Office of the Director of
Telecommunications
Regulation

The Internet in Ireland
- Communications Transmission and Delivery Issues -
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Consultation Paper

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Contents:

1 Introduction

The Internet comprises an enormous range of activities which impact on many aspects of life and work in Ireland and elsewhere. Many consider that its successful and widespread deployment is essential to economic and social welfare, not just for individuals and businesses but for Ireland as a whole.

The Internet, and access to it, is delivered using communications networks, whether copper (PSTN), fibre, cable television networks, or radio of various kinds including fixed wireless access (FWA), mobile, satellite or digital television broadcasting. The Internet is of ever increasing importance to the telecoms industry – eircom indicates that 40% of local call minutes on its network is accounted for by Internet traffic. Around the world it is widely predicted to become a dominant source of revenue for network operators.

The Internet in Ireland continues to grow at an extremely fast pace and is playing a critical role in many areas of economic development. The Director regulates the communication networks that underpin the Internet. Key responsibilities include, licensing operators, allocating radio spectrum, numbering[1], PSTN pricing (through the price cap), leased line regulation[2] and overseeing interconnection[3].

The Internet market may, from a communications network perspective, be usefully segmented into a number of markets. As well as Internet service providers (ISPs) and telecommunications companies themselves, the following groups need access to bandwidth:

(a) Major IP bandwidth consumers. Companies involved in the major developments in web-hosting, data centres and application service providers of recent years need considerable bi-directional capacity from their bases in Ireland to customers and international locations. They need resilient networks, choice in supplier, rapid, guaranteed capacity delivery, and very competitive pricing. Closely related to this in terms of communications network needs are large corporate customers (generally multinationals) who send and receive large volumes of data on their own internal Intranets or engage in e.business with customers or suppliers (e.g. Internet sales, purchasing and customer applications). These companies may need to support large branch networks nationally or internationally.

(b) The other business market. Small businesses right up to larger less technically focussed companies may also require leased capacity, although on a smaller scale to large bandwidth consumers. They often have more regionally dispersed requirement. They too need resilience, choice in supplier, certain and rapid delivery and competitive pricing. For this group, lower capacity FWA, XDSL provided by way of local loop unbundling (LLU) or from the incumbent, VSAT and to some degree dial-up access to the Internet may also be useful in meeting needs.

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[1] Telecommunications (Miscellaneous Provisions) Act, 1996
[2] European Communities (Leased Line) Regulations 1998, (S.I. No. 109 of 1998)
[3] European Communities (Interconnection in Telecommunications) Regulations, 1998 (S.I. No. 15 of 1998) as amended

(c) SOHO and residential market. The needs of these customers are at the lower end in terms of capacity as compared to other business users. These users are more likely to use dial-up access over a fixed line, narrow-band FWA or XDSL services, and for some, interactive television may be an appropriate option.

For category (c) and to a lesser extent category (b), asymmetrical capacity provision is generally sufficient. Typical customers in this group require far greater capacity for downloading files from the Internet than for sending material to or over it.

Given Irish demographics, categories (a) and (b) will be by far the most important in terms of the development of e-business here, and for Irish based international trade. It is critically important that the major Irish-based firms and their suppliers take advantage of the competitive advantages in terms of speed and price afforded by the internet. These markets are often referred to as B2B markets.

Firms serving the Irish market, regardless of size, are increasingly aware that they face global competition over the internet, even in the most local of markets. These B2C markets are very important in terms of regional employment and indeed Irish/regional/local identity, as well as in providing greater cost savings and efficiencies than conventional business for consumers as well as suppliers.

Irish businesses are aware of the benefits of internet in terms of providing access to new markets (82%[4]) and improving business performance (62%[4]), but take up is still considered to be slower than necessary given the speed of developments elsewhere.

At the end of May 2001 residential internet penetration in Ireland was estimated at 33%[5]. With an active Internet universe of over 550,000[6], of which the largest proportion are under 25, this confirms Irelands future growth potential[7]. Since June 1999 Irelands Internet penetration has grown from 10% of the population, representing an overall increase of those online of 230% in 2 years. Despite the rapid growth in Ireland's residential internet penetration rate it is not among the leaders as yet in Europe and beyond.

The ODTR is aware that the technical and commercial models that support the delivery of Internet services are still evolving. Capacity considerations are becoming increasingly important as the major businesses need enormous bandwidth and even small businesses need to upgrade as they expand their dependence on internet services. Quality expectations are increasing and some category (c) users may be looking for faster access especially when using video based applications.   For all customer groups, there is also the trend towards being able to access the Internet (or corporate Intranet) from mobile devices.

The Director therefore considers the time is appropriate for a wide-ranging consultation on Internet issues relevant to her office. The ODTR has issued papers and developed measures and programmes on individual regulatory measures such as leased lines pricing and delivery, FWA, LLU, VSAT, and interactive TV, all of which

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[4] IDS Media Group
[5] Source: Nielsen NetRatings
[6] Nielsen NetRatings: Current Internet Universe: All individuals 2+ who have access to the internet from home i.e. penetration. Active Internet Universe: All individuals 2+ who accessed the Internet from home i.e. usage.
[7] Source: ODTR Quarterly Review, March 2001

expand choice for operators and users for inter alia, internet use. This consultation document seeks to review developments more broadly.

This consultation will provide a key building block in the development of ODTR programmes in relation to internet. The ODTR may also commission additional work on the commercial issues underlying internet deployment and development.

The Director believes that her role is not to prescribe technical or commercial models for the delivery of Internet services but to facilitate the competitive provision of services by addressing actual or potential market failures. The Director recognises that there will be issues arising in connection with the delivery of Internet services that cannot be predicted at this stage of the market's development and other measures that may prove impossible to resolve under the current regulatory regime. Nevertheless, her objective is to make the regime as future-proof as is practicable, but notes the need to return to the subject as developments proceed.

The paper is structured in a number of main sections as follows,

Section 2: Background and legal framework

Section 3: Details the Internet market today

Section 4: Outlines the future developments for the Internet in Ireland

Section 5: Delivery of Goods purchased over the internet

Section 6: Describes the Consultation procedure and timetable for responses

2 Background & Legal Framework

2.1 Role of the ODTR

The ODTR's role in relation to Internet is in regulating transmission for the provision of, or access to, Internet services by means of communications networks. The Director has rights and obligations to intervene both of her own initiative, or following, for example, a formal dispute raised by an operator against another.

The ODTR has no role in many important aspects of Internet service provision, for example, in relation to content provision or the registration of domain names. Nevertheless, the ODTR can facilitate the development of the Internet market by, for example, licensing competing operators, developing frameworks for different technologies suited to internet delivery (such as FWA, LLU), pricing of interconnect services and leased lines, and the delivery of facilities against agreed service levels.

The ODTR recognises that the Internet is entering a new more mature stage of its development and wishes to understand how interested parties consider the market will or should develop. It is intended to issue a report on the consultation synthesising views and indicating conclusions on the issues raised as appropriate. In some instances, formal decisions may be made.

2.2 Activities to date

The ODTR has considered the Internet in both general documents on developments and framework issues for the Internet. The dial-up market for Internet access poses particular challenges and the ODTR has developed a series of interventions to support options for operators. For example, over the last three months the ODTR has issued several papers relating to Internet access in Ireland.

- ODTR 01/12 – ("*Allocation of additional access codes and number ranges for dial up Internet access) –* Response to consultation and further consultation on the calculation of settlement rates for NTCs.
- ODTR 01/26 ("Allocation of Additional access codes and number ranges for dial up Internet Access) – Response to Consultation. And most recently,
- ODTR 01/42 ("The treatment of discounts in the calculation of Settlement rates for Number Translation Codes) – Consultation.

ODTR 01/12 opened two new access codes and number ranges for dial up Internet access, 1892 (Pay-As-You-Go) and 1893 (Partial or Full Flat Rate Internet Access). While the introduction of product offerings on these codes are a matter for Service Providers who must establish suitable interconnection arrangements with eircom. The ODTR is monitoring these developments closely, and will provide dispute resolution at the request of either party.

ODTR 01/26 – Following the consultation, it was decided that Two Part Charging would address the mix of different call types and call durations over the same Number Translation code.

ODTR 01/42 – A consultation is in progress on the treatment of discounts in the calculation of Settlement rates for Number Translation Codes.

In addition, the ODTR also has issued a number of documents on other categories of issues which have an impact on Internet availability.

- 00/66 Fixed satellite earth station licences in the fixed satellite services in spectrum above 3GHz – VSAT - Application form.

- 01/43 New opportunities in the Radiocommunications market: Fixed Wireless Access (FWA) –Consultation paper.

- 00/88 Service Levels Provided to Other Licensed Operators by Licensees with Significant Market Power - (Leased lines)

This consultation draws on this background and seeks to achieve a holistic view of current and potential problems as they are perceived today.

2.3 Legislative Background

The Director has a range of powers and obligations that have an impact on Internet services based on legislation relating to the regulation of specific aspects of telecommunications services and not from regulation specific to the Internet. Notable items of legislation include (but are not limited to):

- Telecommunications (Miscellaneous Provisions) Act, 1996
- European Communities (Leased Line) Regulations 1998. (S.I. No. 109 of 1998)
- European Communities (Interconnection in Telecommunications) Regulations, 1998 (S.I. No. 15 of 1998) as amended

The Director further notes that the EU is currently reviewing the whole framework under which telecommunications is regulated. The outcome of this review has yet to be finalised but it is highly likely that changes will occur to the current regime. In particular, the new framework will update the scope of many of the Directives, explicitly providing for modern networks such as IP type networks.

One of the reasons that the ODTR is undertaking this broad consultation now is so that it can be prepared when the framework does change.

3 The Internet Today

In this section, respondents are asked for their views on the state of the Internet in Ireland today. It shows the framework under which services are currently provided and asks for broadly based comments in relation to access and service provision. Section 4 will in turn look at future developments.

3.1 The Internet in Ireland

There is considerable variation in internet use among businesses in Ireland, from the major international corporates who make full use of the internet for internal and external business processes to small and even large businesses who have little or no involvement. A recent survey carried out by IDS Media Group[8], covering almost 50,000 private enterprises in Northern Ireland and almost 150,000 business in the Republic of Ireland conveyed a picture of low but rising levels of Internet connectivity among Irish businesses. However, a majority of businesses surveyed in both regions confirmed their intention to get connected. A significant majority of firms surveyed state that the Internet will increase access to new markets (82%), improve business performance (62%) and create new ways of marketing products (85%). Across a wide range of issues such as the cost of the Internet, its usefulness, its ability to access new markets, the improvement of the information floor, its effectiveness as a business marketing tool, security, legal issues, skills and competencies and training, the IDS survey recorded low levels of awareness among firms that are not connected to the Internet.

The ODTR has surveyed business use (both SME and Corporate) of broadband, which becomes of increasing importance once businesses start doing any significant business on-line. Among the larger corporates, 62% indicated that they use leased capacity and 14% ISDN. According to the results in the recent SME survey carried out by IMS for the ODTR, over six in ten (62%) of the companies surveyed do not have any ISDN telephone line and around nine in ten (88%) companies indicate they do not have leased lines.

It is clear from the larger corporates survey that there is substantial unmet demand for broadband, which tends to confirm business interest in developing internet/data uses. The ODTR's frameworks for alternative infrastructure and LLU are intended to help alleviate this, and a long standing programme to require better delivery of leased lines by eircom through its Service Level Agreement programme has been put in place. The Measuring Licensed Operator Performance programme will result in the publication of the first set of comparative statistics for service provisioning/fault repair etc. very shortly. The intention behind this programme is to give users information on how well operators meet their promises to customers, thereby enabling users to make more informed choices of service provider.

A review of the current state of deployment of the Internet at residential level in Ireland is given in Appendix [1]. Ireland started later than the other countries

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[8] Source: Commissioned by Bank of Ireland

examined and although there has been an annual doubling in Internet penetration in the last two years, Ireland still lags other developed countries.
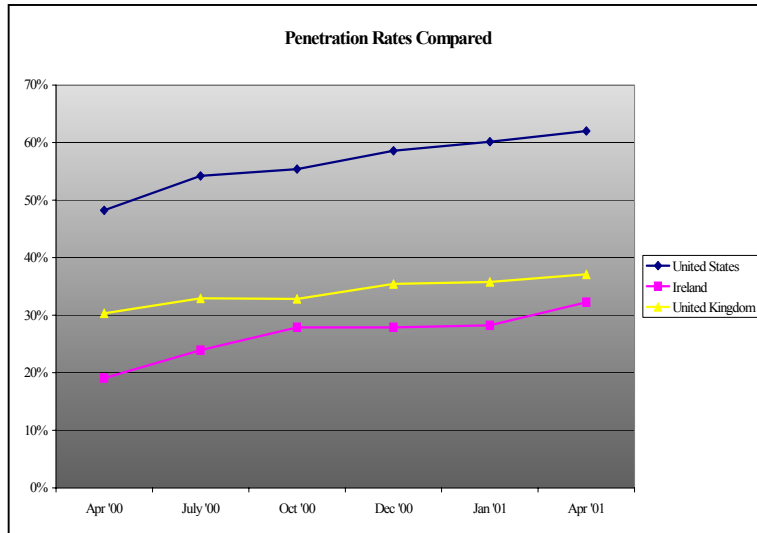
Figure 1.1 Penetration Rates Compared

Figure 1.1 illustrates the growth in Ireland's Internet penetration in the past year. However Ireland still lies behind the UK and the United States in terms of Internet Penetration.

Source: Nielsen NetRatings

There has been significant progress in the past few years creating the legislative and competitive environment to encourage Internet adoption. The government has enacted the e-commerce act and the copyright act. Plans for e-government are well advanced with the allocation of IEP£100million over three years to support projects in the public sector. There are a number of agencies such as Forfas and Enterprise Ireland monitoring and supporting the development of e commerce and actively benchmarking and monitoring Irelands relative progress in the Internet environment.

The availability of international telecommunications connectivity which is required to make Ireland attractive to large scale e-business ventures has also been addressed by government with the part financing of international telecommunications links. Progress has been made in developing the national telecommunications infrastructure under the aegis of the National Development Plan.

A commonly used indicator of the growth of the Internet is the number of Internet hosts[9]. Looking at hosts per 1000 population gives a better indication of the relative development of Internet infrastructure in various countries (see figure 1.2 below). The OECD average in October 2000 was 81.5 hosts per 1000 inhabitants, compared to an average of 37.4 in the European union. Ireland lies behind both the OECD and the EU with an average of 31.1 hosts.

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[9] A host is a domain name that has an IP address record associated with it.

Figure: 1.2 Internet Hosts in OECD Countries

Internet Hosts in OECD countries per 1000 inhabitants, October 2000
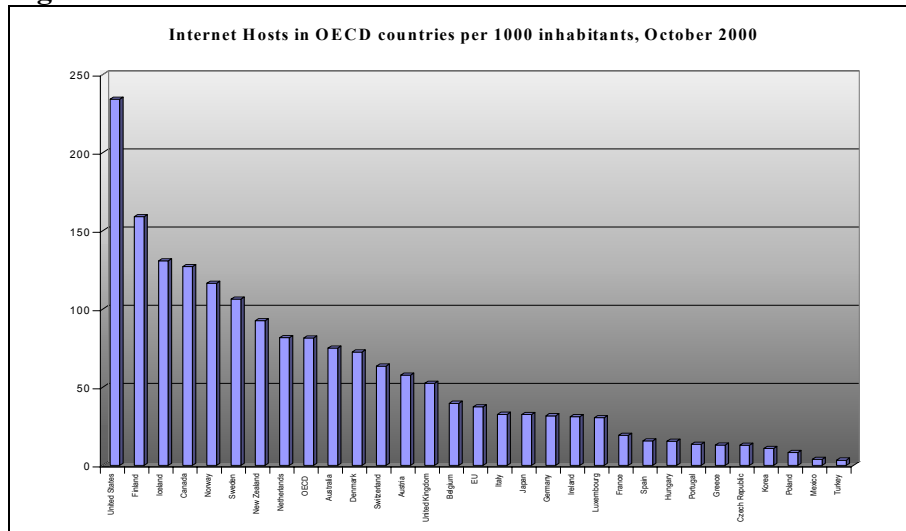
Source: Communications Outlook 2001

According to the OECD the average amount of online time per subscriber is an important means of examining the accessibility of the Internet to residential users and a good indicator of the growth of e-commerce in a country[10]. The average online time reported by leading ISPs generally falls into two categories, metered and unmetered access. On average usage generally falls into a band of between 5 and 9 hours a month in countries with metered access compared to an average AOL (United States) user who spent 32 hours per month online, and Telecom New Zealand users who spent on average 20 hours per month online, where unmetered access is available. Unmetered access has stimulated growth in the amount of time that people spend online.

The number of Irish adults purchasing goods and services online has trebled over the last year. Research recently conducted by Amárach Consulting has found that almost 150,000 Irish adults had purchased something online in the last three months, up from 50,000 a year ago. The launches by major financial institutions and An Post of secure on-line payment services may be helpful in stimulating further growth in this sector. According to figures just released by AC Nielson, the growth in net usage since May 2000 has been driven by Finance (400%), News and Information (186%) and Travel (140%).

In a consumer survey carried out by IMS on behalf of the ODTR earlier this year, a number of questions were asked specifically to identify the demographic and attitude shifts of those that were both online and offline. Examining the survey results reveals a high correlation between age, income and work status of those who are connected to the Internet at home.

In the survey 37% said they had access to the Internet at home. We see low adoption in the 55+ age brackets but healthy representation elsewhere. 47% of those surveyed in the 15-24yr-age bracket have Internet access at home, while only 18% of those over 55 had access.

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[10] Source: Communications Outlook 2001

Not surprisingly, only 6% of those earning less than ten thousand a year have Internet access, in contrast to 76% of those with a household income greater than fifty thousand having Internet access at home. There is a very active Internet representation from full time students, those in employment and at school, however there is a very low representation of those who are retired. 59% of students have Internet access at home, with 45% of the self-employed and those at school having access at home.

Of those who were not yet online the main obstacles in getting connected to the net were not interested (38%), not having a PC at home (23%) and too expensive[11] (15%).

The picture emerging from the IMS survey is not unexpected. The early adopters of the Internet are the young; those with third level education and those with disposable income. Of those who are off net there is a high percentage who see little relevance in being online.

Overall, Ireland has made progress, but there is still room for improvement

In view of Ireland's experience to date and that of the other countries (see appendix 1) studied it can be concluded that there are a number of elements to be considered when devising strategies to increase online penetration. A number of elements have recurred when benchmarking other countries' progress that seemed particularly important in providing for internet growth, in particular the multi-year programmes rolling out adequate high-speed telecommunications infrastructure. However, equally important are the unique cultural factors that play a part in determining what motivates people to connect to the Internet.

Question 3.1-A: *Do you agree with the conclusions drawn on the state of Internet deployment in Ireland? Are there other conclusions that you would draw? If so please give reasons*

3.2   Communications services comprising the Internet

The term 'Internet' is used as shorthand for a network of networks, supporting a wide range of services – not all of which relate to telecommunications. It is a complex market that comprises several parts. The areas of greatest significance include:

- The provision of content and applications.
- The services provided by Internet Service Providers (ISPs) that allow this content to be retrieved.
- The services and applications provided by the internet community (i.e. email, ftp, web, chat, news, search, etc.)
- Web-hosting and Application Service Provision
- Provision of communications facilities and services that link Internet nodes and ISPs together (peering arrangements).
- Provision of communications services that allow corporate customers to build their own IP networks (Intranets).
- The provision of communications services that allow end-users to establish a communication path to the ISP. This is known as 'access'.

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[11] Includes set-up and running costs

- The supply of end-user devices (for example PCs) and local software.

3.3 Access to the Internet

Access can be provided in several ways. A large business may, for example, have a permanent leased line connection to the Internet. This may be of varying capacity and use Internet Protocol (IP). These leased circuits are most likely to be physically conveyed on fibre or point-to-point radio access (FWA). Copper may also be used as the medium for lower speed circuits.

Virtual circuit mechanisms are also emerging. In these cases, the end-user can operate as if it has a permanent connection to the Internet, however physical facilities are not dedicated permanently and exclusively to that customer. The virtual circuit can be thought of as always being open in either direction. Cable modems are examples of a virtual circuit access mechanism. End-user throughput varies by system design feature and the number of users 'sharing' capacity. The virtual circuit may be physically conveyed over a variety of media: radio, cable TV, copper or hybrids of different technologies.

For residential users and many smaller businesses dial-up access is the predominant method used. Here the end-user uses a modem and establishes a normal telephone connection or makes an ISDN call to an ISP identified by a telephone number. The phone call may be made over a land-line or from a mobile device such as a WAP phone. Each time the customer wishes to establish contact with the ISP a new telephone call is initiated. The customer is responsible for establishing the connection and if a channel is not open the ISP (or any other Internet user) cannot contact the customer. Once established, the channel remains open until one party (the user or the ISP) 'hang-up' the connection.

3.4 Commercial Models for Internet Access

The most complex models relate to dial up services, but it may be useful to touch on some other services also.

Leased Lines

The leased line market is capacity based and telecoms operators have the option of building or buying capacity from the incumbent. The potential problem areas in any country are pricing and delivery. The ODTR has introduced a programme of Service Level Agreements (SLA) in respect of leased line and ISDN provision to OLOs. The intention of this programme was to encourage an adequate level of service delivery to OLOs which would be a catalyst for high standard delivery generally. To date, despite the inclusion of uncapped penalties and specific delivery process points, delivery levels have not improved to satisfactory levels, which is impacting on the development of broadband services in Ireland. Eircom's performance under the SLA regime is being examined and a review of the programme is scheduled for September. The ODTR will also be reviewing leased line pricing in August. There are very many categories of leased line between the minimum 64Kbit to 2Mbit and a question arises as to whether these are all necessary and if it is efficient for eircom to provide all them.

The ODTR wishes to review whether Ireland should adopt the approach recently taken in the UK, to treat leased lines as an interconnect product.

Question 3.4 –A: *How do you see the leased line market developing in Ireland? Do you consider that it would be appropriate to have a rationalisation of regulated leased line products below 2Mbit?*

Question 3.4-B: *What are the implications of treating leased lines as an interconnect product?*

Local Loop Unbundling

LLU was introduced on the 1st January last and pricing fixed on interim basis on 30 April. From a situation last year where there were up to 10 operators interested in implementing LLU, currently there is only one application lodged and some limited interest expressed by one or two others. The Irish interim pricing is well within the EU range. It is notable that LLU tends to develop relatively slowly, and within the EU, only Germany which started in 1998 has unbundled more than 100,000 loops. However, there are also indications that capital rationing may be affecting interest in Ireland, and/or the business cases for LLU are considered less satisfactory by operators, for reasons of cost and scale not specifically connected with the elements subject to price regulation, which may in some large international business models represent only one seventh of total costs. While LLU may technically be used for voice as well as internet, the business case for operator and user relies on the broadband uses.

Question 3.4-C: *Are you as an operator actively considering implementing LLU? If not, please indicate the key considerations for you*

Question 3.4-D*: Do you agree with this analysis? If not, please give your reasons.*
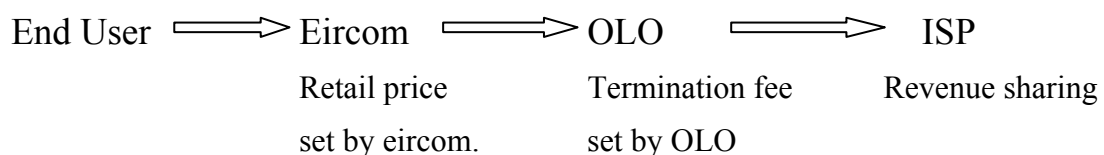
Dial Up Access

Dial-up access can be achieved in various ways. If the end-user is a customer of both eircom and, say, uses eircom.net as its ISP the call passes across the eircom network without other parties becoming involved.

However, those ISPs that are independent of eircom may choose to rent circuits from an OLO rather than eircom, yet most of that ISP's customers will still obtain their basic telephone services from eircom. These customers will be billed by eircom for any calls they make including those made to access the ISP.

When the customer dials the number given to him or her by the ISP, the call will pass through the eircom network, to the OLO network and finally to the ISP as shown below. This situation results in a model that will be common to many users and is referred to as the call termination model.

Call Termination Model

End User ⟹ Eircom ⟹ OLO ⟹ ISP

                     Retail price   Termination fee   Revenue sharing

   set by eircom.   set by OLO

The call will be handed over from eircom to the OLO at the appropriate point of interconnect. Eircom bills the customer and sets the retail tariff (at a rate determined by the number dialled). Out of this revenue, eircom will pay the operator the negotiated termination charge keeping what remains.

The ISP dial-up number may have been allocated to the OLO or ISP (provided that it has a telecommunications licence in its own right) in this example. The numbers used could be Number Translation Codes (NTC) and NTC like codes (for example the 1891 code), geographic numbers used appropriately or one of the new 1892/1893 access codes specifically intended for Internet calls.

The revenue flow between the OLO and the ISP will depend on the commercial relationship between the two. It is common in Ireland for the ISP and OLO to be part of the same commercial entity in which case the termination fee may be 'shared' between the two divisions. However, the ISP may, as is more common in certain other countries, be completely independent of the OLO.

Another increasingly common model in Ireland is the call origination model which is based on 'indirect access' for voice telephony. Here the customer has a physical connection to eircom and pays eircom rental for that circuit. However the customer also has a separate relationship with an OLO. As a result of 'pre-selection' or through inserting a special code on a call-by-call basis, the call passes through eircom's local exchange and is sent to the OLO. The OLO, *not eircom*, bills the customer for this call and pays eircom a call origination fee as set out in eircom's reference interconnection offer. The flow of funds is shown below.

Call Origination Model

Eircom ⟷ OLO ⟶ ISP

End User
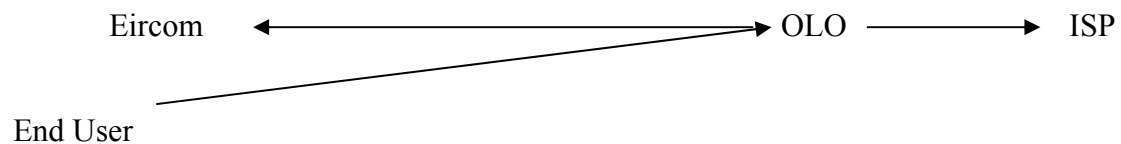
The Call Origination model is usually characterised by the following points.

- The OLO is responsible for the call

- Eircom merely passes the call to the OLO and is paid for this service (Origination Charge)

- The OLO bills the customer

- The OLO sets the retail price.

In this case the dial up access number may consist of a carrier selection code followed by a national geographic number or a non-geographic number.

As for the call origination model the relationship between the OLO and the ISP will define how funds are allocated.

These are currently the most common access methods. Others become possible when OLOs deploy and sell their own local loop infrastructure or make use of local loop unbundling. There are already ways of accessing the Internet that go beyond basic PSTN or Leased Line access. For example, the use of WAP phones for mobile

access. These access mechanisms and the issues they raise are discussed in section 4.6.

Question 3.4-E: Do you agree with the description of the models outlined above ? Are there any other models which you think are relevant ?

3.5   ISP Payment for Internet Services

Section 3.4 considered different elements of the Internet market. Large customers having leased line access to the Internet can contract for Internet service directly with an ISP. The dial-up market is more complex.

In the earliest stages of Internet deployment, dial-up customers (irrespective of whether they use the call origination or termination model) would often have a separate commercial relationship with their ISP. They would pay eircom (or their indirect access provider) for any calls made and would separately pay a subscription fee to the ISP. ISPs however began to get revenues from other sources and saw the high cost of access as a barrier to increasing subscriber take-up. They also looked to simplify bill structure and provide users with greater certainty on fees.

'Pay-as-you-go' schemes developed to address these concerns. In these schemes all charges were collected through the telephone bill and there was no separate subscription fee payable directly to the ISP. Such schemes work if ISPs have sufficient revenue from other sources and/or have agreed revenue sharing opportunities with their Network Operator. The ISP's ability to justify revenue sharing depends on the closeness of the relationship between Network Operator and ISP and the number of additional calls that the ISP may stimulate. In pay-as-you-go schemes, control of the rate charged to the end-user is important. This increases the attractiveness of call origination models.

Operators are extending this concept. Rather than paying a usage dependent fee, the end user will pay a flat rate fee which would provide unmetered access for at least part of the day.

Many operators in Europe offering 'flat-rate' services are finding it difficult to make money and some schemes have been withdrawn. This may be due to one or both of the following: 1) lower than expected portal revenues (see below) and 2) an interconnection regime under which calls are paid for per minute. We return to the issue of flat rate interconnection charging in section 4.

Finally, it is worth briefly mentioning another system that is not used widely in Ireland but is used in some other countries. Here the ISP provides its customers with free-phone numbers. It then charges customers a flat-rate or metered fee directly. There is therefore no direct payment from the customer to its telecommunications operator for accessing Internet services. Instead the ISP pays delivery charges to the Network Operator for the calls its receives on the free-phone numbers.

Question 3.5-A: Do you agree with the description above? If not, please give your reasons.??

3.6   Other sources of revenue for ISPs

As has already been mentioned, ISPs have other revenue opportunities. Most importantly are 'portal' revenues. These are essentially amounts collected from content owners. For example advertising revenues, hosting revenues or commission

on sales made through its portal (e.business revenues). It is widely predicted that revenues associated with providing access will decline in importance and portal revenues will increase. However the growth in portal revenues has often fallen short of many initial estimations and a number of business plans are being revised to reflect this.

3.7 General issues arising from the current state of deployment

Choice is an important feature of the Internet, both for customers so that they can match their needs in terms of price and quality and for providers to enable them to offer a wide range of access options so that they can better differentiate themselves from competitors. The Director is interested to review which options are likely to be most important from the point of view of consumers and providers.

- Access device: customer access services through the full range of access devices such as PC and modem, ISDN enabled PC, WAP phone, GPRS phone, PC connected via a LAN to an internet server, web-TV, etc?
- Charges: customer choice between flat rate, metered (minutes, packets, pages, etc) or hybrid charging packages for access?
- Certain payment -pre-payment/fixed usage charge: customer choice of innovative options to enable certainty such as a pre-payment option – like those available for mobile telephone service?
- Kiosk access: Is there sufficient access to the Internet in public libraries or locations outside the home that are paid for strictly on a usage basis?
- Collection of charges: customers payment of charges for access directly to the ISP (without incurring telephone charges), have charges collected through their telephone bill or using a combination?
- ISP choice
- Customer base: ISP choice of provision of services to business and residential users?
- Coverage: Can it provide (at an appropriate cost) services to all regions?
- Usage profile: potential for ISP to offer services that are appropriate to users who wish to be 'always on', who are heavy users, or who are occasional users?

Future sections of this report address some of the specific questions that arise in relation to the provision of Internet services. Notwithstanding these specific concerns, the Director would like to receive general comments and observations.

Question 3.7-A: Do users have sufficient choice of capacity and pricing mechanisms?

Question 3.7-B: Reflecting on the questions raised above, what do you consider to be the key deficiencies from a user perspective in the models currently available to support Internet service delivery?

Question 3.7-C: Which options do you consider are likely to be most important from the point of view of consumers and providers.

In answering these questions please consider whether there are significant differences between the various markets (residential, SOHO, SME, corporate) addressed.

3.8   Points of Interconnection

The advantages of using IP routing also has an important implications in relation to the definition of where in the network operators wish to interconnect. Although the issue is a general one – similar arguments apply to the interconnection of voice calls – the Internet does add particular considerations. The Director is therefore addressing this issue in this consultation.

Currently, eircom supports interconnection only between switches. Current technology requires the concentration of switching resources to encourage efficiency. Furthermore, denying interconnection at other points means that organisations that roll out IP infrastructure cannot benefit from their investment. The Director notes that there has been previous debate on this subject, but considers that it is timely to review it again. She would also like to receive comments on what would constitute sufficient equipment to allow interconnection.

In asking this question, the Director also notes the trend of extending IP-based networks towards the end-user and of the benefits of permitting Virtual PoPs. She also notes that this issue needs to be considered in relation to numbering conventions.

Question 3.8-A: Should interconnection at POPs be enabled or required? What issues would this give rise to? What would be the impact be on internet quality and pricing?

Question 3.8-B: What is the market impact for your company of current arrangements (interconnection at switches) and can the financial impact be quantified?

Question 3.8-C: What are the arguments against changing arrangements?

3.9   Routing and billing of calls for dial-up interconnection

Like the definition of points of interconnection, the provision of dial-up Internet access raises particular issues with regards to the routing and billing of calls. These specific issues must also be considered in the context of voice telephony generally.

Noting that in general, the precise arrangements for interconnection are a matter for commercial negotiation, the Director nevertheless believes that when required to intervene it is important that routing should be set up in an manner that allows efficient use of both the originating and terminating networks taking account, where necessary, of how an efficient operator may have been expected to design its network. In particular, inefficiencies resulting from historic decisions on network design should not in general disadvantage interconnect seekers. It is also important that the interconnection seeker can specify within reason where the call should be handed over. If one party does not implement efficient routing rules, the other party should, at a minimum, not be financially disadvantaged.

The key issue for the Internet is the requirement for number translation codes (NTCs) to be applied. NTC are implemented through an Intelligent Network architecture overlaid on the basic PSTN. eircom cannot in general access the intelligent network (IN) overlay at the primary (local) level within its switching hierarchy however, the ODTR understands that eircom are currently looking to provide IN functionality at the tandem and primary level where possible, for the Internet Portfolio. The Director welcomes this development as the benefits of IN suggests to the Director each

primary switch would then have IN functionality and flexible routing for Internet non-geographic numbering ranges. Nevertheless the Director recognises that there are practical and cost implications of full IN deployment. However, in principle she considers, based on international best practice, that IN is already a sufficiently established technology as to be part of an efficient routing regime. The Director would welcome views on this.

Billing systems, like routing systems, were generally developed for an era where requirements were simpler. This means that billing systems cannot always do what is required of them. The Director will accept genuine practical limitation in the short term but believes that billing constraints should never be an impediment to future change. She also believes that if the cost of implementing a genuine market requirement is excessive compared to the benefits to industry and users as a whole then 'work-arounds' should be defined and implemented to an agreed timetable. She believes that it is imperative that the industry work together to resolve problems portrayed to be intractable. If operators fail to exert reasonable efforts to resolve problems, the Director will take this into account when resolving disputes.

The Director would like to be alerted to areas where billing constraints may be an issue and what might be appropriate to resolve the problems caused by these constraints.

Question 3.9-A: What factors are appropriate for the Director to take into account when applying the efficient operator principle to Internet interconnection charges where efficient routing cannot be implemented for practical reasons?

Question 3.9-B: What technical routing issues still prevent (or may prevent in the future) efficient routing from being realised? What is necessary to overcome these deficiencies?

Question 3.9-C: What billing constraints still exist or might exist in the future? And what is a reasonable timeframe for resolving these constraints?

Question 3.9-D: What factors are appropriate for the Director to take into account when applying the efficient operator principle to Internet interconnection charges where billing constraints prevent the appropriate recording?

4   Future Development of Internet

This section looks to the future. It considers how the Internet may develop generally but also raises some specific concerns on which the Director would welcome views. These are the provision of flat rate access services, the deployment of IP technology, and the development of new access mechanisms.

4.1   Internet developments

The Internet is continuing to develop. Markets are maturing, services are becoming more diverse and technical developments are enabling new access methods. The Director would welcome views on what will be the most significant trends and also what new problems may arise.

As previously mentioned, the Internet access market has particular concern to the Director. However, she notes that there are links between sectors. For example: without content, demand for communications services will not exist; a proportion of internet portal revenues may, in certain circumstances, appropriately subsidise access costs; different levels of vertical integration may lead to competitive distortions in one of the areas. Therefore the Director would welcome general comments on how the market may develop so that she is aware of the context in which the market will need to be regulated. In doing so, respondents are asked to take account of the current and future shape of the EU regulatory framework.

Question 4.1-A: *How would you see the Internet market generally developing over the next 3 years? Please consider the following markets separately:*

- the residential market for access and services

- the SOHO market for access and services

- the SME market for access and services

- the large corporate market for access and services

In relation to this question, the Director would particular welcome views that consider supply side issues separately from demand issues. On the demand side please consider the different sub-markets. On the supply side, it would be helpful to consider issues under the following headings:

- Service definition and delivery
- Industry structure and dynamics, for example
    - Changes to the economic structure of the value chain (eg increasing importance of portal revenues)
    - Extent of competition and any potential areas that might remain or become bottlenecks in the future (e.g. how will the independent ISP sector develop?)
    - Barriers to entry
    - Vertical integration or greater specialisation
    - Horizontal concentration
- Infrastructure and Technology
- Content and Applications

Question 4.1-B*: what will be the most significant revenue streams for ISPs? Please quantify where possible or provide market research evidence?*

4.2 Barriers to Development

Demand for Internet services is affected by availability of choice in content and delivery at the right price. Price levels can be set lower when demand is high, but the problem is to reach sufficient demand to reduce price levels. Introducing a virtuous circle whereby residential and business users wish to increase their use of the Internet and the suppliers of services can benefit from economies of scale and lower prices further.

The Director would welcome views on what environment will best create this virtuous circle. Because of the way in which different elements of the Internet market are linked, comments will be welcomed on all aspects. It may be appropriate that comments are provided in response to further questions set out in this section.

Question 4.2-A*: What do you think are the most significant barriers (other than those specifically mentioned in the rest of this paragraph) that might prevent the Internet market from achieving its full potential over the next three years?*

Question 4.2-B*: What would be the impact of removing these barriers? If you have undertaken market research, we would be glad to know of your findings.*

4.3 PSTN Congestion

Capacity problems can arise on the public switched telephone network (PSTN) as a result of the surge in traffic that accompanies Internet access. Dial up Internet access not only stimulates more calls but those calls that are made tend to last longer. This is causing pressure on the PSTN. It is expected that broadband access will alleviate, to some degree, the pressures at the local switching level if and when it is substituted for Dial up Internet access. For example, the use of a data network such as Frame Relay, ATM or leased lines can be used to take the traffic off the PSTN at the earliest point of interconnect.

Question 4.3-A*: Do you see PSTN congestion as a significant problem? What solutions are needed in the short to medium term?*

4.4 Flat-rate Interconnection - dial up market

A Flat Rate interconnection product is a move away from the pence per minute interconnection charge structure to the capacity based charging model. ISPs may find it advantageous to offer customers a fixed rate Internet access product. However, developments in both Ireland and overseas demonstrates that, given lower portal revenues than had been forecast, some operators are finding it hard to make a profit from such schemes. Matching telephony costs and revenues is particularly important as margins decline. In the UK, flat rate schemes have been introduced for OLOs, and other EU countries are working on this also.

Flat Rate interconnection has the advantage of allowing the operators to know their costs before introducing a full subscription based product. Interconnect payments to the incumbent are no longer unbounded. The introduction of the new Internet access code 1893 also allows for partial flat rate access. Here the consumer would not pay for their Telecommunications time online up to pre-set limit, but an agreed subscription for their Internet service.

While the introduction of product offerings on these codes is a matter for the operators and eircom, eircom are obliged to negotiate with the operators for the introduction of the new product offerings. Should eircom introduce a retail offering they must also provide a wholesale offering to the operators, as the principle of non discrimination also applies to eircom. The ODTR is monitoring these developments closely, and will provide dispute resolution at the request of any party in the event of slow progress or the breakdown of negotiations.

Internationally, three main types of Flat Rate Interconnection products have been defined, namely,

- **Digital Local Exchange** interconnection: The point of interconnection is at the local exchange.
- **Hybrid** Flat Rate: Here the interconnection is also in the local exchange, but the operator may purchase onward capacity up to the Tandem level which would be charged at a pence per minute rate. And finally,
- **Single Tandem.** Flat Rate Interconnection: Here the traffic is interconnected at the tandem level.

The ODTR is aware that certain operators are seeking to negotiate such a product with eircom and is already aware of certain issues specific to the parties involved. The ODTR would nevertheless be interested, even while this process continues, to understand fully the issues of concern to the industry as a whole.

Our consumer survey referred to in Section 3.1 above indicates that some 15% named internet related/telephony costs as substantial issues for those not considering getting access. Pre-paid access has been very important in getting over similar issues for mobile usage. It is useful to consider if such types of innovative strategies may be useful in overcoming this kind of concern.

Question 4.4-A: Are there other ways of providing for flat-rate consumer products? Are there other innovative methods of containing/controlling/providing certainty to consumers and if so, what interconnect basis would be required for them?

Questions 4.4-B What considerations would moving to a capacity based interconnect product for dial up internet give rise to?

4.5   IP-based networks

Traditional voice telecommunications services are based on circuit-switching technology. The routing of calls within the Internet on corporate Intranets uses a different approach that divides information into packets. These packets then have addressing information appended to them. It is analogous to dividing a complete

letter into pages and sending each page in separate envelopes. The packets are 'reassembled' at the terminating location. The rules that control this process are known as the Internet Protocol or IP. Routing messages (especially, but not exclusively, data calls) using IP has many advantages over circuit-switching technology. Indeed, some newly formed operators already run IP-only networks and other more established organisations are considering a complete transition to IP-based networks even for voice calls.

Private Intranets and the Internet itself run IP over capacity provided by infrastructure based telecommunications operators. Currently capacity for private networks is provided as a leased line with a specific capacity. It may also be possible for private network operators or ISPs to buy a managed IP product directly.

The use of the IP within core network is an increasing trend. However it is also necessary to consider the extent (range) of IP within the access networks – ie how close to the customer it will be deployed. Already business users with private circuit access from their servers to the Internet use IP exclusively – their access nodes have dedicated IP addresses. Users of digital subscriber line technology and cable modems will also use IP on an end-to-end basis typically via a 'virtual circuit'. Other end-users (especially residential users) are still reliant on dial-up mechanisms. Here a circuit-switched communications channel is established to an IP node – often at the ISP's server. However, the ISP can deploy modems and routers at Points of Presence (PoPs) in other locations. Transport between the PoP and the server then occurs on an IP network. This, for example, is the basis of eircom's [eircom. net] service using 1891.

In many countries, a Network Operator (particularly one with IN capabilities) will offer IP delivery as a service to ISPs and will allow the ISP to use its (the Network Operator's) geographic numbers and equipment as a virtual PoP. In these countries this has stimulated a vibrant independent ISP sector and has allowed Network Operators to achieve economies of scale.

The trend appears to be to use IP more extensively within the network bringing, in effect, the IP node closer to the end-user.

Trends towards more extensive use of IP-based networks will have an impact on regulation. This is because IP messages (even if they are used to carry voice over internet – VoIP) are subject to different rule than circuit switched calls. The Director recognises these differences and wishes to understand how quickly people believe that the switch to IP based networks will occur and the regulatory concerns that this raises.

Responses in this area will be used to identify potential problems, drive the ODTR's longer-term plans and, where appropriate, be used when considering short-term issues.

Question 4.5-A: How quickly and extensively do you see IP being deployed within core networks in the Irish market?

Question 4.5-B: *What regulatory concerns would a move to IP-based network cause you or your company?*

4.6   New access mechanisms and Models

It is possible to access the internet via an increasing range of technologies including, for example, the following:

- Mobile access
- From a WAP handset
- From a GPRS handset
- From a 3G mobile handset
- Virtual circuit access
- ADSL line
- Cable modem
- Wireless broadband
- Web TV (a hybrid solution that uses a dial-up PSTN path to the ISP but a digital TV delivered path from the ISP to the end-user)
- Other digital access

The Director would like to have views on any barriers to the deployment of these technologies and which will be the most significant.

Question 4.6-A: Which new access methods are most likely to succeed in Ireland and over what timeframe?

Question 4.6-B: Do views on any barriers to the deployment of the technologies above and which will be the most significant Barriers raise?

5 Delivery of goods purchased over the Internet

The ODTR is responsible for the regulation of Universal Postal Services in Ireland in accordance with National and EU legislation[12].   The Postal Directive defines the type of postal service that everyone has the right to receive. It covers letters and postal packages up to 20 kilos in weight.   An Post, as a designated universal service provider[13] must guarantee delivery to the address of every natural or legal person in the State five days a week.   Other companies are free to provide similar services, (except certain items of correspondence and direct mail[14]), without the need to obtain a licence or other authorisation. The Director would like to know whether the needs of retailers using the Internet are fully met by An Post and its competitors; and would also like to know the views of their customers on the speed and cost of the service received.

Question 5-A: *Do you consider that the range of services provided by An Post in delivering goods over the internet adequately meet your needs, with particular reference to:*

- *Price of services*
- *Convenience of posting, availability of collections from premises, and latest collection times.*
- *% of mail delivered the Next day working day after posting*
- *Time of deliveries*
- *Consistency in time of delivery*
- *Efficiency and general responsiveness of Customer Services*

Question 5-B: *Are you aware of any other companies who provide the delivery services you require for delivery of internet purchases – either nationally or in a specific locality – and how do these services compare with the services provided by An Post in terms of the headings set out in Question 5-A.*

Question 5-C: *Is a separate price charged for "packing and delivery" or is it incorporated into the price? If there is a separate charge it is based on the cost of delivery or is it subsidised? How does the total cost (cost of goods + delivery + any other charges) compare with the cost of purchasing costs from a shop?*

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[12] The "Postal Directive" (Directive 97/67/EC of 15 December 1997) establishes a harmonised regulatory framework for postal services throughout the European Union. It was transposed into national law by the European Communities (Postal Services) Regulations 2000 (SI No.310/2000 "the Regulations").

[13] The Regulations have designated An Post as a Universal Service Provider and the Minister for Public Enterprise may designate one or more additional postal service providers as a Universal Service Provider having an obligation to provide all or part of the Universal Service

[14] unless the items weigh more than 350 grammes or are charged more than five times the standard tariff for an item in the first weight step

6 Consultation Procedure and Timetable

The consultation period will run from 4th July 2001 to the 27th of August 2001 during which the Director welcomes written comments on any of the issues raised in this paper.

All comments are welcome, but it would make the task of analysing responses easier if comments were referenced to the relevant question numbers from this document. In the interests of promoting openness and transparency, the ODTR will summarise the comments received in a report on the consultation. The Director appreciates that many of the issues raised in this paper may require respondents to provide a considerable amount of confidential information if their comments are to be meaningful. Respondents are requested to clearly identify confidential material and if possible to include it in a separate annex to the response. Such information will be treated as strictly confidential. Unless marked confidential the ODTR will make copies of the comments available for public inspection at its offices.

"All responses pursuant to this consultation should be clearly marked "Reference: Submission re ODTR 01/47" and sent by post, facsimile or e-mail to:

> Ms. Aoife Mc Grath
> Office of the Director of Telecommunications Regulation
> Irish Life Centre
> Abbey Street
> Dublin 1
> Ireland
>
> Ph: +353-1-8049743   Fax: +353-1-804 9680 Email: mcgratha@odtr.ie

to arrive on or before the 27th of August 2001.

Apart from acknowledging responses, the Director regrets that she will be unable to enter into correspondence with persons contributing comments on this consultation paper.

Appendix 1

The purpose of benchmarking is to track Ireland's progress, but also to compare and contrast best practises in other countries and to consider them in the context of the Irish situation. This section examines, in three selected countries, the best practice adopted in terms of policies for high Internet adoption. Finland, Sweden and Korea were chosen because of their high Internet penetration.

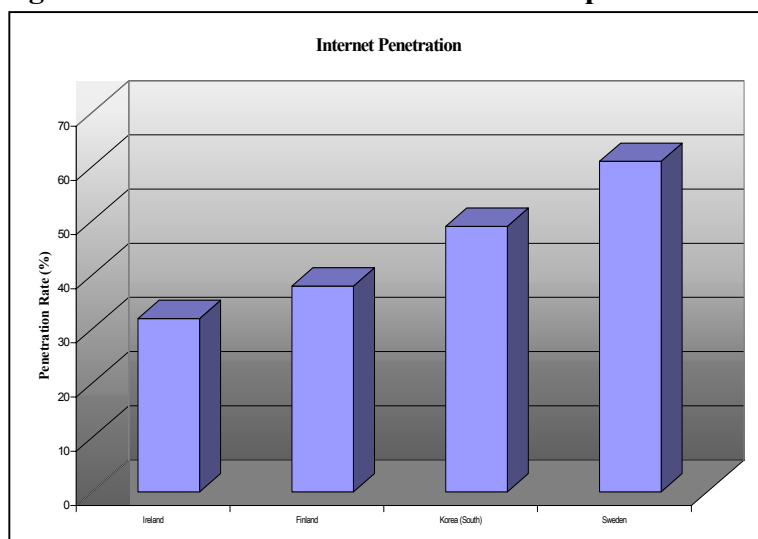**Figure 2.1 Internet Penetration Rates Compared**

Figure 2.1 illustrates the various Internet penetration rates of the selected countries. Sweden has the highest penetration rate (61%), followed by Korea[15] (48%), Finland (38%) and Ireland (32%).

Source: Nielsen NetRatings and Nua Internet surveys.

Taking a closer look at the various Internet penetration rates we find that countries that invested early and continued to invest, subsequently have high Internet penetration (See figure 2.2 overleaf). Looking at Finland, Sweden and Korea in terms of high level policy, it is clear that they all have a very focused national policy in terms of being an "information society". In the case of Finland this was identified as early as 1994 in a position paper setting out how they were to achieve this goal. Similarly Sweden and Korea has been focused on the adoption of IT since early 1990's.

Countries who were early adopters of the Internet, and set up the initiatives and directed investment into the rollout of infrastructure now have the highest penetration rates when compared to other countries that were slower to adapt to the Internet. These countries have an inherent advantage and bridging the penetration rate gap could prove to be a difficult problem for late adopters.

The Internet penetration rate in Korea is a measure of all those over the age of 7 who have access to the Internet. The Internet penetration rate in the other selected countries is a measure of residential Internet access of all those over the age of 2.

Figure 2.2 Time of First Household Access via Home PC: % Households
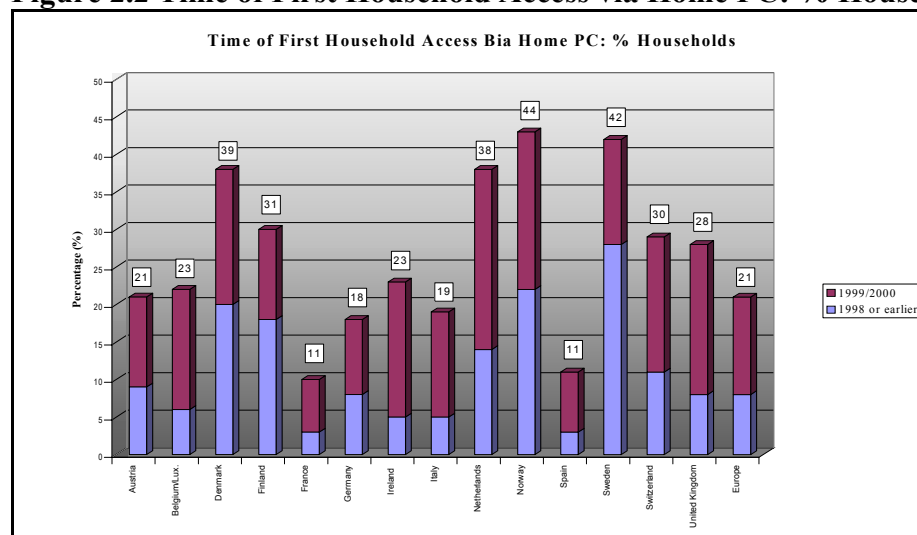
Source: Nilesen NetRatings

A similar theme running through those countries with high Internet penetration was the channelling of investment into increasing access points, physical infrastructure and awareness campaigns. The ability to access the Internet in schools and libraries gave people the opportunity to become familiar with the Internet and not have to worry about the amount of time that they spent online. With a strong correlation between household income and Internet access, the availability of the Internet, whether in cafes, schools or libraries provides households with the opportunity to readily access the Internet without having to purchase a home PC or worry about connection costs.

A common Government policy adopted by both Sweden and Korea was to increase PC penetration in households. Korea has a public policy to promote one PC per person that is developed through making access widely available in offices, schools, public places such as post offices, Internet cafes and households. In Korea the most popular access point remains the house (64%) while (22%) log on from work[16], however outside the home Internet cafes are widely used with 43% usage.

Korea established an Information Society Forum in 1998 to promote the use of information and help promote the public awareness of the information society. June was designated as the month of information and since 1998 a number of events and contests have been hosted.

Growth in use of the Internet must be facilitated by education programmes targeting all levels of society in terms of age and income level. Education policy regarding IT and related courses feature prominently in the programs of countries with high

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[16] Net Value Survey – September 2000

Internet usage. A survey conducted in September 2000 indicates that those countries with higher level of access to schools offering courses about the Internet contributes towards a more IT focused population. Sweden has the highest rate of young people accessing the web from school – 78%, the next highest country in terms of school access was Canada at 74%[17].

Finland's Ministry of Education has been actively pursuing the Information Society goal through different strategies in terms of teaching and research to ensure that the new methods offered via the internet are effectively captured in the education system. Investment in expanding the provision of education in sectors relating to the IT industry is continuing. The rapid growth in the use of the Internet has been attributed partly to the widespread access at schools and also free public Internet points in libraries.

Sweden has adopted similar policies and their investment in IT in schools will continue. Various new IT competence measures have been outlined, such as small business IT programmes, 20,000 additional places in higher education and the opening of an IT university.

Korea has a policy to improve the national IT literacy via free education services to people with low incomes.

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[17] Angus Reid Group, September 2000.