



Telecommunications in the Midst of Two Crises: 2008-2020

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Abstract: This research deals with a pervasive general purpose technology and an economic resource of huge value founded on innovation, subject to rapid changes and obsolescence, a capital-intensive industry and high-revenue industry. The study addresses from a general and company perspective the impact on the telecommunications of the shock hitting the world economy with exceptional virulence, size and extent unseen in the last eight decades. The text consists of three main sections which analyses a broad issue -telecommunications in the world- and two specific points -the companies' response to the crisis and one particular path, namely, mergers and acquisitions. It is built on different sources from major institutions and big companies. The 2008 global financial crisis adversely hit mergers and acquisitions, causing a sharp decline in these markets, which did not recover before 2014. Nevertheless, after the downturn, the emerging market countries benefited from the attractive asset prices in advanced countries and expanded their acquisitions abroad. This research contributes to general knowledge that telecommunication sector faces both common and industry risk factors. The analysis at companies' level finds the importance of specific factors derived from the nature of the companies in question, independent of specific shocks.

Keywords: Telecommunications, Crises, Mergers and Acquisitions

1. Introduction

When the echoes of the technology crisis had not yet faded, a new shock hit the world economy and life of individuals with exceptional virulence, size and extent unseen in the last eight decades¹. As the Financial Crisis Inquiry Commission stated [79] (pp. xvi-xvii)², the collapse of the housing bubble—fueled by low interest rates, easy credit, scant regulation, and toxic mortgages—ignited events, which led to a full-blown crisis in the fall of 2008. When the bubble burst, hundreds of billions of dollars in losses in mortgages and mortgage-related securities shook markets as well as financial institutions involved around the world. The losses were magnified by derivatives such as synthetic securities. The crisis reached seismic proportions in September 2008 with the failure of Lehman Brothers and the impending collapse of the insurance colossus American International Group. Panic caused the credit markets to seize up, trading ground to a halt and the stock market plummeted. The initial niche problem in the United States mortgage market triggered a global economic slowdown and the world wide

economy plunged into a deep recession which shook the foundations of the global economic system³.

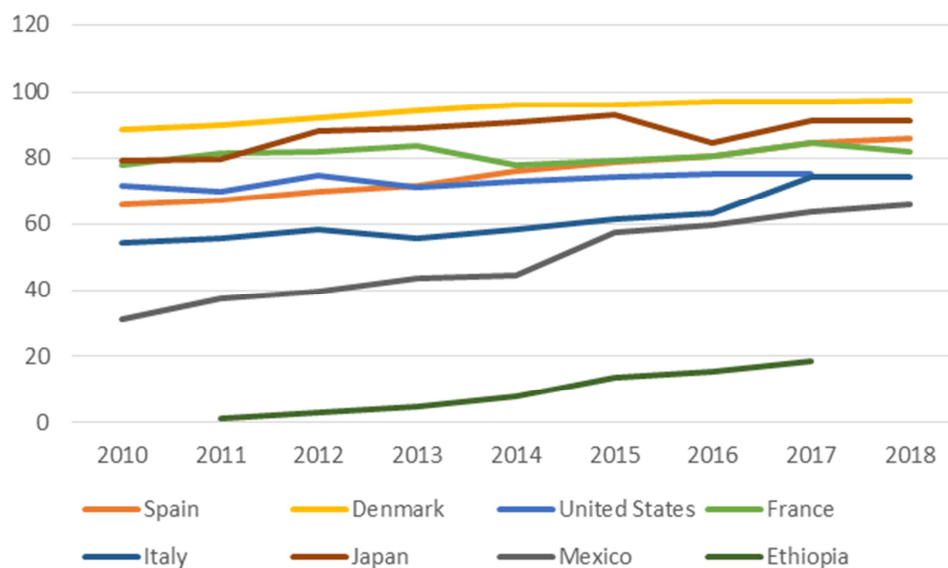
It seems pertinent to ask what happened to telecommunications in such a situation. This requires considering the key characteristics of this sector. First and foremost, more than just a mere public utility, telecommunications is a pervasive general purpose technology and an economic resource of huge value which is founded on innovation. Secondly, this sector embraces technologies that are subject to rapid changes and thus to rapid obsolescence (*New York Times*, 17 December 2001). Consequently, the telecommunications are a capital-intensive and innovative industry in which consumers benefit from high investments by network operators and thus economies of scale for private investment and build-out partnerships play a prominent role⁴. Thirdly, telecommunications are a high-revenue industry. The telecommunication sector is affected by risk factors, which include general and industry factors. One of the things that the analysis of the companies reveals is the importance of specific factors derived from the nature of the companies in question, independent of specific

shocks. As ICT industry it offers an increasingly critical infrastructure for economic growth and development⁵. In short, the very special characteristic of the industry includes the presence of network effects and oligopolistic market structures and the innovation-led nature⁶.

Over and above the key characteristics of this sector, it is helpful to know its evolution. The global telecommunications system had undergone considerable growth and dramatic change since the swift restructuring which began in the early 1980s and was possible because of the neoliberal policies implemented by governments around the world⁷. In this era, telecommunications had evolved as a basic infrastructure and

had also become an economic engine as well as an enabler of social, educational, technological and medical progress worldwide.

In its galloping ascent -not without notable delays in some countries (Figure 1), the Internet grew to permeate all aspects of the economy and society. Consequently, the major financial institutions - World Bank (WB) and the International Monetary Fund (IMF)- strategically positioned this sector networks as a key paradigm for the development of countries as well as an important contributor to GDP, job creation and the efficient tool of businesses worldwide⁸.



Source: Elaborated from INE, *Anuario Estadístico*, 2019, pp. 539-540; 2020, p. 545.

Figure 1. Internet users per 100 inhabitants in eight selected countries, 2010-2018.

As Roeller and Waverman (2001) argue, a good communications network improves the flow of information, expands markets, reduces transaction costs and replaces costly physical transport [73]. In terms of internationalisation degree, by 2006, in the Internationalization Index - number of foreign affiliates divided the number of all affiliates-telecommunications ranked third, after pharmaceuticals and electrical/electronic industries and second in the average return on sales of major industries⁹.

In 2005, value added of the telecommunications sector amounted to €190.3 billion, of which 71.57 % was generated in the European big five -from UK, Germany, France, Italy and Spain- and revenues amounted to €421.2 bn, of which an estimated 62.67% corresponded to public companies. In 2008, estimates placed the telecommunication industry's revenue at \$3.85 trillion or just under 3 percent of the gross world product [69]. The turnover grew uninterruptedly in 2000-2006 to 145 in index terms, very strongly in the beginning of the period, slowing down in 2005-2006 already and further in the 2008 crisis. Overall revenue growth in telecoms in 2008 still amounted to 1.3%¹⁰. The operating profit margin or profitability for companies in the whole information sector increased -by 0.4 percentage points to 7.4% in 2006-, slightly

below that for all non-financial joint stock companies except gas and oil sectors¹¹.

From a regional approach, in 2008, EU telecoms continued to grow by exactly 1.3% in real terms, 0.3% above the real GDP growth of the economy as a whole. The stable cash flow of most operators enabled the sector to withstand the sharp deterioration in the economic climate relatively better than other sectors. However, like the rest of the economy, telecommunications companies had difficulties in accessing credit, with the inevitable effect on investment capacity [40].

A study in 2007, a time of some uncertainty and volatility in the global economy¹², concluded that it would take five years for demand to exceed total broadband capacity at the Internet access layer. The overall cost of upgrading the Internet to keep pace with demand was estimated at \$137 billion over that period. It was therefore possible that there was already a significant shortfall in the investment needed to bridge the gap between demand and capacity, a shortfall that the financial crisis would only exacerbate (Nemertes Research Group, 2007).

Within this framework, the present study aims to investigate the response of a sector as particular as the telecommunications industry to the crisis. It is structured in

two main sections: the first presents a general overview of telecommunications in the world, the second gives the companies' response to the crisis. It draws heavily on the reports and studies of major international institutions on the one hand, and on company reports on the other.

2. Telecommunications in the World

The main risks facing the world economy included the extent and duration of the financial market crisis and the magnitude of its impact on the real economy, as well as the willingness of companies to invest and consumers to buy. The International Monetary Fund forecasted 3.9 percent for global economic growth in 2008, 2.6 percentage points higher than the GDP reported by the German Federal Statistical Office [35] (p. 61)¹³.

The financial crisis of 2008 transferred to the real economy in 2009 and clearly caused falls of 1% in private consumer demand and 10.9% of gross capital formation in the Eurozone. The volume of trade fell and unemployment increased in all of the most developed countries¹⁴.

The financial crisis had a diverse impact across countries. In the US, all areas related to ICT declined, including manufacturing, services and employment levels. In other indicators, ICT exports declined by 20% from 2008 and continued to decline since then. According a different pattern, imports fell by an average of 13.24% in 2005-2009. Globally, the ICT industry faced large declines in exports in all euro area countries - in total 26% in the period 2008-2012 - in particular in Portugal and Finland (more than half), Ireland (36%), far behind Germany, France, Sweden and the Czech Republic (20%). ICT imports also decreased by 17%. In contrast to the US, European ICT exports continued its downward spiral, no doubt because Europe was hit the hardest of all developed countries¹⁵. The financial crisis depth and the global economic slowdown in 2008 increased the uncertainty and diminished the ability of ICT companies and telecommunication operators to invest in their expansion and the next generation of global communication networks¹⁶.

Sensitivity to financial risks varied across industries. The financial crisis nearly wiped out the global automobile industry with differences between companies and diversity of strategies (Herciu and Ogorean 2013, pp. 50-55). It put the "Big Three" US car companies - General Motors, Chrysler and Ford - on the brink of potential insolvency [1] (pp. 136-145); Insider, 16 September 2018, p. 1).

Steel industry found to be very sensitive to the financial risks: in 2009 crude steel consumed in the world fell by 8.2% respecting to 2007 [81] (pp. 1-8). This industry was one of the hardest beaten in the 2008 downturn, more than the major steel using sectors, some in very serious trouble. U. S. steel production fell 37.2% between January and November 2008, and raw steel production during the week ending January 3 fell a 59.3% from the same period last year, while sales of domestic light vehicles were off 36.7% in December. The decline in steel production had several causes: sharp fall in the construction and automobile production - 57 percent of

the steel bought each year in the United States- as well as fall-off steel orders from machinery, appliances and other electrical equipment - 13 percent [1]. Finally, it underwent a shift in the behavior of the wholesalers, known in the steel industry as service centers. Unable or reluctant to borrow money under the crisis, they had stopped to buy and were selling off their inventories instead [73] (p. 1); [79].

If we consider the ICT sector, growth in OECD countries declined by around 4% in 2008 compared to 2007, although it did not collapse immediately, as it did in 2001-02 with the end of the ICT bubble, and it remained somewhat firmer than the performance of OECD economies [68]. The decline continued in early 2009.

This drop, often very sharp, matched the 2001-2002 declines in most ICT segments, with a triple connotation. Some sectors did better than in the previous crisis. The ICT industry also performed considerably better in this crisis than industries such as the automotive industry. There were clear regional differences in the effects of the crisis, with the recession hitting Asian OECD countries hardest, especially Japan, with falling output and rising inventories. Many non-OECD Asian economies were also severely impacted. Asian ICT trade declined by 25-40% year-on-year, as the crisis took its toll on integrated Asian production networks. There were several reasons for this behaviour: currency fluctuations, which particularly hurt Japan's export-dependent ICT industries, and the slump in exports and slowdown in domestic demand for Chinese producers and their suppliers.

However the upturn was very rapid, particularly in Asia, signs of recovery appeared and the rate of decline turned up by the middle of 2009 as most countries exhibited positive growth. In terms of sectors, the ICT hardware companies were more affected in their revenues early in the economic crisis than ICT services firms, as was the case in 2001-2002. Semiconductors, electronics, communications and IT equipment were hit by slumping business and consumer demand and growth dropped sharply. But ICT services also slowed, and year-on-year growth of IT services and software both turned negative in the first quarter of 2009. The Internet, with business growth around zero, and software firms saw steep falls in growth of over 20 percentage points in the last four quarters, in sharp contrast with their recent performance. Overall, hardware sectors such as communications equipment declined less than in 2001-2002, just the opposite of what was happening to some ICT services.

Semiconductor production, which is a bellwether for developments in the ICT industry, fell particularly rapidly at the end of 2008 and in the first quarter of 2009, with world capacity use dropping towards 50% and orders of semiconductor equipment falling very rapidly. However the crash has not yet reached the scale of 2001-2002 except in Asian OECD countries, and there was a sharp upturn in total month-on-month semiconductor billings. Large semiconductor firms are generally in good financial shape, with net cash positions considerably higher than in 2001. R&D and innovation activities continue to be financed from internal sources as revenues contract, and so far

semiconductor R&D has declined much less than revenues. In a highly capital-intensive industry where the ability to invest is a competitive advantage, a strong balance sheet with high-quality investment-grade debt is critical¹⁷.

Investment in telecommunications fell between 2000 and 2003 after the bursting of the dot. com bubble. In contrast, it increased by 9% each year in 2005-2007, reaching USD 185 billion in 2007 - 16% of telecommunications revenues or 2.2% of gross fixed capital formation - as a result of operators upgrading mobile and broadband networks. North America (46%) led total telecommunications investment in the OECD, followed by Europe (36%) and Asia-Pacific (18%)¹⁸.

Despite its long-standing superior resilience, the intensification of the financial crisis showed that telecommunications could not escape the consequences of the credit crunch. Indeed, there were rising indications that the financial crisis would depress the debt-ridden telecoms sector. Rising capital costs were likely to erode profits, the financial crisis should crimp telecommunications carriers' spending and the weakening economy was likely to dampen demand¹⁹.

From 2007 onwards, growth in global telecommunications slowed down, especially in the EU-27 and the US. This was due to industry-specific reasons, such as the maturity of the main drivers of the sector - mobile telephony and fixed broadband - as well as external reasons, such as the recession in 2009, especially in developed countries, which impacted on final demand and revenues. In 2008, estimates placed the telecommunication industry's revenue at \$3.85 trillion or just under 3 percent of the gross world product [71]. In 2009, revenues from electronic communications services worldwide were estimated to have grown by 1.7% over 2008 to reach USD 1,440 billion. The contribution to this slight increase varied widely across the world. The leading role was played by the emerging economies (China, Brazil, Russia, India and Mexico). The practically nil increase of the EU-27 and the very small increase of the US in revenues generated caused them to lose relative weight in the world market²⁰.

In terms of economic environment, by the end of 2009, the financial and capital markets of the global economy had stabilised. Factors affecting the development of production worldwide included the credit crunch and the expiry of expansionary fiscal policy programs. Extremely volatile exchange rates, particularly in the United States and the Southern and Eastern European countries, also entailed considerable translation risks for the operators²¹.

Forecast by the OECD, the contraction by 1 percent in 2009 in the global economy may have given way to the growth of 4.5 percent in 2010.

Global economic output increased much faster than expected, but the pace of this recovery slowed slightly towards the end of 2010, as economic stimulus packages in industrialised countries came to an end in the industrialized countries and the resulting "push effects" weakened. This trend was not fully offset by self-sustained growth. The growth engines in 2010 were the emerging economies, which accounted for about 70 per cent of global growth, could by

accelerating global trade and expansionary monetary and fiscal policy in the major economic powers.

According to OECD forecasts and initial estimates, the economic upturn was perceptibly weaker and increasingly uneven in most industrialised nations as well as in the core countries of Deutsche Telekom's European operating segment [33] (pp. 61-63).

Researchers found an impact of mobile telecommunications on economic growth smaller for countries with a low mobile penetration, usually low income countries. They also find increasing returns from mobile adoption when assessing the impact on productivity growth [45] (pp. 387-426).

Worldwide telecommunication revenues –the axis of telecommunications differential-declined considerably in 2009, due to the drive of mobile communication markets and specifically to the rapid increase in smartphone penetration, stabilised in 2010 and rebounded in 2011. During these last two years, when measured in PPP, sector growth remained slightly above overall economic growth, and telecommunication revenues as a percentage of GDP decreased slightly. The countries with highest telecommunication revenues a percentage of COP were Estonia (4.64%). Korea (4.16%) and Portugal (3.82%). Luxembourg, Norway, Sweden and Austria were under 1.52%, in accordance with the OECD Communications Outlook 2013, pp. 63-64.

Investment in telecommunications infrastructure resumed its upward trend. In 2011, operator investment exceeded USD 188 billion, well below the 2008 peak and the all-time high of USD 240.5 billion in 2000. Mobile network investment was in the third generation (3G), 3.5G and 4G networks but also in fixed networks²².

The telecommunications industry recorded negative revenue growth rates since 2009. In 2011-2016, the telecommunications entered years of slow decline, with revenue growth, EBITDA margins and cash-flow margins down from 4.5 percent to 4 percent, 25 percent to 17 percent, from 15.6 percent to 8 percent, respectively. Competitive boundaries were shifting to the tune of the shrink of core voice and messaging businesses, partly under regulatory pressures, but also because social media was opening up new communications channels²³.

In terms of particular years and in Europe, in 2011 the telecommunications industry reduced its turnover in the EU-27 by 1.9%, at under GDP as it happened in several years before (IDATE1). The consumer price index (CPI) in the EU-27 fell by 0.4%, according to Eurostat. The EU-27 estimated there was a drop of 10 million, or 5.5%, in the number of fixed lines. Lines and revenues of fixed telephony in the EU as a whole shrank since 2003. IDATE estimated that global mobile telephony revenues fell by 0.5% while mobile broadband revenues were up 14.1%. There was a trend in the EU for a fall in the prices of voice calls both on the domestic front, boosted by cuts in termination rates introduced by the national regulatory authorities (NRAs), and in Europe as a whole, due to regulations on roaming in the

EU introduced in 2007²⁴.

In 2012, a year of recession and severe belt-tightening in the European Union, the revenues of the major EU operators continued the negative trend begun in 2009 because of the price moderation and the reduction in certain areas of consumption. It was estimated that turnover in the in European industry came down by 1.1% with results uniform by type of service. On the contrary, broadband revenues were up, above all in the mobile broadband, where estimated sales revenue for the year grew by 6.3% although the turnover for fixed broadband rose in more modest rate (2.4%)²⁵.

In 2013, under of a timid economy recovery, with an annual growth in real GDP of 0.4% for the EU-28 the use and penetration of most electronic communication services grew as it happened in the roll-out of new generation networks, both fixed and mobile. However, in Europe, IDATE estimated a fall in the revenue for the industry in the five major European economies (France, Germany, United Kingdom, Italy and Spain) whose joint revenue fell by 4.6%²⁶.

The sector revenue in Europe fell at an estimated rate of 6.6% since 2010. In a slightly more favourable economic context than that of previous years -growth in GDP of 1.4%-, worldwide and European revenue from telecommunications fell by 0.9% and 3.5%, respectively (IDATE data²⁷). The need to finance heavy investment and the sustained fall in revenue in the EU-28 lead to the market consolidation processes initiated in 2013 [21] (p. 9).

A new decline of the revenues occurred in 2013 but investment began to grow; a decrease in the use of traditional telephony services as internet (VoIP) services was increasing; quickly growth of data traffic; higher voice call and data prices of the mobile in the EU than in the US, while the usage of mobile was higher in the US, resulting in a higher 'average revenue per user' in the US European Commission (Press release, 22 July 2014).

In 2014, the penetration of fixed and mobile broadband – whose development was considered a key factor for European economic recovery- continued to rise in the EU at a year-on-year rate of 4.4% and 12.4%. Fibre networks were the only networks whose active connections grew in Europe in 2014 – at 8%.

In the EU-28, almost a third of fixed broadband lines were active Next Generation Access (NGA), which covered 62% of European households in 2014. Price was one of the determining factors that inclined the users to subscribe to the service for broadband, followed by download speed (EC Communications Eurobarometer January 2014). Mobile broadband continued its rising trend in terms of subscribers - 71.6 per 100 inhabitants - and revenues - up 36% since 2010 - reaching a quarter of the sector's total revenues in 2014. At the same time, voice services, and in particular mobile voice services, declined, with billings 23.7% lower than in 2010. Fixed and wireless networks -copper pair networks or the HSPA mobile network- enabled the provision of practically universal coverage telephony and limited-speed broadband services. These networks coexisted with other, expensive

next generation networks, which offered higher connection speeds and fast or ultra-fast broadband. The global coverage of fixed NGA networks in the EU-28 was 68.1 out of every hundred households. Around 43% of European households could connect to ultrafast HFC networks/DOCSIS 3.0 standard²⁸. These varied from one country to another so that their almost inexistence in most countries coexisted with the widespread use in other cases, as in Belgium and the Netherlands with coverage reaching nearly 90% of homes. The high cost of rolling out the new networks, particularly fixed networks because of the high cost of the infrastructure, avoided a nationwide extension and forced to a concentration in areas with greater service demand, such as large or medium-sized cities with higher population densities, a younger population and greater economic activity. In the EU-28, 10.4% of households located in rural areas were unable to access a broadband network.

In the mobile segment, 3G/HSDPA networks, suitable for mobile broadband, had a practically universal coverage in the EU-28²⁹ but next generation LTE or 4G networks only reached 86% of households in the EU-28³⁰. LTE-4G coverage in Europe grew 20 percentage points in 2014, reaching 79% of homes through 80 operators. Outstanding in this range were the Nordic countries together with several others - Portugal, Switzerland, Finland and Estonia. In 2015, broadband penetration in the EU-28 continued to increase, especially mobile broadband, at a year-on-year rate of 12.9%, well above the 3.7% for fixed broadband.

The most traditional voice communications services were going through a chronic crisis for years. The EC estimated a fifth fall in fixed telephone revenue between 2010 and 2014 and a 23.7% fall in mobile telephone revenue. The decline in revenue from voice services was due to a significant competition in telephone markets and the emergence of IP networks and Over The Top (OTT) communications services, similar or superior to the traditional telephone and messaging services, which reduced the demand for traditional services. Eurostat data stated that in Europe 29% citizens used the Internet to make calls.

In 2015, the fall of the European revenue from telecommunications 3.5% - 2.6 percent points more than that of worldwide revenue-³¹ affected all the European operators except Deutsche Telecom and Telenor. EU-28 prices fell less than in 2013. The need to finance heavy investment and the sustained fall in revenue in the EU-28 led to the market consolidation processes initiated in 2013.

In 2016, global telecoms revenues increased by 1.1%, while in the EU they decreased by 1.2%, 1.8% less than in 2014 and 3.7% less than in 2015³². In the EU-28, the growth in fixed NGA network coverage had been 32% since 2012. LTE network coverage was more than three times higher than at the end of this year. The Nordic countries stood out with penetrations above 95%.

Given the high cost of infrastructure, only 25.1% of households in rural areas in the EU-28 had access to these networks. Finally, mobile broadband continued to grow at a high rate -75.3 75.3 data subscriptions per 100 inhabitants,

including active subscriptions from smartphones, SIM card connections on tablets, PCs or computers. According to Eurostat, 42.8% of individuals used their mobile telephone to access the internet, approximately five points more than in 2014³³.

3. The Companies' Response to the Crisis

In general, the telecommunications face often a volatile environment with all kinds of uncertainties and changes. Success lay in the ability to anticipate events at an early stage, to systematically identify, assess and manage the resulting risks and to acknowledge and seize opportunities³⁴.

A remarkable factor relates to the rapid changes in available technology and the potential increase in competition and capital costs in the telecommunications sector. Competition in the telecommunications industry tended to intensify and to put pressure on pricing, margins and customer retention³⁵.

The global telecommunications market underwent enormous changes since the end of the 20th century. These changes were driven by technical advances at the cost of huge investments. They included the development of various fixed and mobile access networks and advances in the core networks to deploy these new technologies (especially the data network), of end-user devices, of applications and services offered over the Internet and of related business models. No less important was the increased demand for telecommunications services, coupled with similar trends in the device markets, which significantly increased their capacities, as well as competition resulting from the entry of new operators, and supported by regulatory and competition policy developments [59] (p. 20)³⁶.

The market development was defined by several issues. Whereas in 1989, state-owned monopolies dominated for years in the majority of OECD countries, by 1998, a majority had open competition in both the fixed network and cellular mobile markets [8] (pp. 1-36); [57] (pp. 24-26)³⁷. Liberalisation across the EU voice telephony - the main service offered over fixed networks- and infrastructure markets came to a virtual end.

Data services were very limited, and based on dial-up modems or (for businesses) leased lines; cable TV networks were used to offer TV services; second generation (2G) mobile services were nascent and in many countries competition was limited, while spectrum for mobile services was largely limited to the 900MHz band (and in some case 450MHz). Two decades later, generally speaking, competition in fixed markets was widespread, if variable from country to country. Competition comes from a combination of cable-TV operators and alternative telecoms operators who use their own networks and/or wholesale access to the incumbent operators' networks. Penetration levels of the traditional fixed voice telephony (PSTN) were falling, broadband connectivity was becoming the most important service offered over fixed networks; basic broadband services were widely available and two of three of

EU citizens had access to super-fast broadband (speeds of above 30Mbps). Ultra-fast speeds of up to 1Gbps were available in key areas. Mobile services had developed enormously; basic mobile voice coverage was almost ubiquitous in populated areas, and the launch of higher-speed 3G and 4G services had allowed broadband data access over mobile networks [59] (pp. 22-23).

Digitalisation altered the existing market structures and market realities of many formerly analogue industries. The exponential growth in the use of data services prompted a steadily increasing demand for higher speeds for fixed and mobile networks. New technologies such as the Internet of Things, Industry 4.0, Big Data and cloud computing were demanding ubiquitous connectivity and high performance and security standards. In a market environment where network infrastructure must be substantially upgraded and a large ecosystem of rival market players has developed, investment incentives must be created³⁸.

Telecommunications technology shifted from the traditional circuit- and wire-based technology to voice over IP (VoIP) technology. IP-based networks are able to provide the whole range of services voice and data, as well as video, from both wired and wireless networks. Already in 2008, more than one third of telephone calls worldwide were made using VoIP mainly because IP technology is much cheaper than conventional telecommunications networks – for both operators and customers³⁹.

The development of wireless, wired and IP technologies significantly enhanced the capabilities of wireless networks and increased the commercial viability of alternatives to traditional wired telephone service. Maintaining competitiveness required the deployment of a more sophisticated wireline network, as well as research into other new technologies. Competition in the telecommunications industry tended to intensify and to put pressure on pricing, margins and customer retention⁴⁰.

The development of new technologies, such as IP-based services, also has created or potentially could create conflicting regulation between the FCC and various state and local authorities, which may involve lengthy litigation to resolve⁴¹.

In particular, the significant technological changes and formidable increase in usage of the wireless segment asked continually for investment in the wireless network.

Improvements in the service depend on many factors, including continued access to and deployment of adequate spectrum, a valuable and scarce resource public domain property owned by the State as well as a prerequisite for all wireless communication systems⁴². Network service enhancements and product launches may not occur as scheduled or at the cost expected due to many factors, including increases in network equipment and handset component costs and delays in determining equipment and handset operating standards, as well as those coming from suppliers, tower siting or labor-related delays. For its part, market risks interfere primarily from changes in interest and foreign currency exchange rates⁴³.

Regulation plays an important role in that sector. The European Union largely sets the relevant regulatory framework through regulations, directives, and recommendations of the EU Commission. Member states must apply directly the first and take into account by the national regulatory authorities, although they not directly bind. The further development of the European legal framework offered opportunities for greater legal certainty and consistent framework conditions in the single European market, but also risks of additional regulatory restrictions.

Several European operators had plans to divest some infrastructure assets that they had previously considered strategic in order to raise funds to reduce their debts and to finance other activities considered more attractive. Telecom Italia embarked on this path, through the spin-off of its "Tower" branch and the creation of Inwit, designated to manage the operational, monitoring and maintenance of the group towers and repeaters⁴⁴. In February 2016, Telefónica created Telxius, to which it transferred its Spanish and global telecommunications network - 15,000 towers - and the group's 31,000 km international submarine fibre-optic network. For its part, Deutsche Telekom was contemplating spinning off and selling some of its infrastructure assets. All these developments had the potential to strengthen a vertically disintegrated European infrastructure sector.

4. Competition: Mergers and Acquisitions

As we have pointed out, competition in the telecommunications industry tended to intensify and to put pressure on pricing, margins and customer retention⁴⁵. The goal of competition and the efforts deployed by the institutions to conquer it ask for an investigation of the means and results, and more specifically of the international strategic alliances and mergers and acquisitions (M&A) of various types⁴⁶.

International strategic alliances increased significantly in number (more than five-fold), pace, scale, complexity and value in the last decade of the twentieth century, paralleling the growth in cross-border mergers and acquisitions to achieve global scale in operations. The majority of them involved firms from OECD countries, although in the 1990s non-member Asian countries including China increased in importance. Alliances were being formed across a broad range of sectors, including chemicals and pharmaceuticals, computers and electronic equipment, and financial and business.

Within a specific kind of international strategic alliances, mergers and acquisitions have played a dominant role in the world economy. Generally M&A pursue as the main motivation the improvement of profits and efficiency through a new business combination, as the immediate objective the growth and expansion of the company assets, shares and market share and as the ultimate objective the maximisation of profits and the achievement of sustainable competitive

advantages (Directorate for Financial and Enterprise Affairs 2004, p. 2).

Five merger waves took place during the 20th century and two additional waves have occurred in the 21st century [15] (pp. 1-21). Cross-border M&A rose six-fold in 1991-98 to over 85% of foreign direct investment in 2000. The trend towards M&A did not subside in 2000. In Europe, Vodafone sold Orange, acquired from Mannesmann in 1999, to France Telecom [67] (p. 14).

The main driver of M&A rather than greenfield investment was the need to acquire complementary intangible assets: technology, human resources, brand names, etc. This was compounded by a number of factors, including overcapacity and increased competition in traditional industries and new market opportunities in high-tech sectors. By enabling global industrial restructuring and efficiency gains, cross-border M&A can pay dividends in terms of corporate performance and profits [57].

Mergers and acquisitions along with the creation of new companies acted as vehicles for industry entry from the synergies and symbiotic opportunities generated by an integrated global marketplace with companies from different industries and sectors [80] (p. 29).

As far as economies of scale are concerned, technological change is closely associated with various processes of vertical integration and disintegration over time. As fundamental methods of concentration and centralization of production and capital on international scale M&A represent ownership transfer and change in company control [14] (p. 2) (Annex 1)⁴⁷.

In essence, researchers disagree not only about the main determinants of mergers and acquisitions but also about how and to what extent these determinants influence M&A activity [27] (p. 5).

It has been underlined that M&A at the same stage of production in an industry allow firms to consolidate control over the market and its subsequent profits. There are several reasons for horizontal market integration. Industry instability in periods characterised by slow growth and policy deregulation leads firms to limit competition by acquisitions in order to control a larger market share. These risk mitigation efforts push for geographic diversification, spreading risk and reducing the negative effects of a possible economic downturn in specific regions.

The wave of international mergers and acquisitions became more pronounced in the twenty-first century, although the pace of M&A activity slowed down in the 2002-2003, mainly because of the absence of mega mergers [41] (pp. 207-208). An unprecedented number brought about a major realignment of business players. The communication industries, in particular, have taken full advantage of deregulatory trends to make ever larger combinations [43] (s. p.).

The first wave of telecommunications mergers occurred in the 1990s as firms sought new markets and economies of scale, in spite of not being the panacea⁴⁸. The tide of telecommunications mergers became gigantic and drastically

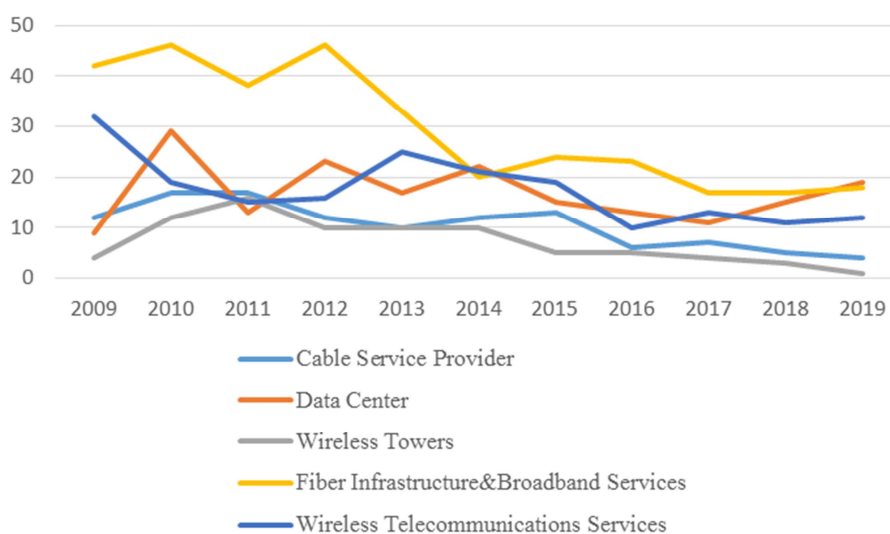
restructured this sector around the world. In great areas - the United States and Europe- telecommunications companies became concentrated in an increasingly narrow group, leading to a rapid oligopolisation of the sector. A number of factors influence M&A activity in the telecommunications industry. The major drivers include globalization, deregulation, technological change, the search for scale and scope economies, and, in the case of US, advantages offered under corporate tax laws [83] (p. 321). On the contrary, there were not active cross-border M&As in Asia [68] (p. 58).

The global financial crisis of 2008 negatively affected M&A provoking a sharp decline in this markets, which did

not recover until 2014. Nevertheless, after the crisis period, emerging market countries took advantage of the attractive asset prices in developed countries and increased their foreign acquisitions [70] (pp. 257–281).

Some scholars attribute this market contagion mainly to the fact that it affected each sector fairly uniformly and therefore recovery cycles evolved over time, given the symmetrical nature of the underlying causality [59] (p. 4). Certain peculiarities must be admitted.

Take the US industry, for example, trading generally tended to fall in the years following the 2008 financial crisis, as shown in the graph below.



Source: Own elaboration from BKD Capital Advisors, 2019, pp. 2-11.

Figure 2. Transactions in the US telecommunications, 2009-2019.

The financial crisis, the global economic slowdown and flattening market growth rates in Eastern Europe threatened to cause a slowdown in mergers and acquisitions. However, three trends continued to drive telecommunications activity in the region: privatisations of state-owned incumbent operators, as well as bids for GSM and UMTS spectrum licences and CDMA, WiMAX or TETRA. Slowing telecommunications growth rates in Eastern Europe and increasing competitive intensity were likely to push operators to consolidate⁴⁹. Two M&A processes were driven by the trend towards pan-European consolidation, namely the acquisition of OTE by Deutsche Telekom and the failed attempt to acquire TeliaSonera in mid-2008 by France Telecom, which ambitioned to expand the footprint in Eastern Europe.

Three objectives served as a spur to consolidation, namely to take advantage of remaining market growth addressed by another operator in another service area or in a different geography, to drive a competitor out of the market, or to increase the value of the company through potential cost synergies. These can be categorised into three groups, all of which are related to reducing either network infrastructure and device acquisition costs, or reducing labour costs by optimising processes, as Arthur Little stated in 2008.

Privatization processes were either driven by the liberalisation according EU-regulation or simply by a desire of governments to cash-in. 2007 saw two transactions triggered by privatization: the Albtelecom and Telekom Srpske sales and seven operators should be on the watch list of investors as they will be privatized in the next few years. Two failed privatizations are likely candidates for renewed attempts as the respective countries need to adhere to EU: the sale of 49% in Latvian company Lattelecom and the Telekom Slovenije, both transactions stopped because of diverging price expectations. Five further privatizations were expected in non-EU countries: the sales of 51% of BH Telecom in the Federation of Bosnia and Herzegovina and the 67% of Ukrtelekomin in Ukraine; the sale of a stake of Moldtelekom in Moldavia; the sale of a stake of Beltelecom in Belarus and the attempts to privatize a stake of Telekom Srbijavija in Serbian. CDMA licences were typically acquired by strategic investors wishing to complement their existing networks, while WiMAX licences are typically acquired by alternative operators, often backed by financial investors, as the WiMAX operators compete with the service offerings of the established operators⁵⁰.

Once the crisis years were over, the volume of mergers and acquisitions in the telecommunication services industry

decreased 9% in 2019 compared to 2018, a year with several mega-mergers. Nevertheless, the median capital invested increased 31% in 2019. The main reason came as a result of some larger mergers characterizing the environment for telecom service providers [9] (p. 2).

According a differentiation by subsectors, the wireless carriers experienced a clear worldwide trend toward cross-border investments driven by the European focused cross-border deals in front of uncertainty surrounding the U. S. – China trade war and the desire to compete with superior technologies. As a result, Europe experienced a wave of M&A in 2018-2019. The industry's peak consolidation world-wide trend also fueled the movement. Consolidation led the number of enterprises in the sector to decline at a CAGR of 2.2% over the past five years to 2019 [9] (p. 4).

5. Conclusion

In general, the telecommunications face often a volatile environment with all kinds of uncertainties and changes. Success lay in the ability to anticipate events at an early stage, to systematically identify, assess and manage the resulting risks and to acknowledge and seize opportunities.

This research contributes to general knowledge that telecommunication sector faces both common and industry risk factors. The analysis at companies' level finds the importance of specific factors derived from the nature of the companies in question, independent of specific shocks.

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Appendix

M&A: Case Studies

Deutsche Telekom sought to take advantage of economies of scale and international synergies to further grow worldwide. This entailed both consolidation in existing markets and entry into new areas.

The changes in the consolidated group related to both acquisitions and divestments and started before the financial crisis. At the end of 2007, T-Mobile Netherlands acquired from France Télécom the Dutch mobile company Orange Nederland N. V. which added a customer base of 2.2 million to the growth of the Mobile Communications Europe segment. As part of this acquisition the equity interests in Orange Nederland Breedband were purchased with the intention to sell⁵¹.

In the United Kingdom, T-Mobile UK (including Virgin Mobile) added around 0.4 million new customers. Mobile

USA planned, signed an agreement and acquired in 2008 the regional mobile communications provider SunCom Wireless Holdings, Inc. to expand its presence to the southeastern United States, Puerto Rico and the Virgin Islands. Together with the acquisition of the Greek company OTE, non-current assets increased but they were partly offset by exchange rate effects and a decrease of inventories and trade receivables⁵².

In 2006, Vivento started the deconsolidation activities, which successfully continued in 2007. Vivento sold seven call center sites of Vivento Customer Services GmbH, two of them – Cottbus and Suhl – to walter services ComCare and five locations – Rostock, Neubrandenburg, Potsdam, Erfurt and Stuttgart –to the Arvato group. A total of some 1,200 employees moved to different employers under the transfers in 2007. Furthermore, Deutsche Telekom signed a strategic partnership to transfer the operations of Vivento Technical Services GmbH to Nokia Siemens Networks with effect from the first days of 2008 [36] (p. 51).

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2 The Financial Crisis Inquiry Commission 2011, pp. xvi-xvii; see also IMF 2009.

3 ITU 2009, p. 9.

4 Deutsche Telekom 2018, p. 45.

5 ITU 2009, p. 9. Since 1998, the OECD understands the ICT sector as a conjunction of manufacturing and services that capture, transmit and display data and information electronically. The principles underlying the definition include the following: for manufacturing industries, the products must be intended to fulfil the function of information processing and communication; must use electronic processing to detect, measure and/or record physical phenomena or control a physical process. For services industries, the products of a candidate industry must be intended to enable the function of information processing and communication by electronic means: OECD 2002, p. 81.

6 Tyagi 2018, pp. 1-36.

7 Dal Yong 2005, pp. 289–304.

8 OECD 2010, p. 4; Gautam, Singh and Sharma 2015, p. 110; Chanakira 2012, pp. 1-20.

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- 27 World Telecom Services Market, IDATE, 2015.
- 28 The DOCSIS (Data-Over-Cable Service Interface Specifications) specification was launched before the crisis (2006), almost a decade after the introduction of the DOCSIS 1.0 specification, devoted to the implementation of typical services related to Internet access. DOCSIS 1.0 aimed to enable connecting until 8 MHz channels in the downstream direction at high speeds: <https://www.avsystem.com/blog/DOCSIS/>. As Cisco acknowledged, adoption of DOCSIS accelerated the deployment of data-over-cable services and would ensure interoperability of equipment throughout system operators' infrastructures.
- 29 Cisco's forecasts (VNI Forecast High-lights).
- 30 One of the pillars of the EC's connectivity plans published in 2016 was the availability of 5G mobile access in strategic locations such as educational and research centres, hospitals and communications nodes. GSMA Intelligence estimated the investment in the 5G networks (excluding spectrum) by the operators in some USD 1 trillion worldwide for 2021-2025: Deutsche Telekom 2020, p. 41. 3G HSDPA (High Speed Downlink Packet Access) was essentially an upgrade to basic 3G that allowed for higher connection speeds using similar equipment: Goldstuck 2009, p. 58.
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- 37 The first years of the millennium saw a renewed recognition that there are realms in which the traditional roles of the state have a legitimate place so some rebalancing in the mix of these functions has occurred: Bauer 2010, pp. 27-28.
- 38 Deutsche Telekom 2014, p. 34. Industry 4.0 held the potential for a new industrial revolution. Connecting people, machines and material enables production processes in real time, which increases efficiency levels. The newly acquired data support product improvements and the development of completely new services: Deutsche Telekom 2015, p. 15.
- 39 AT&T 2013, pp. 34-37; Deutsche Telekom 2008, pp. 61-63. The merger of diverse services into the Internet was soon perceived as inevitable: Briscoe 2006, p. 3.
- 40 AT&T 2009, pp. 55-57. Timotheus Höttges, Chairman of the Board of Management at Deutsche Telekom, pointed that "there are no good ('fiber-optic') or bad ('copper cable') technologies – there are only good and bad bandwidths!". Outstanding engineers could achieve very high bandwidths with an economic and technological mix, by integrating the copper cable network into a fiber-optic infrastructure. For him the keyword was super-vectoring, which enables speeds of over 250 megabits per second and opened the door to achieve technical speeds of up to 11 gigabits per second: Deutsche Telekom 2015, p. 11.
- 41 AT&T 2013, pp. 34-37; AT&T 2007, p. 50.
- 42 Saksela and Smura 2006, pp. 55-61; shortage of the radio spectrum is caused by the limitation of the number of frequencies available and by the impossibility of using the same frequency to transmit different information in a given geographical area: Caballero 2022, p. 27. Spectrum prices reached record levels during the sale of 3G licences at the start of the new millennium, before gradually declining until 2007. From 2008 to 2016, therefore during the financial crisis, once 4G auctions became commonplace, the final average price paid for auctioned spectrum increased significantly - by a factor of 3.52. This average increase was mainly the result of increases in the generally more efficient sub-1 GHz band allocations, higher reserve prices, and a number of sales with extremely high final prices: GSMA 2017, p. 3.
- 43 AT&T Inc. 2012, pp. 54-56.
- 44 Inwit 2021, p. 12.
- 45 AT&T 2009, pp. 55-57. Strategic alliances between two or more organizations are a means to enhance strategic resources: Serrat 2009, pp. 1-19.
- 46 International technology mergers and acquisitions occur when this international activity is for technical purposes. Horizontal M&A aim at access to technology used in the core business, while vertical M&A aim at access to upstream and downstream technology related to the core business. Joint mergers and acquisitions, on the other hand, are aimed at access to non-core technology for the further: Liu, Cai and Tan 2012, pp. 7-12.
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- 49 Little 2008, pp. 3-5. The CDMA standard allowed the deployment of networks to deliver cost-effective fixed wireless broadband and voice services. Worldwide interoperability for Microwave Access WiMAX Technology uses fixed, local radio cells to provide high-speed Internet access via the air interface.
- 50 Little 2008, pp. 3-5. Ukrtelekom's privatisation in 2011, with the subsequent withdrawal of the Ukrainian state from the telecoms sector, could open up the application of the EU regulatory framework. On the other hand, there was the eventuality that Ukrtelekom's new owner, Ukrainian oligarch Rigaš Akhmetov, would use his political influence to prevent the emergence of a truly independent telecoms regulator: Langbein 2015, p. 119.
- 51 Deutsche Telekom 2007, p. 145. Case No COMP/M.4748 -T-MOBILE/ORANGE NETHERLANDS, REGULATION (EC) No 139/2004. Article 6(1)(b) Non-opposition, 20/08/2007.
- 52 Deutsche Telekom, pp. 50-51, 54-55, 67; Deutsche Telekom 2008, p. 64.