ICT Policies in Europe: Past, Present and Future

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Abstract
The ICT sector has gone through a long reform process which has introduced elements of competition in a market that was characterized by a natural monopoly configuration and which was predominantly state-controlled, due to its network structure. The present work is aimed to give a snapshot of the reform paths occurred within the ICT sector, taking into account both the EU level as well as individual Member States' level. Similar to other sectors of general economic interest, the process of European Integration has been a strong driver in these policy reforms. The observed privatization and liberalization processes have brought developments for the whole sector in terms of more consumer choice, lower prices and better quality of service. Finally, the given work presents insights to future developments.

Keywords: ICT; Network Industries; Policy Reforms.

Developments in the ICT industry
Starting in the 19th century, telecommunication has gone through 200 years of development. Historically, the first calls were made in the second half of the 19th century via the public switched telephone network (PSTN). A century later, in the 1980s the shift from analogue PSTN to the integrated services digital network (ISDN) took place in Europe. Meanwhile, mobile telecommunication services became commercially available. The consumers received this new technology with open arms, and especially in the last decades, mobile telecommunication services have experienced spectacular demand growth worldwide. Banerjee & Ros indicate that "between 1990 and 2002, the International Telecommunications Union (ITU) estimates that the number of mobile subscribers worldwide grew from 11 million to 1.15 billion—a compounded annual growth rate of almost 47 percent. In 2002, the number of mobile subscribers worldwide surpassed the number of fixed main lines for the first time."(Banerjee & Ros, 2002)

However, fixed telephony did not cease to exist - and it will not do so in the near future since its infrastructure is a requirement for mobile telephony and the internet which emerged in the 1990s. The internet completely changed the way of telecommunication. Its spread led to the digital revolution that influenced on all areas of human life. Moreover, it contributed to the modernization and emergence of economic sectors, the transformation of consumer behavior and the change of media use in private and economic environments (see also Banerjee & Ros, 2002).

The ever increasing demand from consumers for better quality of services in telecommunication resulted in the development of new technologies that enable faster (broadband) and wireless (WiFi) internet connection. Again, both revolutionized the industry. However, it can hardly be determined whether innovations emerged because of market-pull or technology-push situation. Furthermore it has to be kept in mind, that in the past consumers could not even utter nowadays' demands because they were not yet conceivable. Today, research is conducted already on the 5th generation network and consumers demand free-of-charge internet in public places and more bandwith also for WiFi. Florio (2013) emphasizes the relatively quiet life of the telecommunication industry which has been shaken by a series of technological shocks since the 1980s. These technological changes that were mentioned above and the presence of substitutes of traditional operators and the substitute services determine price and quality of service in the telecommunication industry.

The forces at stake: price and quality drivers
Drivers that determine price and quality of service in the telecommunication industry are:

1. *Technological change*: first when new technologies are introduced, the price is high but later on the increased demand helps to lower the prices. For example, the shift from analogue to digital telephony not merely lowered the costs for the operators but eventually lowered the prices for the consumers, too. Due to the development of mobile voice technology, the costs went down again and allowed to offer the services for a much cheaper price. (see also Evans, 2004)
2. *The presence of substitute operators*: privatized companies created competition in the market and lowered the prices for the consumer. For example, fixed telephony used to be pricey because there was no substitute service for it. Flavio asserts that the policy reforms of privatization and liberalization of the telecommunication sector together contributed towards reducing the prices of local calls (Flavio, 2013).
3. *Substitute service providers*: Over-The-Top (OTT) providers serve as a substitute to traditional telecommunication services and are a substitute for the whole telecommunication value chain. Since the 1990s, OTT providers such as Netflix, Youtube and Amazon have tremendously changed the sector. In addition, the free-of-charge telephony services (e.g. Whatsapp and Viber) lower the price for telecommunication. They drive the competition but also improve the quality of the service. Finally, OTT services can be run independent from physical infrastructure. If the network enables internet signals, then any service can be organized on this infrastructure. It is possible to develop a service in a small start-up company and enter the global market. A decade ago, this opportunity did not exist. The OTT put into question the traditional roles of the infrastructure operators, the value added service providers and the service reseller (Picot, 2016).

Currently, prices for telecommunication services are stable but differ between European member states. That probably reflects different competitive market situations. Generally, prices for broadband connection have fallen as the demand increased. Yet, the prices per end user for telecommunication increased again, because different other services are bundled in a package with mobile voice telephony, e.g. internet and television.

Main policy reforms at the EU level

Each of the above mentioned drivers raises new questions for the telecommunication industry and the policy makers. As Florio argues, the telecommunication sector is the core laboratory for network industries and it is the industry where a now already 20 year long policy paradigm shift started the earliest (Florio, 2013).

There are a lot of kinds of telecommunications policy reforms and those have a lot of kinds of aims: protecting the consumers, ensuring adequate infrastructure investments, creating a strong network, promoting competitive behavior, obtaining lower prices, increasing the service quality, allowing the portability of the number, fighting against roaming charges, easing the access for the consumer or regulating entrant barriers of the offers (many objectives, some of them contradictories).

Traditionally, in the telecommunications sector the different policy reforms choose one of the different possible combinations: public ownership/private ownership of the industry, free entry/oligopoly/monopoly of the market and regulation/liberalization of the industry (Florio, 2013). Hence, the regulatory regimes can be categorized according to ownership, level of competition and the presence of regulation. There are vertically integrated public monopolies; privatized, but still vertically integrated monopolies, without any price regulation; price-cap regulated privatized monopolies; different steps of liberalization from unbundling to unregulated oligopolies to full market entry.

When we study policy reforms in telecommunication, first, it is important to stress that the process of technological change implies that regulators and law-makers have to frequently adjust their views because of entirely new developments (Newbery, 2000). Telecommunications sector is not homogenous, as it presents different kind of services and tariffs structure, subscription rates, connection charges, rental prices

of equipments (see also Bacchiocchi et al 2011). Therefore it is very difficult to compare one product with other. We must use dynamic models because a particular policy reform can take time to apply for reasons of contractual obligations (Picot, 2016).

The EU offers something near to a natural experiment, on one side, there is one policy actor, the European Commission, who pushes towards a well defined reform package, as embodied in telecom directives. On the other side, there are the member states that more or less are in compliance with the EU legislation and which show big differences in reform design, sequencing, timing, market structures (Bacchiocchi et al, 2011).

The most important reform in the sector of telecommunication promoted by the European Union is intended to establish a single market in Europe and create a single European supervisor. Concrete measures to achieve this objective were approved in the legislative package of the European Commission on 11 September 2013 (MEMO /13/779) and are aiming at:

- create four or five major operators providing services across the European Union;
- create common and simple rules;
- eliminate roaming charges;
- remove surcharges on international calls;
- provide rights to telecommunications consumers;
- promote network neutrality.

Different reform patterns across Europe

The reform paths and the policy patterns in the ICT sector largely vary among and across countries. Within the EU, the process of European integration in network industries and the rules of the common market worked as strong drivers for delineating national policies for ICT. However, the picture does not correspond to a homogenized policy framework and notable differences are observed with regard to the implemented reform programmes. Policy patterns can be discerned according vertical and horizontal criteria, which in turn form different patterns of reform in different national settings. According to the existing literature and empirical research (Levi-Faur, 2004; Schneider & Werle, 2006; Thatcher, 2006; Florio, 2013; Rodine–Hardy,2013; Szcepanski, 2013; ITU, 2015) some of the key variances that are observed among the national reform patterns, as showed in the following Table.

- the role of the state
- the degree of privatization, liberalization and deregulation
- the type and the volume of Europeanization
- the type and methods of privatization
- the pace and the timing of the reforms
- the policy diffusion mechanisms
- the delegation/allocation of authority and regulatory
- the degree of institutional adjustment
- the ownership and organization status of the incumbents
- the corporatization process of the state owned enterprises
- the framework of consumer protection
- the public service and universal service obligations
- the research and development framework
- market – related variables, such as the degree of market opening, the structure of the market, the unbundling techniques, pricing, licensing measures, etc.
- technical issues, such as the fees and the spectrum sharing/allocation
- the technology used and the degree of technological adjustment and modernization

A crucial variable of both the ICT reform plans and the implementation programmes is the regulatory and institutional environment. The national regulatory frameworks vary across the member states (Szcepanski, 2013), though they all tend to converge in the common rules set out by the EU Directives and since the 1990s have undergone notable changes (Thatcher, 2006).

Beyond the diffusion of liberal policy patterns (Rodine – Hardy, 2013) and the strong impact of the Europeanization process, domestic policy styles in the ICT sector still exist. Diversities of the policy-making patterns and the national interests at stake (Heritier, 1999) partly explain the observed variations. However, a broader explanatory model should include more factors. Focusing on some illustrative cases, particular variations and divergences arise with regard to the reform paths of different countries in the ICT sector.

Britain adopted more radical reforms and at an earlier stage compared with other European countries, also used as a 'pilot case' for the EU liberalization process[1]. The strategy of the policy makers prioritized market forces and the promotion of competition, reserving a rather restricted role for the state as a regulator. Within the context of industrial activities, the British model is particularly characterized by 'market-orientation' and 'company-led trajectory', while a clear orientation towards liberalization, deregulation and privatization is rather evident (Hulsink, 1999). The pattern can be shortly described as "regulated competitive markets" (Thatcher, 2006) and Britain had shown a strong and stable orientation towards the opening of the markets and the delegation of activities to the private sector.

Contrary to the British paradigm, the **French** pattern is more 'state-controlled' oriented, while the government has an active role, both in entrepreneurial and administrative terms, still embedding strong protectionist and interventionist elements (Hulsink, 1999). The long standing statist tradition has been embedded and is still present in telecommunications reform programmes, while conflict may arise between the national policies the EU regulatory framework (Thatcher, 2006). A key feature of the French policy on

[1]Or a "reform frontrunner", in Florio's words (2013, 36)

ICT is the higher significance of the public service concerns, which often conflicts with the rules of the competitive market. As regards the pace of reform, France was a late-comer in reforming the ICT sector and certain delays were observed in the process of the regulatory adjustment (Thatcher, 2006)

The **Dutch** model was oriented towards international trends of liberalization, privatization and deregulation, but the country adopted a more moderate approach and a gradual implementation pace, compared with the radical and to a certain degree sweeping UK and US reforms (Hulsink, 1999). The Dutch model to a certain degree was inspired by the telecommunications pattern of Britain (Hulsink 1999, 293), while the two countries form a "pro-liberalization" group, which opposes the "pro-regulatory" one, which was supported by France and Germany (Natalicci[2]).

In a comparative perspective, the UK seems to have recorded a higher degree of adjustment to the liberalization prerequisites than France and the Netherlands (Hulsink 1999, 281). With reference to the regulatory institutions in Britain, France and Germany, Thatcher (2006) further suggests that the observed variations can be linked with "different varieties of capitalism" in the above countries.

Turning to a southern European country, **Greece**'s reform pattern in the ICT sector was a typical case of gradual/incremental adjustment to the Europeanization and liberalization prerequisites. In contrast to the above mentioned cases, no national strategy can be claimed, as the regulatory and market reforms mostly came as a result of the external EU obligations, while the incumbent firm has been already corporatized and partly privatized since 1996 mostly for revenue raising reasons. Besides the fact that the state's strong presence in the telecommunications sector was abolished, the country didn't adopt a clear-cut market - oriented approach. In a similar context, Greece transposed the EU Directives in national law in rather technical way, while a concrete reform pattern cannot be discerned.

The above examples provide an indicative framework of the differences that are observed among different countries in the process of the ICT sector reform. Further variations exist across broader clusters of countries, for instance between the Central Europe and the Northern European countries (Rodine – Hardy 2013), as well as compared with countries outside the EU, such as the Latin American group (Levi Faur 2004).

The role of government-owned enterprise in the telecommunication industry and the need for ownership changes in service providers

In the telecommunication industry, the concept of a state-owned incumbent comes from the legacy copper networks in possession by the governments. Those had mainly been overseen by the respective governmental bodies, e.g. the Ministry of Communications, and had usually combined with postal and other public utility functions such as electricity distribution.

The role of state-owned telecoms enterprises can be evaluated from both positive and negative points of view. On a positive side, the sell-off of nationalized telecoms operators during the privatization stage generates significant revenues for the states, allowing them to use the financial proceeds to address certain pressing issues. Additionally, this results in the inflow of foreign direct investment (FDI) to the country and paves the way for other network industries to follow the trend, as telecoms has historically been among the first sectors to get privatized (Alonso et al., 2012). Finally, this process may contribute to the

[2]Cited by Heritier 1999, 41.

internationalization of the formerly national incumbents through becoming parts of large multinational corporations (MNCs).

It seems that all these benefits can only be reaped at some later stage, when the governments decide to privatize their telecoms incumbents. But what about the actual functioning period of those state-owned companies? In this regard, the below listed aspects appear on the negative side. Firstly, the national incumbents are sole monopolists under the protection of their states, which gives them a privilege to set unreasonably high prices for their services. Besides, the absence of competition provides almost no incentives to innovate and make investments to upgrade networks and service levels. As a result, the end user is in an unfavorable situation with no other choice to switch to. Entry to the market is banned with high barriers artificially imposed by the state that protects its own interests.

Taking all these reasons into account, changes in the ownership structure of service providers is a necessary measure to open up the market for competition and to ensure a variety of consumer choice and continuous technological/ service innovation for the benefit of all stakeholders. This has been practiced since the 1970s onwards and has delivered much progress in the development of the telecommunication industry worldwide.Between 2000 and 2007, six out of the ten largest privatization transactions in the OECD countries were concluded in the telecoms sector, with the total proceeds value of US$ 55.7bn.

Table: Ten largest privatization transactions in the OECD, 2000-2007

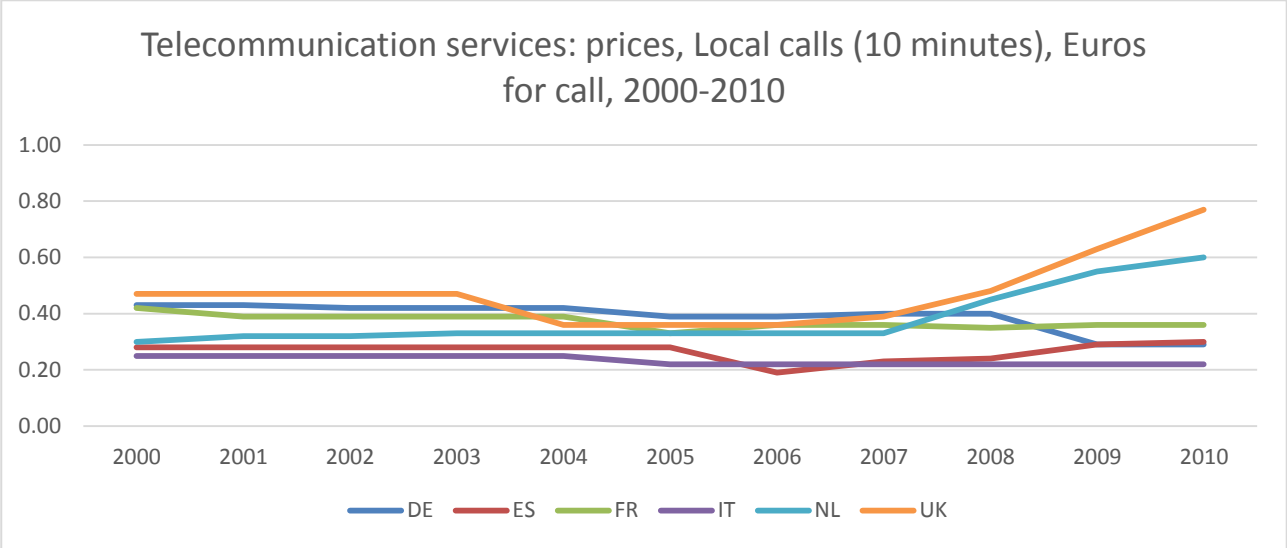
Year	Country	Company	Sector	Share of company transferred (%)	Proceeds (US$ bn)
2006	Australia	Telstra Corp.	Telecom	33.6	13.7
2000	Germany	Deutsche Telekom	Telecom	6.6	12,8
2004	Italy	ENEL	Utilities	19.6	9.5
2000	Japan	NT&T Corp.	Telecom	6.4	8.7
2005	France	Electricité de France	Utilities	12.7	8.4
2000	Sweden	Telia AB	Telecom	29.4	7.7
2005	France	Autoroutes du Sud de la France	Transportation	50	6.8
2005	Turkey	Turkish Telecom	Telecom	55	6.6
2004	France	France Telecom	Telecom	10.9	6.2
2005	France	Autoroutes Paris-Rhin-Rhone	Transportation	70.2	5.8

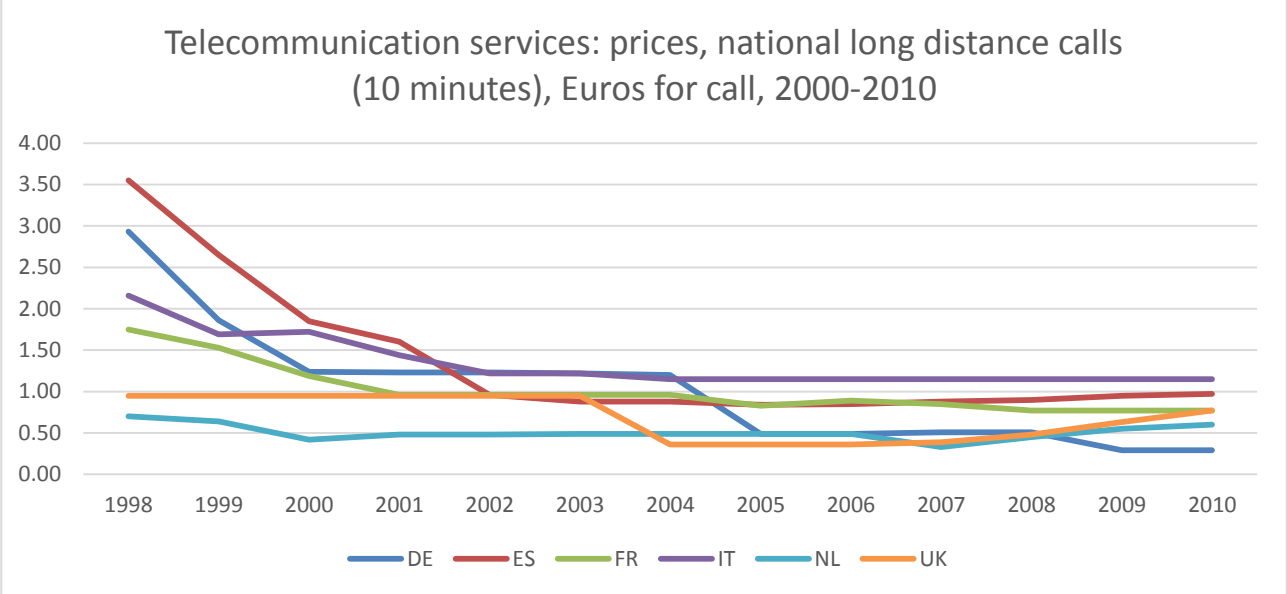
Source: Privatisation in the 21st Century: Recent Experiences of OECD Countries, Report on Good Practices, January 2009

Reforms' impact on consumers

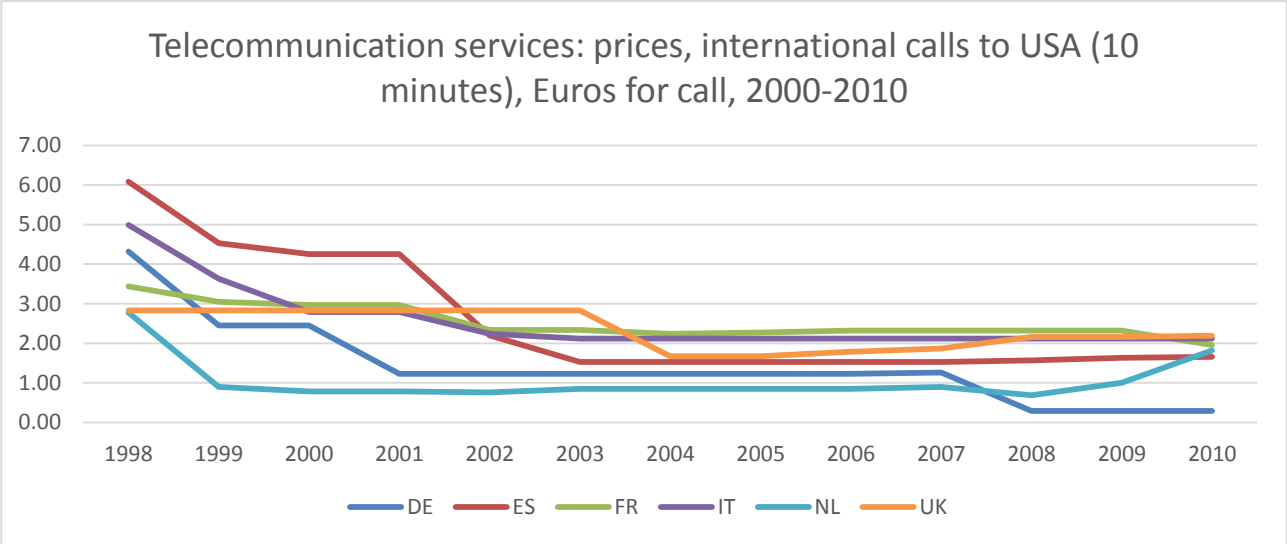
Past reforms in telecommunications have partially benefitedEuropean consumers by increasingtheir choice thanks to low prices, high quality and innovative services.

First, competition has been promoted, with positive effects on consumer welfare through price reduction. The EU law and its implementation by Member States[3] have helped the prices of telecommunication services to fall between 2000 and 2010, mostly for national long-distance calls and international calls.





[3] See Directive 2002/21/EC of the European Parliament and of the Council of 7 March 2002 on a common regulatory framework for electronic communications networks and services ('Framework Directive').



Source Florio, 2013. Data source: Eurostat, [isoc_tc_tprc].

According to the existing literature, different policy reforms in telecommunications have had different impacts on prices: the introduction of number portability has a negative impact on mobile call prices (Grzibowski, 2005); prospective competition and effective competition, both reduce the price of all the telecommunication services (Boylaud & Nicoletti, 2001); privatization of incumbent telecom operator increases prices while establishing an independent regulatory authority decreases them (Estache et al, 2006); privatizations increase prices in developing countries while has no effect on developed economies (Gasmi & Virto, 2010);so it is very difficult to know how a particular policy reform impacts the telecommunication prices[4].But not only impact in prices have been studied (for example Banerjee & Ros (2000), Gutierrez (2003), Fink et al. (2002), Ros (2003) and Li & Xu (2004) reports that privatization reduces unmet demand in developing countries.

The cross-country study by Bacchiocchi et al. (2011) on the impact on consumer prices of European telecoms privatization and liberalization of telephone markets shows that the prices of international and national phone calls were reduced significantly by an increase in the number of mobile phone users and by higher levels of investment and by increases in competition (liberalization)– while the change from public to private ownership (privatisation) made no significant difference.

[4] From a theoretical point of view, the impact of privatization and liberalisation on prices is ambiguous a priori. A positive effect of privatisation and liberalisation on prices can be expected if they have been set artificially low by public owned (monopoly) enterprises. The reasons behind such a behaviour can find it rational, for example, in political reasons. In this case, the effects on consumers' welfare is expected to be negative, as the reform process lead to higher tariffs, in a perspective of financial sustainability (Foster et al., 2004). However, as stressed by Florio (2013), telecommunication providers were found to be profitable across European countries and often independent of transfers from the government. Changes in prices structure can also occur. In many countries, public telephone monopolies have cross-subsidized between local and long distance calls, which are usually not sustainable in a competitive framework. Instead, if enterprises have been inefficient in case of public ownership or in case of private monopolies, reforms will probably lead to tariff reductions as consumers benefit from the improved efficiency if they offer more potential space for competition. However, while there have been great advances in telecommunication services in the last decades, there is still debate whether or not privatisation is the only possible source of efficiency increases and consequently of consumer prices decreases. Borghi et al. (2016) suggested that the negative effect on productivity of publicly owned firms can be reduced (or reversed) if quality of institutions (government quality, regulatory quality and government effectiveness) is high.

In addition, Eurobarometer surveys, which analyse citizens' opinions with the telecommunication services, can be also taken into account to address satisfaction with reforms (Clifton et al., 2005; Clifton & Dìaz-Fuentes, 2010; Bacchiocchi et al., 2011; Fiorio & Florio, 2011). Two main dimensions can be considered: the consumers' satisfaction with telecommunication prices and with telecommunication quality. The perception of quality is of particular importance. As one may argue that, with the market liberalisation, citizens would end up with lower quality services (CEEP & ETUC 2000). Paired with unfair prices and restriction to access to service, this have consequences for equity and social cohesion (Clifton et al., 2011).

Bacchiocchi et al. (2011), using Eurobarometer data on opinions, finds thatregulation variables have significant effects on the probability of being satisfied. Public ownership has negative impacton dissatisfaction suggesting thatconsumers express more likely dissatisfaction with prices the further the reform process has gone. Entry regulation, instead, positively affects dissatisfaction with prices. For what concerns perception of quality, the same study finds no significant effects of privatisation, while legal conditions towards competition have a negative impact on the perception of higher quality. An opposite effect is provided by the market structure indicator, while the opposite happens as the market becomes more open. In addition to these results, Clifton et al. (2011), looking at the UK and Spain, showed that the citizens which express higher levels of dissatisfaction with telecommunications services are those more potentially vulnerable as consumers, like unemployed, the elderly and the lower-educated.

However, the increase in competition in the telecoms sector does not necessarily guarantee the people's needs and protection of their rights. Measures are therefore necessary to ensure consumers' privacy and citizens' access to all essential telecoms services. Hence, emphasis has been put by European Institutions on the protection of consumer rights in terms of access to services, fair pricing, provision of relevant information on services subscribed and privacy of personal information.[5]

Finally, investments in broadband networks supporting high-speed internet have been promoted at EU level as well as support in wireless technologies[6]. In 2014, the special Eurobarometer report "E-Communications and Telecom Single Market Household Survey" has been released, containing results of an extensive survey conducted at EU level on households' access to telecommunications services. Concerning the accessibility in telecommunications, nearly all EU households have telephone access, either fixed and/or mobile[7].The overall proportion of households that have Internet access at home is around 65%, the majority of which is represented by broadband access, with dial-up access only remaining significant in a small number of countries.[8]

Conclusion

[5]Misleading Advertising Directive: Council Directive 84/450/EEC of 10 September 1984 relating to the approximation of the laws, regulations and administrative provisions of the Member States concerning misleading advertising. The Distance Selling Directive: Directive 97/7/EC of the European Parliament and of the Council of 20 May 1997 on the protection of consumers in respect of distance contracts. The Unfair Commercial Practices Directive: Directive 2005/29/EC of the European Parliament and of the Council of 11 May 2005 concerning unfair business-to-consumer commercial practices in the internal market. Regulation on co-operation in consumer protection. within the European single market: Regulation (EC) No 2006/2004 of the European Parliament and of the Council of 27 October 2004 on cooperation between national authorities responsible for the enforcement of consumer protection laws (the Regulation on consumer protection cooperation).

[6]https://ec.europa.eu/digital-single-market/node/118

[7]Penetration rates in Europe rangefrom 100% in 10 Member States to 94% in Portugal, Romania and Slovakia.

[8] Most Member States in eastern and southern areas generally have broadband penetration of 56% or less, with the lowest levels recorded in Italy (41%) and Portugal (43%).

According to the above analyses, the dynamics in the ICT sector may indicate a policy paradigm shift from nationalized monopolies to effectively competitive markets. However, besides the convergence tendency, certain variations among countries are still observed. Recently reforms have changed the rules of the game for the whole sector. Until now, reforms have focused on introducing competition in the ICT network industry. This has been done by both privatization and liberalization, which resulted in the unbundling of the natural monopoly component from the provision of services.

The privatization trend has brought in much needed development for the whole sector in terms of more consumer choice, lower prices and better quality of service. In addition, the accessibility and affordability of ICTs has improved for consumers in all the traditional telecommunications services. The remaining issue is to provide consumers with services of higher quality, as the access to broadband connection.

Despite the positive effects on consumers brought about by policy reforms, the main drivers of welfare increase have been the technologicaladvancements and innovations.The massive increase in ICT consumption all over the world and the appearance of new smart technologieswill be the main demand drivers for the ICT sector.Already today, things are changing as OTT services enter the market and operate independently from the rules and infrastructures of traditional ICT industry. The OTT put into question the traditional roles of the infrastructure operators and will considerably challenge the regulators in the future.

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