Deployment of broadband infrastructure in the EU: Is state intervention necessary?

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Broadband development is considered to be central to economic growth in a knowledge-based economy and society. The deployment of broadband infrastructure, however, has been rather slow in Europe. The main aim of this paper is to identify the barriers for delay in broadband development in Europe, and to discuss whether there is a need for intervention.

The current state of broadband deployment and uptake in the EU Member States (compared to the US) is studied in order to identify the availability of the different technological platforms (mainly DSL and cable modem). It hereby distinguishes between residential and SME broadband access.

Encouraging local competition has been the preferred way to promote investment in broadband infrastructure. This paper explores whether the EU regulatory policy choice had the desirable results of increasing competition, as well as new entrants' (and incumbents') incentives to invest in alternative infrastructure. Despite the popularity of the policy of local loop unbundling, empirical evidence shows that this policy has not stimulated competition and digital infrastructure investment in Europe so far.

In May 2002, the European Commission presented for the first time an overarching strategy - the e-Europe Action Plan 2005 - to stimulate the deployment of broadband infrastructure and demand for related applications. In this Action Plan the Commission reinforced its view that competition is the key to efficient market developments. It stated, however, that Member States may give regional aid or financial incentives to promote broadband development in remote and underdeveloped areas. This paper goes on to make recommendations on the role the government in speeding-up broadband deployment.

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1. Introduction

Broadband is the buzzword of the new millennium in Internet technology. Broadband refers to telecommunication in which a wide band of frequencies is available to transmit information. Broadband access technologies can deliver fast transmission of voice, data and video services directly to homes and businesses (with a wide range of applications from high speed Internet access to on-demand movies, music, games, video-conferencing, and shopping through TVs).

The precise definition of broadband varies widely, and will continue to do so as technology matures. More commonly, broadband has been assigned data rates ranging between 256 Kbps and 1.5 Mbps. This paper will use the OECD (2001) definition of broadband, which transmits 256 Kbps from provider-to-consumer (downstream) direction and 128 Kbps from consumer-to-provider (upstream) direction. This is the most basic rate offered in the OECD countries and therefore allows for a more accurate comparison of cross-national data.

It is beyond the scope of this paper to discuss the benefits of broadband. Instead it focuses on why there is delay in broadband deployment in Europe, and how can policy facilitate broadband deployment. The first step is to obtain a clear picture on broadband deployment by looking at: (1) broadband subscription rates by residential and SME users; and (2) retail prices of broadband services. Available data show that broadband diffusion is widely diversified within Europe, with Belgium, the Netherlands and Sweden being the front-runners and the rest of the EU making slow progress in broadband adoption. Available data on Small and Medium Enterprises (SMEs) in Europe also show that ISDN remains the favorite technology. The limited SME access is of concern because these enterprises account for 99% of the EU firms, and are a significant source of each country's employment and economy. Overall, the EU is lagging well behind the US in the deployment of broadband. Moreover, the DSL technology is preferred to cable modems in the EU.

Empirical evidence in the EU suggests that the regulatory environment has given insufficient incentives for operators (incumbents and competitors) to build alternative broadband infrastructure. During the last few years regulatory policy has mainly focused on local loop unbundling, which has been a complicated process and results are rather disappointing.

Recent European Commission and local government initiatives show how the government can intervene in broadband infrastructure development. The European Commission recently announced a comprehensive broadband policy. This paper goes on to discuss whether public funding should assist broadband infrastructure deployment or not.

2. Current state of broadband deployment in Europe

Broadband can be delivered through digital subscriber lines (DSL), cable modems, fixed wireless, satellite dishes, and fibre optic. This paper will focus on the two technologies of DSL and cable modems, which are the most dominant platforms in Europe. This section will briefly discuss the strengths and weaknesses of each leading technology, and how it influences the new entrant's choice and incentives to deploy

infrastructure. It will then go on to discuss the current state of broadband deployment in Europe.

Leading broadband technologies and incentive structure for investment

Currently the local loop is the most appropriate medium for delivering services rapidly, cheaper and equally. Digital Subscriber Line (DSL) local access technology is inexpensive compared to the deployment of cable or new fibre. DSL can simply upgrade existing analogue copper telephone lines by using specialized electronics at both ends of the connection. Since DSL uses the existing network it can reach almost every residential and business user (unlike cable which does not always reach small business users). It also provides users an "always-on" access to Internet at faster rates (up to 1.5 Mbps)[1] than standard analogue modems (56 kbps) over a single dedicated line. DSL technology, however, has some distance limitations as it is restricted to users who are located less than 3.6-5.5 km from a DSL equipped central office (CO). In other words, some rural areas may be difficult to reach. Moreover, the maximum speed of DSL depends on the distance between the customer and the central office – the closer the user is to a DSL equipped central office the faster the service, and vice versa. Overall, DSL technology serves better densely populated locations and countries. In Europe, on average nearly 80% of telephone lines are within 4 km of a local exchange (in contrast with 60% in the USA) which makes DSL a more popular platform in Europe compared to the USA.

Table 1
Indicative transmission speeds of some high-speed technologies

		Transmission speed		
Modem Type	**Bandwidth avble**	**Downstream**	**Upstream**	**Infrastructure**
Wireline	4KHz	Up to 56 Kbps	Up to 56 Kbps	Analogue Copper loop
xDSL*	0.5-1 MHz	1.5-9 Mbps	16-500 Kbps	Analogue copper loop
Cable Modem	6-8 MHz	0.5-30 Mbps	0.1-1 Mbps	Hybrid Fiber/Coax
Wireless	"-24 GHz	9.6 Kbps 750kbps-155 Mbps		Wireless

*ADSL : downstream data rates: 1.5-6/8 Mbps ; upstream : 64/176-640 Kbps ; downstream connection speeds vary depending on a customer's distance from the CO.
HDSL: d/u : 1.5 Mbps; VDSL: d /u : 51 Mbps

Incumbent operators have a commercial incentive to slow down the roll-out of the DSL service because it cannibalizes their own profits, and it allows new entrants to enter the market and cut into their profits. DSL deployment is a great threat to existing profitable revenue streams, such as leased lines, ISDN, in particular for the business market. An incumbent is more likely to target DSL for residential users, only because there is a competitive threat posed by cable modems for the residential market.[2] A new competitor will only enter the local market when it values it as profitable since entry is

[1] This rate surpasses ISDN and Fixed Wireless speeds of only 128 Kbps, while it is lower compared to leased lines rates of 2, 34, 155 Mbps, and wireless of 1-2 Mbps.

[2] DSL technology also suites the residential demand pattern which tends to request for a lot of information (high downstream capacity) and send little information (low upstream capacity). Leased lines tend to be more suitable to business users as they allow for high dedicated upstream and downstream capacity (up to 155 Mbps).

time and capital intensive. A new entrant must achieve scale at every central office level in order to succeed.[3]

Cable modem access is the broadband access technology with the most subscribers in the United States.[4] With high coverage, cable connections offer a significant alternative for providing broadband access to residential and business users. Cable uses the bandwidth of one or more analogue TV channels to provide shared downstream service of bandwidth up to 30 Mbps, split between the subscribers that are served off a particular node. Although cable has no distance restrictions, cable access is shared leading at times to congestion and security problems. In other words, transmission slows down as more users go online. Moreover, cable networks need large investments for high bandwidth.

For the moment, fixed wireless technology is not a viable alternative for high bandwidth data transmission. Fixed wireless technology is quick to deploy compared to other technologies that have to install wires. Wireless networks do not have high installation and maintenance costs. There are, however, technical problems associated with installation of antennas, and access to costly spectrum.

Broadband penetration in the European Union: Residential and SME users

Broadband is a key to Europe's competitiveness in providing cheap, fast Internet access to European citizens and business alike. The two leading broadband technologies in Europe are DSL and cable modems. In June 2002, the EU had approximately 8.3 million broadband subscribers (including DSL, cable and other broadband technologies), which accounts for 2.2 % of the total EU population. In the EU, DSL lines totaled around 6 million (73%), cable lines totaled around 2.1 million (25%), and other types of technologies (like Ethernet in Sweden) accounted for about 200,000 lines (2%) (ECTA 2002).[5] It is clear that DSL is the most pervasive broadband platform in the EU in contrast with the USA (where cable modem is the most prevalent platform).

There is a wide variation in broadband penetration within the EU Member States. In June 2002, Sweden (7.8%), Belgium (6.3%), and Denmark (4.6%) had the highest broadband penetration rates per inhabitants. Data show that broadband penetration is higher where competition exists between technological platforms (i.e., DSL and cable), such as in Belgium, the Netherlands and Austria. The slower broadband take-up in the UK may be due to the fact that prices of dial-up Internet access in the UK are among the lowest in the world (there is a choice of metered and unmetered packages).

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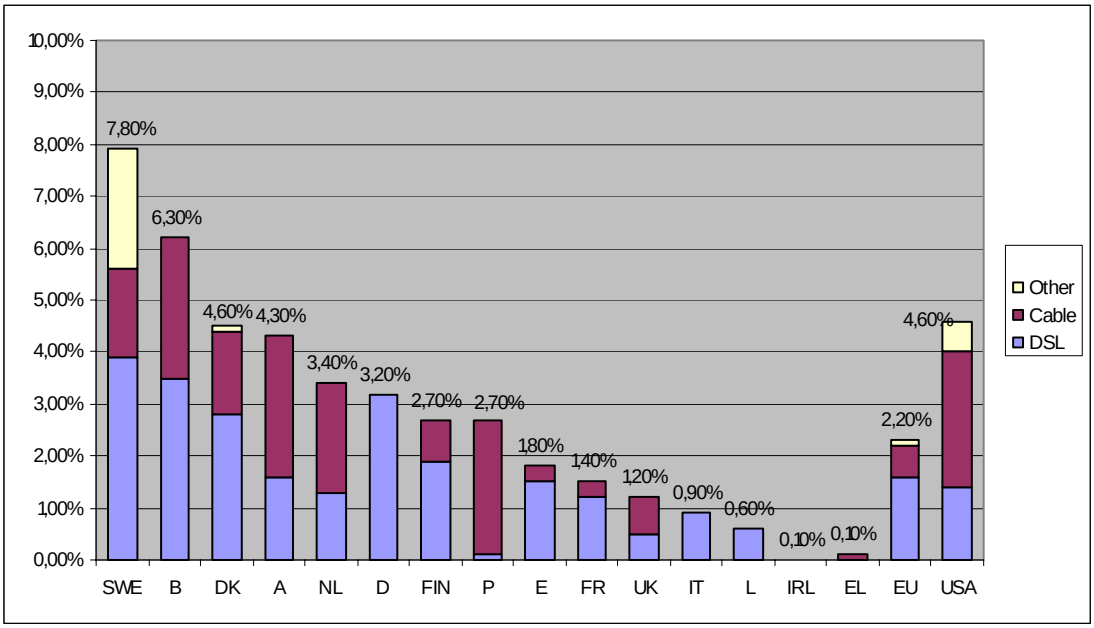
3 Estimates show that new entrants need 60-100 clients at central office level (to break even) while an incumbent operator needs 40 clients at central office level.

4 The US cable TV penetration is 60% of households compared to the EU average of 25%.

5 In the US, there are 13.5 million high speed lines in service with 4.7 million subscribers getting access via DSL (around 35%), and 8.8 million customers (65%) receiving cable broadband access (Leichtman Research Group 2002).

Figure 1
Broadband penetration in EU Member States (per 100 inhabitants) (June 2002)



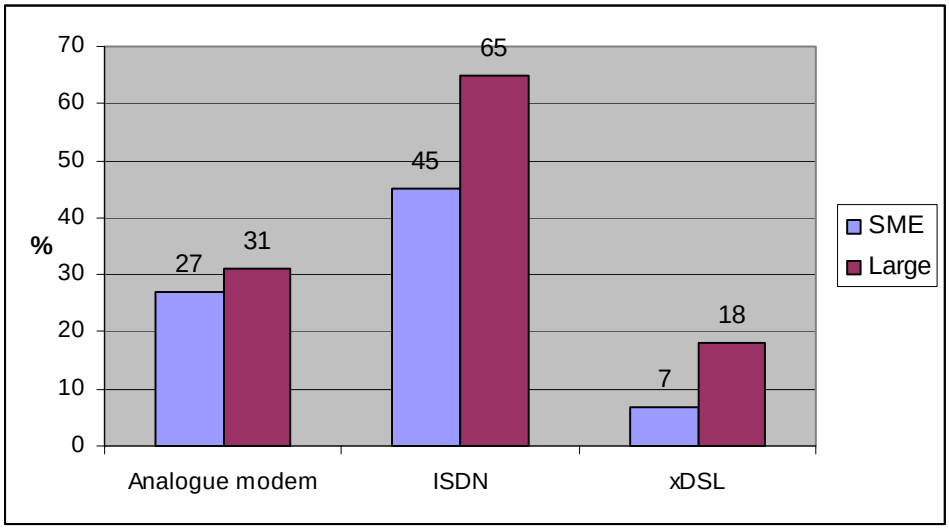
Source: ECTA, June 2002; Leichtman Research Group (2002).

Particular focus is placed on broadband access of Small and Medium-sized Enterprises (SMEs) since they are a key source of the EU economy. Given that SMEs account for over 99% of the 19 million EU enterprises (in non-agricultural market sectors), employ 66% of the EU private sector employment[6], and generate 55% of the total turnover (EC 2001e), broadband deployment cannot be a success without their full participation. SMEs will play a major role in competition, sustainable growth, employment opportunities, and better social cohesion. Broadband Internet connection is set to become an essential requirement for any successful business as it will allow for faster and affordable participation in the global Internet economy. SMEs must take advantage of the growth potential offered by digital technologies through e-business and e-commerce.

In a pilot study on e-commerce undertaken by 13 EU Member States during the first half of 2001, Internet access using an ISDN connection was the most common method of connection for all enterprises. Around 45% of SMEs and 65% of large enterprises surveyed chose ISDN, 27% of SME and 31% large enterprises relied on slower analogue connections, and only 7% and 18% used a broadband technology, respectively (Figure 2). When looking at all enterprises together in individual EU Member States, early liberalizers like Finland appear to profit from broadband connections - 18% of surveyed companies were connected to xDSL technology (Figure 3). When looking at company size there appears to be a 'digital divide': the European SMEs are lagging behind large companies in taking advantage of broadband technologies.

6 In comparison, SME employment accounts for 46% in the US and 33% in Japan (SMEs in Europe, 2002). In Europe, very small firms (under 10 employees) provide one third of all jobs. Moreover, the average size of a business in Europe is 6 workers (compared to 19 in the USA and 10 in Japan).

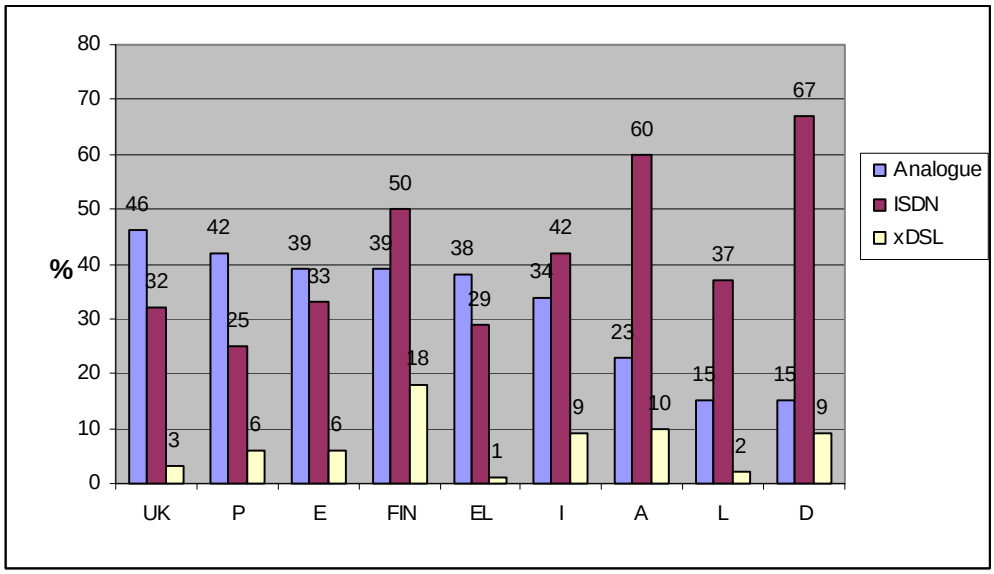
Figure 2: Type of Internet connection by enterprise size (first half 2001)



Source: Eurostat (2001).

According to the aforementioned survey (Eurostat 2001), the main barriers to Internet use are lack of security (66% of SMEs and 83% of large enterprises) and technical problems (56% of SMEs and 59% of large enterprises) (slow and unstable data communication). Other obstacles cited were the cost of establishing and maintaining Internet access, and the shortage of appropriate ICT skills, which prevents them to reap the benefits of e-Business.

Figure 3
Type of Internet connection in some Member States
(% of enterprises with a certain type of connection, 2001)



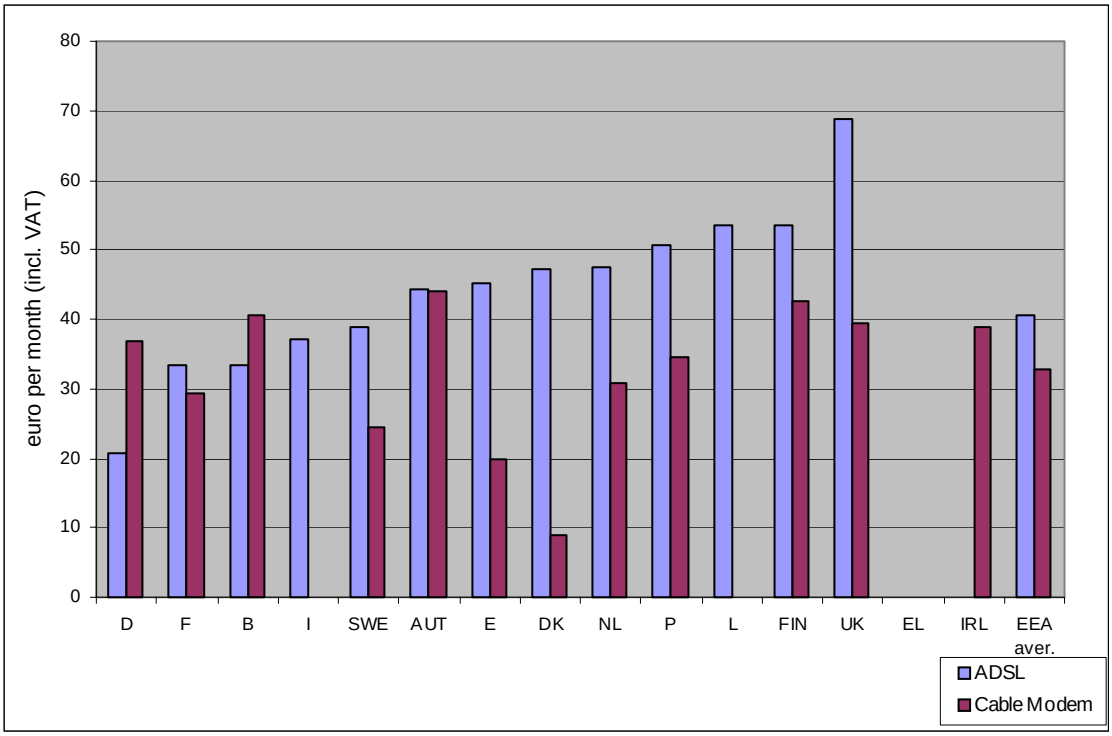
Source: e-Commerce database, Eurostat (all EU Member States except DK, NL, S) 2001

Both residential and SME broadband penetration rates are quite low although with variations among EU Member States. More affordable broadband technologies will make faster connections more attractive to SMEs. As part of the eEurope Action Plan the Commission launched the *GoDigital* initiative, which aims at raising the SME awareness about the potential opportunities in e-Business.

Comparative broadband prices

Prices also determine the accessibility and usage of each technology. Retail prices of DSL and cable modem service vary from country to country. Figure 4 shows that cable modem services are less expensive than DSL services.

Figure 4: Retail prices of cheapest DSL and cable modem service in each country (1 November 2001)



Source: CEC (2002).

However, one must be very cautious when comparing DSL and cable modem prices for a number of reasons. First, the initial set-up costs for cable modems and DSL equipment are not accounted for. Second, cable TV penetration in Europe covers only, on average, about 25% of the homes. Therefore, the lowest cable modem prices are not available to all consumers. Third, one must take into account the different speeds of the two technologies that are not reflected in the figure.

3. Regulation and broadband deployment

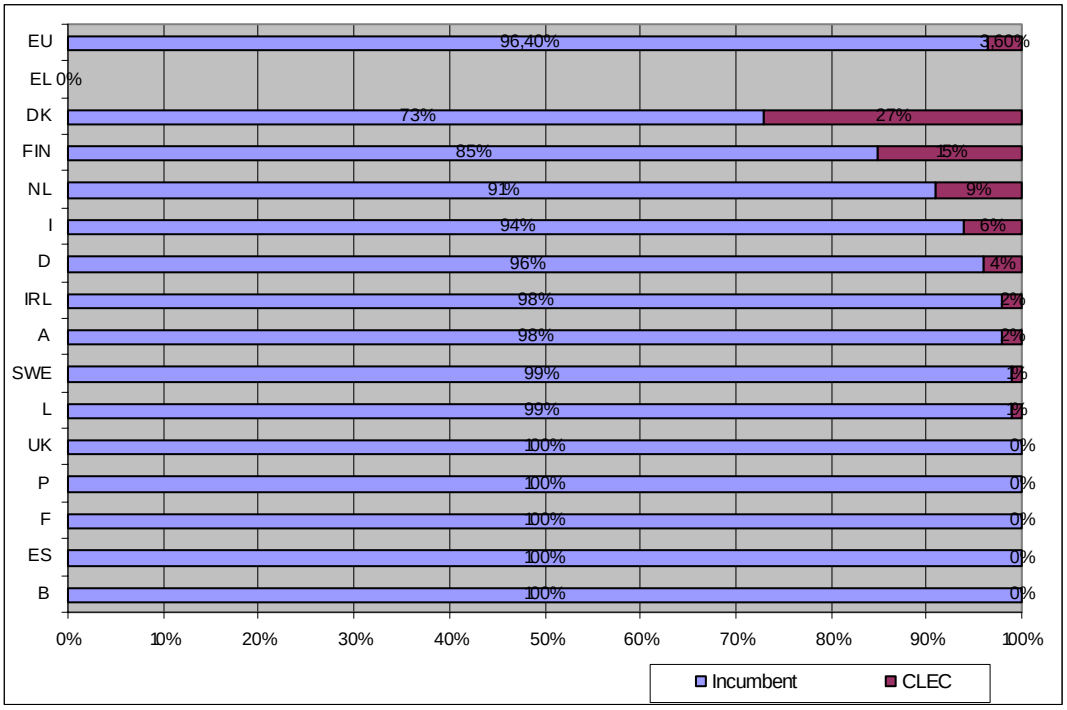
Even before the 1998 full liberalization date, the European Commission promoted infrastructure competition through the liberalization of alternative infrastructure in 1995. The goal was to encourage alternative infrastructure to compete with telephone incumbents through offering all services (except voice telephony, which was liberalized in 1998). However, there was very slow progress in infrastructure competition.

The EC policy gradually shifted towards service competition at least as a transitional measure. Entry costs were considered as significantly lower to infrastructure competition. Europe's effort to increase broadband Internet access to bridge the gap with the United States focused on unbundling the local loop of the telecommunications

network. Full and fair access to the local loop was expected to boost competition, lead to innovation, bring down the prices for services, and increase their take-up.

The existing regulatory framework did not encourage broadband deployment. The EU Regulation 2887/2000[7] was adopted with the aim of boosting competition in the broadband and high-speed Internet access market. This Regulation required incumbent operators to offer unbundled access to their copper local loops and wholesale products by 1 January 2001. The Regulation applied only to notified operators designated as having significant market power (SMP) in the provision of public telephone networks. It required three unbundled means of access: provision of full local loop unbundling, shared unbundling (line sharing), and high speed bit stream access (whole provision of DSL service by incumbent).[8] The EU regulation required the unbundling of the same network elements as in the USA[9] with the exception of fibre and dark fibre. The EU policy choice focused only on copper pairs as it did not want to discourage eventual investment in fibre by the incumbent.

Figure 6: Broadband DSL share of market by type of operator



Source: ECTA (2002)

7 Unlike a Directive, which has to be transposed into national law, a Regulation is immediately binding in its entirety and directly applicable in all Member States.

8 In 'high-speed bit stream' access the incumbent installs high speed access link to customer and allows access to new entrants. Incumbent maintains control of technical and service provision therefore not considered a substitute of full unbundling or shared access.

9 List of minimum unbundled elements: (1) Local loops, including loops used to provide high-capacity and advanced telecommunications services; + Sub-loops; (2) Network interface devices (NID); (3) Local circuit switching (except for larger customers in major urban markets); (4) Interoffice transmission facilities (dedicated and shared transport); (5) Signaling and call-related databases; (6) Operations support systems (OSS).

One year and a half after the enforcement of the EU Regulation, the local loop unbundling policy has disappointing results. In June 2002, there were 6 million DSL connections in the EU. Germany had the highest number of DSL lines in Europe with 2.6 million lines. Incumbent operators operated as much as 96.4% of the total DSL lines, while new entrants operated only 3.6% over unbundled local loops (ECTA 2002).[10] Nearly all of the incumbent DSL lines are provided directly by the incumbent or their ISP. The Regulation did not promote competition in local access, and instead incumbents extended their dominance into the broadband market.

All EU Member States have mandated full unbundling and all incumbents published an unbundled reference offer (RO). Incumbents used delaying tactics to prohibit the competitive operators in the local access area. According to some figures, only around 900,000 lines have been fully unbundled in the EU (0.03% of total number of lines) (ECTA 2002). Most of the lines were unbundled in Germany, were unbundling was required on a national level in 1998. As of June 2002, only 756 full local loops were unbundled in France, 600 in the United Kingdom, and 390 in Spain (ECTA 2002). Moreover, most Member States have a shared unbundled offer. However, there are only limited shared unbundled lines in Europe. Shared access is mainly operational in Denmark, Finland, Belgium and the Netherlands (EC 2001).

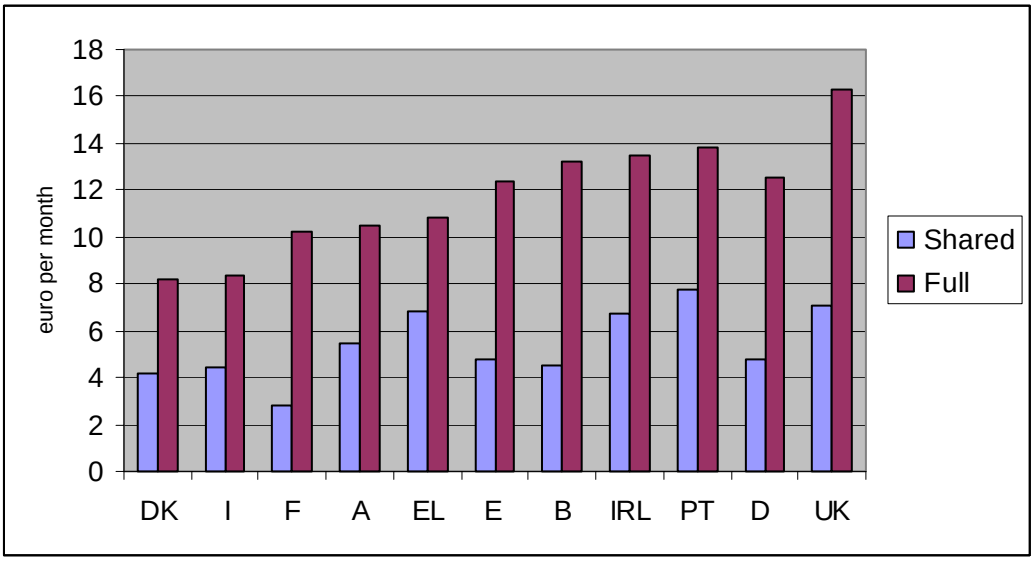
The collocation of new entrant's equipment at incumbent's main distribution frame (MDF) has been a complicated and a slow process. Collocation is operational at 81% of all main distribution frames (MDF) in Finland, 25% in Germany, 24% in Italy, 23% in the Netherlands, 20% in Belgium, and 2% in Sweden and the UK (ECTA 2002).

There were also some pricing obstacles related to local loop unbundling. The EU Regulation emphasizes that costing and pricing rules for local loops and related facilities should be transparent, non-discriminatory, and cost-oriented. Price determination of unbundled elements should allow the incumbent to cover its costs along with a reasonable return in order to ensure upgrade and development of infrastructure; pricing should not distort competition (in particular no margin squeeze between prices of wholesale and retail services of the notified operator). Notified operators are obliged to publish and update a reference offer (RO) for unbundled access and related facilities containing the terms and conditions for unbundled access to the local loop (one off fees, rental of collocation space, etc.). The reference offer has to be sufficiently unbundled in order not to force new entrants to pay for undesired elements.

Monthly rental prices for fully unbundled loops range from € 8,2 in Denmark to € 16,3 in the UK (EC 2002). Monthly rental prices for shared unbundled loops range from € 3 in France to € 7,8 in Portugal (EC 2002). One must note that the above prices may not be fully comparable, as they may not correspond precisely to the same service. These wide differences, however, indicate that prices may not be fully cost-oriented as requested in the Regulation.

[10] In the USA, incumbents served about 93% of ADSL subscribers compared to the competitive operators of 7% (FCC 2002).

Figure 7: Full and shared access prices in some EU Member States (June 2002)



Source: EC (2002).

Retail and wholesale pricing are based of two separate systems. Retail sector uses a price-cap basket system that allows the incumbent to regulate prices for all of its products, while wholesale prices of unbundled elements are drawn upon a 'best efficiency' cost basis. The wholesale prices of unbundled elements put them out of economic reach for most new entrants. The completion of tariff re-balancing is essential to ensure that the retail prices for line rental are consistent with the unbundling fees. Otherwise situations of price squeeze are likely to arise where the difference between the two does not allow to cover the incremental cost of providing that service and to generate acceptable profits.

The ULL Regulation created a situation, which required detailed involvement of regulators. National regulators had to micromanage each company but they were ill-equipped to deal with the incumbent's creativity to block access.

In December 2001, the European Commission launched infringement proceedings against Germany, Portugal and Greece for failure to implement the provisions of the unbundling Regulation on shared access to the local loop (line sharing). More recently, the Commission opened infringement proceedings against Ireland, Germany, France, the Netherlands and Portugal on the availability of sub-loop unbundling (failure to provide the reference offer (RO) in a complete and sufficiently detailed manner). This offer should allow new entrants to pay only for the required elements, and must give a breakdown of costs for the sub-loop so that an operator can install equipment closer to clients' premises rather than the local exchange. In most Member States, immediate steps have been taken to remedy these failings.

The implications of local loop are postponement of operators' entrance into broadband markets. This resulted into DSL monopolies, and reduced investment in infrastructure. This started the discussion for infrastructure separation. Ultimately, however, infrastructure competition is the best way to develop broadband services. In the EU very few Member States even have two competition providers using different infrastructures.

However, duopolies are not sufficient to provide competition. It is important to have more technologies and more infrastructure competition. The following shows some initiatives at the local/regional level and EU level to overcome the inertia in local loop competition.

4. Recent broadband development initiatives: local/regional initiatives and the e-Europe 2005 Action Plan

Many countries have been actively promoting broadband development and action plans for some time. In some countries national governments are leading the effort, while in others local and regional initiatives are more prominent. The intensity of the effort on a regional/local level depends on the geographical challenges (low population density, remote population) and the political structure (federal versus unitary systems) of each country. Moreover, the European Commission is addressing broadband deployment with its *eEurope* initiative.

Telecommunications has been traditionally one of the fields where national governments play a major role. With the first signs of liberalization, many local and regional authorities attempted to build their own telecommunications networks for a number of reasons. Some prosperous city and regional governments were interested in promoting high-speed networks in order to attract businesses (i.e., Cataluña, the Basque Country, Flanders). Also, local governments are often the largest users of telecommunications within a community and therefore had an economic interest in the availability and low cost of telecommunications services (i.e., Berlin). Other cities have built their own network for environmental reasons (i.e., Stockholm). Moreover, certain regions had a political interest in affirming their autonomy by creating their own network (i.e., Cataluña, the Basque Country, and Flanders). The issue is becoming increasingly important because of the impact city infrastructures may have on local loop competition.

The following is an example of the measures taken by the city of Stockholm in order to promote access to bandwidth.

Local and Regional Authorities: public financing for broadband infrastructure

Today Sweden is one of the leaders of broadband deployment in Europe. In 1994, Stockholm's city government established a municipal infrastructure utility (Stokab) [11] to lease dark fibre to operators and other customers (such as major banks and insurance companies) with significant communication costs. Stockholm allowed for only one competitive telecommunications network to be built.

There were several reasons for establishing one city network. First, it was considered less expensive for operators to lease Stokab fiber than to build their own network since major cost elements could be shared among several operators. Second, for environmental reasons, Stockholm bars new service providers from building their own infrastructure in order to prevent extensive excavation work in the streets of the city.

[11] The Municipality of Stockholm owns 91% and the Stockholm County Council owns 9% of Stokab.

Following Stockholm's success story, more municipal networks are being constructed throughout Sweden along the lines of Stokab network. Consequently there is more competition in the local market and lower prices in Sweden. The key benefits are the creation of a true broadband platform, with access to all, and future proofed (moving beyond copper local loop).

The eEurope Initiative: A broadband strategy

The first strategic document that set out the vision of a European broadband infrastructure was the 1994 Bangemann Report. In December 1999 the European Commission launched the *eEurope* Initiative[12] with the goal of bringing all of Europe on-line. At the special Lisbon Summit in March 2000, the Heads of State and Government committed themselves to a number of measures, including target dates, to bring the benefits of information society to every citizen, school and company – it identified ten priority areas. At the Feira Summit in June 2000, the *eEurope* Action Plan 2002[13] (EC 2002) was endorsed by the Heads of State and Government, which set concrete targets to bring Europe fully into the digital era. The initiative focused on ten priority areas, including faster and cheaper Internet (through local loop unbundling), e-education, e-transport, e-healthcare, e-government, access to users with special needs.

Table 2: eEurope timeline (1999-2002)

Date	Title	
8 December 1999	eEurope: An information Society for All	European Commission
8 March 2000	eEurope: An Information Society for All – Progress Report	Communication for the Special EC of Lisbon 23-24 March 2000
14 June 2000	eEurope 2002: An Information Society for all – Action Plan	Cl and EC for Feira European Council 19-20 June 2002
28 November 2000	The eEurope 2002 – Update	European Commission.
2 February 2002	eEurope Benchmarking Report	Commission Communication to Cl, EP, ECOSOC and CoR.
March 2001	Report to the Stockholm spring council: eEurope 2002: Impacts & Priorities	EC
February 21-22		Informal Telecoms Council Vitoria
March 2002	eEurope 2005	Barcelona Council – Council invited the EC to draw up a comprehensive Action Plan
June 2002	eEurope Action Plan – 2003-05	Seville Summit

Two years later, the European Commission presented for the first time a comprehensive broadband strategy to the EU leaders at the Barcelona Summit in March 2002. The EU leaders endorsed the eEurope 2005 Action Plan at the Seville Summit in June 2002. The eEurope 2005 succeeds eEurope 2002 Action plan and continues the progress towards the Lisbon objectives. The new e-Europe 2005 Action Plan supports the establishment of competition between different technological platforms, such as digital TV, fixed wireless access, satellite and third generation mobile in order to increase and maximize accessibility. The EC continues to stress the importance of stimulating broadband through the promotion of online public services, e-government, e-health and e-learning, (e-business), hereby hoping to work as a catalyst towards private sector behavior.

The report stresses that competition is the driving force for broadband in order to have a rich array of affordable and innovative services. For the first time, however, the

[12] See http://europa.eu.int/information_society/eeurope/action_plan/index_en.htm.

[13] See http://europa.eu.int/information_society/eeurope/action_plan/pdf/actionplan_en.pdf

European Commission encourages governments to use structural funds[14] (regional aid) or other "financial incentives" (in line with EU competition rules) to boost high speed Internet in less favoured regions where the establishment of broadband network would not be commercially viable.

Hence, the Commission seems to move towards a more multi-faceted view on how broadband deployment should occur. A solid broadband strategy involves effort from all levels: local, regional, national and EU levels from both public and private sectors.

4. Concluding remarks

Although broadband deployment is considered to be a key for a knowledge-based economy, this paper shows that the current broadband penetration rates in the EU are quite low. In the EU, only 2.2% lines per 100 inhabitants are broadband. There is a wide variation among EU Member States where countries like Belgium and Sweden are ahead of the pack. These are countries where alternative infrastructure (such as cable TV or Ethernet) already existed and provided competition to DSL technology. In spite of being important economic actors in each EU country, SMEs are also reluctant in picking up broadband. In a recent survey, only 7% of SMEs had broadband access while citing lack of security and slow access as main obstacles. Both residential and SME users in Europe have mainly DSL broadband access rather than cable, in sharp contrast with the US (where broadband cable is more dominant). The *GoDigital* Initiative is hoped to raise the SME awareness to the benefits of e-commerce.

This paper argues that up until recently there was no overarching broadband policy in Europe. The regulatory framework was more narrowly focused on local loop unbundling policy with the expectation that this would promote facilities-based competition and assist in broadband deployment. However, local loop unbundling did not give sufficient incentives to invest in broadband infrastructure for neither new entrants nor incumbents. Competition occurred where there was already a technological alternative, such as cable TV. This suggests that local loop unbundling *by itself* is not sufficient to make progress.

The EU local loop unbundling policy tried to overcome some incentive problems that occurred in the United States by deregulating only copper elements (rather than fibre as in the US case). In both the EU and US, local loop unbundling had rather disappointing results. In the EU only 900,000 lines were unbundled, and prices of full and shared access varied widely among EU Member States. Hence, the recent move by the European Commission in stressing the importance of public finance to boost infrastructure investment in economically backward regions.

Generally speaking markets, not regulators, should drive the deployment of broadband technology. Yet governments can take several complementary steps in order to stimulate broadband investment and demand and reduce regulatory barriers.

[14] Structural funds account for a third of the nearly 100 billion euros EU budget an aim at promoting economic development in poor and peripheral regions. The EU already supports IT projects in EU Member States. The main objectives of these projects are to promote awareness of the benefits of IT in the regions, to improve links to universities, to train teachers. Limited finances are allowed to go to telecom infrastructure in cases where commercial incentives to invest are absent in less favoured regions.

Government should create a technology-neutral regulatory environment conducive to competition and long-term investment. In addition, governments should help drive demand starting from broadband deployment of infrastructure and applications in public access points, such as schools, public administration (through tele-work programmes), and public hospitals. Governments could encourage partnerships with regional and local authorities to stimulate demand in areas where demand may not initially justify commercial broadband provision.

In conclusion, a policy mix of good regulatory policy (treating broadband providers alike) and government intervention to stimulate demand is necessary for the deployment of broadband.

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