Profits $mn	Assets $bn	Employees	No. of states
Ameritech	9.0	1100	15.4	79 000	6
Bell Atlantic	9.1	1100	15.4	80 000	7
BellSouth	10.5	1500	19.7	99 100	8
Nynex	10.4	1100	16.2	98 200	6
Pacific Telesis	8.5	970	15.3	82 000	2
Southwestern Bell	8.0	1000	14.8	74 700	5
US West	7.8	950	14.4	75 000	14

Source: Carpentier et al. (1992), Loomis (1983), O'Reilly (1983) and Vietor (1989).

AT&T to divest its interests in 22 Bell Operating Companies (BOCs) that provided local telephone services.[3] In return, AT&T would be freed from its 1956 Consent Decree obligations, thereby enabling it to enter new markets such as information services or those not falling within the compass of regulated telecommunications (Snow, 1995: 212). The MFJ would come into force at the start of 1984.

The MFJ required the management of AT&T, under the watchful eye of Judge Greene, to develop detailed plans to implement divestiture. These plans created Bell Communications Research (Bellcore) to provide research services to the Baby Bells,[4] and transferred the directory publishing operations of AT&T to the Baby Bells.[5] Thus, on divestiture, each of the Baby Bells was comprised of at least one BOC, the directory publishing operations of AT&T within its region and a one-seventh stake in Bell Communications Research. In contrast, new-AT&T would comprise long-distance, manufacturing and research organised in accordance with the Computer 2 enquiry.[6]

Although this division of AT&T's businesses resulted in a significantly smaller company, new-AT&T still had assets of $35 billion (Vietor, 1989: 84). Each of the seven Baby Bells were substantial enterprises in their own right; as shown in Table 8.1, their assets ranged from $14.4 billion to $19.7 billion while their revenues varied from $7.8 billion to $10.5 billion. Covering 14 states, US West was the largest geographically of the Baby Bells, while Pacific Telesis had the fewest number of states – two – within its territory. The remaining Baby Bells covered between five and eight states.

As it was widely felt that the Baby Bells would act anti-competitively like their former parent company (Sappington, 1995; Sullivan, 1989), significant restrictions were placed upon them (Vietor, 1989: 84). The MFJ prohibited them from:

Table 8.2 Line of business restrictions and release dates

Line of business restriction	Release date
Other non-regulated services	September 1987
Information services	July 1991
Inter-exchange telecommunication services	February 1996
Manufacturing products and CPE	February 1996

Source: Whalley (1999: 109).

- providing inter-exchange telecommunication services or information services;
- manufacturing or providing telecommunications products or customer premises equipment;
- providing any other product or service, except exchange telecommunications and exchange access service, that is not a natural monopoly service actually regulated by tariff.

The Baby Bells could, however, apply for waivers that would allow them to enter new lines of business if they could demonstrate that they would not exercise monopoly power in these markets (Snow, 1995: 212). Unsurprisingly, the Baby Bells sought to have these restrictions limited, requesting waivers to enter a wide variety of new markets. By dint of numerous waiver applications, the Baby Bells were able to remove some of the lines of business restrictions, a process which is described in Rubin and Dezhbakhsh (1995) (see Table 8.2) . It was, however, only with the passing of the Telecommunications Act in February 1996 that their entry into the inter-exchange and equipment manufacturing markets became a possibility.

The 1996 Act stated that the Baby Bells were free to enter the long-distance market once they had satisfied a 14-point competitive checklist. After an initial hiatus, when none of the Baby Bells were able to persuade regulators that their local markets were sufficiently competitive, the first long-distance application was granted in December 1999 in New York state. Since then, all of the Baby Bells have been granted permission to provide long-distance services (Curwen, 2003).

As the regulatory framework changed, so too did the Baby Bells. The remainder of this section identifies three areas of change. In the first place, all of the Baby Bells expanded from the regional markets that they had inherited at divestiture into other parts of the United States, although some did so more vigorously than others. US West, for example, expanded into dispersed parts of the United States through the purchase of cellular and

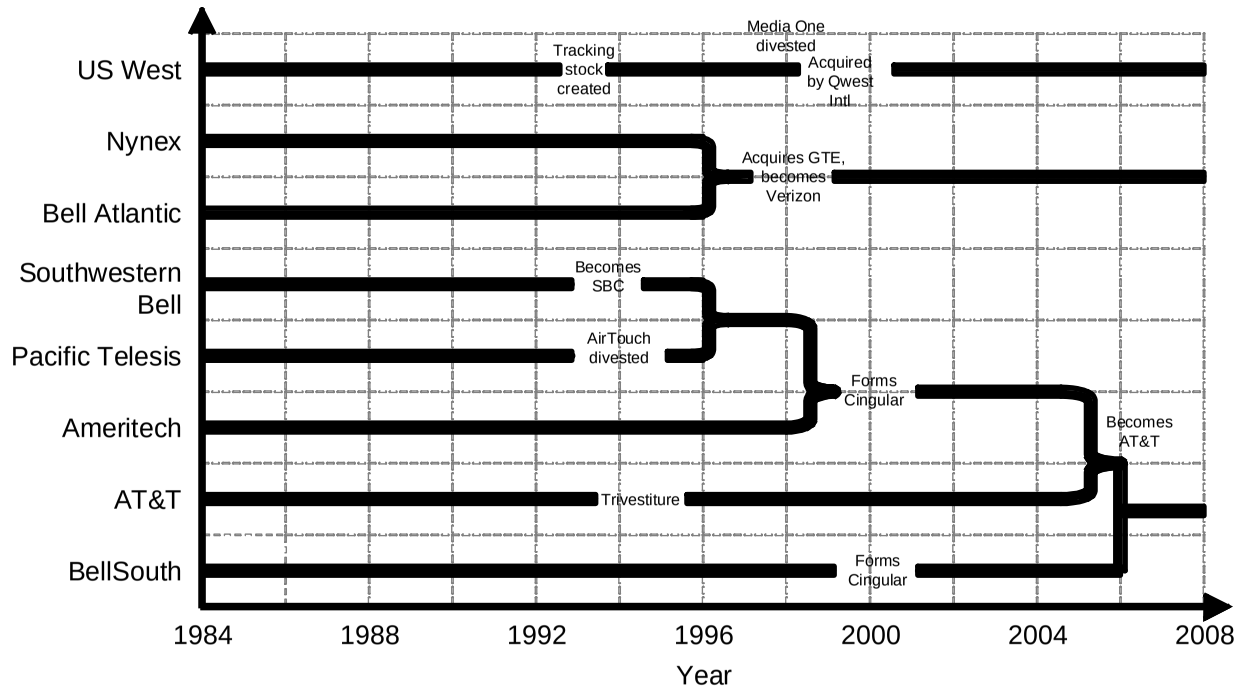
cable-TV franchises. In contrast, Ameritech was more reserved in its expansion, preferring to focus on markets geographically contiguous to its five-state Great Lakes region such as St Louis, rather than on other parts of the USA.[7]

Secondly, the Baby Bells engaged in diversification. In the immediate aftermath of divestiture, the Baby Bells entered a wide range of new lines of business, and while some of these were related to their core telecommunications operations, others were not.[8] US West acquired a substantial property portfolio within its region while Nynex entered both the software and computer retailing markets. Bell Atlantic entered the computer industry, though most of its diversification appears to have been focused towards the leasing and financing markets. The expansion of the Baby Bells into non-telecommunications markets continued until the early 1990s, when regulatory changes and the continued disappointing financial results of many of the diversified investments resulted in its reversal. As a consequence, by the late 1990s the Baby Bells had largely exited these businesses.

Thirdly, the Baby Bells restructured themselves. The various restructurings that have occurred are shown in Figure 8.1, which highlights the complexity of a consolidation process that by early 2006 had reduced the number of Baby Bells to three, namely Qwest (US West), Verizon Communications (Bell Atlantic, Nynex) and AT&T (Ameritech, BellSouth, Pacific Telesis, Southwestern Bell). The consolidation process that resulted in these three Baby Bells is explained below, with each of the three being addressed in turn.

US West can be found at the top of Figure 8.1. After expanding outside its region through both acquisitions and joint ventures, US West grouped all of its non-BOC operations together in 1995 into a new holding company called US West Media Group. Tracking shares in this new holding company were then issued pro rata to all existing US West shareholders.[9] The domestic cellular operations were sold to AirTouch Communications in April 1998 for $5.9 billion and eventually became part of Verizon Wireless, a joint venture between Verizon Communications and Vodafone.

In 1997, the board of US West sought to formalise the separation of its BOC and non-BOC operations via a proposal to separate US West Media from US West. Prior to the actual separation, regulatory requirements necessitated the transfer of the 14-state directory publishing operations from US West Media to US West for $4.75 billion in debt and stock. The domestic cable-TV businesses, as well as all of the international operations of US West, were spun off as MediaOne in June 1998. AT&T subsequently acquired this company in April 1999 for $58 billion as part of its drive to become a key player in the US broadband market.[10]



Source: Compiled by the authors.

Figure 8.1 Baby Bell restructuring, 1984–2008

The spin-off of MediaOne meant that US West was almost the same as it had been on divestiture in 1984; that is, a company providing local telephone and directory publishing services within its region. The revenue and earnings stability associated with both businesses made US West an attractive takeover target, especially to companies in search of revenues to fund their expansion in other markets. After a short bidding war between two long-distance operators, Global Crossing and Qwest International, US West succumbed to a $51.3 billion bid from Qwest International in June 1999. US West subsequently changed its name to Qwest.

Immediately below US West in Figure 8.1 are Bell Atlantic and Nynex, two Baby Bells whose fortunes are interwoven. Less than two months after the Telecommunications Act of 1996 became law, Bell Atlantic entered into a $25.6 billion 'merger of equals' with Nynex.[11] This consolidated its position in the north-east of the United States, and increased its stake to 50 per cent in PCS PrimeCo, a cellular joint venture that eventually became part of Verizon Wireless. In July 1998, Bell Atlantic merged with GTE in a deal valued at $67 billion, and on completion of the merger changed its name to Verizon Communications. Finally, after a short bidding war with Qwest, Verizon Communications acquired MCI in early 2005 for $10.8 billion.

At the bottom of Figure 8.1 can be found the four Baby Bells that have consolidated to become AT&T in its current (2008) guise. In late 1993, Pacific Telesis grouped together its non-regulated subsidiaries in PacTel Corporation and sold 14 per cent to outside shareholders. Just a few months later, in April 1994, Pacific Telesis distributed its remaining stake in PacTel Corporation on a pro rata basis to its existing shareholders. On completion of the spin-off, PacTel Corporation changed its name to AirTouch Communications.

In April 1996, SBC Communications, as Southwestern Bell had become,[12] entered into a $16.5 billion 'merger of equals' with Pacific Telesis. During 1998, SBC Communications merged with two more telecommunication companies; in January 1998 it merged with SNET, although given their relative sizes this was effectively an acquisition, while in May it merged with Ameritech in a deal worth $68 billion.

In 2000, SBC Communications and BellSouth merged their domestic cellular operations to form Cingular Wireless, a 60–40 joint venture. In October 2004, Cingular Wireless paid $41 billion to acquire AT&T Wireless, one of the companies that had emerged from the restructuring of AT&T just after the turn of the millennium. This restructuring effectively saw AT&T divest its wireless and broadband operations and close its residential long-distance business to new customers in order to focus on the corporate long-distance market.

At the start of 2005, SBC Communications announced its intention to merge with AT&T in a deal valued at $16 billion. When the merger was approved in November 2005, SBC Communications changed its name to AT&T. In March 2006 AT&T announced that it would merge with BellSouth in a deal valued at $84 billion. The FCC gave its final approval on 29 December.[13] This merger, as shown in Figure 8.1, accordingly reduced the number of independent Baby Bells to three: Qwest, Verizon Communications and AT&T.

During the period in which the Baby Bells have undergone restructuring, their international ambitions and footprints have also evolved, and the focus is on these in the remainder of the chapter. The frequent name changes of the Baby Bells are undoubtedly a cause of confusion. To avoid this, the following convention is adopted in the rest of this chapter: SBC is used throughout the period to the end of 2006 while Bell Atlantic and Nynex are used in conjunction with events occurring between 1984 and 1996. Between 1996 and 1998 Bell Atlantic/Nynex is used, whereas after 1998 Verizon is adopted.

8.3 DETERMINING HOW MUCH THE BABY BELLS HAVE INTERNATIONALISED

In contrast to previous chapters, a different approach to measuring Baby Bell internationalisation has been adopted, which takes into account the difficulties of longitudinal data collection. The Baby Bells do not describe their international operations in detail. As a consequence, it is hard to determine the exact size of their international operations in terms of capital invested, revenue or subscribers. In addition, the data can also be inconsistent between years, not least because the Baby Bells have regularly restated their accounts to reflect acquisitions and divestments as well as changing regulatory requirements.

The international operations of the Baby Bells are also obscured by their consolidation with other businesses. Since 1984, these international operations have variously been consolidated with their diversified holdings, directory-publishing operations or with all non-regulated activities.[14] The inconsistency that occurs, both between years and between Baby Bells, complicates any attempt to undertake a longitudinal analysis of their internationalisation. This inconsistency also means that a longitudinal financial analysis of internationalisation in a manner similar to Dassler et al. (2002) or Gerpott and Jakopin (2005) is not possible for the Baby Bells.

While financial data are not provided for all international operations, it is possible to calculate the balance between regulated and non-regulated

Baby Bell revenues. However, non-regulated revenues can, depending on the Baby Bell, contain revenues from non-telecommunication activities such as property management or computer retailing, as well as directory publishing, domestic cellular and international revenues.[15] Moreover, not only has the balance between regulated and non-regulated revenues changed over time but the portfolio of activities contributing to the non-regulated activities has also changed.[16] If the proportion of non-regulated revenue increases over time, this may be due to revenue growth in one of several revenue sources or a decline in regulated revenues. In other words, non-regulated revenue is too broad a category to shed light on Baby Bell international investment revenue trends.

Due to the limited availability of data and the inherent inconsistency of much of what is available, the approach adopted here is to take data from the annual reports without considering any re-statements that may have subsequently occurred. In other words, only data for the year just completed are taken from each annual report. All international investments that appear in annual reports are considered, and when constructing the international presence of each of the Baby Bells, they are treated in the same way. In other words, no account is taken of the different scale of the international investments.

Although it is acknowledged that this means that two international investments with, for instance, vastly different revenues will be treated as identical when in reality they are not, such a stance has been adopted because data are incomplete. Quite simply, the annual reports of the Baby Bells do not provide sufficiently detailed data between 1984 and 2008 for the size of every international investment they have made to be determined.

Multiple investments in the same country are counted separately, primarily so that the number of separate investments made outside the USA for each Baby Bell can be ascertained. A second reason is that, on occasion, the Baby Bells have invested in several different lines of business within the same country. In total, eight different lines of business are identified, namely: cable, cellular, content, data, equipment, fixed (which includes public telephone operators, second national operators, facilities management, long-distance and international cable), paging and services (which includes director and information services, software, alarms and security services). However, when the number of countries is determined, multiple businesses in the same location are discounted.

Although a number of investments are identified that in turn have subsidiaries, only the initial investment is included in the analysis. One reason for this is the lack of data that would enable all of the subsidiary investments to be tracked, while a second reason is that the minority stake in many of the investments limited the ability of the Baby Bells to influence

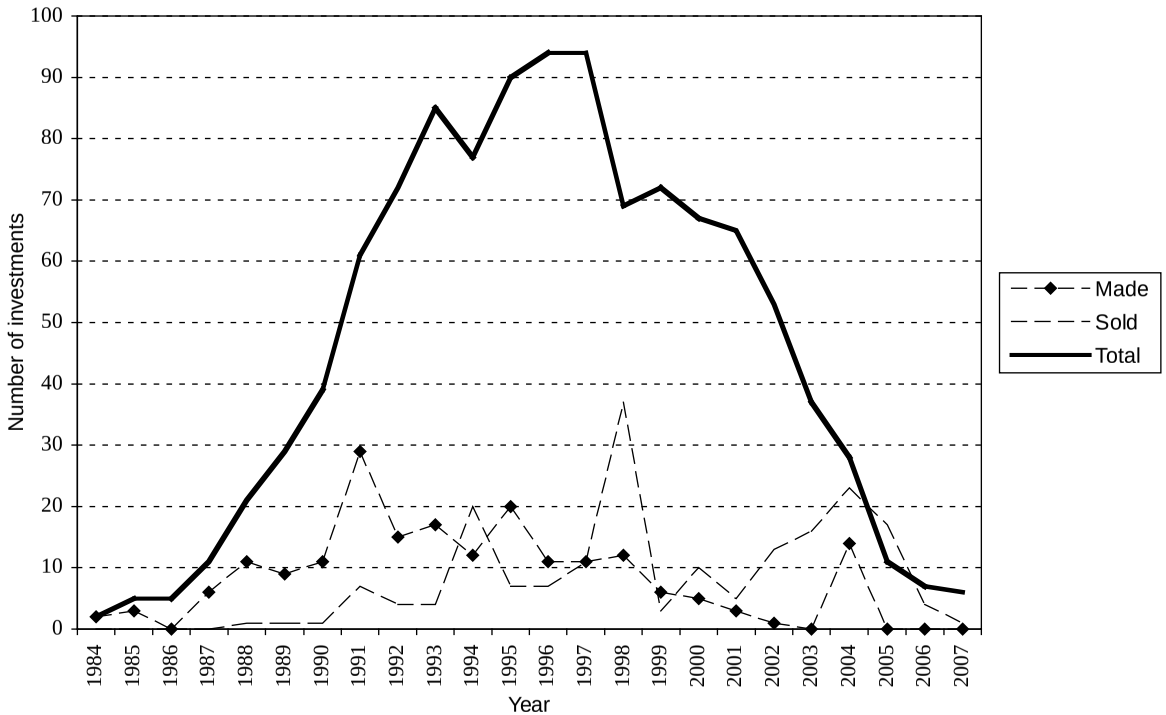
management. However, determining how Cingular Wireless should be treated in the analysis is not straightforward. As a joint venture between two Baby Bells, Cingular could conceivably be included in the totals for both BellSouth and SBC, although as the latter was the majority shareholder, an argument for including Cingular solely within its total could also be made. The inclusion of Cingular within the totals for both Baby Bells would inflate the number of investments and distort the subsequent analysis, and hence when this, and SBC's merger with BellSouth were taken into account, the inclusion of Cingular and its various subsidiaries within the total for SBC was preferred.

8.4 INTERNATIONALISATION FOLLOWED BY DE-INTERNATIONALISATION

Drawing on Figure 8.2, it is possible to make a series of observations regarding the internationalisation and de-internationalisation of the Baby Bells. In the first place, the Baby Bells collectively made 198 international investments between January 1984 and the end of December 2007. There is considerable variation in the number of investments made each year; in some years only a handful of investments were made while in 1991 almost thirty investments were made. Hence, the 'golden age' of internationalisation would appear to have been between 1991 and 1995. During these five years, 93 international investments were made, with the result that the number of investments held peaked in 1996 and 1997.

A second observation is that from 1991 onwards the number of international acquisitions that the Baby Bells made gradually declines, with the exception of two years. The first exceptional year, 1995, falls within the 'golden age' noted above while the second does not. The increase in 2004 is due to the acquisition by Cingular Wireless of AT&T Wireless which brought with it a large international portfolio located primarily in the Caribbean but only a small number of subscribers outside the USA.[17] In the year after acquiring AT&T Wireless, Cingular sold all of its international operations bar one, partly to satisfy regulatory requirements arising from the acquisition and partly to exit markets in which it was no longer interested.

A final observation is that from 2000 onwards the Baby Bells sold more international investments than they acquired. In other words, their de-internationalisation began in earnest during 2000. This is, however, slightly misleading as it ignores the de-internationalisation associated with the divestments of AirTouch Communications by Pacific Telesis and of MediaOne by US West. Both of these divestments, in 1994 and 1998



Source: Compiled by the authors.

Figure 8.2 Number of international investments, January 1984–December 2007

respectively, reduced the overall number of international investments, though given the larger international portfolio of MediaOne its divestment was the more significant of the two. By the end of December 2007, as a consequence of divestments and sales, the remaining three Baby Bells held between them just six international investments.

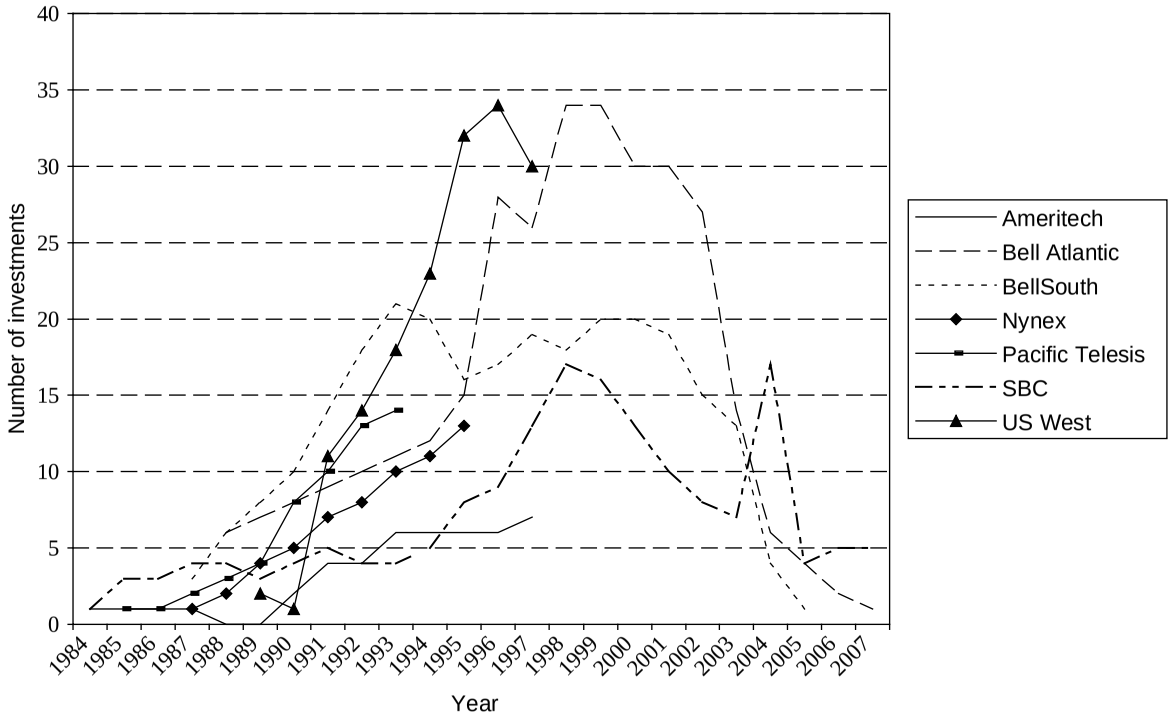
Number of International Investments by Baby Bells

Figure 8.2 does not show the variation that exists between the Baby Bells in terms of the number of international investments that they made. From Figure 8.3 it can be seen that the maximum number of international investments held by the Baby Bells ranged from seven by Ameritech to 34 by Verizon. However, the abrupt ending of lines for four Baby Bells signifies either the divestment of their international operations (Pacific Telesis and US West) or the year in which they merged with another Baby Bell with the consequence that their international investments were transferred to the new company (Ameritech and Nynex). When this is taken into account, the 34 investments held by Verizon are in fact the result of Bell Atlantic's mergers with Nynex and GTE. Thus, the largest number of international investments held by a *single* Baby Bell is 34 by US West in 1996.

Verizon Communications continued to operate a substantial international footprint of operators until 2001 when it affected an abrupt volteface. Beginning in 2002, Verizon sold all but one of its international investments. The only remaining international investment is a 23.1 per cent stake in Vodafone Italy although it may be noted that Verizon bid unsuccessfully for a mobile licence in Qatar during 2007.

SBC also increased its international footprint through its merger with Ameritech in 1998. The merger added seven new holdings, although its impact was partially offset by the sale of international investments within its existing portfolio as well as among the newly acquired operations. From 1998 onwards, SBC steadily offloaded its international investments although its portfolio dramatically increased once more in 2004 with Cingular's acquisition of AT&T Wireless. However, this upturn was only temporary – Cingular sold two of the newly acquired investments in 2004, twelve in 2005, and has retained only those in Puerto Rico and the US Virgin Islands, which some might consider to be part of the USA in all bar name. It also continued to sell its original portfolio of holdings.

Figure 8.3 also shows that in the late 1980s and early 1990s, BellSouth was at the forefront of Baby Bell internationalisation. BellSouth rapidly built the largest international portfolio, although a shift in its strategic priorities away from Australia – where it owned various paging businesses as well as a stake in Optus, the second national operator – towards cellular



Source: Compiled by the authors.

Figure 8.3 Number of investments by Baby Bell, 1984–December 2007

Table 8.3 Baby Bell investment by line of business

		Ameritech	Bell Atlantic	BellSouth	Nynex	Pacific Telesis	SBC	US West	Total
Line of business	Cable	–	3	1	2	3	3	18	30
	Cellular	4	10	18	4	9	24	14	83
	Content	1	3	–	–	–	–	1	5
	Data	–	–	6	–	1	–	–	7
	Equipment	–	7	–	–	–	1	–	8
	Fixed	4	12	2	4	1	6	2	31
	Paging	–	1	4	–	–	–	–	5
	Services	2	4	3	7	5	4	4	29
	Total	11	40	34	17	19	38	39	198

Source: Annual reports.

markets resulted in a small decrease before it remained more or less steady until the turn of the millennium.

Another strategic change, this time in favour of Latin American cellular markets, resulted in a further withdrawal, primarily from Europe, as did BellSouth's exit from Brazil due to tougher-than-anticipated market conditions. Although BellSouth had previously claimed that Latin America was a strategic priority along with broadband, long-distance and domestic wireless,[18] it sold its investments in March 2004 to Telefónica Móviles for $5.85 billion.

Line of Business by Baby Bell

It is also possible to identify the different lines of business that the Baby Bells invested in overseas. Eight lines of business are identified in Table 8.3. The first point that can be made is that one line of business – cellular (mobile) – accounts for slightly more than 40 per cent of all the investments made by the Baby Bells, a figure that vastly exceeds fixed, the next most popular category. It is worth noting, however, that although 31 'fixed' investments appear in this category, it is quite broad and includes facilities management as well as investments in public telephone operators. The 'services' category is also broad, encompassing directory publishing and information services. As a consequence, the second largest category that is comprised of a single line of business is cable. When cellular and cable are taken together, they account for just under 60 per cent of all the international investments made by the Baby Bells.

Secondly, for three of the Baby Bells their international portfolio is

bipolar. Ameritech, Bell Atlantic and US West have two lines of business that have received more or less the same number of international investments. For Ameritech and Bell Atlantic the two lines of business are cellular and fixed, whereas for US West it is cable and cellular. US West stands out as the only Baby Bell to invest extensively in cable businesses overseas, accounting for almost two-thirds of all Baby Bell investments in this market. In contrast, BellSouth has overwhelmingly favoured cellular, as has SBC.

Broadly speaking, three-quarters of all the international investments took place during the 1990s which, when widespread liberalisation and the introduction of competition is taken into account, is perhaps not a surprise. What could be viewed as a surprise is that the lines of business in which the Baby Bells have invested has changed over time. In the 1980s, three lines of business were preferred: equipment, paging and services. All eight international investments in equipment were made by Bell Atlantic and SBC during the 1980s, while most paging and service investments also occurred during this decade. Both BellSouth and Pacific Telesis invested in paging businesses on a more or less equal basis, whereas several Baby Bells made service investments throughout the decade.

During the 1990s, investments took place in different lines of business. Investments in cable, which began at the end of the 1980s, continue throughout the decade to be joined by two other lines of business, cellular and fixed. Cellular investments account for 45 per cent of all investments throughout the decade, and regularly constitute the single largest area of investment numerically in each year.

International Expansion through Merger Activity

Both Bell Atlantic and SBC have engaged in domestic mergers with companies that already had an established international presence of their own, resulting in often quite substantial changes to their international footprints.

Prior to its 1996 merger with Nynex, the internationalisation of Bell Atlantic could readily be described as largely disappointing, albeit with two exceptions – TCNZ and Omnitel in Italy. While Bell Atlantic was able steadily to expand its international footprint, it was not until 1990 that it made its first significant investment overseas when it joined with Ameritech to acquire TCNZ for $2.5 billion. This was then followed three years later by an investment in Grupo Iusacell, a Mexican wireless operator, and by what ultimately became a $475 million investment in Omnitel, an Italian wireless operator, in 1994.

TCNZ, Grupo Iusacell and Omnitel were financially the three largest international investments made by Bell Atlantic. While TCNZ and Omnitel could be considered to be very successful international investments, this

starkly contrasted with its investment in Grupo Iusacell. In November 1993, Bell Atlantic invested $520 million to acquire a 23 per cent stake in the Mexican wireless operator, and invested a further $524 million the following June to increase its stake to 41.9 per cent. Although Bell Atlantic was initially very enthusiastic about this investment, problems were soon encountered and it was dragged into a corruption scandal involving the founding Peralta family. Subsequently, Bell Atlantic invested once more in Grupo Iusacell with the consequence that its total investment in the company increased to $1.7 billion. Unsatisfactory growth by the company, as well as continued unfavourable economic conditions, eventually forced Bell Atlantic/Nynex to write off $957 million of its investment before selling its stake in the company in 2003 (Verizon Communications, 2003: 18).

Bell Atlantic suffered other disappointments when internationalising prior to its merger with Nynex. The Baby Bell participated in consortia in Australia, South Korea and Taiwan, with those in Australia and Taiwan failing to win a cellular licence while the alliance with Korea Telecom came to nothing (Wasden, 1993). With the sale of the European equipment businesses, the international footprint lacked geographical coherence and was generally regarded as 'piecemeal'.

The merger of Bell Atlantic and Nynex helped to rectify this as the international footprint of Nynex complemented that of Bell Atlantic. The merger extended its international footprint into six new countries as well as complementing its existing presence in two countries apiece in Europe and Asia. For example, Nynex but not Bell Atlantic was present in Greece, and although both Baby Bells were present in the Czech and Slovak Republics, they operated in different lines of business – directory publishing in the case of Nynex and cellular for Bell Atlantic.

The merger of Bell Atlantic/Nynex with GTE further expanded its international footprint. Perhaps surprisingly, the ten international investments of GTE were all located in countries in which neither Bell Atlantic nor Nynex were present, and included countries that Bell Atlantic had previously sought unsuccessfully to enter, such as Taiwan. The two European investments, in Austria and Hungary, complemented the existing Bell Atlantic/Nynex investments as they were geographically close by as well as in a line of business in which the Baby Bell was already active, namely directory publishing.

GTE also operated five fixed-wire investments in what can best be described as an eclectic range of countries. Two of these investments were located in the Pacific and one each in Canada, the Caribbean and Latin America. The scattered nature of these investments broadened the resulting international footprint as much as the complementary European operations gave it coherence. Although additional international investments were made after the merger with GTE, these did not 'fill in the gaps',

with the most substantial being in Canada where the Baby Bell already had a presence. Given the limited nature of these additional investments, the merger between Bell Atlantic/Nynex and GTE could be viewed as marking the highpoint of the Bell Atlantic's internationalisation.

SBC has also entered into mergers that have impacted on its international presence. The internationalisation of SBC can be divided into two periods on either side of 1995. Prior to 1995, SBC invested in four different lines of business – cellular, equipment, fixed-wire and services – across a geographically diffuse set of countries (Australia, France, Israel, Mexico and the UK). Notwithstanding this apparent lack of focus, Maney (1995) described the international holdings as 'brilliant' though it can be argued that this was primarily due to the investment in Telmex, the success of which has been described above.

After 1995, SBC focused most of its internationalisation efforts on two lines of business, namely cellular and fixed-wire, although it did continue to invest across a broad range of countries. Although most of these investments were focused on the cellular market, SBC acquired three stakes in fixed-wire operators – Golden Lines International, diAx and Telekom South Africa – during 1997. The merger with Ameritech in the following year added four more fixed-wire investments, but as the remaining stake in one – TCNZ – was sold during 1998, the net addition to SBC's fixed-wire portfolio was three. As all three investments were in Europe, the merger expanded SBC's European footprint.

Even though SBC did make two more investments in fixed-wire operators, these were in contrast to the sale of fixed-wire investments that began in 1999 but which mainly constituted sales during 2003 and 2004. As the sale of investments was not restricted to fixed-wire, 1998 effectively marked the high point of internationalisation by SBC. The acquisition of AT&T Wireless by Cingular Wireless did expand its international footprint, albeit only temporarily as most operations were sold during 2004.

8.5 DISCUSSION

The previous section has charted the internationalisation and de-internationalisation of the Baby Bells prior to the end of 2007. Given the extent to which the Baby Bells expanded their international footprints during the first half of the 1990s, these years could easily be described as the 'golden age' of Baby Bell internationalisation. From the mid-1990s onwards, the Baby Bells exited international markets to such an extent that by the end of 2007 they collectively retained just six international investments.

However, *why* did the Baby Bells sell or divest almost all of their international investments? Their extensive de-internationalisation can be located at the confluence of three interrelated issues: the financial returns from internationalisation, the changing nature of regulation within the USA and domestic merger and acquisition activity.

Although some of the international investments made by the Baby Bells proved to be very successful financially, there is little evidence to suggest that this was widespread. While the Baby Bells draw attention in their annual reports to the financial success of some of their investments, particularly their cellular and public telephone operator investments, they are largely silent as to the financial success of their data, content, equipment, paging and services international investments.

Even though the annual reports of the Baby Bells do not provide sufficient detail to determine the financial success or otherwise of individual investments, they do provide some insight into the revenues and net income that the international investments of some of the Baby Bells generated (see, for example, Verizon Communications, 2001; BellSouth, 2003: 37). These examples clearly demonstrate that whereas internationalisation may generate reasonable revenues and net income, Verizon and BellSouth rely predominantly on their domestic businesses for these. In other words, the financial contribution of their internationalisation, even at its peak, was not that substantial.

While the limited financial success of many of the international investments undoubtedly contributed to the Baby Bells' de-internationalisation, the remaining two issues are of greater importance. As noted above, the MFJ imposed four lines of business restrictions on the Baby Bells. The Baby Bells were allowed to invest in other non-regulated services in 1987 and information services in 1991, though they had to wait until the 1996 Act before they were released, albeit subject to a 14-point competitive checklist in the case of inter-exchange telecommunication services, from the remaining two restrictions. The lifting of these restrictions created new investment opportunities for the Baby Bells in the United States, though it is arguably the case that the most significant and attractive of these opportunities was entry into the inter-exchange market.

The Baby Bells were initially unsuccessful in their attempts at entering the inter-exchange market, not least because regulators at both the state and federal level felt that the local telephone markets served by the BOCs were not competitive. Bell Atlantic and SBC were, however, successful in their attempts to expand their geographical footprint in the United States through merging with their fellow Baby Bells. Notwithstanding the increasingly onerous conditions placed on the Baby Bell mergers by the Federal Communications Commission (FCC),[19] the mergers underlined

the attractiveness of the inter-exchange market to the Baby Bells. The Baby Bell mergers expanded Bell Atlantic's and SBC's presence in the local telephone market, markets that they could link together once they were able to enter the inter-exchange market.

At this point it is perhaps worth noting that Pacific Telesis and US West reacted differently to the 1996 Act. Pacific Telesis pre-empted the Act by divesting AirTouch Communications in 1994, thereby concentrating its attentions on its core California and Nevadan markets. At the same time, Pacific Telesis would provide a wider range of services within these two states, thereby leading Maney (1995: 83f) to describe the strategy as 'California First'.[20] However, by the time the Telecommunications Act was passed, this strategy had not been fully implemented, with the consequence that Pacific Telesis was weakened to such an extent that it was taken over by SBC for, with hindsight, a relatively modest sum.

US West also exited its non-BOC territory businesses, though after the Act had become law. In some respects, the decision of US West to divest its domestic cable business was surprising; it had regularly drawn attention to the UK where cable TV and telephony could be combined, and had made several domestic purchases of cable-TV systems culminating with the $10.8 billion purchase of Continental Cablevision in early 1996. However, section 652 of the 1996 Act prohibited a telephone company from owning more than 10 per cent of a cable company providing service in the same area (Chen, 2006: 31). Thus, while the FCC did approve the merger, it required the cable systems of Continental Cablevision within the region served by US West to be divested. As a consequence, US West was unable to combine cable-TV services with telephony, and achieved only limited synergies. Both of these factors contributed to US West's decision to divest MediaOne in 1998.

8.6 RE-INTERNATIONALISATION

The previous section has demonstrated that the Baby Bells have de-internationalised to such an extent that they now collectively own just a handful of international investments. It is, therefore, surprising that both Verizon Communications and AT&T have shown signs of a renewed interest in internationalisation. As already noted, Verizon Communications expressed an interest in acquiring a licence in Qatar during 2007 though it is hard to rationalise why it decided to commence its re-internationalisation in a country so 'foreign' in almost every sense of the word. However, the behaviour of AT&T is of rather more interest in that not merely did it also fail to win the same mobile licence in Qatar in December, but during 2007 its CEO identified India, Asia and the Middle East as potential targets,

specifically identifying a stake in Telekom Malaysia International in January 2008 (Total Telecom, 2008). India is of especial interest given that the then AT&T Wireless sold its stake in BPL Mobile during 2004 and that it is unquestionable that India currently represents the most desirable country for inward investment in mobile. To this end, AT&T applied for a mobile licence in partnership with Mahindra Telecommunications, a local operator with which AT&T had an existing joint venture formed in 2006 to serve the corporate sector (Taylor and Parker, 2008).

Further, during early 2007 a controlling stake in Telecom Italia was put on sale by Pirelli (via its subsidiary, Olimpia). Among the interested parties was AT&T, acting in a joint venture with Mexican incumbent América Móvil (Michaels, 2007). América Móvil claimed that it was merely interested in a financial investment whereas AT&T claimed that it was seeking to extend its telecoms services at the world level. As it turned out, the Italian government was less than enthused and the joint venture was terminated.

A final point to note is that AT&T has been internationalising at arm's length through its continued ownership of a small minority stake in América Móvil. While in its SBC guise, AT&T acquired a de facto financial investment of more than 7.5 per cent of the equity of América Móvil when it was spun off from Telmex in 2000. By 2005, SBC International owned 26.3 per cent of the AA shares, that represented 30.18 per cent of the total capital. Although the arm's length internationalisation that AT&T has been exposed to through its continued ownership of a stake in América Móvil has not been included in the discussion above because it is a small minority (non-controlling) stake, it is necessary to highlight its existence to clarify the discussion in Chapter 9. It is by no means unusual for one operator to hold some of its overseas holdings via a minority stake in another internationally-minded operator, but this particular arrangement is unusual in that América Móvil has built up a massive overseas presence, consisting almost entirely of wholly-owned subsidiaries in Latin America, not to mention a significant MVNO in the USA, branded as TracFone. Collectively these businesses enable AT&T to derive over 10 million proportionate subscribers from its investment in América Móvil.

8.7 CONCLUSIONS

This chapter has charted the internationalisation and subsequent de-internationalisation of the Baby Bells. All of the Baby Bells expanded internationally, though differences are evident in terms of their geographical spread, the lines of business in which they invested and the enthusiasm with

which they embraced internationalisation. Baby Bell internationalisation peaked in the mid-1990s, with de-internationalisation occurring in earnest after 2000, so that by the end of 2007 they had sold all but six of their international investments.

But why did the Baby Bells de-internationalise so swiftly and so extensively? It is arguably the case that while the restrictive regulatory environment imposed by the MFJ encouraged the Baby Bells to internationalise, changes in this environment subsequently contributed to their de-internationalisation. One such change was the passing of the Telecommunications Act of 1996, which allowed the Baby Bells to enter the inter-exchange market for the first time, whilst another was the adoption of a more liberal attitude towards M&A activity by the FCC.

Through a series of mergers and acquisitions, the number of Baby Bells has fallen to three, entry into the long distance market has been effected and more or less national wireless operators have been created. These substantial changes to the structure of the telecommunications market were funded, at least in part, by the proceeds of the Baby Bells' de-internationalisation. As these changes have largely been completed, it is perhaps not that surprising that AT&T and Verizon Communications are being linked once again with overseas investment opportunities. What is surprising, however, is the nature of some of the opportunities with which they are being linked, and that both AT&T and Verizon Communications would contemplate re-internationalising so soon after de-internationalising.

NOTES

1. The Baby Bells are also known as RBOCs (regional Bell operating companies) or RHCs (regional holding companies).
2. For details of this dispute, which at its heart was centred on the uncooperative relationship between the then AT&T and new entrants such as MCI, see, for example, Temin (1987), Vietor (1989) and Snow (1995).
3. The MFJ also required that AT&T sell its stakes in two other, non-Bell, local telecommunication companies, Cincinnati & Suburban and Southern New England Telephone (SNET).
4. Ownership of Bellcore was divided equally among the seven Baby Bells. Carpentier et al. (1992: 26) state that a second role of Bellcore was to 'serve as a co-ordination centre for communication services with regard to national security issues and emergency service activities'.
5. Given that the overarching rationale of divestiture was to separate monopoly from competitive activities, it was thought that the directory publishing activities would remain with AT&T. However, as directory publishing revenues had been treated as BOC revenues for almost a decade prior to 1984 (Chessler et al., 1986: 8), they were transferred to the Baby Bells where directory revenues would help to reduce local charges.
6. The Computer 2 enquiry required that basic services be separated from advanced services. As a result, AT&T on divestiture was comprised of two principal subsidiaries;

AT&T Communications, responsible for long distance telecommunications within the United States, and AT&T Technologies. This latter company brought together Bell Laboratories with other companies such as AT&T International and AT&T Information Systems subsidiaries – see Carpentier et al. (1992: 28) or Vietor (1989: 83) for a full list of the businesses operated by AT&T Technologies.

7. See Whalley (1999) for a detailed description of the domestic expansion of all Baby Bells, and Noda and Bower (1996) for the domestic cellular expansion of BellSouth and US West.
8. A wide variety of new markets was entered into by the Baby Bells including real estate, computer retailing, financial services, software development and liquefied petroleum gas distribution (Whalley, 1999).
9. By issuing tracking shares, US West was able to create a stock that followed the performance of its non-BOC operations without separating ownership of these operations from the Baby Bell. If any dividends were paid, these would be funded by the non-BOC operations.
10. See, for example, Curwen and Whalley (2004: 78–99) for a detailed discussion of AT&T's strategy and accompanying restructuring. The focus of AT&T at the time on the US broadband market contributed to its decision to sell most of the international operations of MediaOne, a process that also helped AT&T to recoup a substantial proportion of the cost.
11. In the 'merger of equals' between Nynex and Bell Atlantic, Nynex became a wholly-owned subsidiary of Bell Atlantic and its shareholders received stock in Bell Atlantic. This qualified as a tax-free reorganisation, with the resultant 'pooling of interests' requiring all financial accounts prior to the merger to be restated as if they had been a single company all along (Bell Atlantic, 1998: 35).
12. Southwestern Bell changed its name to SBC Communications in 1994, in part to downplay its geographical heritage.
13. There is a good account of recent events at http://en.wikipedia.org/wiki/AT%26T_Mobility.
14. Chessler et al. (1986) were surprised at the complex organisational structures that the Baby Bells adopted in the aftermath of divestiture given their previous arguments against structural separation. The structures adopted effectively divided the Baby Bells into two; that is, into the Bell Operating Companies and support services on the one hand and everything else on the other. The international investments of the Baby Bells would be included in this 'everything else' category.
15. See, for example, Rosenberg et al. (1993) for a discussion of the relationship between regulation and revenues.
16. See, for instance, Whalley (1999) for a detailed discussion of the changing domestic business portfolios of the seven Baby Bells.
17. Although AT&T Wireless had 23.952 million proportionate (equity) subscribers at the end of December 2004, 22.1 million of these were located in the United States. The Caribbean accounted for just over 300 000 proportionate subscribers between them, while India accounted for 1.545 million.
18. See, for example, the 2001 Annual Report of BellSouth.
19. For a detailed discussion of FCC merger policy and the conditions placed on the Baby Bells, see, for example, Chen (2006).
20. In 1995 Pacific Telesis paid $696 million for PCS licences covering California and Nevada (Pacific Telesis, 1995), and also invested in wireless cable-TV.

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9. Internationalisation as of end-2007

9.1 INTRODUCTION

Previous chapters have described internationalisation within the mobile telecommunications industry on a regional basis. The allocation of countries to particular regions, such as Turkey to Europe, was desirable because of the strong relationship between particular operators and particular countries. This is, however, no longer an appropriate way of structuring the discussion. As our objective is to analyse internationalisation on an industry-wide basis, this chapter brings together all of the international operators identified in the previous chapters and undertakes the analysis on a worldwide basis. As a consequence, a somewhat different division of the world into regions is employed in this chapter. One of the advantages of this division is that it allows the use of a region called the 'Middle East'. Previously our interest in Middle Eastern operators has lain in their attempts to operate *outside* their domestic region and hence the region itself was not deemed worthy of a chapter by itself.

The remainder of this chapter is structured as follows: the first section below outlines the methodology adopted and is followed by sections corresponding to each of the four dimensions of internationalisation that we have identified, namely: number of countries, psychic dispersion, number of proportionate subscribers and the location of these subscribers by region. These four dimensions are then brought together in a section that identifies the most internationalised mobile operator at the end of 2007. Conclusions are then drawn in the final section of this chapter.

9.2 METHODOLOGY

As a consequence of the limited global availability of data and the inherent inconsistency of much of what is available, four measures of internationalisation are adopted here. These are:

- The number of countries in which the mobile operator has invested.
- The psychic dispersion of these investments.

- The number of proportionate subscribers.
- The dispersion of these subscribers by region.

To be included in the analysis, the internationalising mobile operator must be present in at least five countries including the domestic market. The term 'countries' is used here to encompass any areas such as islands or territories that have independent networks and/or have their own telecommunications licensing regulators. Drawing on Dunning (1993), Root (1987) and Young et al. (1989) among others, it is possible to identify a wide range of entry models that are available to an internationalising company. However, to be included in the country tally presence the investment must involve an operational mobile telecommunications network. As a consequence, potential entry arrangements such as international roaming or brand franchising are excluded as they do not provide a sufficient degree of investment to merit inclusion.

Where the mobile operator has multiple investments in the same country, only a single presence is recorded even though the subscribers for all of the networks are aggregated. Subject to this proviso, each equity stake, regardless of its size, is recorded as a single presence in a country. Having said this, the size of the stake is adjusted for when calculating the associated number of subscribers (see below).[1] Furthermore, a presence is recorded only when a network has been rolled out and is attracting subscribers; the mere acquisition of a licence is not counted. However, a mobile virtual network operation is counted because it brings with it subscribers and thus income.

The use of holding companies within the telecommunications industry complicates the process of determining exactly in how many countries an operator is present. If an operator has invested in a holding company, should this be counted as a single investment or should each of the holding company's subsidiary investments be counted? The approach adopted here is to count all of the subsidiary investments. Given that, broadly speaking, it is not possible to determine the control that each operator exercises over its investments, it is assumed that each investment is an active one unless the mobile operator has expressly stated that the holding is purely for investment purposes. The same is also true for the holding of stakes in other operators.[2] Although it is possible to argue that a minority subsidiary of a minority-owned operator should not be counted as a country presence due to the indirect nature of the stake, it may reasonably be counter-argued that the strategy being pursued is precisely to gain a presence in a spread of countries via this method rather than to attempt to buy direct stakes in tightly-held companies at exorbitant prices.

After the country presence tally of a mobile operator has been determined, it is then possible to calculate its psychic dispersion. One possible

methodology is suggested by Kogut and Singh (1988) who draw on Hofstede (1980) to calculate an index of psychic dispersion relative to the United States.[3] While this could be reworked for each country hosting one or more of the mobile operators we analyse, only 39 countries are covered in Hofstede (1980). As a consequence, not all of the home markets and host countries would be included within any index that is constructed using this methodology. In other words, a more geographically comprehensive method is required.

One such method is to use the nine groups of countries identified by Ronen and Shenkar (1985). Through synthesising the literature, they suggest nine zones:

- Anglo – Australia, Canada, Ireland, New Zealand, South Africa, United States and United Kingdom.
- Arab – Abu-Dhabi, Bahrain, Kuwait, Oman, Saudi Arabia and United Arab Emirates.
- Far Eastern – Hong Kong, Indonesia, Malaysia, Philippines, Singapore, South Vietnam, Taiwan and Thailand.
- Germanic – Austria, Germany and Switzerland.
- Independent – Brazil, Japan, India and Israel.
- Latin European – France, Belgium, Italy, Portugal and Spain.
- Latin American – Argentina, Chile, Colombia, Mexico, Peru and Venezuela.
- Near Eastern – Greece, Iran and Turkey.
- Nordic – Denmark, Finland, Norway and Sweden.

As these nine zones contain 46 countries between them, it is possible to add a tenth zone, Other, that allows a company's presence in all other markets to be noted. The methodology proposed by Sullivan (1994: 340) for calculating psychic dispersion can potentially be adopted, with each zone equating to 10 per cent psychic dispersion. As the intention is to examine the psychic dispersion of the international operations of each of the mobile operators, the home country should not be included in the analysis. Thus, if the mobile operator has international operations in five out of the ten zones, it would have a psychic dispersion score of 50 per cent.

The third dimension of internationalisation that we include in our analysis is the number of subscribers controlled by a mobile operator. To be included within the analysis, the company must control at least 5 million proportionate subscribers.[4] At this point it is accordingly necessary to remind ourselves of the difference between 'gross' and 'proportionate' subscribers. Gross subscribers comprise all of the mobile subscribers to which a company can lay claim, either in its domestic market or based upon it

having an investment in a foreign operator. As no account is taken of the size of the stake, the company simply claims all of the subscribers generated by its various investments for itself.

In contrast, proportionate (or equity) subscriber figures do take into account the size of the equity stake held. For example, if one mobile operator owns a 50 per cent stake in another company that has 2 million subscribers, the proportionate subscriber figure that it can claim is 1 million. Since gross subscriber figures inflate the number of subscribers controlled by a typical mobile operator, and thus distort the size of its revenue stream and profitability in the process, we have opted to use proportionate subscriber figures throughout our analysis.

Calculating the number of proportionate subscribers is, however, far from straightforward. Firstly, it is often unclear exactly how many subscribers a mobile operator actually has, with the figure provided by the company often not agreeing with that produced by regulators, consultancies and Internet websites.[5] Wherever possible, a company's own figures are used, but in many cases recourse has been had to other sources such as regulatory bodies. Related to this is a second complicating factor, namely that the exact size of some equity investments is unknown due to the presence of contradictory information in the public domain. In other words, it is not clear whether the size of the stake held is X or Y per cent.[6]

The problem is further compounded when the presence of holding companies is taken into account. The use of holding companies adds another layer of ownership and subscriber data to be identified, and gives rise to the temptation to assume, sometimes incorrectly, that the holding company controls all of its subscribers. In practice, as Curwen (2005) notes, this is not always the case. For example, Vivo is a Brazilian-based joint venture that is owned 50/50 by Telefónica and Portugal Telecom. Hence, it is widely assumed that the gross subscribers of this joint venture should be divided equally between the two parent companies. However, Vivo does not wholly own its various subsidiaries in Brazil. As a consequence, the proportionate number of subscribers that either Telefónica or Portugal Telecom could lay claim to in 2007 was significantly less than the number implied by a simple two-way division of the published subscriber numbers.

Problems may also arise from the failure to specify what is being measured; is it the holding company or one of its subsidiaries? Thus, for example, all mentions in English of Turkey's dominant mobile incumbent, irrespective of source, refer without fail to 'Turkcell'. What is never mentioned is that there is a parent company, Turkcell Holding, and a half-owned operating subsidiary, Turkcell. Readers are evidently expected to know intuitively which is relevant to the discussion in hand and which is not.

Around the turn of the millennium, several incumbent fixed-wire telecommunication companies formed specialised mobile subsidiaries that were subsequently part-floated on a stock exchange, possibly as a means of creating value for shareholders or possibly to create a currency in the form of the shares of the subsidiary that could be used to fund future acquisitions. One such company was Telecom Italia Mobile while another was Telefónica Móviles. However, when such companies were being formed, their parents did not necessarily transfer all of their mobile investments to the specialised mobile holding company. As a consequence, the mobile portfolio of the parent company often was, and sometimes still remains, larger than that held by the subsidiary. This is recognised through our unit of analysis being the parent company and not its mobile subsidiary.[7]

Once the number of proportionate subscribers for each of the companies included in our analysis has been calculated, it is possible to re-work the figures so that the geographical dispersion of the subscribers becomes apparent. Rugman (2003, 2005) and Rugman and Verbeke (2004) examined the sales of the largest 500 multinational enterprises, categorising them on the basis of where in the triad of North America, EU and Japan their sales were generated. The analysis found that the majority of multinational enterprises examined were regionally and not globally focused. Interestingly, although several of the nine 'global' multinational enterprises identified by Rugman and Verbeke (2004: 7) were drawn from the information and communication technologies industries, none were telecommunication service providers.[8] This approach has also been used to determine internationalisation within specific industries. The preference for regional or bi-regional rather than global strategies has been observed in industries such as retailing (Rugman and Girod, 2003), food and beverages (Filippaios and Rama, 2008) and cosmetics (Oh and Rugman, 2006).

A regional approach is adopted here. In contrast to Rugman and Verbeke (2004), seven regions have been identified. On the one hand, these regions reflect the regulatory and commercial differences that exist within the global mobile telecommunications industry. On the other hand, they also reflect the possibility raised by Dunning et al. (2007) that multinational enterprises could be attracted to sub-regions within North America, the European Union and Japan. More regions facilitate a more detailed understanding of mobile operator internationalisation strategies. The additional regions that have been included also reflect the simple fact that mobile telecommunication licences have been offered outside the triad identified by Rugman and Verbeke (2004). The seven regions adopted in our analysis are as follows:

- Western Europe, which includes the current 27 member states of the European Union plus residual Western Europe;

- Eastern Europe, which includes the Balkans, Belarus, Moldova, Russia and the Ukraine;
- The Middle East, which includes the Arabian peninsula, Armenia, Azerbaijan, Cyprus (North), Georgia and Turkey;
- Asia-Pacific, which includes Kazakhstan, most other 'stans', Australia and New Zealand;
- Latin America, which also includes most of the Caribbean;
- North America, which largely constitutes Canada, Puerto Rico and the United States;
- Africa as geographically defined.

It is evident that the geographical positioning of a country can conflict with its habitual positioning for reasons of, say, political economy. For example, Egypt is often regarded as being in the Middle East rather than Africa. Furthermore, one often hears the term 'Eurasia' used in relation to the CIS countries. Since it is impossible to come up with a definitive division of the world into regions that would satisfy all readers, we must simply point out that consistency of definition over time is probably a more important issue.

9.3 NUMBER OF COUNTRIES

Drawing on Table 9.1, it is possible to make a series of observations regarding the number of countries in which mobile operators were invested at the end of 2007. The first observation is that the 413 entries are divided up in a somewhat unexpected manner. One would intuitively expect international operators to be found predominantly in the most developed parts of the world and, in practice, Western Europe does loom large with 87 entries. By way of contrast, North America is largely the preserve of domestic operators – only Deutsche Telekom has an independently-owned network in the USA – and Canada is notable for the absence of international operators. What is surprising at first sight is that Africa accounts for a further 102 entries, far more even than Asia-Pacific, which has 88. What this suggests, *inter alia*, is that Asian operators prefer to stick to their own region[9] while the large number of African countries, combined with their general state of under-development, has presented opportunities for telcos wishing to establish their international credentials.

The second observation is that whereas the 30 companies surveyed were collectively invested in 413 countries, these investments were not at all evenly spread among the companies. The companies with most country coverage were France Télécom followed by Vodafone and Telefónica with

Table 9.1 Presence in countries, 31 December 2007

Company	Number of countries	Number of countries by region						
		Western Europe[1]	Eastern Europe[2]	Middle East[3]	Asia-Pacific[4]	Latin America[5]	North America[6]	Africa
France Télécom[7]	40	12	2	1	2	8	1	14
Vodafone[8]	35	14	1	3	7	–	1	9
Telefónica (incl. O_2)[9]	33	9	–	–	3	16	–	5
MTN (incl. Investcom)	22	1	–	3	1	–	–	17
TeliaSonera	19	8	3	4	4	–	–	–
Zain (incl. Celtel)	19	–	–	4	–	–	–	15
América Móvil	17	–	–	–	–	15	2	–
Telenor	17	4	4	2	7	–	–	–
Etisalat	16	–	–	4	3	–	–	9
Hutchison Whampoa	16	6	–	1	8	–	–	1
Millicom International	16	–	–	–	3	6	–	7
Orascom	14	–	–	1	8	–	–	5
Deutsche Telekom[10]	13	8	4	–	–	–	1	–
Qatar Telecom[11]	13	–	–	6	5	–	–	2
Tele2[12]	13	11	2	–	–	–	–	–
Portugal Telecom	10	1	–	–	2	1	–	6
Singapore Telecom	10	1	–	–	8	–	–	1
NTT	8	–	–	–	8	–	–	–
OTE	8	3	5	–	–	–	–	–
Sprint Nextel	8	–	–	–	–	5	3	–
Telekom Austria	8	3	5	–	–	–	–	–
Telekom Malaysia	8	–	–	1	7	–	–	–

SK Telecom	7	–	–	–	6	–	1	–
Turkcell Holding	7	–	2	4	1	–	–	–
VimpelCom	7	–	2	2	3	–	–	–
Vivendi Universal[13]	7	1	–	–	–	–	–	6
Mobile TeleSystems	6	–	3	1	2	–	–	–
Telecom Italia	6	1	–	–	–	5	–	–
TDC	5	4	–	1	–	–	–	–
Vodacom	5	–	–	–	–	–	–	5
Total	413	87	33	38	88	56	9	102

Notes:

1. Western Europe includes the 25 EU current member states plus residual Western Europe.
2. Eastern Europe includes the Balkans, Belarus, Moldova, Russia and the Ukraine.
3. The Middle East includes the Arabian peninsula, Armenia, Azerbaijan, Cyprus (N), Georgia and Turkey.
4. Asia-Pacific includes 'stans' such as Kazakhstan, Australia and New Zealand. Tibet is not counted separately.
5. Central and Southern America plus most of the Caribbean.
6. North America constitutes Canada, Puerto Rico and the USA.
7. Trading mostly as Orange, a wholly-owned subsidiary. Those French overseas territories where Orange is present are counted separately and not included within the total for France.
8. Network Partnership Agreements are not included within Vodafone's total.
9. Telefónica Móviles owns and operates almost all of the networks.
10. Trading mostly as T-Mobile, a wholly-owned subsidiary.
11. Including al-Wataniya.
12. MVNOs are included in Tele2's total as some investment is required before they can become operational.
13. Poland is still counted as Vivendi is still engaged in legal attempts to recover its assets.

Source: Compiled by the authors.

a presence in 40, 35 and 33 countries respectively, while the operators with the least coverage were TDC and Vodacom with a presence in five.

A third observation is that the 17 companies with a presence in at least 10 countries collectively accounted for 323 of the 413 investments, equivalent to well over three-quarters of the total. It may also be observed that the top three companies had a collective presence in 108 countries, equivalent to over one-quarter of the total. It is worth noting here that the top three companies – France Télécom, Vodafone and Telefónica – were present in significantly more countries than the fourth-ranked, MTN, which was present in just 22. However, it may also be noted that Digicel had stakes in roughly 25 (mostly) small Caribbean networks in December 2007 but too few subscribers to qualify for the sample.

The high total for France Télécom is hard to credit at first sight, if for no other reason than that, like certain of its peers, it makes no reference to many of the small, indirect and unconsolidated stakes in its annual reports. This makes it difficult to be absolutely certain of the status of some of the holdings, but as can be seen it is the extensive but minor holdings in Africa that account for much of the total, not to mention the many small independent island networks dotted around the world.

A related observation is that the investments of a significant proportion of the companies were numerically concentrated in a single region at the end of 2007. Altogether, 12 companies had two-thirds or more of their investments within a single region. Those companies which had concentrated their investments in Western Europe were TDC and Tele2, while NTT, Singapore Telecom, SK Telecom and Telekom Malaysia concentrated on Asia, América Móvil and Telecom Italia on Latin America and MTN, Vivendi, Vodacom and Zain on Africa.

9.4 PSYCHIC DISPERSION

It is immediately evident that the geographical basis for the allocation of networks used in Table 9.1 does not accord all that closely with the concept of psychic dispersion which groups countries according to their cultural affinity. It is argued that companies seeking to internationalise may well prefer to go first to foreign countries that are culturally close – that is, in the same zone – in order to learn how to operate overseas before moving on elsewhere. Hence, the greater the number of zones in which they operate at any point in time, the greater is the degree of internationalisation achieved.

However, the ten-zone division referred to previously is problematic when applied to mobile telecommunications as only 46 countries are identified in the nine zones excluding 'Other'. The fact that Africa is entirely absent other

than South Africa in the Anglo zone helps to explain why every operator qualifies for the 'Other' zone, which accordingly loses any real utility.

That said, it is of interest to note from Table 9.2 that only five operators achieve a psychic dispersion score of 50 per cent or higher. The highest, at 70 per cent, are Hong Kong-based Hutchison Whampoa – which is partly accounted for by its unique strategy of seeking to be a new entrant across a variety of zones via establishing third-generation (W-CDMA) rather than second-generation (GSM) networks – and Telefónica, which increased its zonal coverage by taking over O_2. Close behind comes Vodafone with 60 per cent, although this appears to undervalue its international range of operations given that they include the likes of China and Egypt. In joint fourth place are France Télécom/Orange and Telecom Italia which score 50 per cent, but nearly half of the scores are either 20 or 10 per cent – scores which, given the standard entry in the 'Other' column, effectively mean that there is only a weak link with the previous work on psychic dispersion.

One factor reducing scores across the board is the virtual absence of entries in the 'Arab' zone. Only the three operators based in the zone, Qatar Telecom, Etisalat of the UAE and Zain of Kuwait, have non-domestic networks there. This reflects the fact that the countries within the 'Arab' zone are either closed to foreign direct investment or are too small to attract the attention of an inward investor. In contrast, there are seven entries in the 'Near Eastern' zone, which has grown rapidly with liberalisation. It is of interest that of the ten operators with a psychic dispersion score of 40 per cent or more, the majority are present in the Anglo and Independent zones and half in the Far Eastern and Latin European zones. Indeed, a surprising number of operators are present in at least one of the four countries that comprise the 'Independent' zone. Brazil and India in particular have attracted foreign investment because they are large emerging markets with substantial growth opportunities. The popularity of the 'Other' zone reflects the widespread liberalisation of the telecommunications industry in general and mobile in particular that has occurred in recent years. As a consequence, large swathes of Africa as well as parts of Eastern Europe and Asia are now open to foreign direct investment.

A final observation is that if we compare the number of countries identified in Table 9.1 with the psychic dispersion scores discussed above, a large country score does not necessarily equate to an equally high psychic dispersion score (although it is the case that three of the four operators with the highest dispersion scores are present in at least 25 countries).

It is evident from the above that the concept of psychic dispersion as developed in the literature does not yield much light on the behaviour of mobile operators as they seek to internationalise. The problem is one that has been referred to previously, namely that to internationalise, an

Table 9.2 Psychic dispersion, 31 December 2007

	Total	Anglo	Germanic	Nordic	Near Eastern	Arab	Far Eastern	Latin American	Latin European	Independent	Other
Hutchison Whampoa	7	X	X	X			X		X	X	X
Telefónica (incl. O_2)	7	X	X				X	X	X	X	X
Vodafone	6	X	X		X				X	X	X
France Télécom	5	X	X				X		X		X
Telecom Italia	5				X			X	X	X	X
América Móvil	4	X						X		X	X
Singapore Telecom	4	X					X			X	X
Sprint Nextel	4	X						X		X	X
Telekom Malaysia	4				X		X			X	X
TeliaSonera	4			X	X				X		X
Deutsche Telekom	3	X	X								X
MTN (incl. Investcom)	3	X			X						X
NTT	3						X			X	X
Orascom	3						X			X	X
Portugal Telecom	3								X	X	X
TDC	3		X	X							X
Telenor	3			X			X				X
Tele2	3		X	X							X
Qatar Telecom	2					X					X
Etisalat	2					X					X
Millicom	2							X			X
OTE	2				X						X
SK Telecom	2						X				X

Telekom Austria	2		X								X
Turkcell Holding	2				X						X
Vivendi Universal	2								X		X
Vodacom	2	X									X
Zain (incl. Celtel)	2					X					X
Mobile TeleSystems	1										X
VimpelCom	1										X
Total	96	10	8	5	7	3	9	5	8	11	30

Notes:
Anglo = Australia, Canada, Ireland, NZ, South Africa, UK, USA.
Germanic = Austria, Germany, Switzerland.
Nordic = Denmark, Finland, Norway, Sweden.
Near Eastern = Greece, Iran, Turkey.
Arab = Abu-Dhabi, Bahrain, Kuwait, Oman, Saudi Arabia, UAE.
Far Eastern = HK, Indonesia, Malaysia, Philippines, Singapore, S. Vietnam, Taiwan, Thailand.
Latin American = Argentina, Chile, Colombia, Mexico, Peru, Venezuela.
Latin European = Belgium, France, Italy, Portugal, Spain.
Independent = Brazil, India, Israel, Japan.
Other = everywhere else.

Source: Compiled by the authors.

operator needs either to acquire equity stakes or licences, and neither become available simply for the asking. Furthermore, there is a slow route and a fast route available, with the latter comprising the taking over of an established international operator. But such an operator may have either a psychically aligned or psychically dispersed set of holdings – it is not normally possible for a prospective bidder to choose which one to go after, at least not in the short or often even the medium term. In other words, the element of opportunism is too great to provide support for the traditional view of psychic dispersion.

This suggests that there is a need to develop a version of psychic dispersion that takes into account the peculiarities of the telecommunications industry. One such approach could be to identify the institutional characteristics of telecommunication markets, and then group countries depending on their similarities and differences. Although the presence of formal institutions has been shown to encourage foreign direct investment (Bevan et al., 2004), it is also necessary to determine how the institutions function. Another approach could reflect the country characteristics of the emerging markets where many operators say they will expand into when asked about their expansion plans, not least because developed markets offered only limited opportunities for expansion.

Having said this, the term 'emerging markets' lacks precision and while it may cover, say, most of Africa, there are perhaps as many differences between African countries as there are similarities between them. Moreover, it does not take into account the regional differences that exist between, for instance, west and east African countries, or the presence of tribal areas that transcend national borders.

As things stand currently, the most acquisitive operators come from the Middle East, and moves are anticipated from those based in Russia and China among others. If they wait for opportunities to acquire psychically compatible operators they will be waiting a long time – but China Mobile opted for Millicom and it should be borne in mind that the psychic incompatibilities were surely part of the reason why the deal went sour.

9.5 NUMBER OF PROPORTIONATE SUBSCRIBERS

Table 9.3 shows the number of proportionate subscribers controlled by each company. In addition, the table breaks down this figure by region. The table clearly highlights the large disparities that existed at the end of 2007 in terms of the number of proportionate subscribers controlled by each company, with the number controlled ranging from 249 million for Vodafone to 7 million for TDC. The 30 companies between them controlled

roughly 1.650 billion proportionate subscribers. On the basis of the substantial variations that existed at the end of 2007, it is difficult to argue that internationalisation by mobile telecommunications companies is associated with any particular scale of operation.

Comparing the top ten companies in Tables 9.1 and 9.3 is informative as several differences can be observed. In the first place, five of the ten most-internationalised mobile telcos, as measured by country presence, are not included in the top ten when the measurement criterion changes to the number of proportionate subscribers. This feature would in practice have been much more pronounced had there been no minimum requirement placed upon the number of proportionate subscribers since Cable & Wireless and Digicel operate in a large number of mostly small markets in the Caribbean.

Another company whose large geographical footprint is not reflected in its subscriber numbers is Hutchison Whampoa. This is because it does not own any of the heavily subscribed GSM networks in Western Europe, having entered there fairly recently via the 3G licensing process. It is also worth pausing to remark upon the situation in Russia and the USA. Two of the three mega-operators in Russia – Mobile TeleSystems (MTS) and VimpelCom – are to be found in Table 9.3 whereas MegaFon is not. Altimo – formerly Alfa Telecom, part of the Alfa Group – owns stakes in both MegaFon and VimpelCom, and also holds stakes in Turkey (and hence indirectly in Fintur Holdings alongside TeliaSonera) and the likes of the Ukraine and Uzbekistan. It accordingly accounts for a large number of proportionate subscribers. However, it only holds minority stakes, claims not to be seeking control and has no experience as an operator. For this reason, it is treated here as purely an investment company and is excluded from the tables. Meanwhile, Sistema owns the majority of MTS and has recently bought into India, but fails to qualify for the tables even though its CEO stated in February 2008 that 'we want to be one of the top five players in the world by number of mobile subscribers' during the period 2008–2010 or not at all, as it is treated as an investor.

As noted previously, major US-based operators such as AT&T and Verizon Communications would have appeared in the tables in previous years but have disappeared due to their withdrawal to their home region since 2005. In practice, AT&T arguably qualifies because it has long held an investment in América Móvil equivalent to roughly 8 per cent of the latter's equity. However, since it otherwise operates only in the North American region, and since the América Móvil stake is clearly a non-controlling investment, it would distort the tables were it to be included.

It may be noted that Altimo is not the only holding company to create difficulties in tabulating international operators. For example, Temasek

Table 9.3 Proportionate subscribers by region, 31 December 2007

Company	Total subs (millions)	Number of subscribers by region[1] (millions)						
		Western Europe	Eastern Europe	Middle East	Asia-Pacific	Latin America	North America	Africa
Vodafone[2]	248.761	132.352	1.127	16.106	41.744	–	29.568	27.864
América Móvil	153.898	–	–	–	–	142.139	11.759	–
Telefónica (incl. O_2)	147.354	62.319	–	–	neg.	82.624	–	2.386
Deutsche Telekom	104.591	74.029	1.879	–	–	–	28.683	–
France Télécom[3]	92.140	64.103	10.593	0.772	0.100	3.842	neg.	12.730
Mobile TeleSystems	83.577	–	79.313	1.104	3.160	–	–	–
Telenor	79.778	9.768	29.093	0.221	40.696	–	–	–
Singapore Telecom	61.948	neg.	–	–	61.948	–	–	neg.
Telecom Italia	60.619	36.288	–	–	–	24.331	–	–
Orascom	57.985	–	–	0.107	38.048	–	–	19.830
Sprint Nextel[4]	54.909	–	–	–	–	0.861	54.048	–
TeliaSonera	51.252	13.679	18.823	15.402	3.348	–	–	–
VimpelCom[5]	49.443	–	44.162	0.657	4.624	–	–	–
MTN (incl. Investcom)	48.088	0.113	–	6.522	0.720	–	–	40.733
Turkcell Holding	42.849	–	4.373	37.200	1.276	–	–	–
NTT	38.031	–	–	–	38.031	–	–	
SK Telecom	34.095	–	–	–	34.050	–	neg.	–
Zain (incl. Celtel)	30.071	–	–	5.733	–	–	–	24.338
Vodacom	29.894	–	–	–	–	–	–	29.894
Telekom Malaysia	28.260	–	–	neg.	28.250	–	–	–
Portugal Telecom	19.887	6.261	–	–	0.182	10.547	–	2.897
Hutchison Whampoa	19.380	12.659	–	0.738	5.868	–	–	0.115

Etisalat	18.678	–	–	10.295	7.053	–	–	1.330
Millicom International	18.211	–	–	–	2.243	10.518	–	5.450
Vivendi Universal	17.739	10.176	–	–	–	–	–	7.563
Tele2	17.236	8.239	8.997	–	–	–	–	
OTE	14.797	12.096	2.701	–	–	–	–	
Telekom Austria	14.533	9.065	5.468	–	–	–	–	–
Qatar Telecom[6]	8.834	–	–	3.348	2.909	–	–	2.577
TDC	7.273	7.113	–	0.160	–	–	–	–

Notes:
neg. = negligible.
1. Defined as per footnotes to Table 9.1.
2. Network Partnership Agreements are not included within Vodafone's total.
3. Those French overseas territories where Orange is present are counted separately and not included within France.
4. Sprint Nextel accounts as follows: 53.847 million direct subscribers less affiliates (4.578 million) less Virgin Mobile (5.085 million) less Qwest (824 000) plus 18.5% stake in Virgin Mobile (941 000) plus 100% Boost Mobile (4.578 million) = 48.035 million in the USA. The gross figure is used here as other operators usually (but not invariably) include MVNOs.
5. The data are for 'active subscribers' as published by VimpelCom. However, they are much lower than those used elsewhere: for example, Russia is given as 42.221 million compared to the usual 50.889 million (which is known to be exaggerated). Hence direct comparability with other Russian operators which use other methodologies must be treated with caution.
6. Including 51% of al-Wataniya.

Source: Compiled by the authors.

Holdings in Singapore is the majority stakeholder in Singapore Telecom and hence could be treated as the ultimate parent company, leading to the displacement of SingTel from the tables, but its status is clearly as an investment company, not an operator, and hence it is not included. An even trickier example is Weather Investments II which is owned by the Sawiris family. Weather owns fractionally over one half of Orascom Telecom Holding as well as Italy's Wind and Greece's Wind Hellas. The latter two operators contribute roughly 20 million proportionate subscribers to Weather, but even more would be lost due to the part ownership of Orascom were Weather to be used rather than Orascom in the tables. Hence, it is a moot point whether one or the other company should be used in the tables. Since Weather is not itself an operator, we have opted for Orascom – at least for 2007 – but this may need to be re-assessed.

A final awkward case is Qatar Telecom which acquired a 51 per cent stake in al-Wataniya in March 2007. Prior to 2007, Qatar Telecom operated only in the modest markets of Oman and Qatar, but in March 2007 it suddenly announced that it had ambitions to be counted among the top 20 telecommunications companies in the world (presumably including fixed-wire) by 2020. Even with its oil riches, this seemed to be ambitious, but it promptly made investments not only in al-Wataniya but in the likes of Shennington Investments and Singapore Technologies Telemedia such that by the end of 2007 it was involved in 13 networks spread across the Middle East, Asia-Pacific and Africa regions. Because its stake in al-Wataniya was only 51 per cent, it still did not have enough proportionate subscribers to qualify for the tables until near the end of 2007, but we have chosen to treat it as a qualifying operator, in the process displacing al-Wataniya from the tables.

9.6 NUMBER AND PERCENTAGE OF PROPORTIONATE SUBSCRIBERS BY REGION

Table 9.4 reworks the data contained in Table 9.3 above so that the evident regional differences are highlighted. It is clear from the table that for many mobile operators their domestic market provided a significant number of their proportionate subscribers at the end of 2007, notwithstanding their internationalisation. For nine of the companies listed, the home market accounted for at least half of the proportionate subscribers that they claimed, and for six among these the domestic market accounted for at least two-thirds of their proportionate subscribers. There was even one operator whose domestic market provided more than 90 per cent of its proportionate subscribers, while at the other end of the spectrum there was one operator

Table 9.4 Percentage of proportionate subscribers by region, 31 December 2007

Company	Total subs (millions)	Domestic as % of total	Percentage of subscribers by region[1]						
			Western Europe	Eastern Europe	Middle East	Asia-Pacific	Latin America	North America	Africa
Sprint Nextel	54.909	98.1	–	–	–	–	1.6	98.4	–
VimpelCom	49.443	85.4	–	89.9	1.3	9.4	–	–	–
Turkcell Holding	42.849	83.5	–	10.2	86.8	3.0	–	–	–
NTT	38.031	83.3	–	–	–	100.0	–	–	–
Vodacom	29.894	81.1	–	–	–	–	–	–	100.0
Mobile TeleSystems	83.577	68.7	–	94.9	1.3	3.8	–	–	–
SK Telecom	34.095	64.4	–	–	–	99.9	–	0.1	–
Telecom Italia	60.619	59.9	56.4	–	–	–	43.6	–	–
Vivendi Universal	17.739	57.4	57.4	–	–	–	–	–	42.6
TDC	7.273	40.4	97.8	–	2.2	–	–	–	–
OTE	14.797	38.5	81.7	18.3	–	–	–	–	–
Etisalat[2]	18.678	34.3	–	–	55.1	37.8	–	–	7.1
Deutsche Telekom	105.202	33.4	70.8	1.8	–	–	–	27.4	–
América Móvil	153.898	32.5	–	–	–	–	92.4	7.7	–
Portugal Telecom	19.887	31.5	31.5	–	–	0.9	53.0	–	14.6
MTN (incl. Investcom)[3]	48.088	30.8	0.2	–	13.6	1.5	–	–	84.7
France Télécom[4]	92.140	27.8	69.6	11.5	0.9	0.1	4.2	neg.	13.7
Telekom Austria	14.533	27.2	62.4	37.6	–	–	–	–	–
Telekom Malaysia	28.387	25.4	–	–	neg.	100.0	–	–	–
Tele2	17.236	15.7	47.8	52.2	–	–	–	–	–
Telefónica (incl. O_2)	147.354	15.4	42.3	–	neg.	neg.	56.1	–	1.6
Qatar Telecom[5]	8.834	14.3	–	–	37.9	32.9	–	–	29.2

Table 9.4 (continued)

Company	Total subs (millions)	Domestic as % of total	Percentage of subscribers by region[1]						
			Western Europe	Eastern Europe	Middle East	Asia-Pacific	Latin America	North America	Africa
TeliaSonera[6]	51.252	14.2	26.7	36.7	30.1	6.5	–	–	–
Orascom[7]	57.985	8.5	–	–	0.2	65.6	–	–	34.2
Vodafone[8]	248.761	7.4	53.2	0.4	6.5	16.8	–	11.9	11.2
Zain (incl. Celtel)[9]	30.071	5.1	–	–	19.1	–	–	–	80.9
Singapore Telecom	61.948	3.8	neg.	–	–	100.0	–	–	neg.
Hutchison Whampoa	19.380	3.7	65.3	–	3.8	30.3	–	–	0.6
Telenor	79.778	3.6	12.2	36.5	0.3	51.0	–	–	–
Millicom International[10]	18.211	0.0	–	–	–	12.3	57.8	–	29.9

Notes:
1. Defined as per footnotes to Table 9.1.
2. The company's home market is the UAE.
3. The company's home market is South Africa.
4. Those French overseas territories where Orange is present are counted separately and not included within France.
5. Including al-Wataniya which is based in Kuwait.
6. TeliaSonera's home market is defined as Finland plus Sweden.
7. The company's home market is Egypt.
8. Network Partnership Agreements are not included within Vodafone's total.
9. Zain's home market is Kuwait while Celtel is based in the Netherlands.
10. The company's home market is Luxembourg.

Source: Compiled by the authors.

that did not operate at all in what was technically its domestic market, and six others where the domestic proportion was under 10 per cent.

If we remove the two extreme operators from consideration, then Hutchison Whampoa, Orascom, Singapore Telecom, Telenor, Vodafone and Zain stand out as their domestic markets accounted for less than 10 per cent of their proportionate subscriber base. In respect of Hutchison Whampoa, Singapore Telecom and Telenor, this simply reflected the small size of their domestic markets, but that was clearly not the case for Vodafone in the United Kingdom. The UK accounted for 7.5 per cent of Vodafone's proportionate subscribers, with the remainder being spread across the rest of Western Europe (53.2 per cent), Asia (16.8 per cent), North America (11.9 per cent), Africa (11.2 per cent) and Eastern Europe (0.4 per cent). While this does demonstrate that Western Europe provided the majority of Vodafone's proportionate subscribers, it also shows that Vodafone had a substantive presence in at least two other regions, namely Asia and North America. Vodafone's presence in a further region, Africa, had been quite small prior to 2007, but the sharp increase during 2007 reflected its 35 per cent stake in Vodacom of South Africa – raised to 50 per cent in January 2006 – which was growing rapidly, as well as growth in its directly held investments.

Through an examination of the percentage of proportionate subscribers by region, we can conclude that many mobile operators are in fact highly regional in their international focus. For 16 out of the 30 companies detailed in Table 9.4, one region accounted for at least two-thirds of their proportionate subscribers as follows:

- Western Europe: Deutsche Telekom, France Télécom, OTE and TDC.
- Eastern Europe: Mobile TeleSystems and VimpelCom.
- Middle East: Turkcell Holding.
- Asia: NTT, Singapore Telecom, SK Telekom and Telekom Malaysia.
- Latin America: América Móvil.
- North America: Sprint Nextel.
- Africa: MTN, Vodacom and Zain.

In every case bar one (Zain), this region was also where they were headquartered.

A further issue to address is whether, if a large number of mobile operators drew their proportionate subscribers predominantly from a single region, any of them had a significant presence in two or more regions. If drawing 20 per cent of the proportionate subscriber base from a single region is taken as being a significant presence, then 14 operators had a

significant presence in two or more regions at the end of 2007. Those operators with such a presence were Deutsche Telekom, Etisalat, Hutchison Whampoa, Millicom International, Orascom, Portugal Telecom, Qatar Telecom, Telekom Austria, Telecom Italia, Telefónica, Telenor, TeliaSonera, Tele2 and Vivendi Universal. Only Qatar Telecom and TeliaSonera among these had a significant presence in three regions. However, for the other 12 operators a single region, which more often than not was their domestic region, still provided more than half of their subscribers. It is also of interest to note that Portugal Telecom and Telefónica drew more than half of their proportionate subscribers from Latin America, rather more than from their domestic region.

9.7 IDENTIFYING THE MOST INTERNATIONALISED OPERATORS

In the previous section certain important dimensions of internationalisation have been explored. As a part of this, attention has been drawn to the fact that the list of the ten most internationalised mobile telcos as determined by the number of countries in which they were present at the end of 2007 was not the same when the number of proportionate subscribers was the measurement criterion. This was also the case when the percentage of proportionate subscribers outside the mobile operator's domestic market was used.

Table 9.5 lists the top ten operators according to the various criteria discussed above. Drawing on Table 9.5, it is possible to identify three mobile operators that appear among the top ten companies in the first three columns, namely Telefónica, Telenor and Vodafone, while América Móvil, France Télécom, Hutchison Whampoa, Orascom, Singapore Telecom, TeliaSonera and Zain appear in two columns. The most surprising omission is Deutsche Telekom which is quite dependent upon the home market and appears to have little interest in investments beyond its neighbours to the east and in the USA. However, Telecom Italia, which is currently a shadow of its former self in international terms, is another of the 'big five' failing to appear in more than one column (see below).

If the fourth column is also taken into account then the first observation that we can make is that since Vodafone has a higher ranking than Telefónica and Telenor on three of the criteria, it must be deemed to have been the most internationalised operator in the mobile telecommunications sector during 2007. Nevertheless, with over 50 per cent of its subscribers coming from the West European region – although that ratio has been falling steadily – no subscribers at all in one of the seven regions, a negligible presence in another,

Table 9.5 The most-internationalised mobile operators at 31 December 2007

Rank order	Number of countries	Proportionate subscribers	Percentage of proportionate subscribers outside the domestic market[1]	Psychic dispersion
1	France Télécom	Vodafone	Telenor	Hutchison Whampoa (1=)
2	Vodafone	América Móvil	Hutchison Whampoa	Telefónica (1=)
3	Telefónica	Telefónica	Singapore Telecom	Vodafone
4	MTN	Deutsche Telekom	Zain	France Télécom (4=)
5	TeliaSonera	France Télécom	Vodafone	Telecom Italia (4=)
6	Zain	Mobile TeleSystems	Orascom	América Móvil (6=)
7	América Móvil	Telenor	TeliaSonera	Singapore Telecom (6=)
8	Etisalat	Singapore Telecom	Qatar Telecom	Sprint Nextel (6=)
9	Telenor	Telecom Italia	Telefónica	Telekom Malaysia (6=)
10	Hutchison Whampoa	Orascom	Tele2	TeliaSonera (6=)

Note: 1. Excluding Millicom International which has no subscribers in its home markets.

Source: Compiled by the authors.

a now much reduced presence in Asia and with rumours of its departure from the USA, where it has no controlled operations, it is hard to accept that Vodafone can be deemed to be a worldwide operator, its Partner Network Agreements notwithstanding.

The rank order beyond Vodafone is rather more contentious. Whereas Telefónica is not overly dependent upon its home market, it effectively operates in only two regions, with Spain providing the great bulk of its European subscribers and Brazil the bulk of the remainder. Hence, while it has recently been actively seeking to expand its horizons, especially with the purchase of O_2, its profile remains bi-regional. Meanwhile Telenor is a much smaller operation and really only operates in three regions, so its relative prominence

in Table 9.5 is deceptive. Clearly, although not bi-regional, it is not far off that description given the proximity of its West and East European investments.

For its part, France Télécom is unique in that it is present in every region, which would be an impressive result were it not for the fact that it is so dependent upon a single region for its subscribers (and hence fails to make the list in column 3). As an aspiring worldwide operator it has much to thank for its colonial past, but in subscriber terms it is really tri-regional with no presence in North America other than on Canadian islands and only rather minor networks in several other regions. Furthermore, it is unlikely to make major new investments in the near future. América Móvil appears in the same three columns, which is impressive for an operator based in Latin America, but it is effectively a one-region operator with a big domestic market, so once again its multiple appearances in Table 9.5 are deceptive. That leaves Hutchison Whampoa, a company whose telecommunications holdings are undergoing radical restructuring. These holdings grew rapidly, in good part due to the long-awaited explosion of 3G subscriptions, mainly in Italy and the UK. However, needing to fund its huge investments in 3G, and having hived off most of its non-European assets into Hutchison Telecom International (HTIL), it subsequently sold a fifth of HTIL to Orascom and Hutchison Essar to Vodafone, and hopes to conduct IPOs in Italy and the UK. At the end of the day, therefore, its position in Table 9.5 is somewhat deceptive because its domestic market is so small and it remains essentially a bi-regional operator, albeit one with a much more laid-back attitude than other operators about moving into markets where it has little psychic affinity.

The fact that two major West European incumbents, Deutsche Telekom and Telecom Italia, are less prominent may, as noted previously, be viewed as surprising. In the latter case, however, this reflected a conscious strategy of concentrating upon the very large markets of Italy, Brazil (where it toyed with selling out) and Turkey (where it did sell out) while selling its non-core networks. Deutsche Telekom is a more interesting case because it exited the high-growth market of Russia, declined to bid for O_2, and its CEO stated in August 2005 that it was 'not actively seeking new acquisitions, but we will continue to evaluate new opportunities which arise within our existing footprint'. Clearly, this is hardly the profile of a company with global ambitions and it is currently negotiating a further European stake in Greece while rumours swirl around its intentions towards Sprint Nextel in the USA where it is already established. Finally, TeliaSonera, the only European operator that was the product of a merger, performs well and only just fails to qualify in all four columns. However, although it has operations in four regions, its subscribers are almost equally divided between just three of them so it is clearly a classic tri-regional operator.

9.8 CONCLUSIONS

This chapter has examined internationalisation at the end of 2007 along four different dimensions. Through these dimensions – number of countries, psychic dispersion, the number of proportionate subscribers and their distribution by region – the differences that exist across the 30 mobile operators in this study have been highlighted. These four dimensions were then brought together in a composite index to answer the often asked question as to which operator is the most internationalised. Although Vodafone is identified as the most internationalised of the 30 mobile operators examined, it cannot be considered to be a global operator due to the regional distribution of its subscribers. In addition, determining which operator is the second, third or fourth most internationalised is not easy – although a range of candidates such as América Móvil, France Télécom, Hutchison Whampoa and Telefónica exist, they all, in one way or another, fall short of establishing a definitive place in the international pecking order.

For historic reasons some mobile operators have lots of minor stakes dotted around the world, but these are not really evidence of an international strategy as such. Through the use of regionally allocated subscriber data we have been able to demonstrate that there is in fact no such thing as a global operator in any meaningful sense of the term. Certainly, sheer size and global presence are poorly correlated. This is of considerable interest because it is now commonplace for the new generation of aspiring international operators, mostly emerging from the Middle East, to use the term 'global' or its equivalent to explain their strategic intentions. However, the evidence shows only too clearly that they will never attain a truly global status, but rather come to ape the bi-regional or tri-regional pattern that much more closely reflects the reality of most large international operators.

Even so, it is not uncommon to read about the global presence of mobile operators. Indeed, a recent book (Ibbott, 2007) is subtitled 'The Vodafone-Ericsson journey to globalization'. However, this book is about how Vodafone imposed common managerial practices within the company and says nothing directly about the strategy that determined where the company would operate and why. Although it is helpful to assume that the answer to these questions is that there is always a coherent strategy in place, the evidence does not really bear out this supposition. There is plenty of evidence of coherence when it comes to operating regionally, but operating on a multi-regional basis, and especially on a worldwide basis, has always necessitated much more of an opportunistic strategy which contains not merely expansionary moves but periodic strategic withdrawals. The experiences of both NTT in Europe and Vodafone in Japan, for example, have shown only too clearly that once an operator moves out of its comfort zone,

which will be influenced by such factors as commonality of culture and language, it cannot expect the strategy devised to suit the environment of its home region to be transferable to other regions without significant adjustment.

The difficulties that both of these operators experienced demonstrate that making such adjustments is not a straightforward process. Despite their size and resources, NTT and Vodafone were unable to prosper in markets that have long been held up as being central to any claim that an operator can make to have a global presence. Their difficulties also suggest that the mobile telecommunications industry has not reached anything resembling a long-term steady-state – that is, the industry is likely to witness another bout of restructuring in the near future. Regardless of whether this is triggered by the need of operators to redeploy capital to their domestic markets or by the emergence of potentially more lucrative investment opportunities elsewhere in the world, the restructuring offers the possibilities for some, but not all, operators to expand their geographical footprints and acquire more subscribers. The extent to which changes in the structure of the mobile telecommunications industry have occurred in recent years will be discussed in the following chapter.

NOTES

1. The size of a stake is a very unreliable guide to the associated number of proportionate subscribers, and hence even very small stakes should not be excluded as it is sometimes argued. For example, Vodafone's 3.3 per cent stake in China Mobile (Hong Kong) yielded 12.2 million proportionate subscribers in 2007.
2. The obvious drawback to including indirectly-held stakes is that it superficially involves an element of double-counting – that is, the same subscribers end up being attributed to two or more mobile operators. However, the purpose of this book is to examine the international operations of individual mobile operators, not of operators taken as a whole, and hence this drawback is not relevant.
3. Kogut and Singh (1988: 422) draw on the four cultural dimensions identified by Hofstede (1980) to develop their index. These dimensions are power distance, uncertainty avoidance, individualism and masculinity/femininity.
4. Although this number is necessarily arbitrary, it has one major advantage in that it avoids the problems of making comparisons that would otherwise arise with operators such as Cable & Wireless and Digicel, which have large numbers of networks, but where most of them yield very small numbers of proportionate subscribers.
5. There are a large number of mobile operators that do not provide subscriber data for all of their networks. Indeed, many annual reports omit any mention of indirect and/or minority stakes. In addition, there is no universally accepted standard for reporting subscriber numbers. For example, mobile operators differ in how long they count a subscriber as 'active' after making or receiving the last recorded phone call or text message.
6. The ownership of networks, especially in countries such as Russia, is a matter that is frequently brought before the law courts. Partly for this reason, and also because it is strictly a financial investor and not a mobile operator, Altimo (Alfa Telecom) has been excluded from the analysis. To be included in the analysis, ownership data has been triangulated

and account taken of the position pending the outcome of any outstanding cases before the courts.

7. As it happens, the recent popularity of buying back floated shares in mobile subsidiaries – for example, France Télécom/Orange, Deutsche Telekom/T-Mobile, Telefónica/Telefónica Móviles and Telecom Italia/TIM – means that NTT is now the only major telecommunications operator with a significant holding in its mobile subsidiary in the hands of other parties.
8. To be 'global' a multinational enterprise must have at least 20 per cent of its sales from each of the triad regions, with no single region accounting for 50 per cent or more of the total (Rugman and Verbeke, 2004: 7). Of the nine companies that are identified as being global, only one, Nokia, is from the telecommunications industry.
9. NTT DoCoMo was the only Asian operator actively to seek an international footprint outside Asia, and its tribulations overseas have done little to stimulate anyone else to follow suit although it is itself beginning to show signs of renewed interest.

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10. Dominant operators in international mobile telecommunications: an empirical analysis

10.1 INTRODUCTION

The issue as to which mobile operators are seeking to achieve a major international presence in the mobile telecommunications industry is essentially an empirical one which can be addressed primarily through their behaviour and to a lesser extent through their public comments. It has been established in Chapter 9 that, despite much anecdotal evidence to the contrary, no existing mobile operator can as yet truthfully claim to have a worldwide/global presence. However, it has become clear that operators have emerged, primarily in the Middle East, with highly ambitious acquisition programmes at precisely the point in history when the previously highly-acquisitive American operators have largely retreated back into their home market. Thus, we must reasonably assume that the mobile map of the world is being redrawn in a major way.

Previous chapters took a more dynamic view covering a period of roughly five years from 2003 to 2007 inclusive. By so doing, different aspects of internationalisation within the mobile telecommunications industry have been highlighted. The discussion of internationalisation within the Asia-Pacific region in Chapter 3 drew attention to the difficulties that mobile operators face when it comes to building an international footprint. Given that mobile operators based outside the region have preferred to focus their attention on investment opportunities elsewhere, with the notable exceptions of Telenor and Vodafone internationalisation has largely taken the form of Asia-Pacific based companies investing in Asia-Pacific markets. In contrast, Middle-Eastern based operators are playing a prominent role in the restructuring of Africa's mobile telecommunications market (Chapter 4). Although operators from the former colonial powers, such as France Télécom and Vodafone, have played a role in the restructuring, the continent's widespread liberalisation has also attracted the attention of Middle-Eastern based operators who see Africa as a key

component in fulfilling their ambitious plans to become global operators or at least one of the industry's largest operators by subscribers. This does not mean, however, that African-based operators have played no role in the restructuring since the likes of MTN and Vodacom have expanded into other African markets.

Chapter 5 focused on restructuring within Europe. The expansion of the EU, initially in 2004 and more recently in 2007, elicited different responses from mobile operators. With the exception of Vodafone, operators have not sought to build for themselves an extensive pan-accession country footprint but have instead opted to concentrate their attention on a smaller number of countries determined by their strategic priorities or geographical proximities. For instance, Tele2 has focused on the Baltic States while Deutsche Telekom has preferred those markets contiguous with, or close to, its borders. Vodafone was able to achieve its extensive presence in the accession countries through combining ownership of mobile operators in two markets with entering into Partner Network Agreements in the smaller markets that effectively franchise the Vodafone brand in another five cases.

The discussion of European mobile telecommunications restructuring highlighted the concentrated nature of many of these markets. With only three exceptions – Liechtenstein, Poland and the UK – the two largest operators control 70 per cent or more of the market between them. This places competitive pressures on the other operators present in the market, with the consequence that it is perhaps not a surprise that in a majority of European countries the most recent operator to launch is also the smallest operator and that it is increasingly being questioned whether the size of the smaller operations makes economic sense.

While Latin America attracted foreign investment from a range of operators, the pivotal event in the restructuring of the market was the decision by BellSouth to sell its international businesses and focus on the United States, its home market. As a consequence of the restructuring that this initiated, two operators – Telefónica and América Móvil – were able to expand their Latin American footprint to such an extent that they came to dominate Telecom Italia. The discussion of Latin American restructuring in Chapter 6 introduced the sea change that American mobile operators have undergone with respect to internationalisation that was explored in the subsequent two chapters. After enthusiastically embracing internationalisation, American operators like BellSouth and AT&T divested themselves of almost all of their international operations in order to focus on their domestic market which was itself going through a major bout of (expensive) restructuring. Regulatory and technological developments underpinned this sea change. The Baby Bells were encouraged to internationalise by a regulatory framework that limited those domestic markets in which

they could invest, but as the framework was loosened and technologies, especially mobile ones, developed, they were faced with a need to raise capital to fund domestically orientated investments and acquisitions as they sought to respond to the increasing competitive pressures that they faced. The retrenchment of American operators provided others with opportunities to consolidate or expand their international footprints, primarily in Latin America.

The dynamic pictures of internationalisation provided in the regionally focused chapters were combined in Chapter 9, although the need to focus on internationalisation at the industry level meant that an essentially static view of the situation was presented. The remainder of this chapter brings everything together while taking a multi-year view, and looks towards the future.

10.2 INTERPRETATION OF TABLE 10.1

Table 10.1 identifies the number of countries in which each of the 30 operators in the sample was present, via either a direct or indirect stake, during the period 1 January 2004 to 31 December 2007. The number stated is that applicable on the latter date, while the numbers in brackets indicate any change that occurred during 2007 and the previous three years. Thus we can see, for example, that Telefónica started 2004 with 17 operations and ended it with 22, started 2005 with 22 and ended it with 25, started 2006 with 25 and ended it with 30 (in the latter case largely as a result of acquiring O_2, itself a table entry during 2005, which has accordingly been removed from the main part of the table and inserted in italics at the bottom) and started 2007 with 30 and ended it with 33.

One year can sometimes seem like a lifetime in the mobile telecommunications sector, but given the fact that the vast majority of 2G licences have been issued worldwide, there are not many opportunities to break into new markets via this route, especially in relatively developed countries. Equally, the acquisition of equity stakes tends to be a time-consuming business, often because regulators and governments want to have the final word. Hence, in principle, not much change should be expected in any single year, but practice may be quite another matter. In practice, the total number of networks in which the 30 operators in Table 10.1 had direct and/or indirect stakes rose from 385 to 413 during 2007, an increase of 28 or nearly 7 per cent. The previous year, 2006, saw network numbers rise from 356 to 385, an increase of 29 or roughly 8 per cent. In turn, 2005 showed a much larger overall net increase of 49, or 16 per cent, while 2004 saw a decrease of 7, or 1 per cent. In effect, 2004 witnessed the final working through of the

Table 10.1 Presence in countries, 2007 and changes 2007/2006, 2006/2005, 2005/2004, 2004/2003

Company	Number of countries	Number of countries by region		
		Western Europe[1]	Eastern Europe[2]	Middle East[3]
France Télécom	40 [+3, 0, +1, −2]	12 [0, 0, +1, −1]	2	1
Vodafone[8]	35 [0, −1, +3, 0]	14 [0, −3, +1, 0]	1	3 [0, +2, +1, 0]
Telefónica (incl. O_2)[9]	33 [+3, +5, +3, +5]	9 [+1, +5, +1, 0]	–	–
MTN (incl. Investcom)[10]	22 [0, +11, +4, 0]	1 [0, +1, 0, 0]	–	3 [0, +3, 0, 0]
TeliaSonera[11]	19 [+2, +1, +1, −2]	8 [0, +1, 0, 0]	3 [0, 0, +1, 0]	4
Zain (incl. Celtel)[12]	19 [0, +1, +14, +2]	–	–	4 [0, 0, 0, +2]
América Móvil[13]	17 [+2, +1, +3, +2]	–	–	–
Telenor	17 [0, +3, +2, −2]	4 [−1, 0, 0, −1]	4 [0, +1, 0, −1]	2 [+1, +1, 0, 0]
Etisalat[14]	16 [+3, 0, +7, +1]	–	–	4 [0, 0, +1, +1]
Hutchison Whampoa	16 [+1, 0, 0, 0]	6 [0, 0, +1, 0]	–	1
Millicom International	16 [−1, +1, +1, 0]	–	–	–
Orascom[15]	14 [0, 0, +4, +1]	–	–	1 [−1, 0, +1, +1]
Deutsche Telekom	13 [−1, 0, −3, 0]	8	4 [0, 0, −2, 0]	–
Qatar Telecom[16]	13 [+11, 0, +1, 0]	–	–	6 [+4, 0, +1, 0]
Tele2	13 [−1, +1, +1, 0]	11 [−1, +1, 0 , 0]	2 [0, 0, +1, 0]	–
Portugal Telecom	10 [0, 0, +1, 0]	1	–	–

Singapore Telecom	10 [+3, 0, +1, −1]	1 [+1, 0, 0, −1]	–	–
NTT	8 [0, +1, −1, −1]	0 [0, 0, −2, 0]	–	–
OTE	8 [+2, −1, 0, 0]	3	5 [+2, 0, 0, 0]	0 [0, −1, 0, 0]
Sprint Nextel[17]	8 [0, +1, −1, −1]	–	–	–
Telekom Austria	8 [+3, 0, +1, 0]	3	5 [+3, 0, +1, 0]	–
Telekom Malaysia	8 [−1, +2, +1, −6]	–	–	1 [0, +1, 0, 0]
SK Telecom	7 [0, +3, 0, 0]	–	–	–
Turkcell Holding	7 [0, 0, +1, 0]	–	2 [0, 0, +1, 0]	4
VimpelCom	7 [+1, +2, +2, 0]	–	2 [0, 0, +1, 0]	2 [+1, +1, 0, 0]
Vivendi Universal	7 [+2, 0, +1, −2]	1 [0, 0, 0, −1]	–	–
Mobile TeleSystems	6 [+1, 0, +1, +1]	–	3	1 [+1, 0, 0, 0]
Telecom Italia	6 [−1, −1, −4, −1]	1 [0, 0, −2, −1]	–	0 [−1, 0, 0, 0]
TDC	5 [−4, −1, +4, −1]	4 [−4, −1, +3, −1]	–	1 [0, 0, +1, 0]
Vodacom	5 [0, 0, 0, 0]	–	–	–
Total	413 [+28, +29, +49, −7]	87 [−4, +4, +3, −6]	33 [+5, +1, +3, −1]	38 [+5, +7, +5, +4]
Alltel[18]	*1 [0, −4, −2, 0]*	*0 [0, −2, −1, 0]*	–	*0 [0, 0, −1, 0]*
O_2	*4*	*4*	–	–
Verizon Comms	*3 [−2, −1, 0, −6]*	*2 [0, 0, 0, −1]*	–	–
Investcom	*10 [*, +2, +1, 0]*	*1 [*, 0, 0, +1]*	–	*2*
al-Wataniya	*7 [+1, 0, 0, +2]*	–	–	*4 [+1, 0, 0, +1]*

Table 10.1 (continued)

Company	Number of countries by region			
	Asia-Pacific[4]	Latin America[5]	North America[6]	Africa[7]
France Télécom	2 [0, 0, 0, −1]	8	1	14 [+3, 0, 0, 0]
Vodafone[8]	7 [+1, 0, +1, 0]	–	1	9
Telefónica (incl. O_2)[9]	3 [0, 0, +1, 0]	16 [+3, 0, 0, +5]	0 [−1, 0, 0, 0]	5 [0, 0, +1, 0]
MTN (incl. Investcom)[10]	1 [0, +1, 0, 0]	–	–	17 [0, +6, +4, 0]
TeliaSonera[11]	4 [+2, +1, 0, −1]	–	–	0 [0, −1, 0, −1]
Zain (incl. Celtel)[12]	–	–	–	15 [0, +1, +14, 0]
América Móvil[13]	–	15 [+1, +1, +3, +2]	2 [+1, 0, 0, 0]	–
Telenor	7 [0, +1, +2, 0]	–	–	–
Etisalat[14]	3 [+2, +1, 0, 0]	–	–	9 [+1, −1, +6, 0]
Hutchison Whampoa	8 [+1, 0, 0, 0]	0 [0, 0, −1, 0]	–	1
Millicom International	3 [−1, 0, −1, 0]	6 [0, +1, 0, 0]	–	7 [0, 0, +2, 0]
Orascom[15]	8 [+1, 0, +5, +1]	–	–	5 [0, 0, −2, −1]
Deutsche Telekom	0 [0, 0, −1, +1]	–	1	0 [0, 0, 0, −1]
Qatar Telecom[16]	5 [+5, 0, 0, 0]	–	–	2 [+2, 0, 0, 0]
Tele2	–	–	–	–
Portugal Telecom	2	1	–	6 [0, 0, +1, 0]
Singapore Telecom	8 [+1, 0, +1, 0]	–	–	1 [+1, 0, 0, 0]
NTT	8 [0, +1, +1, 0]	–	0 [0, 0, 0, −1]	–
OTE	–	–	–	–
Sprint Nextel[17]	–	5 [0, +1, 0, −1]	3 [0, 0, −1, 0]	–
Telekom Austria	–	–	–	–
Telekom Malaysia	7 [0, +1, +2, 0]	–	–	0 [−1, 0, −1, −6]
SK Telecom	6 [0, +2, 0, 0]	–	1 [0, +1, 0, 0]	–
Turkcell Holding	1	–	–	–
VimpelCom	3 [0, +1, +1, 0]	–	–	–
Vivendi Universal	–	–	–	6 [+2, 0, +1, −1]
Mobile TeleSystems	2 [0, 0, +1, +1]	–	–	–

Telecom Italia	–	5 [0, −1, −2, 0]	–	–
TDC	–	–	–	–
Vodacom	–	–	–	5
Total	88 [+11, +9, +13, +1]	56 [+4, +2, 0, +6]	9 [0, +1, −1, −1]	102 [+7, +5, +26, −10]
Alltel[18]	–	*0 [0, −2, 0, 0]*	*1 [0, 0, 0 , 0]*	–
O_2	–	–	–	–
Verizon Comms	*0 [0, 0, 0, −4]*	*0 [−1, −1, 0, 0]*	*1 [−1, 0, 0, −1]*	–
Investcom	*1 [*, +1, 0, 0]*	–	–	*6 [*, +1, +1, −1]*
al-Wataniya	*1 [0, 0, 0, +1]*	–	–	*2*

Notes:

1. Western Europe includes the 27 EU current member states plus residual Western Europe.
2. Eastern Europe includes the Balkans, Belarus, Moldova, Russia and the Ukraine.
3. The Middle East includes the Arabian peninsula, Armenia, Azerbaijan, Cyprus (N), Georgia and Turkey.
4. Asia includes Kazakhstan, Australia and New Zealand.
5. Central and South America plus most of the Caribbean.
6. North America constitutes Canada, Puerto Rico and the USA.
7. Defined geographically to include Egypt.
8. Network Partnership Agreements are not included within Vodafone's total.
9. Telefónica took over the networks of O_2 during 2006. The comparison is with the sum of the separate networks in 2005, 2004 and 2003.
10. MTN, which is based in South Africa, took over the networks of Investcom during 2006. The comparison is with the sum of the separate networks in 2005, 2004 and 2003.
11. TeliaSonera's home market is defined as Finland plus Sweden.
12. Zain, formerly The Mobile Telecommunications Co., is based in Kuwait. In May 2005, it acquired 85% of Celtel, a pan-African operator with 14 networks which had previously qualified for the table in its own right.
13. América Móvil is based in Mexico.
14. Etisalat is based in the UAE.
15. Orascom is based in Egypt.
16. Qatar Telecom owns 51% of al-Wataniya, or simply Wataniya, which is based in Kuwait.
17. Sprint took over the networks of Nextel during 2005. The comparison is with the sum of the separate networks in 2004 and 2003.
18. Alltel took over the overseas networks of Western Wireless during 2005 and sold them all during 2006. The comparison is with the sum of the separate networks in 2004 and 2003.

Source: Compiled by the authors.

damage wrought by the telecommunications meltdown during 2000–2002, and as shown there has subsequently been a very substantial expansion.

However, it is worth reminding ourselves that this aggregate number was derived by netting out additions and subtractions in each column, a process that reflected in part both takeovers and bilateral transfers between international operators as they sought either to improve their balance sheets or follow a more coherent strategy for their international holdings. Thus, for example, the net gain in 2007 of 28 comprised 37 gains less 9 losses while the net gain of 29 in 2006 comprised 33 gains less 4 losses. But it should further be borne in mind that the numbers in brackets are themselves netted out – in other words, if one network in a region is acquired and another sold during the same year by the same operator then the bracket will register a change of zero. Hence, it follows that the total amount of activity is larger than – perhaps roughly twice as large as – that indicated by the overall rate of change according to the table aggregates.

What is not immediately apparent from Table 10.1, but is worth mentioning again, is the extraordinary bout of restructuring involving US-based operators. In October 2004, AT&T Wireless was acquired by Cingular Wireless, itself owned by SBC Communications (60 per cent) and BellSouth (40 per cent). At the time, AT&T Wireless – previously hived off from parent AT&T – had stakes in 17 networks, of which three were in North America, 12 in Latin America, one in Asia and one in Western Europe. Hence, both owners of Cingular Wireless made significant gains in the number of operational countries (albeit not due entirely to the AT&T transfer) with SBC rising from 6 to 17 and BellSouth from 12 to 20 (the difference reflecting the existence or otherwise of overlaps). However, in June 2005, the sale of most of the Caribbean-based networks was negotiated with Digicel, an Irish-owned operator which had too few subscribers to qualify for Table 10.1. This meant that during 2005, the number of networks operated by Digicel rose from 7 to 15 (there were overlaps), while SBC lost 14 in total, of which 13 were in Latin America and the Caribbean, and BellSouth lost 17 in total of which 15 were in Latin America and the Caribbean. In November 2005, SBC changed its name to AT&T, having previously acquired the fixed-wire operator and, on 31 December 2006, new AT&T bought BellSouth. In effect, this meant that new AT&T no longer had any direct stakes other than in the USA, Puerto Rico and the US Virgin Isles, although its 7.9 per cent stake in América Móvil gave it an indirect presence in 14 Latin American countries due to the phenomenal growth of the Mexican operator.

Other US-based operators were also affected. For example, Sprint appeared in the table for 2004 as essentially a North American operator while Nextel Communications had a part-owned international subsidiary,

NII, operating in Latin America. Sprint acquired Nextel in October 2005 and there is accordingly an entry in Table 10.1 for Sprint Nextel. Less well-known is the fate of Western Wireless, which in 2004 had six stakes in widely-dispersed operators outside the USA. Western Wireless was subsequently acquired by a purely domestic operator, Alltel, which then set about selling off all of the overseas holdings by the end of 2006. Verizon Communications also set about a fire sale of international operations, selling roughly half of its stakes during 2004 and others during 2006, with the result that it only appears at the foot of Table 10.1.

10.3 ACTIVITY IN 2004 AND 2005

The above matters aside, 2004 represented something of a breather for most non-US operators. As Table 10.1 indicates, only Telefónica was significantly active, busy building up its Latin American empire. However, the biggest proportionate effect was felt not in Latin America but the Middle East, as a result of a number of small acquisitions mainly by the operators – Etisalat and the then MTC as well as Egypt's Orascom – that were subsequently to play an increasingly large role in restructuring.

It is also of interest to examine the behaviour of proportionate subscribers as these can grow either through internal expansion at existing operations or through restructuring, or both. Comparing proportionate subscribers (p/subs), the most significant changes (in excess of 50 per cent) during 2004 were as follows:

- Orascom's p/subs rose by 110 per cent from 4.1 million to 8.6 million, largely due to a more than doubling of p/subs in Algeria and Pakistan.
- Mobile TeleSystems' p/subs rose by 105 per cent from 16.9 million to 34.7 million, due to a doubling of p/subs at all of its holdings.
- Hutchison Whampoa's p/subs rose by 76 per cent from 6.3 million to 11.1 million, partly due to millions of new 3G subscribers in Italy and the UK.
- Telenor's p/subs rose by 60 per cent from 15.5 million to 24.8 million, largely due to a more than doubling of p/subs in Bangladesh, Denmark, Russia and the Ukraine.
- Telefónica's p/subs rose by 58 per cent from 32.3 million to 51.2 million, due to a massive expansion in South America.

Not surprisingly, the main changes in 2004 were caused by internal growth, with only Telefónica benefiting significantly from new acquisitions.

The year 2005 was a totally different affair from 2004 in that there was far more restructuring outside the USA than during 2004. Much of the overall activity took place in Africa and Asia. However, a significant part of the African activity was accounted for by the purchase of Celtel by MTC – which in the process removed Celtel from the sample set – and much of the rest by the half share in Atlantique Télécom acquired by Etisalat together with the activities of MTN. In the case of Asia, the main change resulted from Orascom's purchase of a 19.3 per cent stake in Hutchison Telecom International (HTIL). It may also be observed that the apparent tranquillity in Latin America was deceptive, as noted above, because there was in fact a massive fall-out from the adjustment that had taken place the previous year when Cingular Wireless bought AT&T Wireless.

At an individual operator level quite a lot happened overall in addition to the last-mentioned transfers. The substantial movement of assets in Africa involved MTC (4 to 18 countries), Etisalat (6 to 13) – both based in the Middle East – and MTN of South Africa (7 to 11), none of which had made significant acquisitions the previous year. Elsewhere, most operators were essentially constant other than Orascom (10 to 14) as a result of the HTIL stake while at the same time shedding three stakes in Africa – note the contrast with MTC (subsequently renamed Zain) et al. – América Móvil (11 to 14) which continued its acquisitive strategy in Latin America, Telecom Italia (12 to 8) which began to shed its non-core holdings after its merger with TIM, and TDC (6 to 10) which began to set up Internet-based MVNO activities in Western Europe.

Not surprisingly, this spurt of restructuring activity also showed up in terms of proportionate subscribers, although internal growth was still the main driver behind rising subscriber numbers. Thus:

- MTC/Celtel's p/subs rose by 262 per cent from 2.6 million to 9.5 million, essentially because of the acquisition of Celtel.
- Orascom's p/subs rose by 172 per cent from 8.6 million to 23.4 million, largely due to big gains in Algeria and Pakistan and the purchase of a stake in HTIL.
- Investcom's p/subs rose by 93 per cent from 1.9 million to 3.7 million, partly due to gains in Ghana and Syria.
- Telekom Malaysia's p/subs rose by 105 per cent from 7.4 million to 15.2 million, largely due to big gains in Bangladesh and Indonesia.
- Telekom Austria's p/subs rose by 84 per cent from 4.8 million to 8.9 million, largely due to entering Bulgaria.
- Vodacom's p/subs rose by 80 per cent from 11.1 million to 20.1 million, largely due to big gains in South Africa.

- Telenor's p/subs rose by 72 per cent from 24.8 million to 42.6 million, largely due to gains in Bangladesh, Russia, Thailand and the Ukraine.
- Mobile TeleSystems' p/subs rose by 70 per cent from 34.7 million to 59.0 million due to big gains in Russia and the Ukraine.
- MTN's p/subs rose by 64 per cent from 11.6 million to 19.0 million largely due to big gains in Nigeria and entry into new countries.
- Hutchison Whampoa's p/subs rose by 55 per cent from 11.1 million to 17.2 million, largely due to millions of new 3G subscribers in Italy and the UK.
- América Móvil's p/subs rose by 53 per cent from 60.6 million to 92.6 million, partly due to big gains in Argentina, Brazil, Colombia and Ecuador.

Turning finally to examine the regional location of networks, it may be noted that, during 2005, Etisalat, MTN, Telekom Malaysia, Telekom Austria, Vivendi Universal and especially MTC all significantly reduced their dependency upon the home market – in the latter case from 46.1 per cent to 15.4 per cent – due to big gains in non-domestic subscriber numbers. Outside the domestic market Telekom Austria saw a 32 per cent increase in its dependency upon Western Europe counter-balanced by an equal reduction in Eastern Europe, while MTC saw its total dependency upon the Middle East reduced to 42.9 per cent as a result of the purchase of Celtel. For its part, Hutchison Whampoa became considerably more dependent upon Western Europe as 3G subscriptions exploded in Italy and the UK, as did Vivendi Universal, while Telenor moved in the opposite direction as its Eastern European and Asian networks grew very rapidly.

10.4 ACTIVITY IN 2006

There were significant gains overall during 2006, but these were predominantly to be found in the Middle East, Asia and Africa. Elsewhere, Telefónica completed the takeover of O_2, in the process refocusing somewhat upon the West European market at the expense of Latin America, while Vodafone was notable for its departure from Sweden and Japan and the alleged negotiations in respect of its stake in Verizon Wireless. Overall, the most dramatic change from an international perspective was MTN's acquisition of Investcom.

At an individual operator level the changes are best understood in terms of proportionate subscribers. Thus:

- Etisalat's p/subs rose by 94.6 per cent from 5.6 million to 10.9 million, mainly due to its acquisition of a network in Pakistan and substantial growth in Saudi Arabia.
- MTC/Celtel's p/subs rose by 90 per cent from 9.3 million to 17.7 million, essentially due to massive (141 per cent) growth at Celtel (mainly via the acquisition of a network in Nigeria).
- Orascom's p/subs rose by 82 per cent from 23.4 million to 42.6 million, largely due to a 10 million gain in Pakistan.
- Millicom's p/subs rose by 79 per cent from 7.2 million to 12.9 million, due to across-the-board gains.
- Telefónica's p/subs rose by 71 per cent from 71.8 million to 122.9 million, mainly due to its acquisition of O_2.
- al-Wataniya's p/subs rose by 64 per cent from 3.6 million to 5.9 million, mainly due to a gain in Algeria.

Turning finally to examine the regional location of networks, it may be noted that, during 2006, Etisalat, Telefónica, Telekom Malaysia and Tele2 significantly reduced their dependency upon the home market due to big gains in non-domestic subscriber numbers. Outside the domestic market Telefónica saw a significant increase in its dependency upon Western Europe as a result of acquiring O_2 while Etisalat saw its dependency upon the Middle East further reduced to 26.8 per cent as a result of the entry into Pakistan. For its part, Tele2 became considerably more dependent upon Eastern Europe due to rapid growth in Russia, while MTC became significantly more dependent upon Africa and less dependent upon the Middle East as a result of growth at subsidiary Celtel.

10.5 ACTIVITY IN 2007

For the second year running, the amount of international activity was significantly lower than in 2005 although it remained at the same fairly high level as in the previous year. This was partly explained by the low incidence of takeovers of multi-network operators, especially in Africa; the only exception was Qatar Telecom's acquisition of 51 per cent of Kuwait's al-Wataniya. In fact, most regions showed modest activity, with Asia-Pacific leading the way mainly as a result of Qatar Telecom's surge in investment. In all cases the activity was of a positive kind other than in Western Europe, which is clearly going through a phase where international operators are shedding their smaller and minority-owned networks in order to release resources for use elsewhere. These networks are tending to be absorbed by existing operators that are keen to bulk up

in order to attain sufficient scale to become competitive and remain profitable. This process is also taking place – indeed has now largely taken place – in the USA, but is essentially a domestic matter, although it is worth observing that the final stages of the process have been accompanied by the re-emergence of international ambitions on the part of US operators.

Not surprisingly, with subscriber growth largely endogenous rather than driven by takeovers, there were relatively few quantum leaps in subscriber numbers. The most notable feature was the bursting upon the scene of Qatar Telecom where the massive growth in p/subs simply reflected its programme of acquisitions. Elsewhere:

- OTE's p/subs rose by 83 per cent mainly as a result of raising its stake in CosmOTE from 66.7 per cent to 90.7 per cent together with substantial growth in Bulgaria and Romania.
- Etisalat's p/subs rose by 71 per cent from 10.9 million to 18.7 million, driven by the acquisition in Indonesia and substantial growth in Pakistan and Saudi Arabia.
- Zain's (formerly MTC/Celtel's) p/subs rose by 70 per cent from 17.7 million to 30.1 million, essentially due to impressive (83 per cent) growth at Celtel (where it acquired the outstanding 15 per cent stake), especially at its Nigerian operations.

The fact that so few operators managed to achieve a growth rate in excess of 50 per cent during 2007 – and indeed the tendency for the number so doing to decline on an annual basis as demonstrated above – can most obviously be attributed to the simple law of large numbers. A 50 per cent growth from a base of 1 million requires an additional 500 000 p/subs whereas from a base of 10 million it requires an additional 5 million p/subs and so forth. Once markets, as they must, reach near saturation – a process that may take only a few years – adding that many subscribers becomes extremely difficult if attempted endogenously, and as we have noted, the potential to acquire ready-made international operators must remain modest at best. It is of interest that two of the three operators cited above acquired enlarged stakes in their main subsidiaries during the year, but that process has also now largely run its course since it has been fashionable for several years for incumbent fixed-wire operators to own the whole of their domestic mobile subsidiaries.

10.6 ACTUAL AND WOULD-BE INTERNATIONAL TARGETS

The most sensible way of determining the international strategies of operators is to examine where they historically have been, and currently (May 2008) are, seeking to acquire either licences – predominantly 2G but occasionally 3G (W-CDMA/cdma2000 1×EV-DO) – or stakes in existing operators. It is also possible to examine the statements made by their CEO or company representatives that indicate which markets the mobile operator may be considering expanding into. Table 10.2 summarizes the most recent transactions, commencing on 1 January 2006, and including some transactions that are known to have been agreed even though the physical transfer has yet to occur.

Table 10.3, by way of contrast, gathers together information on the countries that operators would like to enter, those that they have tried unsuccessfully to enter, those that they have thought about entering but decided not to pursue the matter and those that they wish to exit. While there is evidence of considerable activity, it should be borne in mind that the tables only contain data on the 30 operators in the sample set and hence give only a limited view of total activity on a worldwide basis.

More than two-thirds of the operators in Table 10.2 have entered more countries than they have departed, with the reverse being true for most of the remaining companies in our sample. Turkcell is the only mobile operator that neither entered nor departed from a country during 2006 and 2007. Through comparing the countries that mobile operators have actually entered with those that they have been rumoured to be interested in, it can be seen that the actual acquisition of stakes and licences is effectively the tip of the iceberg, as most attempts at expansion fail due to the competitive interest that is encountered. Thus, a fuller picture of the international intentions of operators can be gained from combining their actions with statements of intent.

In recent times, the availability of new licences has not surprisingly tended to occur in less-developed countries, especially in Africa, but, given that many markets have limited potential, it is also not surprising that the cost of licences in countries with significant potential such as Egypt and Saudi Arabia have become hugely – and perhaps unrealistically – expensive and tend to be won increasingly by Middle East-based operators funded by domestic monopolies. The diverse array of stakes and licences that operators such as Etisalat are associated with reflects their domestically-funded deep pockets. Notwithstanding the expense of majority stakes, the limited benefits of minority stakes or the difficulties of launching a new operator, Etisalat has been interested in a diverse array of licences and stakes across

Table 10.2 Country entries and departures, 2006 and 2007[1,2,3]

Operator	Entries	Departures
Alltel	–	Austria, Bolivia, Haiti, Slovenia
América Móvil	Dominican Republic, Jamaica, Puerto Rico	–
AT&T	–	Caribbean (various)
Deutsche Telekom	–	Uganda
Etisalat	Afghanistan, Indonesia, Pakistan, Egypt (L)	Sudan
France Télécom	Central African Rep., Guinea, Guinea-Bissau, Luxembourg (indirect), Niger (L)	Netherlands
Hutchison (HTIL)	Indonesia, Vietnam[4]	India
Investcom	Afghanistan, Republic of Guinea	–
Millicom	Colombia	Pakistan
Zain (MTC)	Nigeria, Saudi Arabia (L)	–
MTN/Investcom	Iran, *Investcom*	–
Mobile TeleSystems	Armenia	–
NTT	Guam/N. Marianas	–
Orascom	Indonesia (indirect)	Iraq
OTE	Bosnia (indirect), Montenegro (indirect)	Armenia
Portugal Telecom	DR Congo (L)	–
Qatar Telecom	Algeria, Cambodia (indirect, Indonesia (indirect) Iraq, Kuwait, Laos (indirect), Maldives, Palestine, Saudi Arabia, Singapore (indirect), Tunisia	–
Singapore Telecom	Pakistan	–
SK Telecom	Cambodia, USA, China	–
Sprint Nextel	Chile	–
TDC	Norway	Austria, Germany, Netherlands, UK, Latvia, Lithuania

Table 10.2 (continued)

Operator	Entries	Departures
Tele2	Switzerland	Denmark
Telekom Austria	Belarus, Macedonia, Serbia	–
Telecom Italia	–	Turkey, Venezuela
Telefónica	Germany, Ireland, Isle of Man, UK,[5] Slovakia, Italy, Bolivia, Paraguay (all indirect)	Puerto Rico
Telekom Malaysia	India, Iran	Malawi
Telenor	Armenia, Georgia, Uzbekistan (all indirect), Serbia, Namibia (L)	Austria
TeliaSonera	Spain, Afghanistan, Uzbekistan, Tajikistan (indirect)	Uganda
Turkcell	–	–
Verizon Comms.	–	Dominican Rep., Puerto Rico, Venezuela
VimpelCom	Armenia, Georgia, Uzbekistan, Vietnam (L)	–
Vivendi Universal	Burkina Faso, Gabon (both indirect)	–
Vodafone	North Cyprus, Turkey, Pakistan (indirect), Qatar (L)	Belgium, Japan, Sweden, Switzerland

Notes:
1. (L) signifies a licence. The other entries are equity purchases.
2. 'Indirect' signifies that an operator in which a direct stake is held has entered the country specified.
3. Including agreed transfers where the shares have not yet been physically transferred.
4. Hutchison does not technically own the shares but obtains a share of the profits.
5. All as a result of acquisition of O_2.

Source: Compiled by the authors.

a swathe of countries, not least because it is felt that its deep pockets afford it the ability to invest freely and widely to achieve its ambitious growth targets.

There are, of course, other mobile operators who are frequently listed as being interested in whatever stake or licence has come onto the market. The sheer number of strategic interests that Deutsche Telekom, France Télécom and Vodafone have been associated with since the start of 2005 ensures that they form the heart of a list of 'usual suspects' interested in acquiring the stake or licence in question. But, as we have shown in previous chapters, much of the international investment in the mobile telecommunications industry is regional, with the consequence that they could be joined by a range of operators such as one or more of the African operators, América Móvil, Mobile TeleSystems or Telefónica, depending on the actual geographical location of the stake or licence.

For most of the operators listed in Table 10.3, their portfolio of rumoured interests favours less-developed countries. Some operators, however, are seemingly interested in a broader spectrum of investment opportunities that cut across less-developed and developed countries. This should not be taken as implying that the rumoured interests of these operators favour equally the two types of markets. For example, although Vodafone has been linked with stakes and licences across both less-developed and developed countries, its rumoured portfolio favours the former over the latter.

The fact that American operators are listed in Table 10.3 may be surprising given their retrenchment to focus on the United States. This reflects the constantly changing nature of the industry – whereas a few years ago domestic developments necessitated operators' retrenchment, these are once again encouraging their internationalisation. That the American operators have so far been unsuccessful at converting their interest into actual stakes or licences is due, in part, to the more competitive nature of the industry compared to when they first internationalised. It may also reflect their unwillingness to match the financial largesse of the Middle East-based operators on the one hand and those with a more pressing, perhaps overriding, strategic imperative on the other. In other words, given that American operators are once again effectively starting from scratch, their international footprint will be built up as much on the basis of opportunism as through the implementation of any carefully constructed strategy.

It is arguably the case that opportunism has long played a role in the internationalisation of mobile operators. Investment opportunities, whether they are stakes or licences, do not become available according to any pre-ordained plan or schedule, with the consequence that would-be investors have to decide whether to pursue a random opportunity or wait

Table 10.3 Strategic interests, 1 January 2005 to 31 December 2007[1]

Company	Interested in stake (S) or licence (L)	Failed to win stake (S) or licence (L)	Not pursued (NP) or for sale (FS)
Alltel	–	–	–
América Móvil	Bolivia, Chile, Costa Rica, Panama, Caribbean (S/L), Telecom Italia (S)	–	Spain (NP), Colombia Móvil (NP), Millicom International (NP)
AT&T	Telecom Italia (S), India (S), Telekom Malaysia Intn'l (S)	Qatar (S)	–
China Mobile	–	Millicom International (S), Pakistan (S)	–
Deutsche Telekom	Shyam Telelink (India) (S), Telekom Sprske (Bosnia) (S), BH Telekom (Bosnia) (S), Ukraine (S), OTE (S), Slovenia (S), Romania (L), '3' (S), Cable & Wireless (S)	Tunisie Télécom/Tunicell (S), Serbia (S), Burkina Faso (S)	O_2 (NP), Turk Telekom (NP)
Etisalat	Algeria, Libya (L/S), India (S), Sri Lanka (S), Yemen (S), Oman (S), Sudan (L), Lebanon (L), Telekom Malaysia Intn'l (S)	Telsim (S), Tunisie Télécom/Tunicell (S), Turk Telekom (S), TIM Hellas (S), Kuwait (L/S), Yemen (L), Ghana (S), Serbia (S), Qatar (L), Armenia (S)	Colombia Móvil (NP), Kenya (NP), Nitel/M-Tel (Nigeria) (NP), Morocco (3GL)
France Télécom	ONE (S), North Africa (L/S), Maroc Télécom (S), Vietnam (S), Wind (S), Panama (L), Ghana Telecom (S), Kenya (L/S), M-Tel Nigeria (S)	Eurotel Praha (S), Serbia (S), Ghana (S), Tunisie Télécom/Tunicell (S), Burkina Faso (S), Saudi Arabia (L), Mauretania (L)	Telsim (NP), Bosnia (S) (NP), USA (NP), OTE (S) (NP), Turkey (3GL) (NP)
Hutchison Whampoa	Cure (Philippines) (S), Meteor (S)	Poland (L)	–

Investcom	–	Oman (L), Nitel/M-Tel (Nigeria) (S)	Millicom International (NP)
KPN	Non-specific L/S	ONE (S)	–
Maxis	Sri Lanka (S)	HTIL India (S)	–
Millicom Int'l	RIC (Iran) (S), Panama (L)	Atlantique Télécom (S), Afghanistan (L), Yemen (L)	'non-core' (FS)
Mobile TeleSystems[2]	Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan (all L/S), Ukrtelecom (S)	Egypt (L), Telsim (Turkey) (S), Armentel (S), Burkina Faso (S)	Baltic states (NP) Mobi 63 (Serbia) (NP) Telekom Srpske (Bosnia) (NP)
MTC/Celtel	Angola, Madagascar, Ethiopia, Warid Telecom Pakistan (all S), Lebanon (L)	Millicom International (S), Egypt (L), Telsim (Turkey) (S), Armenia (S), Qatar (L), Pakistan (S), Senegal (L), Rwanda (S)	Ufone (Pakistan) (NP) Zimbabwe (NP) Nitel/M-Tel (Nigeria) (NP)
MTN	Zimbabwe (S), Lebanon (S)	Atlantique Télécom (S), Celtel (S), MTC (Namibia) (S), Tunisie Télécom (S), Warid Telecom Pakistan (S), Egypt (L), Saudi Arabia (L)	Nitel/M-Tel (Nigeria) (NP)
NTT	Indonesia, Malaysia, Thailand, Vietnam, New Zealand (all S)	–	–
Orascom	Bouygues Télécom (S), ONE (S), Brazil (S), Kuwait (S), M-Tel Nigeria (S), Qatar (L)	Nitel/M-Tel (Nigeria) (S), Millicom International (S), Telsim (Turkey) (S), Serbia (S), Saudi Arabia (L), Vivendi (S)	TIM Hellas (S) (NP), Hutchison Essar (S – NP), Brasil Telecom (S – NP), France (3GL) NP
OTE	–	Romania (L), Serbia (S)	–
O_2	–	–	–
Portugal Telecom	Africa (L/S)	Tunisie Télécom/Tunicell (S), Ghana Telecom (S)	–
Qatar Telecom/ al-Wataniya	Lebanon (L)	MCT Corp. (Asia) (S), Egypt (L), Morocco (3GL)	–

Table 10.3 (continued)

Company	Interested in stake (S) or licence (L)	Failed to win stake (S) or licence (L)	Not pursued (NP) or for sale (FS)
Singapore Telecom	TOT (Thailand) (S), Taiwan Mobile (S), Far EasTone (S), Vietnam (S), Egypt (L), Sri Lanka (L), Ghana Telecom (S)	Ufone (Pakistan) (S)	–
SK Telecom	India (S), Pakistan (S)	–	–
Sprint Nextel	Shyam Telelink (India) (S)	–	–
TDC	Arabian peninsula (L/S), DNA Finland (S)	–	Eurotel Praha (NP), Polkomtel (Poland) (FS)
Telecom Italia	Telekom Slovenije (S)	Tunisie Télécom/Tunicell (S), Egypt (L)	Brasil Telecom (NP), TIM Brasil (FS)
Telefónica	Vivo (S) Honduras (L)	KPN (S) Egypt (L)	Tunisie Télécom/Tunicell (NP), Turk Telekom (NP), OTE (S – NP)
Telekom Austria	Eronet (Bosnia) (S), BH Telekom (Bosnia) (S), Kosovo (L)	Telekom Montenegro/Monet (S), Telekom Sprske (Bosnia) (S), Slovakia (L)	Mobi 63 (Serbia) (NP), OTE (S – NP)
Telekom Malaysia	Bangladesh (S), Laos (S), Myanmar (S), Thailand (S)	Aircel (India) (S), Egypt (L)	Ufone (Pakistan) (NP), True Corp. (NP)
Telenor	Vodafone strategic relationship, Pakistan (S), Vietnam (S)	Millicom International (S), Egypt (L)	Telsim (Turkey) (NP), Bosnia (NP)
Tele2	Bulgaria (L), Ukraine (S), Vietnam (S)	Serbia (S)	ONE (Austria) (NP)

TeliaSonera	LMT (Latvia) (rest of), Shyam Telelink (India) (S), continental Europe (L/S), Telemig (S)	–	Serbia (S – NP), Slovakia (L – NP)
Turkcell Holding	Becoming regional player (L/S), SyriaTel (S)	BTC Bulgaria (S), Turk Telekom (S), TIM Hellas (S), Iraq (L), Kuwait (S), Egypt (L), Saudi Arabia (L)	Bulgaria (L – NP), Ufone (Pakistan) (NP)
Verizon Comms	Verizon Wireless (rest of), Alltel (S)	Qatar (L)	–
VimpelCom	–	Moldova (L)	–
Vivendi Universal	Camtel (Cameroon) (S), Senegal (L/S), SFR (rest of)	Tunisie Télécom/Tunicell (S), Oger Telecom (S)	–
Vodacom	Angola (L), Algeria, Ghana (S, L), M-Tel Nigeria (S), Warid Telecom (S), LAP Green (Libya) (S)	Rwanda (S)	Nitel/M-Tel (Nigeria) (NP), Vmobile (Nigeria) (NP), Westel (Ghana) (NP)
Vodafone	MTS (Russia) (S), Telekom Sprske (Bosnia) (S), Taiwan Mobile (S), Portugal (S), 3 Italia (S), 3 UK (S), SFR (rest of), Vodacom (rest of), Vietnam (S), Emerging markets (S), Montenegro (L), Nigeria (S), Telekom Malaysia Intn'l (S), Bangladesh (S)	Warid Telecom Pakistan (S), Orange Netherlands (S)	Millicom International (NP), Slovakia (L – NP)

Note: 1. Some of the items in the table are 'alleged' in media and other reports. Denials do not, of course, mean the rumours are untrue. The less plausible rumours have been omitted.

Source: Compiled by the authors.

for the next one to come along. Not only is there no guarantee that the would-be investors will be successful in pursuing the stake or licence, but there is also the risk that subsequent opportunities may be more attractive. Mobile operators could seek to counter such uncertainty by investing widely through the taking of minority stakes in partnership with others, though this inevitably invites questions regarding the control that the investor has over the investment, and the financial benefits that accrue from a small stake. Alternatively, the mobile operator could husband its resources and make fewer international investments. Although this may attract criticism since the company would not be embracing internationalisation with the same degree of enthusiasm as others are, it would provide the operator with greater control over its investments. Of course, these two alternatives are not mutually exclusive. Mobile operators could try to combine both strategies and might, over a period of time, move from preferring one to favouring the other, although as we have shown in previous chapters, combining the two strategies is by no means straightforward, and moving from one to the other on advantageous terms depends on the availability of buyers and sellers.

In most developed countries it has become increasingly clear that only the two or at best three largest operators in each case can expect to make significant profits and there has been a corresponding tendency for operators that historically would buy 'anything that moved' to shed non-core assets. There is, however, no uniformity about how these are defined. Non-core assets may be those that do not fit with the operator's strategy or those where regulatory and competitive developments are such that their financial prospects become increasingly unattractive. For example, both Orange and Vodafone exited Sweden, but for different reasons. Orange's exit was encouraged by regulatory issues while that of Vodafone reflected its position as the third operator in an increasingly competitive market and its desire to redeploy capital towards more promising emerging markets.

The largest operators also continue to cling to networks that yield well under a million proportionate subscribers so the process will take many more years to unwind. While the unwinding of these smaller networks will not provide the industry with a seismic shock in terms of restructuring, it will offer others in the industry, regardless of size, the opportunity to consolidate and expand in line with their own strategic interests, whatever they may be. Such an unwinding will release, over a number of years, a steady stream of resources to sellers that they can deploy elsewhere. When the maturity of many developed markets as well as their regulatory environment and degree of competitiveness are taken into account, it is probable that the freed resources will be deployed in emerging markets where growth potential remains significant – provided assets there remain affordable.

There is, of course, an alternative to acquiring stakes or licences, namely to become a MVNO. Although Tele2 initially favoured this method, it is worth remembering that it also owns stakes in a series of network operators and is shedding many of its MVNO operations. In other words, the mobile operator most closely associated with the MVNO model increasingly does not solely rely on this method to deliver subscribers and thus revenue. In contrast, Vodafone has espoused the concept of a partnership whereby the partner operator uses the Vodafone name without Vodafone needing to buy an equity stake – it currently has 41 partnership agreements spanning the entire world. There are undoubted benefits to such an approach. Vodafone has retained a 'presence' in those markets like Sweden from which it has departed, as well as expanded into markets that are too small or too costly to justify a network investment. Having said this, such partnership agreements are also subject to all of the problems associated with franchising a brand. As Vodafone has not sold a network in a large country and replaced it with a partnership agreement, it is arguably the case that the role of partnerships is complementary and thereby underlines the importance of network ownership to operators.

Index