

Business Analysis and Valuation of Vodafone Group

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Executive Summary

Every asset, both financial and real, has a value. The main factor of successful investments and management of these assets is in the understanding not only what the value is, but the source of the value. Vodafone Group, the world's leading mobile telecommunications company with presence in both emerging and mature markets, is in the centre of attention of this thesis. The valuation of company's equity will be performed, based on publicly available information about the main risks and opportunities that could influence this value. I will also attempt to develop a possible Vodafone Group's strategy that might enhance the company's value.

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Introduction

With the unprecedented growth of mobile communications since the mid 1980s, the effects on other sectors, the wider economy and society as a whole have been far reaching. Changes in communications have underpinned the development of the whole IT industry, helped economic growth, particularly in developing markets, and enabled families, friends and communities to communicate across countries and time zones.

There are currently around three billion mobile customers globally¹. At the moment, the majority are in the western world. However, 70% of the growth in customers in the next five years is predicted to come from emerging markets, especially China, India and the rest of Asia. The challenges and opportunities that a telecommunications company faces in these markets are very different from those in European and mature markets.

The company in focus of this thesis is Vodafone Group, who is operating the biggest mobile network worldwide with presence in both emerging and mature markets. The objective of this paper is to estimate the value of Vodafone Group, taking into consideration the main risks and opportunities that could influence this value, and to suggest a possible Vodafone Group's strategy, that might enhance the company's value.

The structure of the thesis is the following: in Chapter 1 a brief presentation of Vodafone Group is given. Chapter 2 focuses on the analysis of Vodafone's business environment, including analysis of its macro-environment, strategic analysis of telecommunications industry and a short SWOT analysis. Chapter 3 contains the company valuation, including the description of main valuation models and

¹ GSM World – the website of the GSM Association: <http://www.gsmworld.com>

Vodafone's value calculations, using the discounted cash flow scenario approach. Recommendations on company's future strategy are given in Chapter 4.

In order to keep this paper as practical and focused as possible, the applicable theory is incorporated in the text where necessary to explain certain developments or to justify the analytical decisions taken. The thesis is based on publicly available information about the company, the industry and the macroeconomic development of world economy from various sources. All analyses are performed given the data and information available up to May 2008. Any public information released beyond that date may change the value of the company, as financial valuation is dynamic in nature.

1. Presentation of Vodafone Group and its affiliates

Vodafone Group Plc. is a mobile network operator with headquarters in Newbury, Berkshire, England. It is the world's leading mobile telecommunications company with mobile operations in 25 countries around the world with over 260 million customers worldwide, as well as 38 partner networks, generating a turnover in 2007 of £31 billion. Vodafone networks can be found on almost all continents – in Europe, the Middle East, Africa, Asia, Pacific and the United States. The name of the company (“Vodafone”) comes from **Voice data fone** and it was chosen by the company to “reflect the provision of voice and data services over mobile phones.”²



The company's goal is: “To be the communications leader in an increasingly connected world.”³ In order to achieve it, Vodafone does not only offer basic telecommunications services (calls and SMS⁴), but also many other advanced services:

- **Vodafone At Home** and **Vodafone Office** are integrated mobile and fixed line communications services designed to deliver on customers' total communications needs and to introduce Vodafone into the household and business as a total communications provider.
- **Vodafone Passport** enables customers to “take their home tariff abroad”, offering greater price transparency and certainty to customers when using roaming services abroad.

² Vodafone website: http://www.vodafone.com/start/about_vodafone.html

³ Vodafone Annual Report, 31 March 2007

⁴ SMS = Short Message Service, text messaging platform designed for mobile phones

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- **Vodafone Live!** is Vodafone's integrated communications and multimedia solution available to mobile phones as well as standard notebook computers.
 - **Vodafone 3G** – services associated with 3G that provide customers with the ability to simultaneously transfer both voice data (a telephone call) and non-voice data (such as downloading information, exchanging email, and instant messaging).
 - **Vodafone Mobile Connect data cards** and **Mobile applications** provide simple and secure access to existing business systems such as email, corporate applications, company intranets and the internet for customers on the move.

Vodafone is managed and organised through two geographic regions – Europe and EMAPA (Eastern Europe, Middle East, Africa and Asia, Pacific and Affiliates).

- Europe includes the Vodafone's principal mobile subsidiaries, located in Germany, Spain and the UK, its joint venture in Italy. Other subsidiaries in this geographic area are Albania, Greece, Ireland, Malta, Netherlands and Portugal.
- The EMAPA region covers Vodafone's subsidiary operations in the Czech Republic, Hungary, Romania, Turkey, Egypt, Australia and New Zealand, joint ventures in Poland, Kenya, South Africa and Fiji, associated undertakings in France and the US and the Group's investments in China and India.

Historically, the Europe region is the primary source of Vodafone's growth, generating approximately 79% of the revenue of the whole company (Appendix 1). However, with an average penetration more than 100%⁵ (Figure 1), this market is

⁵ Vodafone Annual Report, 31 March 2007

Over 100% penetration is possible due to customers owning more than one SIM card

now maturing and delivering lower growth. Whilst growth in this region has slowed, significant growth is now to be seen in EMAPA region where the penetration rates in some countries are below 30%. The expansion of Vodafone to new emerging markets has contributed with greater diversity to Vodafone's traditional market portfolio. Transactions in Turkey, South Africa, India and Romania are just a few examples of the new broad orientation that has evolved in the last couple of years.

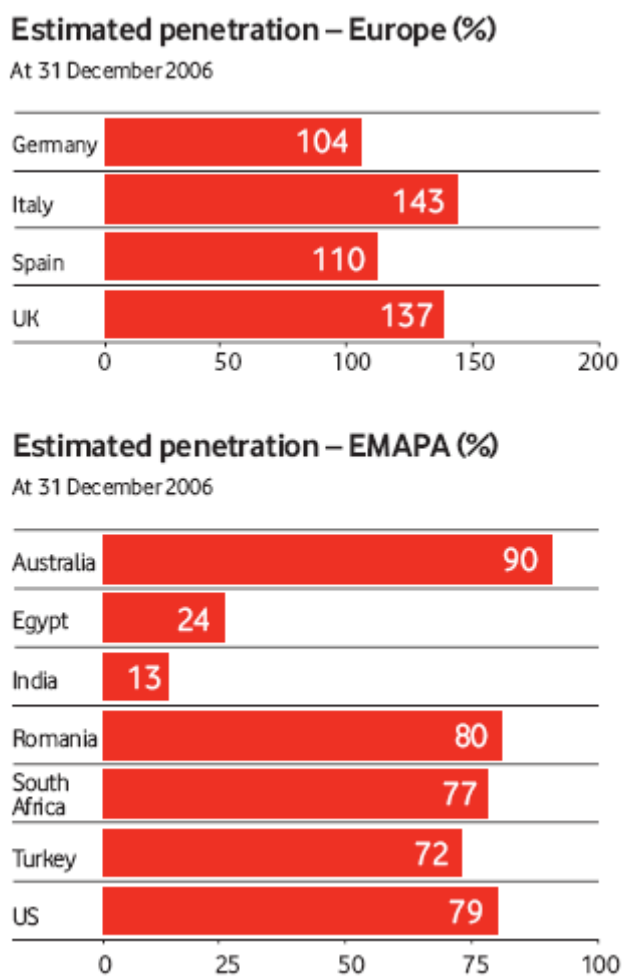


Figure 1: Estimated penetration – Europe and EMAPA

2. Analysis of Vodafone and its business environment

According to Johnson (2005) the environment of company can be viewed in a series of 'layers':

- The most general 'layer' of the environment is often referred to as the *macro-environment*. It consists of broad environmental factors that impact to a greater or lesser extent on almost all companies.
- Within this broad general environment the next 'layer' is called an *industry* or a *sector*. This is a group of organisations producing the same products or services.
- Within industries or sectors there will be many different companies with different characteristics and competing on different bases. Similarly customers' expectations are not all the same, they have a range of different requirements. So the most immediate layer of the company's environment consists of *competitors and markets*.

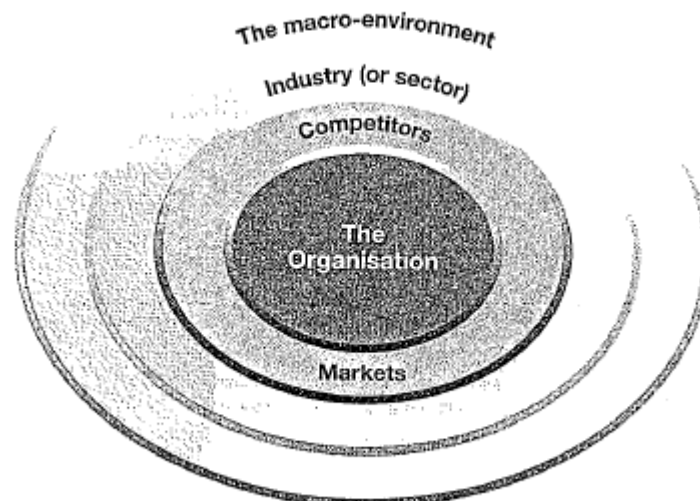


Figure 2: Layers of the business environment

2.1 Analysis of macro-environment

The PEST analysis is a framework that is used to scan the external macro-environment in which a company operates. PEST is an acronym for the following factors: political, economic, social and technological (Appendix 2). These factors play an important role in the value creation opportunities of a company's strategy. However they are usually outside the control of the company and must normally be considered as either threats or opportunities (Johnson, 2005).

The main PEST factors of external influence on Vodafone's value are the following:

Political factors

Vodafone is generally subject to regulations governing the operation of its business activities. Such regulations typically take the form of industry specific laws and regulations covering telecommunications services and general competition (anti-trust) laws applicable to all activities.

Most member states of the EU have now implemented the **EU Regulatory Framework for the communications sector**, which was adopted in 2002. It aims to encourage competition in the electronic communications markets, to improve the functioning of the single market and to guarantee basic user interests that would not be guaranteed by market forces⁶.

The impact of EU Framework on Vodafone was significant. After member states of the EU enacted national laws implementing the EU Framework, Vodafone had to reduce its mobile phone termination rates considerably, for example: 23% in

⁶ Europe's Information Society, thematic portal

Germany (from 14.32 eurocents to 11.0 eurocents), 19% in Italy (from 14.95 eurocents to 12.10 eurocents) and 10.57% in Spain⁷.

Spectrum liberalisation has been one of the key issues in mobile regulation for a number of years. At its heart is the simple proposition that markets, rather than regulators, are better placed to decide the most efficient use of the spectrum. In September 2005, the European Commission published proposals for spectrum reform across the EU, including proposals to allow holders of spectrum greater flexibility on the use to which it is put, to allow holders to trade spectrum within a spectrum market and to improve harmonisation of certain bands. The European Commission has proposed that these reforms be enacted by 2010⁸.

The initiatives concerning consumer protection might become the most important factor for the future of European mobile phone market. In February 2006, the European Commission proposed new **EU Roaming Regulation**, which seeks to reduce by up to 70% of the charges consumers have to pay for using their mobile phone abroad⁹. These proposals came into force on 30 June 2007.

The regulation requires mobile operators to offer a 'Euro-tariff' under which the cost of making calls within the EU is capped at 49 eurocents and the cost of receiving calls within the EU is capped at 24 eurocents. The regulation also requires that wholesale roaming charges within the EU are capped at an average rate of 30 eurocents per minute within 2 months of the regulation coming into force and that operators provide certain tariff transparency services to customers when they roam. The level of the retail and wholesale caps will fall further 12 and 24 months

⁷ Vodafone Annual Report, 31 March 2006

⁸ Mobile Europe: <http://www.mobileeurope.co.uk/magazine/features.ehtml?o=2787>

⁹ Europe's Information Society, thematic portal

following the application of the regulation. The roaming regulation will terminate after 3 years¹⁰.

Economic factors

The most common indicator for measuring a nation's economic activity is **gross domestic product (GDP)**. This indicator covers the production activity of resident producers, calculated as the sum of gross value added from all activities/industries within an economy. Figure 3 shows the evolution of constant price GDP (at fixed 2000 exchange rates) between 1995 and 2008 in the three Triad economies of the EU-27, Japan and the United States (forecasts are made for 2007 and 2008)¹¹.

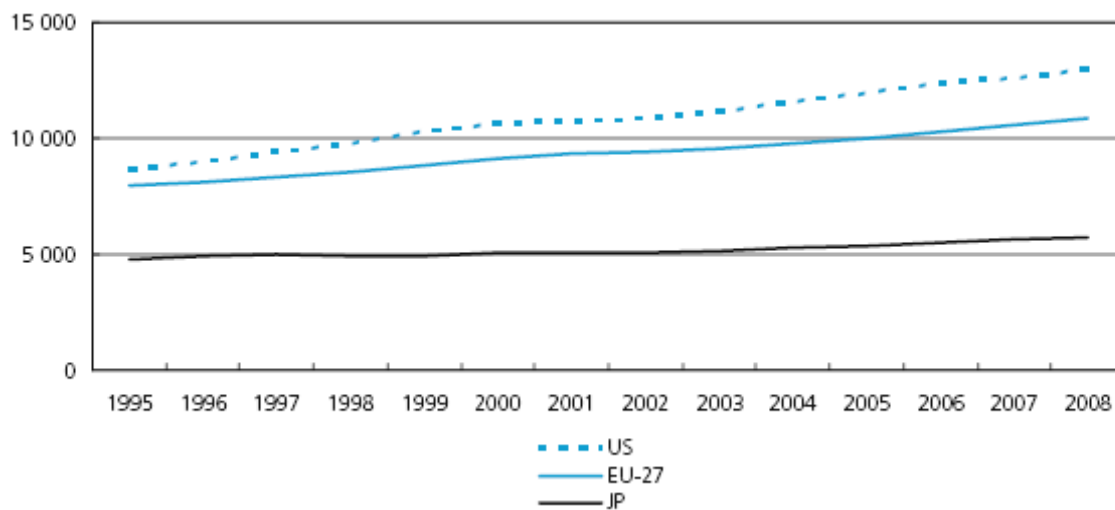


Figure 3: GDP at market prices in constant prices (EUR billion, chain-linked volume, at 2000 exchange rates) 1995-2008

¹⁰ Europe's Information Society, thematic portal

¹¹ European business – fact and figures. Eurostat statistical book, 2007 edition.

EU-27 – European Union of 27 Member States: Belgium, Bulgaria, the Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, the Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, the United Kingdom

For the whole of this period, GDP rose on average by 2.4% per annum in the EU-27, which was below the average rate of 3.1% per annum for the United States, but above the 1.4% per annum growth rate recorded in Japan¹² (Figure 4).

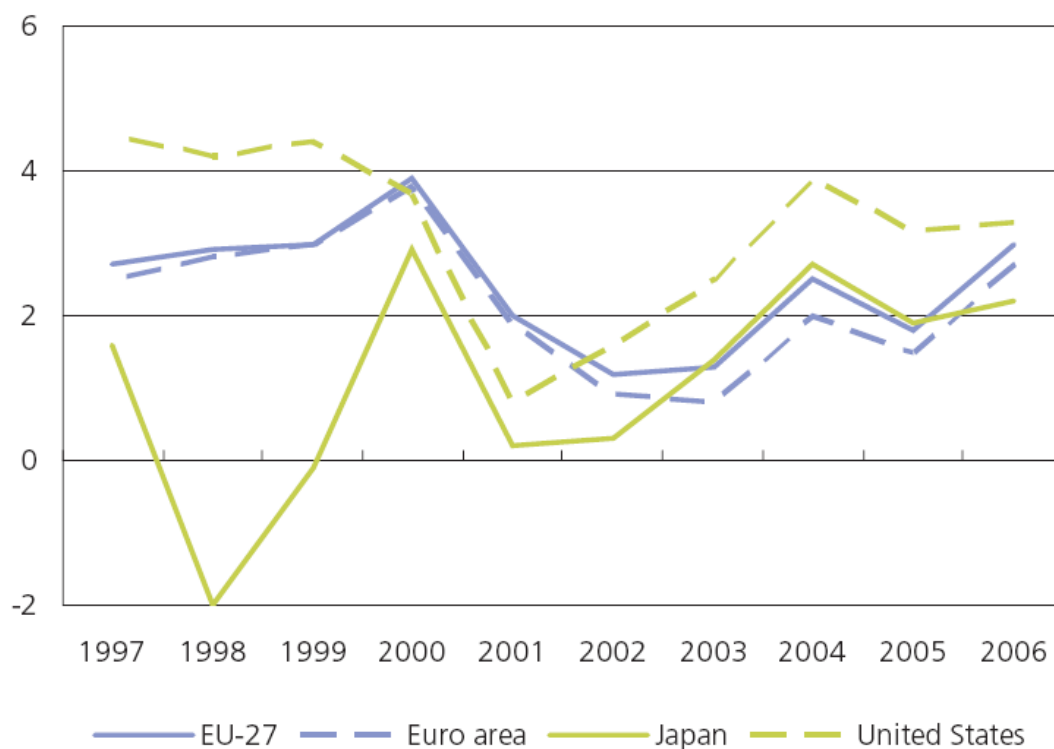


Figure 4: Real GDP growth rate (% change on previous year) 1997-2006

A mild deceleration in global growth is expected because of the U.S. economic downturn in 2007-2008 and tighter credit conditions in global financial markets. The offsetting effects of solid growth in Asia and Latin America, thanks in large part to resilient domestic demand growth and trade diversification, will keep world economic growth close to its potential. These same factors also will support growth in Europe, though at a considerably slower pace. The International Monetary Fund forecasts the growth of GDP in euro area as of 1.25% for 2009¹³.

¹² Key figures on Europe. Eurostat pocketbook, 2007/08 edition

¹³ Moody's Economy: <http://www.economy.com/dismal/default.asp>

Harmonised indices of consumer prices (HICP) are used for monitoring **inflation**. Indeed, the European Central Bank (ECB) uses this index as a prime indicator for monetary policy management within the euro area. The ECB has defined price stability as a year-on-year increase in the HICP for the euro area of close to but below 2% over the medium term¹⁴ (Figure 5 and 6).

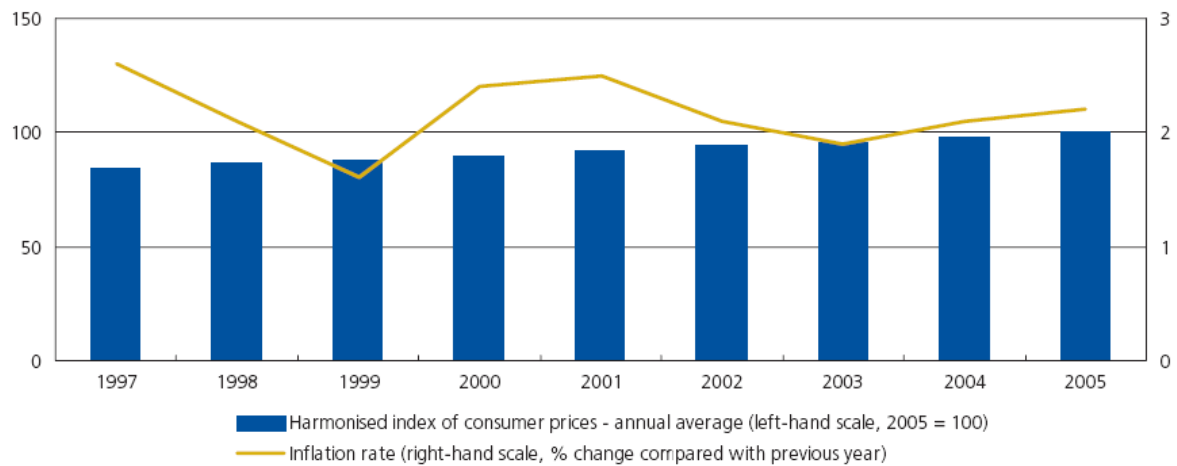


Figure 5: Consumer price index and inflation rate, EU-25, 1997-2005

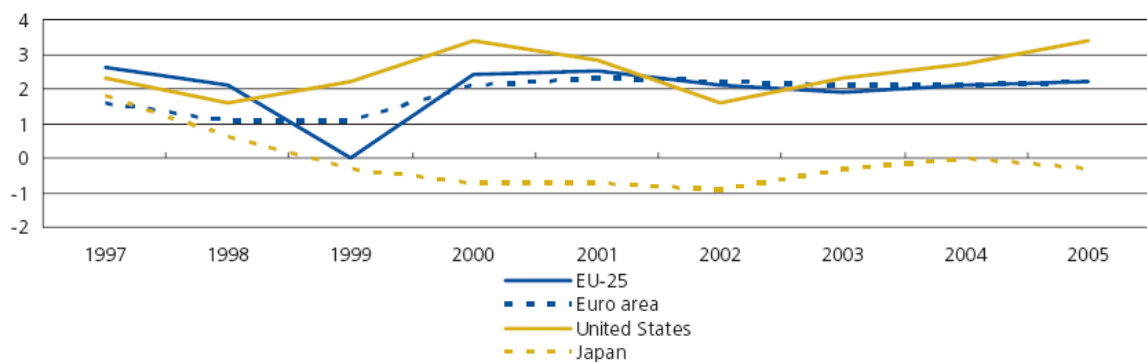


Figure 6: Inflation rate

¹⁴ Europe in figures. Eurostat yearbook 2006-07

The International Monetary Fund raised its forecast for consumer price growth in euro area, which expects to remain above 3% in 2008. For 2009, the growth is forecasted to slow to below 2% by the end of the year, which the IMF believes would allow room for the ECB to ease monetary policy¹⁵.

Social factors

The EU and other regions are facing unprecedented demographic changes that will have a major impact on many areas of society such as social systems, consumption patterns, education, and job markets in the coming decades. People are living much longer and in better health, while fertility rates have dropped. These factors have resulted in the profile of the EU's population becoming increasingly older.

Eurostat's trend scenario for population projections suggests that by 2050 the EU will have 15 million fewer children compared with 2005, while the numbers of older people will rise. By 2045, the EU is likely to have a significantly higher proportion of older persons than its main global competitors¹⁶ (Figure 7).

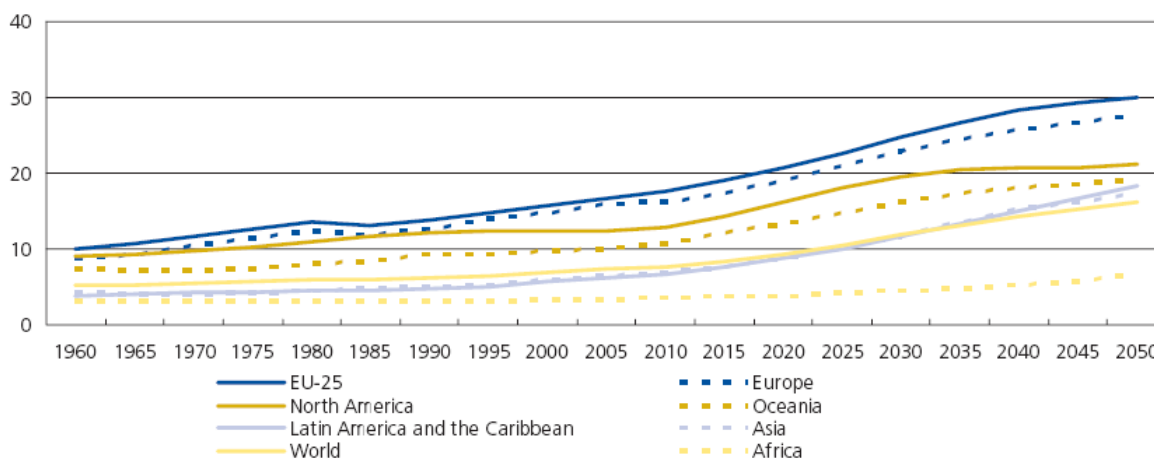


Figure 7: Proportion of population aged 65 and over (% of total population)

¹⁵ Moody's Economy: <http://www.economy.com/dismal/default.asp>

¹⁶ Europe in figures. Eurostat yearbook 2006-07

The evolution of the EU's population is part of a wider trend, as all parts of the world will witness demographic ageing over the next century. Nevertheless, while the population of neighbouring regions in Europe, Africa and the Middle East will start to age, they will continue to grow, as will the population of the United States.

Despite its somewhat faster growth in recent years, the EU's population is developing at a relatively slow pace when compared with other world regions. Between 1960 and 2005 the world's population more than doubled, rising from 3 024 million inhabitants to 6 465 million. During the same period, the population of the EU rose by only 22.6% to 461 million inhabitants, which was equivalent to 7.1% of the world total.

The fastest expansion in world population during the last 45 years was reported in the developing world, in particular, Africa, Latin America and parts of Asia. The number of inhabitants in each of India (1 103 million) and China (1 316 million) was over a billion persons, and together these two countries represented more than one third (37.4%) of the world's population in 2005.

According to United Nations' forecasts, the pace at which the world's population will increase in the coming decades is expected to slow in many regions. The proportion of the world's population living in more developed regions including the EU, Japan, the Russian Federation and the United States will fall between 2000 and 2050 from 19.6% to 13.6%. Less developed regions of the world, including Africa and Latin America are expected to account for the majority of the world's population growth in the next 45 years¹⁷.

¹⁷ Europe in figures. Eurostat yearbook 2006-07

Technological factors

Research and development (R&D) is a driving force behind economic growth, job creation, innovation of new products, and increasing quality of products.

R&D intensity for the EU showed a positive evolution in the six years up to 2003. However, when compared with the United States and Japan, the EU lags behind (Table 1). Gross domestic expenditure on R&D (GERD) in the EU-25 was equivalent to 1.9% of GDP in 2005; this proportion rose to over 3% in just two of the Member States, namely, Finland and Sweden¹⁸. One structural weakness often cited in relation to Europe's research effort is the lack of business financed research. Business enterprise R&D accounted for over 2% of GDP in Japan and the United States, while the corresponding proportion for the EU-25 in 2004 was 1.2%.

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
		(1)	(2)	(3)	(4)		(5)		(6)		(7)
EU-25	:	1.9	1.8	1.8	1.8	1.9	1.9	1.9	1.9	1.9	1.9
EU-15	1.9	1.9	1.9	1.9	1.9	1.9	1.9	2.0	2.0	2.0	2.0
Euro area	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Japan	2.6	2.7	2.8	2.8	3.0	3.0	3.0	3.1	3.1	3.2	:
United States	2.4	2.5	2.5	2.6	2.6	2.6	2.7	2.7	2.7	2.6	:

Table 1: Gross domestic expenditure on R&D (% of GDP)

Government budget appropriations or outlays for research and development (GBAORD) are the amount governments allocate towards R&D activities. Comparisons of GBAORD across countries give an impression of the relative importance attached to state-funded R&D. In 2005, GBAORD, expressed as a percentage of GDP, amounted to 1.06%, 0.74% and 0.71% for the United States, the EU-25 and Japan respectively¹⁹.

¹⁸ Europe in figures. Eurostat yearbook 2006-07

¹⁹ Science, technology and innovation in Europe. Eurostat pocketbook, 2007 edition

2.2 Analysis of telecommunications industry



Figure 8: Porter's five forces model

Porter's five forces analysis is a framework that is usually used for the industry analysis and business strategy development. It derives five forces (Figure 8) that determine the competitive intensity and therefore attractiveness of a market. Attractiveness in this context refers to the overall industry profitability. Porter (1979) referred to these forces as the micro-environment, to contrast it with the more general term macro-environment. They consist of those forces close to a company that affect its ability to serve its customers and make a profit. A change in any of the forces normally requires a company to re-assess the marketplace.

In the following analysis, the attractiveness of the European telecommunications industry will be examined by elaborating upon Porter's (1979) five forces model.

Buyers

The main factor that have marked recent developments in the mobile services market is the enlargement of subscriber bases in the developing economies, particularly in the major emerging markets but also in the industrialised countries, despite already high penetration rates.

During the period 2002-2006 mobile subscriber bases expanded at an annual rate of 21-26%. The number of mobile subscribers passed the 2-billion mark during 2005 and the 3-billion mark during 2007²⁰.

A large part of the increase in the subscriber base is fuelled by the developing countries. By the end of 2007, 70% of the world's mobile subscribers are found in a developing country, compared with 50% at year-end 2003 (Figure 9). In 2006-2007, these countries generated nearly 90% of the net increase in the worldwide subscriber base. Particularly strong growth is displayed by the major emerging economies of Asia (China, India, Indonesia, Pakistan), Latin America (Brazil, Colombia) Europe (Russia, Ukraine, Turkey) and Africa (South Africa, Algeria, Nigeria).

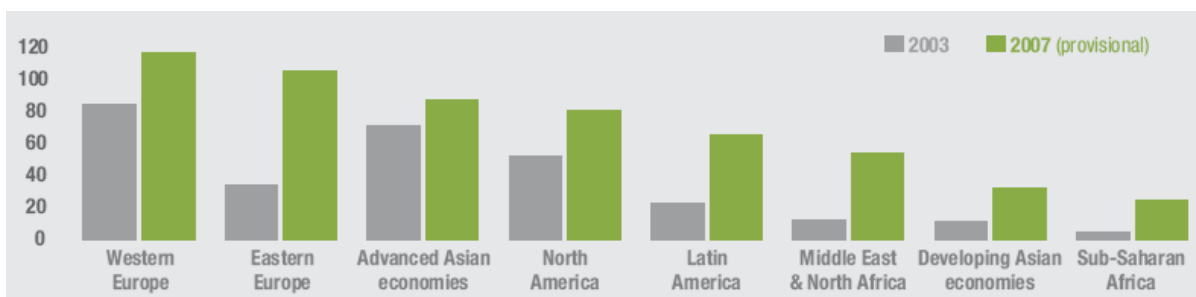


Figure 9: Regional mobile density, 2003/2007 number of mobile subscribers per 100 inhabitants at year end

In the mature markets operators face fierce competition and consumer demand for more features, minutes and texts, for less money. This leads to companies trying to cut costs and transfer these benefits in the form of price cuts to consumers. Buyers are becoming increasingly sophisticated and make use of the wider range of services that mobile operators have to offer including broadband, data availability, MMS and 3G. Yet, prepaid customers already account for 63% of active mobile users and, despite operator efforts to convert them to contract subscriptions, this

²⁰ IDATE, Mobile 2008

will remain a substantial segment of the mobile market for at least the next five years restraining the expenditure of consumers as opposed to contract subscriptions (Salanave and Kalmus, 2007).

Rivalry

As the European telecommunications market is highly saturated and regulated, it is characterized by high levels of competition, whereas the situation in the emerging market is more favourable for Vodafone. Telefónica O₂, T-Mobile, Orange and “3” are the main competitors of Vodafone in the telecommunications market.

1. Telefónica O₂:

Telefónica is originally a Spanish company with affiliates in 19 countries and operates with both fixed and mobile lines. It is a telecommunications company with more than 140 million customers in total. From that 93.5 million customers worldwide are customers of mobile branches of Telefónica company. Its most important regions are Spanish-speaking countries, i.e. Spain and South America, and some other European countries where it operates as “Telefónica O₂” – United Kingdom, Germany, Ireland, Czech Republic, and Slovakia²¹.

2. T-Mobile:

The company has strongly increased its presence within the European area. T-Mobile has 12 direct and indirect shareholdings in mobile communications companies worldwide. The Group is the sole or majority shareholder in Germany, the United States, the United Kingdom, Austria, the Netherlands, the Czech Republic and Poland. It also has a stake in telecommunications companies in

²¹ Telefonica website : <http://www.telefonica.es/acercadetelefonica/eng/>

O2 website : <http://www.o2.com/>

Hungary, Croatia, Slovakia, Macedonia and Montenegro. T-Mobile has around 120 million customers at the end of 2007. Even though is more likely European oriented company, its US branch is growing very rapidly²².

3. Orange:

Orange is the key brand of France Telecom, one of the world's leading telecommunications operators. France Telecom serves more than 172 million customers in five continents as of March 31, 2008, of which two thirds are Orange customers²³.

4. "3"

3, a new European competitor, has recently entered the European market, intensifying competition further. The strategy pursued is one of low prices and it is expected to remain unchanged for the next couple of years. At the same time, the company has been offering innovative services such as the Dual Download, allowing customers to download a tune both on their mobile and their PC²⁴.

In addition to "traditional" competition, tariff rates have been highly driven by the emergence of an alternative mobile business model: *Mobile Virtual Network Operator*. The term Mobile Virtual Network Operator defines a company that offers mobile services without actually possessing any frequency allocation and which is financially very dependent on its host *Mobile Network Operator*²⁵. Their appearance was triggered by the market saturation and the increased effort of suppliers to find alternative outlets to reach the few remaining potential consumers. The regulatory

²² T-Mobile website: <http://ghs-internet.telekom.de/dtag/cms/content/TMOI/en/343728>

²³ Orange website: http://www.orange.com/en_EN/group/

²⁴ 3 website: <http://www.three.co.uk/aboutus/newkind.omp>

²⁵ IDATE, Mobile 2007

framework has also been favourable for their development²⁶. Increasing further competition, their development inevitably has resulted in a further fall in the Average Revenue Per User (ARPU).

What is also interesting within the European telecom business is that the market caution towards the sector has prompted low valuations and this, in turn, has resulted in a very high number of mergers and acquisitions. It has produced M&A activity of no less than € 100 billion since 2005 (Salanave and Kalmus, 2007).

Substitutes

The increasingly vague scope of the market boundaries has drawn considerable interest within the industry. Fixed-mobile line conversion is a real future prospect for network operators. Research shows that the total number of fixed lines fell by 1% in 2004 and by 1.8% in 2005. One of the main driving forces of this change is their substitution by mobile service. A survey by the European Commission indicates that within Europe-5 countries, 15% of the households are mobile only²⁷.

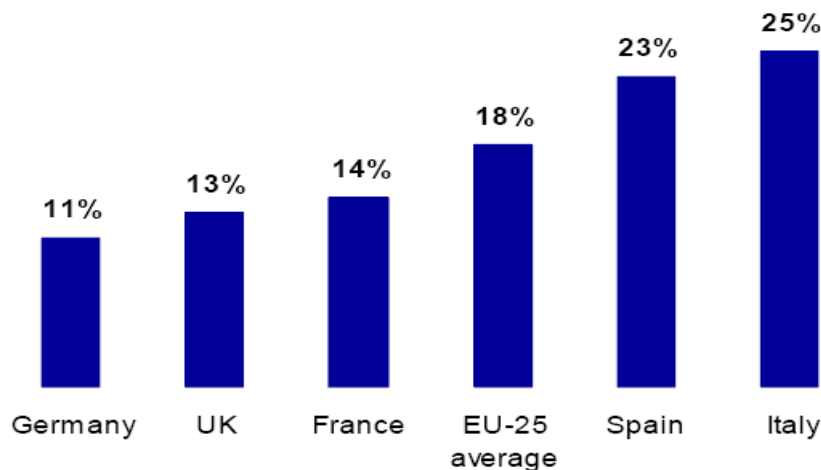


Figure 10: Mobile-only households in Europe, end 2005

²⁶ IDATE, Mobile 2007

²⁷ Salanave and Kalmus, IDATE, Consulting: Telecoms in Europe 2015 – A report for the Brussels Round Table

These findings all point towards the possibility of a new era where consumers will be completely mobile – a prospect that is highly attractive to mobile operators.

At the same time though, Internet calling services through VoIP such as Skype are experiencing enormous growth. A wave of concern arose in 2005 and is still ongoing. Skype essentially offers international calling at the price of national calls. Even though Skype's market share is still low with only 3% on a paying scheme and 1% of global paying international traffic according to Salanave and Kalmus(2007), its initiative is expected to trigger a reaction and an imitation pattern that will cause further price pressure within telecommunications industry.

Entrants

New initiatives from outsiders are not likely in an industry that is highly regulated and protected by significant barriers to entry and high initial fixed cost requirements. Yet the increasing interdependence between mobile network operators and online entertainment providers (music, video, data downloads) leads to a redefinition of the industry boundaries. In the long run, communications' usage and purchases will be increasingly intertwined with those of other digital goods. This is already happening now "with VoIP²⁸, cablecos and Internet access providers (who) are now addressing the traditional fixed voice market of the incumbents and plan to enter the mobile voice segment as MVNOs. Making the opposite move, incumbents are pushing TV through their IP pipes, and mobile carriers have introduced mobile TV through 3G. As a major driver in the industry, fixed mobile convergence (FMC) will increasingly drive fixed and mobile carriers to the same battlefield²⁹."

²⁸ Voice over Internet Protocol: The technology that allows voice communication through the use of the Internet

²⁹ Salanave and Kalmus, IDATE, Consulting: Telecoms in Europe 2015 – A report for the Brussels Round Table, p.68

Simultaneously, retailers are entering the business in the form of the virtual operator network concept, leveraging on their distribution channel and competing on commodity services. Even though at present the effect of this complementary services competition has not had a substantial effect on the market, its effect is expected in the long run as they redefine the offerings, raising the standards for all players.

Suppliers

In the context of the mobile network operators market, the concept of suppliers should be redefined indicating the providers of mobile devices, but also the providers of network infrastructure, software and additional digital services. While it is very important for network operators to sustain a close relationship with device providers, there has been a shift to increase independence. Indicatively, Vodafone's global presence means it has significant purchasing power allowing it to secure exclusive deals with phone manufacturers. Yet it is known in the industry that Vodafone is keen to develop its own, branded phones in an attempt to break the power of Nokia on the phone market, thus at the same time reducing the firm's dependence and making its offerings more complete.

2.3 SWOT Analysis

INTERNAL	Strengths	Weaknesses
	<ul style="list-style-type: none"> • Leadership position • Global brand strength • High geographical reach 	<ul style="list-style-type: none"> • Centralised control – low flexibility • High customer churn rates
EXTERNAL	Opportunities	Threats
	<ul style="list-style-type: none"> • Expanding market boundaries • Growth through 3G • Strategic alliances 	<ul style="list-style-type: none"> • Increased competition • Market saturation in Europe • Emergence of Low-Cost Brands/ MVNO

Figure 11: Vodafone SWOT analysis

Strengths

The main strength of Vodafone within the telecommunications market lies in its brand image and recognition. Vodafone, having established a global presence and having invested highly in marketing a differentiated image by promoting a Vodafone life style, currently enjoys a differentiating advantage that, if exploited properly, can offer a lead in competition.

The presence of Vodafone in numerous countries within Europe as well as in all part of the world enhances this image. It allows customers to travel and enjoy easily the services of their home country operator. In the few countries that Vodafone is not physically present (e.g. Norway) it has well-established strategic alliances which allow for a better service of mobile clients.

Weaknesses

The expansion of Vodafone has been completed at the expense of direct control of its operations. The company grew through a process of acquisitions of national telecommunications companies (e.g. the acquisition of the third biggest Czech mobile phone operator, Cesky mobile) rather than organic growth. This increased its subscribers' base quickly, offering direct market knowledge and immediate additions of customer bases at the expense of direct effective control of the subsidiaries. At the same time though, it implicitly imposed a centralised operational structure for the group, nominating the UK headquarters as the leading business unit running a much centralised marketing and handset procurement at group level. This has resulted in the neglect of local markets and local differences, allowing market share to be gained by smaller local competitors³⁰. Due to the highly saturated Western European market this has resulted in an increase in the price elasticity of demand, with consumers becoming continuously price oriented. This has resulted in high customer churn rates reaching the level of 32.8% in the UK compared to O2's 24%³¹.

Opportunities

The telecommunications market, even though highly saturated in some regions offers great potential due to the ageing population and the sophistication of the consumers. It offers great opportunities through a careful market segmentation and exploitation of particular profitable segments. Different strategies should be pursued – simple phones and simplified pricing plans to the ageing population and more updated, sophisticated solutions for younger generations. The expanding boundaries of the market could provide further opportunities by allowing Vodafone

³⁰ Telegraph: <http://www.telegraph.co.uk/money/main.jhtml?xml=/money/2006/07/30/ccvoda30.xml>

³¹ Telegraph: <http://www.telegraph.co.uk/money/main.jhtml?xml=/money/2006/07/30/ccvoda30.xml>

to enter more aggressively into fixed-line service and to better enjoy the benefits of its high investment in 3G technology.

Moreover the company has undertaken its first steps in establishing strategic alliances to develop customised solutions for end-users: Vodafone recently announced two new partnerships, one with supermarket group ASDA to launch an ASDA-branded mobile service in the UK, and another with electrical retailer DSG International to provide mobile solutions to small businesses³². This could further be enhanced to avoid being a late-entrant in this new method of distribution which offers access to a wide potential customer base.

Threats

The European part of Vodafone's market is characterised by existing high levels of competition. Major brands such as O₂ and T-Mobile are exploiting the price sensitivity of customers and in this way they are building a stronger image and presence in the market. Indirect competition is also increasing further, through the presence of Skype and other related (not only voice) Internet-based services. This, combined with the upcoming European legislative measures is expected to limit further the tariffs for the network providers imposing further need for price cuts which could harm the bottom line profitability of the company.

³² Reuters: <http://www.reuters.com/article/technology-media-telco-SP/idUSL3014013720070330?pageNumber=1>

3. Company valuation

Valuation plays a key role in many areas of finance – in corporate finance, in mergers and acquisitions and in portfolio management. If the objective in corporate finance is the maximization of firm value, the relationship between financial decisions, corporate strategy and firm value has to be specified, as the value of the firm can be directly related to decisions that it makes – on which projects it takes, on how it finances them, and on its dividend policy. Valuation also plays a central role in acquisition analysis. The bidding firm or individual has to decide on a fair value for the target firm before making a bid, and the target firm has to determine a reasonable value for itself before deciding to accept or reject the offer. The role that valuation plays in portfolio management is defined by the investment philosophy of the investor. Valuation plays a minimum role for a passive investor, whereas it plays a larger role in portfolio management for an active investor.

3.1 Valuation Models

Damodaran (2002) distinguishes three general valuation methods. The first is **intrinsic or discounted cash flow valuation**, where the value of a firm or asset is estimated by discounting the expected cash flows back to the present. The second is **relative valuation**, where the value of a firm is estimated by looking at the way the market prices similar firms. The third is **contingent claim valuation**, which uses option pricing models to estimate the value of an asset that share option characteristics. These models were initially designed to value traded options, but lately are applied also in traditional valuation to price assets with option-features – like patents or undeveloped reserves.

Discounted Cash flow Valuation

When valuing a business, the discounted cash flow valuation can be used in one of two ways. First, one can discount the expected cash flow to equity investors at the cost of equity to arrive at the value of equity in the firm; this is equity valuation.

$$\text{Value of Equity} = \sum_{t=1}^{t=\infty} \frac{\text{Expected Cashflow to Equity in period } t}{(1 + \text{Cost of Equity})^t}$$

Adopting the narrowest measure of the cash flow to equity investors in publicly traded firms gives us a special case of the equity valuation model – the dividend discount model. A broader measure of free cash flow to equity is the cash flow left after capital expenditures, working capital needs, and debt payments have been made; this is the free cash flow to equity.

Secondly, one can discount the cash flows generated for all claimholders in the firm, debt as well as equity, at the weighted average of the costs demanded by each – the cost of capital – to value the entire business.

$$\text{Value of Firm} = \sum_{t=1}^{t=\infty} \frac{\text{Expected Free Cashflow to Firm in period } t}{(1 + \text{Cost of Capital})^t}$$

As cash flows cannot be estimated forever, simplification is used for both equity and firm valuation models: estimate cash flows for only a period and then estimate a terminal value at the end of that period. Applying this to the firm valuation model would yield the following:

$$\text{Value of Firm} = \sum_{t=1}^{t=N} \frac{\text{Expected Cashflow to Firm}_t}{(1 + \text{Cost of Capital})^t} + \frac{\text{Terminal Value of Business}_N}{(1 + \text{Cost of Capital})^N}$$

Although a variety of approaches exist in practice, the most consistent with a discounted cash flow method for estimating the terminal value is based on the assumption that cash flows will grow at a constant rate beyond year N ³³, so the terminal value could be calculated as follows:

$$\text{Terminal Value of Business}_{t=N} = \frac{\text{Expected Chashflow in year } N + 1}{(\text{Cost of Capital} - \text{Constant Growth Rate})}$$

In discounted cash flow models, the effect of risk is usually isolated to the discount rate. In equity valuation models, the cost of equity becomes the vehicle for risk adjustment, with riskier companies having higher costs of equity. If the capital asset pricing model is used to estimate the cost of equity, the beta carries the entire burden of risk adjustment. In firm valuation models, more components are affected by risk. The cost of debt also tends to be higher for riskier firms, and these firms often cannot afford to borrow as much leading to lower debt ratios.

The cash flows in discounted cash flow models represent expected values, estimated either by making the most reasonable assumptions about revenues, growth, and margins for the future or by estimating cash flows under a range of scenarios, attaching probabilities for each of the scenarios and taking the expected values across the scenarios.

³³ Damodaran (2002)

Relative Valuation Models

In relative valuation models, stock is valued based on how similar companies are priced by the market. In practice, relative valuations take the form of a multiple and comparable firms; a firm is viewed as cheap if it trades at 10 times earnings when comparable companies trade at 15 times earnings. The main problem lies in the definition of comparable firms and how analysts deal with the differences across these firms.

There are three basic steps in relative valuation. The first step is picking a multiple to use for comparison, which could be categorized into four groups: Multiples of earnings, Multiples of book value, Multiples of revenues and Multiples of sector-specific variables.

The second step in relative valuation is the selection of comparable firms. A comparable firm is one with cash flows, growth potential, and risk similar to the firm being valued.

The last step in the process is the comparison of the multiple across comparable firms. Because it is impossible to find firms identical to the one being valued, the ways of controlling for differences across firms on these variables have to be found. In most valuations, this part of the process is qualitative.

According to Damodaran (2002) risk adjustment in relative valuation can range from being nonexistent to being haphazard and arbitrary at best. In its nonexistent form, analysts compare the pricing of firms in the same sector without adjusting for risk, making the implicit assumption that the risk exposure is the same for all firms in a business. Relative valuations that claim to adjust for risk do so in arbitrary ways. Analysts will propose a risk measure, with little or no backing for its relationship to value, and then compare companies on this measure. They will then follow up by adjusting the values of a company that look risky on this measure.

3.2 Vodavone Value Calculations

The discounted cash flow model is chosen for Vodafone valuation, moreover prediction and calculation of the value of entire business under three scenarios will be performed. The DCF scenario model gives the most details about the company development, but this approach relies heavily on detailed information about the company itself and its market and might be hard to achieve in countries with limited disclosure practices.

Cost of capital

Firms raise money from both equity investors and lenders to fund investment. Both groups of investors make their investments expecting to make a return. The expected return for equity investors would include a premium for the equity risk in the investments; this expected return is the cost of equity. The expected return that lenders hope to make on their investments includes a premium for default risk, and which is called the expected return the coat of debt. If one takes into consideration all the financing that the firm takes on, the composite cost of financing will be a weighted average of the costs of equity and debt, and this weighted cost is the cost of capital.

Cost of Equity

A commonly used Capital Asset Pricing Model (CAPM) states that firm's expected return on equity r_e is given as

$$r_e = r_f + \beta(r_m - r_f),$$

where

r_f is the risk-free rate of return

r_m is the expected return on the market portfolio

β is the firm's "beta" which measures the correlation between the firm's returns and the market's returns.

The Risk-free Rate

The risk-free rate is the expected return on a riskless asset, and it is known with certainty for the time horizon of the analysis. The duration of the default free security used as a risk-free asset should match to the duration of the cash flow in the analysis. As the risk-free rate I will use the 5-years US treasury bond yield, which is 3.42%³⁴.

The Risk Premium

The difference between the expected return on the market portfolio and the risk-free rate ($r_m - r_f$) is called the risk premium. According to Damodaran (2002), in practise one usually estimates the risk premium by looking at the historical premium earned by stocks over default free securities over long time period, despite the fact that the best estimate of the risk premium would be forward looking. Several issues arise when calculating historical risk premiums:

- Firstly, there is the question of which time period to use. Using a long period of time, say 50 years, yields a standard error of the risk premium of 2.8%, while a shorter period of 10 years yields a standard error in excess of 6%.

³⁴ Yahoo!Finance website: <http://finance.yahoo.com/bonds>

However, using a long period ignores the fact that the risk aversion of the average investor might have changed.

- Secondly, there is the choice of what risk-free security to use, treasury bonds or bills. If the yield curve is upward sloping, as it has been for most of the past decades, the risk premium will be larger using bills than bonds.
- Thirdly, one has to choose between a geometric and an arithmetic calculation method. Damodaran (2002) argues for the use of arithmetic averages, stating that it will yield the best unbiased estimate given that annual returns are uncorrelated over time.

As a risk premium I use the spread suggested by Damodaran³⁵ as the average spread for the Western Europe market of 5.2%.

The Beta

There are three approaches available for estimating the beta:

- Use historical data on market prices for individual investments
- Estimate the beta from the fundamental characteristics of the investment
- Use accounting data

Using the first approach, the market beta of a security is determined by regression of returns on the investment against returns on a market index, where the slope coefficient of the regression is the beta of the stock.

While applying direct regression of Vodafone's returns over the S&P500 index, the beta is 1.06 (Figure 12).

³⁵ Damodaran website: <http://pages.stern.nyu.edu/~adamodar/>

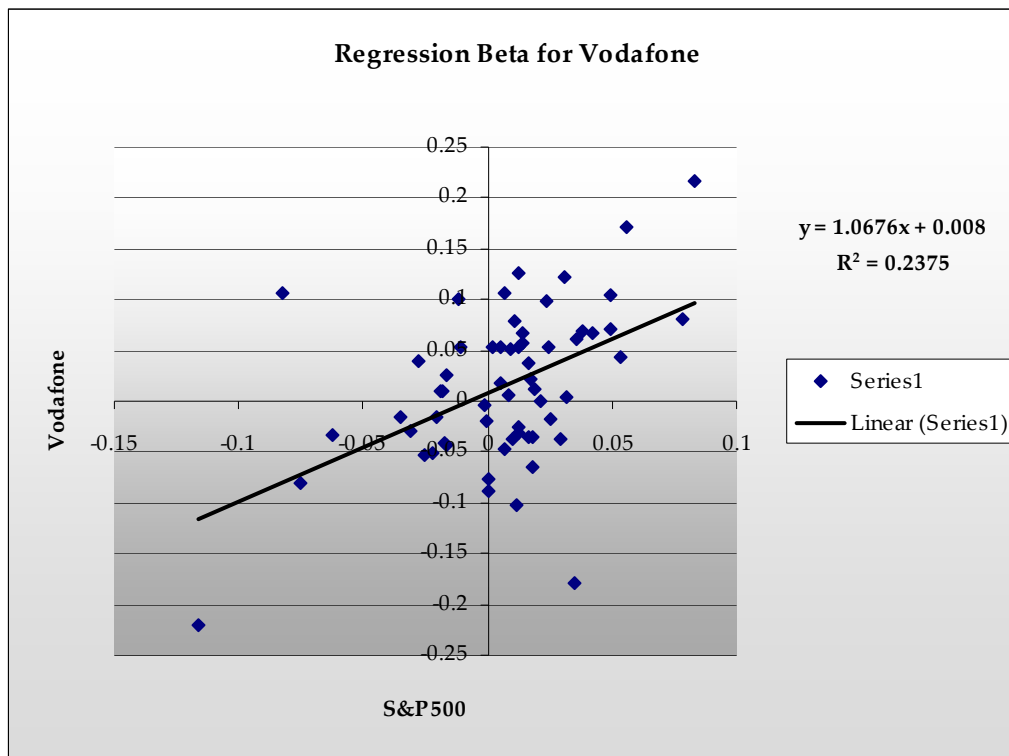


Figure 12: Regression Beta

Although this approach is relatively straightforward, the regression betas have a problem of high standard errors.

Fundamental beta should be more accurate estimate of the market risk for the company, because it takes into account the current or desired structure of the company. It is determined by three variables:

- The type of business
- The operating leverage of the company
- The financial leverage of the company

The challenges with this approach are to define comparable firms, to choose an averaging method and to control for differences in business risk and operating leverage.

For estimating the Vodafone’s beta I have chosen the following telecommunications companies: Telefonica AS, Deutsche Telekom and France Telecom. The bottom-up approach of calculating beta requires to un-level the average beta of comparable firms by their average debt to equity ratio; and re-lever again the beta of the company being valuated.

$$\text{Unlevered Beta} = \frac{\text{Beta}}{(1 + (1 - \text{tax rate})(D/E \text{ ratio}))}$$

Applying the average tax rate of 39.88% and debt to equity ratio of 60.34% to the above formula, the calculated unlevered beta is 1.46. Further applying the tax rate and debt to equity ratio of Vodafone, I receive a beta of 1.69 (Appendix 3).

Other databases provide another beta for Vodafone. Thus Bloomberg’s beta is 1.55, while Yahoo!Finance gives the beta of 1.31.

For further calculation of weighted average cost of capital for Vodafone, I use the average between these four betas, which is 1.40.

<i>Data</i>	<i>Beta</i>
Regression beta	1.06
Fundamental beta	1.69
Bloomberg beta	1.55
Yahoo!Finance beta	1.31
Average	1.40

Table 2: Vodafone betas

Cost of debt

The cost of debt measures the current cost to the firm of borrowing funds to finance projects. In general terms, it is determined by the following variables:

- The risk-free rate. As the risk-free rate increases, the cost of debt for firms will also increase.
- The default risk of the company. As the default risk of a firm increases, the cost of borrowing money will also increase.
- The tax advantage associated with debt. Since interest is tax deductible, the after-tax cost of debt is a function of the tax rate. The tax benefit that accrues from paying interest makes the after-tax cost of debt lower than the pre-tax cost. Furthermore, this benefit increases as the tax rate increases.

The spreadsheet from Damodaran's website³⁶ allows estimating the cost of debt for Vodafone, which is 5.78% (Appendix 4).

WACC

Since a firm can raise its money from equity and debt, the cost of capital is defined as the weighted average of each of these costs. The cost of equity reflects the riskiness of the equity investments in the firm and the after-tax cost of debt is a function of the default risk of the firm. The weights on each of these components should reflect their market value proportions, since these proportions best measure how the existing firm is being financed.

$$WACC = \frac{E}{V} r_e + \frac{D}{V} r_d (1 - T_c)$$

³⁶ Damodaran website: <http://pages.stern.nyu.edu/~adamodar/>

While the market value of debt is assumed to be approximately equal to its book value, which is £22,615mln. The market value of equity is calculated by multiplying the share price of 135.2p by the number of shares 58,085,695,298³⁷. Using these numbers as well as Corporate Tax Rate of 25%, I arrive at WACC=9.28% (Appendix 5).

Normalized Cash Flows

Financial statements remain the primary source of information for most investors and analysts. There are differences, however, in how accounting and financial analysis approaches interpret a number of key questions about the firm.

The operating income that is used as a base for projections should reflect continuing operations and should not include any items that are one-time or extraordinary. Thus, the operating profit before interests, taxes, depreciation and amortization (EBITDA) should be adjusted and normalized for the following items:

- Gains/losses from sales of assets, one-off gains/losses, that are not expected in the future or not from operating core assets
- Non-recurring, restructuring gains/losses, that should not be expected to happen regularly
- “Normalized” accruals (bad debt, write down of inventory, provisions)
- Income from sold businesses or goodwill, as income from purchased businesses
- Financial part of pension costs

Normalized cash flow to the firm is also should be deducted for reinvestments. There are two components in the reinvestment part:

³⁷ Vodafone Annual Report, 31 March 2007

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- Net capital expenditures, which is the difference between capital expenditures and depreciation
 - Investments in non-cash working capital.

The estimating of net capital expenditures requires deduction of depreciation from capital expenditures. The reason is that the positive cash flow from depreciation pays for a portion of capital expenditures, and that it is only the excess that firm's cash flows have to cover.

The second component of reinvestment is the cash that need to be set aside for working capital needs. Increase in working capital tie up more cash and hence generate negative cash flows. Conversely, decreases in working capital release cash and positive cash flow. Working capital is usually defined as difference between accounts receivables, inventory and accounts payable, taxes payable, employee accruals.

The last component to be considered is the effective tax rate. After deducting the normalized cash flows for the tax part, one gets normalized operating cash flows after tax, which could be directly used in discounted cash flow models.

As the main goal is to find the equity value of the company, the remaining step is to adjust the enterprise value to the market value of financial assets/debt:

- Add excess cash /bank deposits
- Add value of shares, bonds
- Add investments in associated companies/long term investments
- Add other financial assets, not included in operating income
- Subtract short term interest bearing debt (loans, bonds)
- Subtract net pension liabilities
- Subtract deferred tax assets/debt
- Subtract market value of minority interest

The following assumptions and adjustments to Vodafone financial statements were made in order to get the estimate for Vodafone expected cash flows during next five years:

- The consolidated Income Statement of the company for the financial year 2007 shows the increase of 6% in **revenues** of the company compared to the financial year 2006. This increase can be attributed to the 41.4% increase in revenues of the EMAPA region, while the Europe region has a decrease of 0.6% in revenues compared to previous year (Note 3 to 2007 consolidated financial statements). All revenues are generated by continuing operations of the company and do not require any adjustments.
- **Cost of sales** has shown a fairly stable proportion of the revenues within last years with 60.2% of the revenues in 2007 and 58.2% in 2006. As Vodafone is a mature company, I assume that the current structure of the company's fixed assets is used at optimum, so any growth in revenues should be followed by similar increase in the infrastructure, in a way that the level of cost of sales would be constant with 60% of the revenues.
- **Selling/distribution expenses** and **administrative expenses** also had constant proportion of the revenues: 6.4% and 11.6% of the revenues in 2006 and 6.9% and 11.1% in 2007. The implementation of the long-term core cost reduction programmes, which were announced in 2006, will lead to cost savings within next five years and as the result it could be assumed a constant level of these expenses in the revenues as of 6.6% for selling/distribution expenses and 11.3% for administrative expenses.
- As the **share of result in associated undertakings** should be taken only operating profit, excluding other non-operating income and expense, so the adjusted numbers are £3,133mln for 2006 and £3,390mln for 2007 (Note 14 to 2007 consolidated financial statements), which is 16.5% of the revenues.

-
- **Impairment losses and other income and expense** are one-time or extraordinary items, so they have to be excluded from the calculations.
 - Additional **adjustments** to the operating profit of £4,774mln in 2006 and £5,188mln in 2007 consist of depreciation of property, plant and equipment and amortization of intangible assets (Note 4 to 2007 consolidated financial statements), as well as a financial part of pension costs (Note 4, 25 and 34 to 2007 consolidated financial statements). The average level of additional adjustments in the revenues of 16.5% will be used in future calculation.
 - **Normalized investments** is the average, normal investment level needed to keep the current property, plant and equipment and intangible assets on today's level. After careful examination of Vodafone investments during last three years (Note 13, 14 and 15 to 2007 consolidated financial statements) the level of normalized investments in the revenues assumed to be 30%. Such level could be explained by Vodafone's strategy of expanding and gaining new customers mainly through acquisitions in the emerging markets, which requires high level of investments.
 - The level of working capital, as well as the **change in working capital**, is negative during last three years. A firm that has a negative working capital is, in a sense, using supplier credit as a source of capital, especially if the negative working capital becomes larger as the firm becomes larger, as in the case with Vodafone. However, in the long term it is not likely that noncash working capital will become more and more negative over time. I assumed that Vodafone's change in working capital will increase with 20% every year, in order to arrive at a positive number.
 - The **effective tax rate** is assumed to be 25%.
 - The level of **financial assets/debt** is calculated as of £19,977mln.

Value with Discounted Cash Flow Scenario approach

Drawing from the analyses of Vodafone and its environment, the major influencing risks, that will be the most critical in terms of the future profitability and hence the value of the company in different scenarios, are the following:

- 3G market take-up
- Fixed-mobile line substitution
- Regulation

The objective of the following analysis is not to determine the most probable future for the mobile network operations sector. Instead, the intention is to stress the different underlying and uncontrollable risks and to examine their influence on the value of the company.

In the following part, three potential scenarios for the future of the industry and its immediate implications on the policy and profitability of Vodafone will be examined.

Downside Scenario

This scenario represents the downturn development of the company due to the following reasons.

First, Vodafone fails to engage in 3G market: consumers are put off by the complexity of the service, the design of the phone and the high tariffs. At the same time, fixed line networks expand further due to the greater availability of Internet-based providers. Moreover, there is high level of regulation with the purpose of increasing the generic competition within the industry for the benefit of consumers. Increases in the use of Skype and other internet-based competitors decrease the power of the conventional network providers and increase price pressure.

Overall, the above scenario demonstrates an adverse situation for the whole telecommunications industry, as well as for Vodafone and its competitors. Low price level determines a poor growth in revenues, which could be assumed of 5% during next five years and 2% in perpetuity.

Those assumptions result in the equity value of £52,792mln (Appendix 6).

In order to check how vulnerable the estimated value is to errors in inputs I have conducted sensitivity analysis of the equity value towards the WACC estimate and the long-term growth rate (Table 3). The highlighted values show the range within which the company is currently traded.

Equity Value 52792		Long-term growth					
		1%	2%	3%	4%	5%	6%
WACC	16%	16320	17656	19196	20994	23118	25668
	15%	18972	20581	22458	24677	27339	30593
	14%	22035	23996	26313	29094	32493	36742
	13%	25610	28031	30938	34490	38930	44638
	12%	29837	32876	36589	41231	47199	55157
	11%	34913	38797	43652	49894	58216	69868
	10%	41121	46201	52732	61439	73630	91916
	9%	48885	55721	64836	77596	96737	128638
	8%	58873	68417	81779	101823	135228	202039
	7%	72195	86194	107191	142187	212179	422153

Table 3: Downside scenario – value sensitivity analysis

Intermediate Scenario

This scenario represents the most likely outcome of managed company in the face of the opportunities offered.

The 3G market enjoys noticeable take-up. Consumers are attracted to the new services offered, Vodafone, having invested substantial amounts on the development of 3G infrastructure, gains a competitive foothold in the industry. The substitution of fixed lines by mobile services continues and is further reinforced by

the ageing population. Regulation in terms of the 3G networks remains at low levels as the adoption of the service is gradual and providers demonstrate the need to obtain the required return on investment. At the same time, the remaining low tariffs for the regular 2G services safeguard customer' interests.

The ARPU within the saturated Western markets for 2G networks is expected to remain at the current low levels or even decrease further as new technologies (3G) start to dominate the market. At the same time, the 3G services, due to high levels of data transfers involved, offer increase of ARPU for Vodafone. As the result a moderate growth in revenues could be predicted as of 8% during next five years and 4% as a constant growth rate afterwards.

The WACC related assumptions remain unchanged, resulting in equity value of £84,814mln (Appendix 7).

The sensitivity analysis in this scenario (Table 4) shows that the company is currently correctly priced if the WACC ranges between 6% and 10% with long-term growth rates of up to 4%.

Equity Value 84814		Long run growth					
		1%	2%	3%	4%	5%	6%
WACC	16%	20499	22033	23802	25867	28306	31234
	15%	23525	25373	27528	30076	33133	36869
	14%	27021	29272	31934	35127	39030	43909
	13%	31105	33886	37223	41302	46401	52956
	12%	35937	39426	43691	49021	55874	65012
	11%	41744	46204	51779	58946	68503	81883
	10%	48849	54682	62181	72181	86180	107178
	9%	57741	65590	76057	90710	112690	149322
	8%	69184	80144	95489	118505	156865	233586
	7%	84457	100532	124644	164831	245204	486324

Table 4: Intermediate scenario – value sensitivity analysis

Upside Scenario

The third scenario represents the upward development of both the company and the market.

Substantial growth in 3G market: consumers – especially younger segments which constitute the basis of the future market – take up the use of 3G and exploit the new services despite higher prices. The fixed-line network declines sharply as young consumers grow older and retain their dependence on mobile devices and do not demand fixed-line service. Minimum levels of regulation regarding the mobile network sector and higher regulation for the new Internet service providers become a reason for Skype and similar Internet-based competitors to fail to attract substantial market share of the telecommunications industry.

Following the most optimistic forecasts, the future growth in revenues could be predicted as of 13% for next five years and 5% in succeeding years.

The equity value under this scenario will amount at £132,534mIn (Appendix 8).

The sensitivity analysis under this scenario is shown in the Table 5.

Equity Value 132534		Long run growth					
		1%	2%	3%	4%	5%	6%
WACC	16%	16320	17656	19196	20994	23118	25668
	15%	18972	20581	22458	24677	27339	30593
	14%	22035	23996	26313	29094	32493	36742
	13%	25610	28031	30938	34490	38930	44638
	12%	29837	32876	36589	41231	47199	55157
	11%	34913	38797	43652	49894	58216	69868
	10%	41121	46201	52732	61439	73630	91916
	9%	48885	55721	64836	77596	96737	128638
	8%	58873	68417	81779	101823	135228	202039
	7%	72195	86194	107191	142187	212179	422153

Table 5: Upside scenario – value sensitivity analysis

Combining the tree scenarios with the appropriate probabilities, it results into equity value of £87,954mln. Provided that the assumptions on which the forecasts are based and the probability distribution are correct, the Vodafone is currently under priced by almost 11%.

Scenario	Probability	Value
Downside scenario	0.2	52792
Intermediate scenario	0.6	84814
Upside scenario	0.2	132534
Total Value		87954

Table 6: Vodafone value under Discounted Cash Flows Scenario approach

4. Recommendations on Future Strategy

The main goal of the optimal strategy is to create sustainable value for shareholders, considering both opportunities for benefit (upside risk) and threats to success (downside risk).

The value of a firm can generally be considered as a function of four key inputs. The first is the cash flow from assets in place or investments already made. The second is the expected growth rate in the cash flows during a period of both high growth and excess returns. The third is the time before the firm becomes a stable-growth firm earning no excess returns. The final input is the discount rate reflecting both the risk of the investment and the financing mix used by the firm.

Cash flow to the firm

Most firms have assets or investments that they have already made, generating cash flows. To the extent that these assets are managed more efficiently, they can generate more earnings and cash flows for the firm. Isolating the cash flows from these assets is often difficult in practice because of the mixture of expenses designed to generate income from current assets and to build up future growth.

Expected growth from new investments

Firms can generate growth in the short term by managing existing assets more efficiently. To generate growth in the long term, though, firms have to invest in new assets that add to the earnings stream of the company. The expected growth in operating income is a product of a firm's reinvestment rate—that is, the proportion of the after-tax operating income that is invested in net capital expenditures and changes in noncash working capital, and the quality of these reinvestments, measured as the return on the capital invested.

A firm can grow its earnings faster by increasing its reinvestment rate or its return on capital or by doing both. Higher growth, though, by itself does not guarantee a higher value because these cash flows are in the future and will be discounted back at the cost of capital. For growth to create value, a firm has to earn a return on capital that exceeds its cost of capital. As long as these excess returns last, growth will continue to create value.

Length of the excess return/high growth period

It is clearly desirable for firms to earn more than their cost of capital, but it remains a reality in competitive product markets that excess returns fade over time for two reasons. The first is that these excess returns attract competitors, and the resulting price pressure pushes returns down. The second is that as firms grow, their larger size becomes an impediment to continued growth with excess returns. In other words, it gets more and more difficult for firms to find investments that earn high returns. As a general rule, the stronger the barriers to entry, the longer a firm can stretch its excess return period.

Discount rate

Discount rate reflects the riskiness of the investments made by a firm and the mix of funding used. By holding constant the other three determinants – cash flows from existing assets, growth during the excess return phase, and the length of the excess return phase – one can reduce the discount rate to raise the firm value.

In summary, to value any firm, one begin by estimating cash flows from existing investments and then consider how long the firm will be able to earn excess returns and when returns fade, then estimate a terminal value and discount all of the cash flows, including the terminal value, to the present to estimate the value of the firm. Figure 13 summarizes the process and the inputs in a discounted cash flow model.

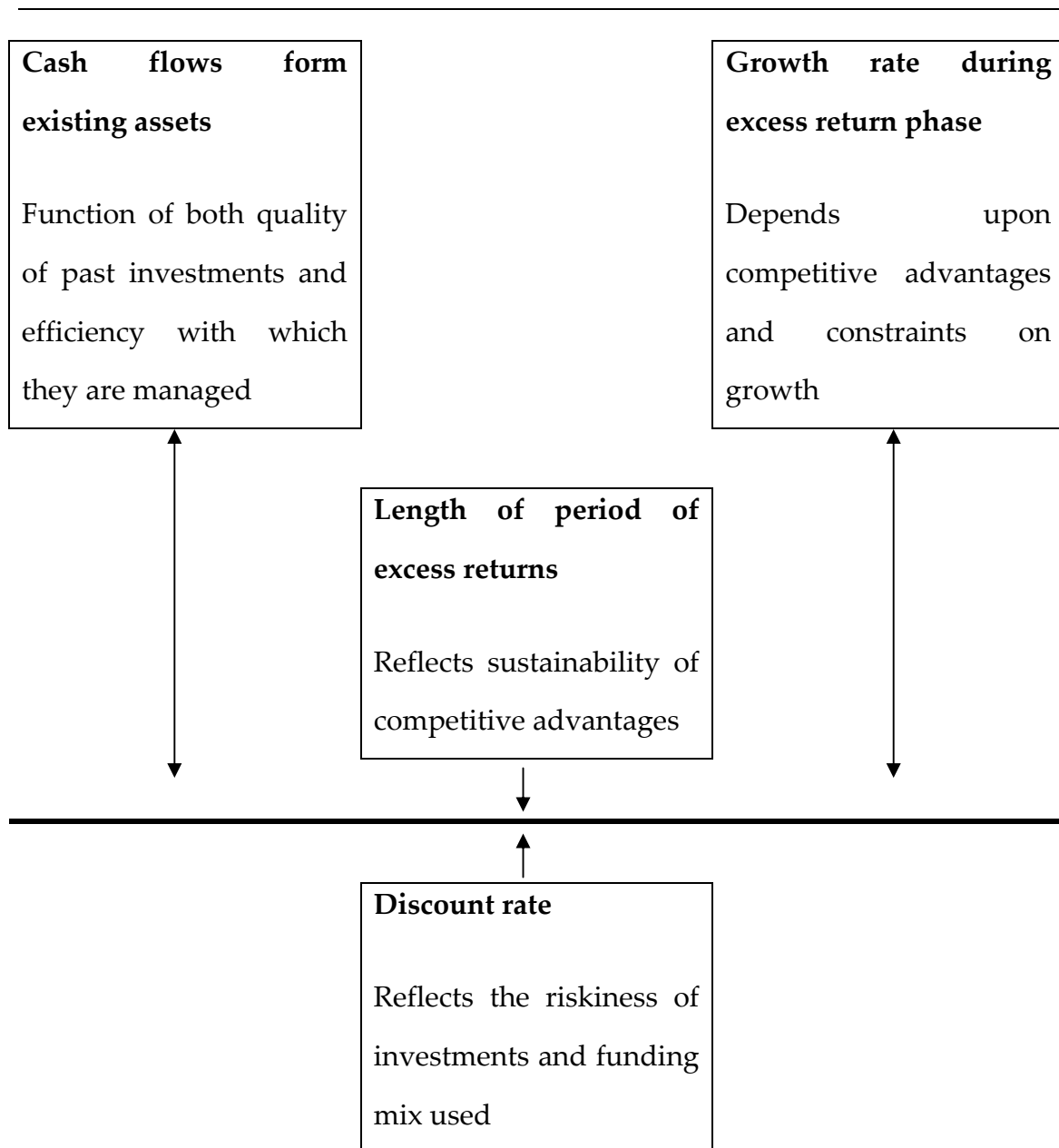


Figure 13: Determinants of value

With these inputs, it is quite clear that for a firm to increase its value, it has to do one or more of the following.

- Generate more cash flows from existing assets
- Grow faster or more efficiently during the high growth phase
- Lengthen the high growth phase
- Lower the cost of capital

Currently, Vodafone is confronted with a greatly changing environment: competition is increasing not only from established mobile operators, but also from new types of competitors; the regulatory environment remains challenging; developed markets, particularly in Europe, are maturing and delivering lower growth. All of these factors are putting pressure on company's profitability and its value.

The following actions could constitute the strategy that will maintain strong performance and deliver value to both customers and shareholders:

Reduce Cost

In order to maintain competitiveness in Europe Vodafone should reduce their cost structure through further outsourcing and exploiting the economies of scale to their fullest extent. Integration across the Vodafone Group's operating companies, particularly in Europe, might help to maximize the benefits of Vodafone's scale and scope. At the same time, as the size of the Group evolves, the appropriate balance between regional and global levels must be ensured for the effect of flexibility, particularly in respect of central functions.

Increase Revenue

Vodafone faces intensifying competition, but the focus of competition in many of the Group's markets continues to shift from customer acquisition to customer retention as the market for mobile telecommunications has become increasingly penetrated. So Vodafone's aim should be to stimulate additional voice usage and substitute fixed line usage for mobile in a way that enhances both customer value and revenue. Such stimulation initiatives are expected to increase ARPU in the medium and longer term as higher usage more than offsets the reduced average revenue per minute or per message.

This could be done through more customer friendly pricing: minute bundles that allow customers to talk more for longer, targeted promotions, family plans; as well as improving network service quality to ensure that customers can use their mobile phone whenever and wherever they want. Vodafone has already initiated the substitution of fixed line usage for mobile in homes through offerings such as Vodafone Zuhause in Germany and Vodafone Casa in Italy and aims to target office communications³⁸.

Develop and Offer New Products

In increasingly competitive local markets where value for money is an important consideration, improving use of existing products and developing a range of new offerings for customers could help Vodafone to continue to grow total revenue and deliver value to shareholders.

Customers have access to new technologies, devices and services. As a complement to mobility, they would like Vodafone to provide a number of new services within the home and the office: integrated fixed and mobile services, such as higher speed internet access, as well as integrated mobile and PC offerings, such as VoIP and instant messaging. Increase in non-voice services could become a part of Vodafone strategy to stimulate usage of its networks resulting in revenue growth. However, there are high risks associated with offering these services. For example, Vodafone may experience significant delays due to problems such as the availability of new mobile handsets or higher than anticipated prices of new handsets. In addition, even if these services are introduced in accordance with expected time schedules, there is no assurance that revenue from such services will increase ARPU or maintain profit margins. Holding the real option could significantly reduce such kind of risk.

³⁸ Vodafone Annual Report, 31 March 2007

This also relates to Vodafone's substantial investments in the acquisition of licences and in its mobile networks, including 3G networks. The Group expects to continue to make significant investments in its mobile networks due to increased usage and the need to offer new services and greater functionality afforded by new or evolving telecommunications technologies³⁹. Failure or a delay in the completion of networks and the launch of new services, or increases in the associated costs, could have a negative effect on Vodafone and should be protected by using real option.

Extend to New Markets

A source of growth could be in emerging markets. They are less penetrated, so the customer growth is the principal source of revenue growth. Gaining new customers depends on many factors, including network coverage and quality, customer satisfaction, product offerings and handset range but a key factor is often the pricing of handsets and tariffs. However, the high level of revenues in such markets is not sustainable. As penetration rates rise in a market, competition intensifies along with a downward pressure on ARPU and result in increased acquisition and retention costs.

Sell Unprofitable Businesses

As the main goal of the company to generate superior returns for shareholders, Vodafone should invest in transactions that yield a return above the cost of capital and overall create substantial value for shareholders. Equally, it should sell businesses which do not meet performance requirements.

³⁹ Vodafone Annual Report, 31 March 2007

However, no matter how good the strategy is, it still has to be implemented in practise. A successful implementation will require some of the following:

- A handful of skilled managers who have clear vision of the strategy and are able to inspire the rest of the company;
- Fast, reliable and easy way of communications within the organisation that allows to inform every individual about the strategy and its changes;
- An organisational culture that produces innovative thinking and a staff that is willing to change.

It should be remembered that the company is a dynamic unit and operate in dynamic environments. Changes in the organisation and the environment in which it operates (especially competitors' moves) must be identified and appropriate modifications made to the strategy on a continuous basis.

Conclusion

Valuation plays a key role in many areas of finance – in corporate finance, in mergers and acquisitions and in portfolio management. The value of the company can be directly related to decisions that it makes – on which projects it takes, on how it finances them, and on its dividend policy. Understanding this relationship is the key to making value-increasing decisions and to sensible financial restructuring.

In the focus of this thesis was the value of Vodafone Group, who is operating the biggest mobile network worldwide with presence in both emerging and mature markets. Drawing from the analyses of Vodafone and its environment, the major influencing risks, that are the most critical in terms of the future profitability and hence the value of the company, were found as following: 3G market take-up, fixed-mobile line substitution and level of regulations. The equity value of Vodafone was calculated using the discounted cash flow scenario method (£87,954mln). Provided that the assumptions on which the forecasts were based and the probability distribution are correct, the Vodafone is currently under priced by almost 11%.

The following actions could constitute the strategy that will maintain strong performance and deliver value to both customers and shareholders of Vodafone Group: cost reduction and revenue stimulation in mature markets, development of new products and services, extension to new emerging markets and selling unprofitable businesses.

As a concluding remark, one has to keep in mind that although the discounted cash flow framework, along with other valuation models, is a quantitative tool, but the inputs leave plenty of space for subjective judgements. A mixture of financial theory, accounting methodology, industry knowledge and sound assumption was used to evaluate the equity of the company. As the underling assumptions change, the estimated value of the firm may change as well.

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Appendix

Appendix 1 2007 Financial Year Compared to 2006 Financial Year

	Europe	EMAPA	Common Functions	Elimina- tions	Group 2007	Group 2006	% change	
	£m	£m	£m	£m	£m	£m	£	organic
Voice revenue	17357	5089		-70	22376	21405		
Messaging revenue	2925	667		-5	3587	3289		
Data revenue	1300	138		-10	1428	1098		
Fixed line operators revenue	1397	75			1472	1290		
Other service revenue	8	-8						
Total service revenue	22987	5969		-85	28871	27082	6.6	4.7
Acquisition revenue	1004	381			1385	1295		
Retention revenue	354	21			375	448		
Other revenue	247	70	168	-12	473	525		
Total revenue	24592	6441	168	-97	31104	29350	6.0	4.3
Interconnect costs	-3668	-1045		85	-4628	-4463		
Other direct costs	-1914	-784	-66	3	-2761	-2096		
Acquisition costs	-2604	-677			-3281	-2968		
Retention costs	-1543	-212			-1755	-1891		
Operating expenses	-5462	-1472	206	9	-6719	-6166		
Acquired intangibles amortisation	-22	-392			-414	-157		
Purchased licence amortisation	-849	-43			-892	-947		
Depreciation and other amortisation	-2888	-779	-181		-3848	-3674		
Share of result in associates	5	2719	1		2725	-2411		
Adjusted operating profit	5647	3756	128		9531	9399	1.4	4.2
Adjustments for:								
– Non-operating income of associates		3			3	17		
– Impairment losses	-11600				-11600	-23515		
– Other income and expense	1	508	-7		502	15		
Operating loss	-5952	4267	121		-1564	-14084		
Non-operating income and expense					4	-2		
Investment income					756	353		
Financing costs					-1579	-1120		
Loss before taxation					-2383	-14853		
Income tax expense					-2423	-2380		
Loss for the financial year					-4806	-17233		
Loss for the financial year from discontinued operations					-491	-4588		
Loss for the financial year					-5297	-21821		

Appendix 2 PEST factors, examples

Political (incl. Legal)	Economic	Social	Technological
Environmental regulations and protection	Economic growth	Income distribution	Government research spending
Tax policies	Interest rates & monetary policies	Demographics, Population growth rates, Age distribution	Industry focus on technological effort
International trade regulations and restrictions	Government spending	Labor / social mobility	New inventions and development
Contract enforcement law Consumer protection	Unemployment policy	Lifestyle changes	Rate of technology transfer
Employment laws	Taxation	Work/career and leisure attitudes Entrepreneurial spirit	Life cycle and speed of technological obsolescence
Government organization / attitude	Exchange rates	Education	Energy use and costs
Competition regulation	Inflation rates	Fashion, hypes	(Changes in) Information Technology
Political Stability	Stage of the business cycle	Health consciousness & welfare, feelings on safety	(Changes in) Internet
Safety regulations	Consumer confidence	Living conditions	(Changes in) Mobile Technology

Appendix 3 Vodafone Fundamental beta

	<i>Beta</i>	<i>Market Debt to Equity</i>	<i>Tax Rate</i>
TELEFONICA	1.35	54.31%	26.33%
DEUTSCHE TELEKOM	0.85	68.85%	34.96%
FRANCE TELECOM	1.13	57.85%	58.34%
Average	1.11	60.34%	39.88%
VODAFONE GROUP		22.56%	32.57%
Unlevered beta	1.46		
Vodafone beta	1.69		

Source: Bloomberg, <http://www.bloomberg.com/index.html?Intro=intro3>

Appendix 4 Inputs for synthetic rating estimation

Enter the type of firm =	1
Do you have any operating lease or rental commitments?	no
Enter current Earnings before interest and taxes (EBIT) =	5196
Enter current interest expenses =	1612
Enter current long term government bond rate =	4.08%

Output

Interest coverage ratio =	3.22
Estimated Bond Rating =	A-
Estimated Default Spread =	1.70%
Estimated Cost of Debt =	5.78%

For large manufacturing firms

If interest coverage ratio is

>	≤ to	Rating is	Spread is
-100000	0.199999	D	20.00%
0.2	0.649999	C	12.00%
0.65	0.799999	CC	10.00%
0.8	1.249999	CCC	7.50%
1.25	1.499999	B-	6.50%
1.5	1.749999	B	5.65%
1.75	1.999999	B+	4.50%
2	2.249999	BB	3.65%
2.25	2.49999	BB+	3.20%
2.5	2.999999	BBB	2.50%
3	4.249999	A-	1.70%
4.25	5.499999	A	1.50%
5.5	6.499999	A+	1.40%
6.5	8.499999	AA	1.25%
8.50	100000	AAA	0.75%

Source: Damodaran website: <http://pages.stern.nyu.edu/~adamodar/>

Appendix 5 WACC calculations

rf	risk free rate	3.42%
rm-rf	risk premium	5.20%
β	beta	1.4
E	equity	78532
D	debt	22615
V=D+E	total value	101147
D/V		0.22
E/V		0.78
Tc	corporate tax	25%
re	cost of equity	10.70%
rd	cost of debt	5.78%
WACC		9.28%

$$WACC = \frac{E}{V} r_e + \frac{D}{V} r_d (1 - T_c)$$

