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**Identification and Assessment of Recommended Practices for the
Design of Internet Surveys**

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Purpose

We are presently experiencing an explosion in the use of Internet surveys. While there is broad experience and knowledge on interviews and paper questionnaires, there is not yet a consensus among researchers involved in business survey research on how best to conduct Internet surveys and little attention has been given so far to their scientific underpinnings. However, most researchers agree that the electronic environment has characteristics that make it distinct from the other survey methods. The aim of this project is to contribute to higher research standards in the realm of business surveys and to develop research-based design principles for Internet questionnaires in business tendency surveys. The paper is based largely on the analytic reports, workshop documents and other instruction material which were prepared by the task force members¹ and other researchers working on Internet surveys within a wide range of countries. At the end of the paper we offer a set of recommendations for good Internet survey design that describes the general experience, gives advice for good research practice and provides a platform for further discussion. For technological terms, please refer to the glossary at the end of the document.

All recommendations refer to the present technological state, but in the last paragraph we offer a brief outlook about the Internet business surveys of the future. However, because of rapid developments in technology and in society, the following recommendations need to be adjusted regularly.

A. Introduction

In little more than a decade the Internet has developed from a tool used mainly in academia to being part of everyday life and one of the major sources of information (see Annex, Box1). Internet surveys are becoming more and more commonplace. The aim of this paper is not to answer the questions, whether Internet surveys are faster, better, cheaper or easier to conduct than surveys using more traditional methods. Given that the Internet is becoming the main communication medium in academia, industry and homes, it seems that researchers have almost no choice but to adjust their survey practices to the altering environment. Internet surveys will probably not replace other modes but will develop into a distinct response mode with its own advantages and disadvantages. The benefits are material savings, less postal expenditure, fewer archive requirements and lower marginal costs – the costs for an increasing number of participants do not increase in contrast to paper surveys. The accessibility of the Web questionnaire around the clock allows customization to the

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respondent's time preferences, in contrast to a personal interview on the phone, for example, that can be mistimed for the respondent. Furthermore, an on-line questionnaire avoids interviewer bias that can impact the validity and reliability of the data. Certainly a Web version of business surveys has a positive effect on the surveyor's image. However, an implementation of Web-based survey techniques also implies some drawbacks. The Web is still not a completely stable medium for survey research. The creation of a Web-based assessment tool usually requires the professional help of a computer expert and can therefore be very costly. Web users have different types of hardware and software, and the Internet connections (time to load a Website) can differ. The respondent must also become familiar with the on-line participation procedure. Therefore, it is more difficult to control the study environment – in particular, the respondent's time exposure for Web survey participation, as it is given within traditional survey techniques. Possible distrust of the new media can also not be ignored. Thus, computerized, self-administered questionnaires have unique specifics concerning coverage error, measurement error, item non-response error, validity and reliability. These errors are as applicable to the design and implementations of Web surveys as they are to mail or interview surveys, but their sources may differ from those in other survey modes. To explore these sources and to give suggestions on how to deal with them is the aim of this paper.

B. Technical Design

In the case of business tendency surveys it is particularly important to follow best practices in designing attractive questionnaires, as they are to be completed mostly voluntarily by senior managers. Thus, Web survey design is not only a question of the right methodology. Design and esthetic value can be regarded as incentives, as customers and participants are paying more and more attention to an intelligent interface that is fast and easy to handle. The verbal, numeric, symbolic and graphic languages of the questionnaire cannot be seen in isolation from each other, as all of these factors affect respondents' motivation and comprehension of the text. Respondents wish to receive some additional gratification during the response process, as participants also regard the Internet as an opportunity to gain new knowledge. Unlike the paper questionnaire or the interview that may maintain the same technique and design over decades, Internet questionnaires require steady adoption and customization.

The technical design of a Web or e-mail survey will usually be handled by computer experts, who may not be aware of the researcher's needs and requirements. Thus, the aim of the following discussion is to create awareness among business survey researchers about the technical opportunities and risks of the two Internet survey tools – Web and e-mail.

E-mail

E-mail questionnaires are one form of Internet surveys. There is a strong argument for saying that e-mail is the most important Internet application. Despite the visual attractions of the Web, many users prefer the information to be sent to them per e-mail. Nevertheless, due to

some technical limitations, the usage of the e-mail tool for survey research is still merely limited to the recruitment of survey participants and delivery of the link to the Web questionnaire. The major technical difficulty in conducting e-mail surveys is the automated reading of results, as there are many error sources (respondents entering wrong characters in the response boxes etc.). E-mails with a hyperlink to a Web questionnaire allow the participant to “opt-in” direct to the relevant Website. However, many participants will respond more favorably to e-mail surveys rather than those requiring them to use a hyperlink and login to the Web. Furthermore, not all potential participants who are contactable by e-mail have access to the Internet; in many cases, businesses for security reasons have only restricted access to the Web, so that an e-mail questionnaire is the only remaining electronic survey method.

The plain text e-mail (ASCII) questionnaires and messages have proved to be the most accepted and practical solution at the present, though their esthetic value is far below the Web questionnaires. HTML e-mails have better features for a fancy design and automated data reading but may more often create incompatibility with the respondent’s e-mail software because of their deliverability complications. Many users do not know that their e-mail clients are configured to filter or alter HTML e-mails and do not know how to change the configuration setting. E-mail attachment surveys are also not recommended at the present, except as PDF documents. Most companies can strip attachments due to virus suspicion on entry to the company network. It is recommended, to offer an optional text-based version of your HTML message. Instead of asking the participants which format they wish to receive, an option that enables switching between the plain-text and the HTML format may be included into the message. To explain the readers how to adjust their e-mail clients to not filter or alter HTML e-mails may be an option, but, many will not follow your suggestions because of the dominate fear of e-mail viruses. Specifying the requirements in an introductory paragraph to the survey is only recommendable when it may affect the majority of participants, otherwise the effect of discouraging the participants from responding via Internet may be bigger.

Furthermore, the e-mail suffers from the worldwide Spam problem. A proportion of e-mails will be rejected due to errors in the e-mail address but also due to Spam filters on the respondent site. The majority of ISPs sends an error message in case the e-mail address was not valid. But at present it is very common that some e-mails are misidentified as spammy and incorrectly sent to junk or trash folder, particularly e-mails with more than one recipient (mass mails). This is a problem to be aware of and there are several practical solutions:

E-mail Addresses

- Ask to be placed in the address book or *safe senders list* (AOL, Yahoo, Hotmail/MSN and Outlook remove their e-mail filtering techniques when the sender's e-mail address is in the recipient's address book). For that reason it is recommendable to create a permanent e-mail address for your project, so that survey participants do not experience inconveniences along with executive staff changes and do not have to adapt their address books.
- Avoid using bought-in e-mail lists, as you could be labeled as a spammer (your e-mail and/or IP hosting account can be blacklisted within the global network).

- Use a recognizable, short, and consistent '*From Address*' (numbers and underlines may be subject to Spam filter).
- Maintain list cleanliness. Most ISPs use list quality filters to detect when a sender is attempting to deliver e-mail to a large number of invalid addresses. Filtering can start at a bounce rate of just 10%. Even a good, permission-based list will see bounces over time. Monitor your bounces on a regular basis and remove invalid addresses from your list.
- To find out the validity of your e-mail list (the contact rate), you may regularly incorporate the “confirm reading” function into your e-mails.

Message and Headings

- Avoid spammy-sounding words particularly in the “Subject:” line like *hello, new, opportunity, offer, important, big savings, only, money, no cost, now only, for free, opt in, please forward* etc. It is also recommendable to avoid the use of “*click here*”, unsubscribe instructions and/or explanation of why the recipient is on the list (Bayesian analysis Spam filter calculate the probability of a message being Spam based on its contents).
- Avoid the “Subject:” line words written all in small case or all in caps, or personalized subject contents.
- If your e-mail message is in HTML, do not use Java, IFRAME HTML tags and Web bugs, as these are frequently used in Spam to confirm address validity, or used in viruses and are thus objects of filtering (further critical features are external image links, random characters, white text, invalid tags).

Testing Procedures

- Most e-mail filtering packages use reverse DNS lookup to make sure that the company that is supposed to be sending the message is actually the company sending the message. If reverse DNS is not enabled, then your mail may not get through.
- Messages may be blocked or redirected to the “junk mail” filter if the sending mail server exceeds certain volume thresholds – messages per second and/or number of simultaneous connections from a given server.
- Send your e-mail campaign to several test accounts. Use ISP inbox testing, by setting up e-mail accounts with the major ISPs such as AOL, Hotmail, Yahoo, etc.
- SenderBase (<http://www.senderbase.org>) provides a tool for checking whether your IP address has been included on any of 10 major blacklists.
- There are lists designed to help legitimate senders of bulk and commercial e-mail to ensure that their e-mails are not erroneously blocked as Spam (white lists). Bounded Sender (at <http://www.boundedsender.com>) is such a certified legitimate email deliverability program with transparent standards.
- Lyris ContentChecker (<http://www.lyris.com/contentchecker>) provides a free tool to filter a message through several SpamAssassin tests that determine if it has characteristics typical for unsolicited Spam mail.
- Looking at the delivery failure protocol (usually sent to you back by system administrator, postmaster or mail delivery system) may offer valuable clues about your messages generally being identified as Spam. The following extract from a failure protocol shows for example, that your message had 4 features (for example spammy words, large number of invalid addresses, etc.) that the Spam filter (SpamAssassin 2.55) has attributed to

Spam, and it would have been rejected if there had been 5 features. Thus you received the failure protocol probably because the e-mail address was invalid. Nevertheless, your message is at a high risk of being labeled as Spam.

X-Spam-Status: No, hits=4.0 required=5.0 X-Spam-Level: **** X-Spam-Checker-Version: SpamAssassin 2.55

Unfortunately, spammers know about this advice as well and the whole area is constantly changing, as spammers continue to find new ways to avoid filtering of their messages. Consequently, the filtering becomes more and more extensive, hampering legal marketing and survey research. Thus, given the rapid development of the Internet and computer technology, researchers will face a permanent challenge of adapting the newest demands and requirements.

Web Questionnaires

- *The main software procedures*

Though the Internet has become irreplaceable in professional and private life, some distrust in the new media still exists. Thus, it seems appropriate to devote a chapter to describing the main software procedures for implementing a Web-based questionnaire. Below is an example of a Web questionnaire and the HTML code for creating such a form. The form contains an option menu, radio buttons, check boxes and a comment field. By pressing the “send” button the data are sent to the e-mail address that is indicated in the code but not visible to the respondent. This form is very easy to create by copying the code into a text editor and saving it with the extension “.html” (for example: survey.html). The file may then be opened with any browser (Internet Explorer or Netscape Navigator). The browser suppresses the HTML commands and displays only the text and the form as seen below.

There are two options for sending the data entered by participants into the on-line form to the researcher: responses may either be mailed (the script contains a “mailto:” command as below) or be directed to a file on the server (server-side scripts). Usually server-side scripts are used to save the data from Web questionnaires. The reason is that some respondent’s browsers may not support the “mailto:” command. The majority of browsers are configured to display a security warning when a ‘mailto:’ command is invoked. Before implementing a Web questionnaire it has to be tested on various types of Web browsers, operating systems, screen configurations and hardware. The same questionnaire items may be disabled or appear rearranged on the screen within different browsers. The unequal appearance of the same questionnaire is matter of concern not only because of accessibility but it may also be a source of measurement error due to different stimulus (for example the visual middle of a scale may vary due to automatic distortion). Several advanced programming features may be incompatible with respondent’s software. For example, the use of Java has been experienced to create such problems.

Web Questionnaire Example

The screenshot shows a Microsoft Internet Explorer browser window displaying a web questionnaire. The browser's address bar shows the file path: C:\PC\Arbeit\Projekte\OECD\Aufgaben\Code2.html. The page content includes a form with the following elements:

- A heading: "Please select your branch:"
- A dropdown menu with three options: "Construction", "Services" (selected), and "Industry".
- A question: "The present economic situation of your company is" followed by three radio button options: "good" (selected), "satisfactory", and "bad".
- A question: "How do you wish to receive the survey results" followed by three checkbox options: "via E-mail" (checked), "via Web", and "per mail".
- A text input field for "Comments:" containing the text "address changed".
- Two buttons: "Send" and "Cancel".

The browser's taskbar at the bottom shows the system clock as 12:05 PM and several open applications, including "Posteingang - Mi...", "Dokument2 - Mic...", "Standards Interne...", and "C:\PC\Arbeit\Pr...".

HTML code to the above form

```

<html>
<body>
<form action="mailto:your_name@your_company.com" method=post enctype=text/plain>
Please select your branch: <br>
<select name=Branch size=3>
<option> Construction
<option> Services
<option> Industry
</select><br><br>
The present economic situation of your company is<br>
<input type=radio name=situation value=1-good>good<br>
<input type=radio name=situation value=2-satisfactory>satisfactory<br>
<input type=radio name=situation value=3-bad>bad<br><br>
How do you wish to receive the survey results <br>
<input type=checkbox name=results checked value=1-email>via E-mail<br>
<input type=checkbox name=results value=2-web>via Web<br>
<input type=checkbox name=results value=3-hard copy>per mail<br>
<br>
Comments: <input name=Comments size=20><br><br>
<input type=submit value="Send">
<input type=reset value="Cancel">
</form>
</body>
</html>

```

A very important aspect is the download time, as it may result in increasing costs for Internet access on the respondent's site. The general advice is to use a technically clear, simple and fast questionnaire design. However, there is often a trade-off concerning the layout of Internet questionnaires: A simple layout is fast and compatible with different operating systems, but a more sophisticated fancy application makes the Internet questionnaire visually more attractive which is very important.

In the following some empirical findings that have been reported to be relevant for the design issues of Web questionnaires are briefly discussed.

- *One-page vs. multiple-page design*

The Web questionnaire is usually accessed with an ID. There are two basic versions for the design of the Web form – a one-page and a multiple-page design. Both offer advantages and drawbacks. A one-page design (scroll form) closely follows the design of the established paper questionnaires and thus provides a better sense of orientation. However, for long questionnaires, a one-page design may be disadvantageous, as respondents refer to the scroll bars on the right to estimate the length of the questionnaire. Web questionnaires have a bigger font and are always visually longer than the paper form. As a long questionnaire usually leads to higher non-response rates, respondents may drop out earlier than in a multiple-page questionnaire. But, the questionnaire completing time for the multiple-page design is longer and it tends to increase the response load, as the number of actions to advance to the next question is higher than within a one-page design. Thus, a progress indicator should be utilized to show respondents how close they are to the end. However, the major advantage of the multiple-page design is that it enables automatic skipping, conditional branching and adaptive questionnaires.

- *Optical design*

Web users often read the text differently than readers of printed material, as they are used to browse through a website. Thus, only the main fragments (highlights) of sentences may be registered. Applied to a questionnaire, question text should be kept short and concise. The important text passages should be in the reader's view and should not occupy the whole width of the screen.

A Web version of the questionnaire implies a longer "way" to the questionnaire than, for example, an e-mail version. Respondents who opt for Web surveys usually do it less for practical reasons but either because of curiosity, learning and experiential aspects of Internet usage or because of the higher satisfaction aspect, related to the esthetic value: color design and higher optical attractiveness. Business survey respondents are managerial executives, are thus belonging to a population group with a narrow distribution of such attributes like age (30–65) and education (specialized or college education). Given this population characteristics, attention should be paid to offering sophisticated and fancy survey solutions that enhance motivation and accordingly the data quality.

Another aspect to be considered when making color selections is color blindness. Some 8% of the male population has some form of color blindness, and by choosing the wrong colors (for instance, red and green) the questionnaire can become unreadable for them.

- *Check-boxes and buttons*

It is recommended that different forms for different kind of questions be used: square checkboxes for multiple-choice questions and round radio-buttons for single-choice questions.

- *Matrix questions*

The using of matrix questions (item batteries) has also proved to be unsuitable for on-line media. It has been discovered that respondents tend to answer these questions uniformly (Gräf, 2002). In case you detect a higher correlation among battery items in Web questionnaires compared to the adequate paper questionnaire, a methodologically better procedure may be to present each question separately (see Figure 1).

Figure 1: Example of a Matrix Question in Table Form and Layout Recommendations

Example of a matrix question

Please try to assess the importance of the following problems the economy of your country is facing at present :	very important	important	not important
Lack of confidence in the government's economic policy	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Insufficient demand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unemployment	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inflation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of international competitiveness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Trade barriers to exports	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Layout recommendation for presenting item batteries

Please try to assess the importance of the following problems the economy of your country is facing at present :				
Lack of confidence in the government's economic policy				
very important	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	not important
Insufficient demand				
very important	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	not important

- *Drop-down menus*

Some instruments were experienced to be sources of measurement errors, such as drop-down-boxes. For some respondents drop-down-boxes (also called pull-down menus, which display only one option initially) may be difficult to handle, as they require simultaneous mouse movements (clicking, moving to the right and down etc.). Furthermore, respondents tend to

give fewer top ratings, which could certainly lead to a bias. The only advantage of the drop-down-boxes is that they are space-saving. Thus, they may be useful for questions that call for precise answers, such as country or region, branch etc.

- *Pop-up questions*

An increasing number of Internet users have incorporated pop-up blocker in their Internet browsers to stop the annoying appearance of new windows with advertisements. Thus, pop-up surveys and questions may be disabled too.

C. Contact With Participants

There are crucial differences in the social dynamics between the surveyor and paper-and-pencil participants and surveyor and on-line participants. Computer-mediated communication is usually perceived to be more anonymous than the traditional letter correspondence due to the virtual environment. On the other hand, on-line surveys offer a good platform for personal contacts with the respondents, which may compensate for the perceived anonymity. By indicating the e-mail address, the participant offers the surveyor an additional opportunity for interaction. Contact with on-line participants happens more often per e-mail than with traditional participants by mail, as it is a cheaper and a faster way to communicate. Furthermore, an e-mail is less official and allows the inclusion of personal aspects or short reply notices that usually do not happen in professional mail and fax communications and may contribute to stronger social bonds between participants and the surveyor. Personification, constant contact with participants, providing a sense of community, giving feedback and other incentives will become even more important in increasing response rates and other aspects of data quality. Thus, it is recommendable to regularly update the interface (for example with news or season's greetings etc.). If possible, create an Intranet facility as a distinct member privilege, accessible by a unique password, where results that may be particularly interesting to participants are displayed and not accessible by the public (for example personalized survey results that put the responses of the participant in perspective with the responses of his sector or industry branch). Also a FAQ (Frequently Asked Questions) and important definitions may be included into the website. Such a website will not only raise the public profile and acceptance of the project but also make the response process more comfortable.

D. Mixed Mode Surveys

Many business surveys are conducted on a voluntary basis and thus are heavily dependent on the willingness of respondents to co-operate. Respondents' preferences concerning the questionnaire mode is an important issue as it closely relates to the aspect of mode effects on data quality. Popular questionnaire modes enhance respondents' motivation and the response accuracy. Some respondents are reluctant to use the Internet because of their previous habits.

But due to the rapid spread of the Internet, we can expect a gradual increase of response rates to electronic questionnaires in the coming years, though Internet-based business questionnaires are still a long way from replacing the traditional paper method, although their popularity is growing among economic professionals as represented in business surveys (see Annex, Box 2).

The more promising approach to get high response rates and diminishing panel attrition is to offer respondents different modes. It is promising in the sense of making participation in a survey easier: respondents can choose the questionnaire version that is most convenient to them. Offering different modes can also be seen as “soft” reminders, as the transmission of the e-mail with an invitation to participate on-line and the letter with the paper questionnaire can be sequenced. However, using differently designed questionnaires is problematic with regard to the data quality criteria, as design and layout of scales have been found to affect responses, so that systematic measurement errors deriving from mode effects may arise. But adapting the paper questionnaire to the on-line conditions, and thus changing the design, is often unavoidable in order to prevent possible error causes.

E. Coverage and Unit Non-Response

The majority of Business Tendency Surveys is based on a sample of enterprises. As only a small portion of the population under study is surveyed, particular attention is paid that the results are representative. It is known that interest and skills in the Internet is higher among younger generations than among older generations. Thus by introducing an on-line survey we run the risk of getting a self-selection bias, with younger avid Internet users as respondents and progressive dynamic enterprises as sample units. Both components may lead to a bias, in particular when relating the answers to attitudinal questions. Thus, it is necessary to be aware of this potential risk and to pay particular attention to the sample configuration and to potential coverage errors.

Concerning the response rates to on-line surveys, there is no single experience made so far. Generally, more recent studies report equal response rates, or even higher response rates for on-line surveys. It may merely depend on the layout of the questionnaire and the country’s specifics, like access to Internet and technical equipment of enterprises. This aspect is particularly important with regard to some industry branches (for example the construction and building sector) and small-scale enterprises (see Annex, Box 3), which may be underrepresented in Internet surveys due to the branch specifics. Ignoring potential coverage and non-response errors in Internet surveys provides the major threat to the validity of results. We suggest that it is a good practice to collect information on respondent’s demographics and other characteristics that may be relevant to the study.

F. Item Non-Response

Item non-response appears when respondents fail to answer some questions in a questionnaire. A low item non-response is usually an indicator of the efficiency of the data

collection instrument. Though some research has been produced on response patterns for different survey modes, no dominant hypothesis about the prevalence of item non-response in mail and Internet surveys has yet been formulated. Generally, findings suggest a lower item non-response for Web surveys. It is possible that a lower item non-response in on-line surveys derives from the fact that on-line users are more competent respondents. On the other hand, as computer-mediated communication is also perceived to be more anonymous, respondents may be less afraid to fail or to provide wrong answers. It has also been experienced, on-line respondents answer the questionnaire faster and more impatiently. This behavior may be related to the fact that the Internet usage is associated with costs per time-unit. Thus, participants are automatically trying to extract the necessary information as fast as possible to minimize the connection costs. Thus, it is likely that a low item non-response may derive from the tendency of on-line participants to be less thorough in answering the questions and indicate that on-line respondents deal with the questionnaire more superficially. But, with the distribution of new technology and broadband connections, like DSL and cable (see Annex, Box 4), people's conception of the Internet may change. However, it is still important to know how most of your respondents are getting on-line because it determines the reasonable file download time. In some countries (see Annex, Box 5) almost all private users and a significant percentage of businesses use conventional telephone lines with low speeds. Large corporations and businesses use broadband permanent connections, which will be the technology at least for the near-term future.

G. Validity

An important issue of concern has been the extent to which the responses of Internet participants differ from responses collected via traditional survey techniques. As colors and layout may affect respondents' comprehension of the information and influences responses, it is important to evaluate whether the results we receive via Internet surveys are the same we would receive with the other methods. The empirical findings have varied greatly, and the lack of consistency in findings is likely due to the wide variation of factors across these studies. According to the experience so far, validity aspects are not a matter of concern in on-line business tendency surveys. However, selection bias may influence validity. Younger, avid Internet users and those with greater technological sophistication tend to be over-represented in Web surveys, at present. Thus, one important aspect is whether demographic characteristics of Internet respondents are comparable to those of traditional paper respondents. Both aspects together – the personal characteristics of on-line respondents and the virtual environment of the Internet – may result in different responses.

H. Reliability

Measurement errors in a survey are deviations of the respondents' answers from their true value. They generally result from poor question wording, questionnaire design and/or respondents characteristics. Web surveys are generally more affected by measurement errors,

owing to several factors: Internet users tend to read more quickly, questionnaires are usually designed not by survey methodologists but by computer specialists, the Internet environment may lead to a higher inaccuracy and a lower perception of responsibility. While the response process on paper is simple and straight-forward, in Web questionnaires there are more opportunities for error at each stage of the process. The Web-based survey participation requires a higher initial investment of energy from the participant. On-line participation is time-consuming and its success can often be beyond the respondent's control. And finally, the respondent has to deal not only with the topic of the questionnaire but must also learn the structure of the hypertext. Comparing cognitive tasks in a paper-and-pencil survey and in an on-line survey, the later is considered to be more demanding. Browsing through an on-line form, using mouse and keyboard while reading the screen, can be distracting for the respondent and reduces the respondents attention for the question answer process. Thus, cognitive capacity in an on-line survey is constrained by the respondent's navigational efforts on the Internet.

There are two methods to attract respondents' attention: the prevention method and the control method. The prevention method includes instructions to remind respondents to pay attention to the question wordings before a mistake can be made. But long instructions are burdensome for the reader, particularly under Web conditions. As we recommended earlier, important text passages should be short, highlighted and in the respondents view. The Web, however, offers the unique opportunity for integration of computerized controls for inconsistencies, which was previously only possible in interviews. But computerized controls shouldn't be used extensively: Automated programming features to control for inconsistencies may not only frustrate participants but may also be generally more time consuming and cause a higher burden particularly to respondents who make mistakes. Furthermore, respondents, being aware of the control functions, may tend to rely on automated data checks. Good experience has been done with automated data controls after the respondent has completed the questionnaire and before the data are entered into the system. Those controls can be used to identify questionnaires with inconsistencies which can then be corrected manually by the executive staff. The advantage of this solution is that automated checks do not affect the respondent and the executive staff does not necessarily need to view all questionnaires but only those that are at risk to contain inconsistencies.

I. Costs and Time of Implementation

Certainly a Web version for business surveys is desirable and has a positive effect on the surveyor's image. Computerization and self-administration promise to reduce the cost of data collection. But the general notion that Internet surveys are cheaper than traditional mail surveys is not necessarily true.

Cost savings:

- Interviewers
- Print and mail costs
- Data entry

Additional costs:

- Development work of computer specialists
- Software
- IT support / help desk

Generally the marginal costs for adding new respondents to a survey are much lower for Internet surveys, while the fixed costs for running an Internet survey are not necessarily lower.

J. Security

Security of data transmitted over the Internet becomes an increasingly important issue because of steadily growing data volume and importance. Business survey respondents send various types of sensitive enterprise data, from details on their present economic activity to strategic plans for the future. Therefore respondents are paying particular emphasis on their data being protected. This section will focus on some central aspects of security issues and common practices.

To build an effective security policy it is important to determine where security breaches can appear or who may cause danger to your data integrity. The participating enterprises usually fear that unauthorized subjects may access some sensitive information about their economic state, particularly their competitors or persons who want to take personal advantage out of the information. Those intruders are referred to as crackers as they want to get access to the system in order to exploit the information it contains. However, with business survey data becoming increasingly important for policy and financial markets, survey institutions may draw attention of cyber-criminals and hackers. A hacker is basically someone who hacks a system because he finds it interesting. Their activity can range from pure satisfaction of having hacked the system to a deliberate vandalism in it. However, despite different intentions, intruders usually use the same techniques and researchers as well as participants should be aware of. Some of those techniques and solutions are thus briefly discussed in the following in order to create awareness about possible perils. However, all those techniques imply quite a high amount of criminal energy. Given the risk of prosecution and the fact that there is no direct financial profit as the final output is information about an enterprises economic situation, one also shouldn't overestimate the danger of deliberate security breaches in business surveys. On the other hand, accidental security breaches shouldn't be underestimated.

- *Password sniffing*

Most systems are usually protected by an ID and a password. However, intruders can get passwords in various ways. While there is an uncountable number of an intrusion scenario, most of them are less likely in the case of business surveys. In the following we will thus refer only to the most common methods intruders may use at present to get access to business survey data on the Internet:

- **Social Engineering:** As simple it sounds, but making use of the human weaknesses is still the most likely scenario. A common technique is to simply call the user, pretending to be from an authorized institution, for example the surveyor and ask for the password. Or the

other site: The surveyor may be called by a person pretending to be the participant who has forgotten his password and be asked to advise him in accessing the questionnaire or the member area. Many people will supply this sensitive information without becoming suspicious.

- **Phishing:** Internet phishing (“password fishing”) are unsolicited emails that attempt to acquire sensitive information from the user. They become known through the increasing number of emails pretending to be from a bank (e.g. using a similar source email address and embedding corporate logos) and requesting the subject to provide his banking PIN or credit card number for example. However, also parties involved in business surveys – participants and even more the survey managers, who have access to the whole system – may easily become victim of a password phisher. Below just an example of such a trustworthy sounding email.

Dear Participant / Dear Colleague

Our automated security systems have indicated that access to your online account was temporarily blocked during the response process. While our IT support was able to successfully resolve the problem, we would recommend that you ensure that your data are complete and your password is still accepted by the system. To log in or change your password, please click on the following URL: <http://www...com>

Best regards,
Your IT support

The only solution to prevent colleagues and participants from becoming a victim of a password cracker is to create awareness of this possible risk and to tell them not to provide their access details to anyone before assuring that the request has been posed by an authorized party.

- *Viruses and Spyware*

Fare higher dangers than phishing are programs that are loaded onto a computer without the victim taking any notice of it, as for example viruses and Spyware.

For business tendency surveys these destructive software pose a two-sided risk. On the one side, there is the risk to pass the “infection” to participants by sending them an email which will cause a considerable damage to the surveyor image. Some viruses are configured to scan the outlook address book and to use the information found there for passing the virus to other persons. Thus, it is advisable not to save the information about your participants in the address book of your Outlook or another email-software, but in a separate file (an Access or an Excel file, for example). The only solution is to be careful with incoming information, websites visited and downloads. A must is a regular update of the virus scan program, as new viruses emerge daily.

The above kind of attacks usually happens not because someone is targeting your computer in particular, but by accident. However, there is also a possibility that someone is trying to

obtain classified data from your PC on purpose. This can be done through a Spyware. This software can record keystrokes; including passwords, confidential and private information. Spyware can be installed by someone deliberately or by an internet based vendor. Cookies can also be classified as Spyware, as they pass information to another party. To mention in this context are the so called Trojan Horses –programs that appear to perform a desirable and necessary function but in addition perform functions unknown and definitely unwanted by the user. Trojans differ in their functions and abilities, varying from informative to destructive. These programs can for example open the browser at an address specified by the attacker (used particularly for advertising purposes). For maximum protection it is recommended to use both Anti-Virus and Anti-Trojans software and also a strong firewall.

Firewall software has been adopted by many users in addition to Virus-scan programs. A Firewall generally functions by stopping communication between the internal network and the Internet. The Firewall administrator then carefully adds rules that allow specific types of traffic to go through the firewall from insight to outside and vice versa. For example, the administrator can stop all incoming connections from the Internet, but still allow internal users to connect in the outgoing direction. A Firewall is simply a fence around the network, with a couple of well-chosen gates. A common misunderstanding is that Firewalls recognize hacker attacks and block them. A Firewall only sees the traffic which passes between the internal network and the Internet, but not whether this traffic is legitimate. The administrator only has the ability to check whether there is an unusual inward or outward activity on your PC. For example, a Firewall can not differentiate between expected and unsolicited emails, for this purpose it is advisable to use spam filter programs. To recognize intruders would be the task of an intrusion detection system. An overview about intrusion detections systems, regularly up-dated information and newsletters about many other security issues is provided at WindowSecurtiy website: <http://www.windowsecurity.com>

- *Security Breaches During the Data Transmission*

Some studies have reported that participants were reluctant to reply to a survey via the Internet for security reasons. They were concerned about potential security breaches possible when submitting survey information via the Web. With technological improvements, security breaches have become more and more unlikely. Secure Sockets Layer (SSL) and, its successor, Transport Layer Security (TLS), are such protocols for encrypted transmission over networks which provide secure communications on the Internet. The most common use of SSL is to provide a secure end-to-end link for transmission of privileged information. The main functions are to authenticate the client and server to each other, to ensure data integrity (during a session, data cannot be either intentionally or unintentionally tampered with) and to secure data privacy – data in transport between the client and the server must be protected from interception and be readable only by the intended recipient. As technology continues to improve and individuals increasingly adopt it, many challenges are lessening. SSL has never been cracked yet, but its application is restricted in some countries.

K. Internet Business Surveys of the Future – an Outlook

▪ *Higher Internet Competence*

Internet adoption is rapidly increasing as it is demonstrated by expanding Internet connectivity and e-commerce (see Annex, Box 4). This fact consequently leads to higher computer and Internet competences of the public. Thus, many challenges relating the training of respondents how to handle an Internet questionnaire will ease. Furthermore, Internet adoption and competence is also a question of generations. With younger generations slowly replacing the previous generations we will be confronted not only with a higher acceptance of Internet surveys, but also with a higher demand on the respondent site (see Annex, Box 2).

▪ *Broadband Internet Connections*

The adoption, scope and the quality of Internet experience highly depends on the quality of Internet connection, i.e. availability, waiting time, network faults and prices.

In the earlier paragraphs we mentioned the problem of a higher number of errors and inconsistencies in Internet questionnaires. It has been reasoned that Internet users read the questionnaire faster and are less patient in answering to the questions. Internet usage habits deriving from Internet costs may pose one reason for this fact. However, the rapid dissemination of broadband connections like DSL and cable will have a strong impact on the Internet usage and adoption. Over the period from 2000 to 2003, the number of broadband subscribers increased at rates about 80% per annum, though the differences among countries are still strong (see Annex, Box 5). Many users take advantage of the so-called flat rates that charge a single fixed fee for the Internet service, regardless of usage. This unlimited access will change people's basic conception of the Internet and their habits. Furthermore, most OECD countries have reached very high levels of telecommunications quality, according to the OECD Communications Outlook 2005 (see Annex, Box 6). With further improvements in quality of connections and services, as well as with further implementation of fibre optic networks, quality, speeds and reliability will increase. In the future, particularly countries with competitive provision of telecommunication services that enables low price levels will experience a growing usage of Internet.

▪ *Technical Progress*

Along with faster modems and high-speed broadband connections as DSL and cable, Internet surveys will stronger benefit from interactive questionnaire design and data consolidation. Results of the earlier methodological experiment will have to be revised as many present constraints will disappear in the future. A series of "new" best practices is already applicable in some countries (for example South Korea) but will remain a vision for at least a decade in the majority of other countries. Advanced design techniques, like automatic consistency

checks, multiple-page questionnaires, automatic skipping and data consolidation can then be utilized without former restrictions.

Higher screen resolution will improve the optical and esthetic value of the on-line questionnaires, allowing higher contrasts and brighter colors. The display resolution of 800×600 pixels was the standard resolution until around 2000. Since then, 1024×768 has been the standard resolution. Most web sites are designed for this resolution. The trend goes towards the resolutions of 1280×1024 or 1600×1200 pixels.

▪ *Graphic Scales*

Graphic scales are rating scales in which the subject ranks his preferences along a continuous line or scale (see Annex, Box 7). While the realization of such scales was difficult in paper-and-pencil surveys, the Web provides optimal conditions for an easy utilization and technical implementation.

There are numerous variations on the approach (e.g., length of the line, labels for the ends, presence or absence of scale marks, vertical or horizontal placement, color etc.). In the majority of Business Tendency Survey three-category scales are used so far to measure outcomes in different items. In a three or even five category scale the respondent is forced to make a decision towards a predefined category. Further important constraint of categorical scales is the central tendency. The graphic scale or in more modern terms the Visual Analog Scale (VAS) is an attempt to introduce a visual element into research of such a complex concept like business confidence. As business tendency surveys usually intend to measure the “business climate” or “business sentiments”, a continuous scale can be used as a “feeling barometer”. This concept comes close to the semantic-differential scales, which employs bipolar adjectives and allow a better expression of the continuous nature of the language. Furthermore, by using a graphic scale with only a few anchors (for example three) there is no increase in cognitive complexity for the respondent, while the information collected is far more complex than any categorical scale would allow.

The major benefit of VAS for business tendency surveys would be an earlier detection of possible trends than given with three-category scales, where respondents tend to remain longer in their old position and to change the category only, when the new state is already evident. In contrast, the Analog Scale enables scores between categories and thus allows a gradual transition of the assessment (see Annex, Box 7) and more sensitive measures.

▪ *Biometrics – A New Security Generation*

Relating security aspects, biometrics is the next generation of authentication methods. Biometrics systems may include fingerprint systems, voice recognition systems, eye scanner systems etc. Those kinds of “passwords” cannot be stolen, neither can be forgotten. They thus will diminish security breaches and most likely make worries about password sniffing disappear.

RECOMMENDED PRACTICES

Based on current knowledge and experience, the advice given here is a starting point which we hope will help to develop research-based principles for Internet surveys. Though, this list is far from being exhaustive, it may provide some orientation for a good research practice.

Getting Started

- Ensure the Internet presence of your institution is professional, as your participants will evaluate this on entry.
- Collect information about participants' demographics and characteristics.
- Check whether your potential participants who are contactable by e-mail have access to the Internet, as in many businesses employees have restricted access to the Web.
- Provide a PIN for limiting access to the questionnaire only to the participant of the survey. If possible use an individualized link, so that respondents do not need to enter an ID and a password.
- Give respondents the chance to choose the mode of their preference, as it offers the possibility of "soft" control for computer competences.
- Assure that IT support is warranted also beyond the end of the start-up phase and that there is a help-line facility (phone number of the department or administrator).
- For ethical reasons, do not acquire data without the knowledge of the respondent (for example cookies).
- Assure data protection, data security and confidentiality.
- Check the differences in the visual appearance of questions that result from different screen configurations, operating systems, browsers and screen displays.
- For the first invitation to an Internet survey preferably use a printed invitation letter that provides a sense of professionalism.
- Conduct a pilot study with volunteer firms and take into account their observations.

E-mail Invitation

- When using e-mail invitations, adhere to a widely accepted format (at present the plain-text format). HTML e-mails and attachments may be rejected for virus risks.

- Ask your participants to place your e-mail address in their address book or the company's safe senders list. For that purpose use a project e-mail address that is not affected by executive staff changes.
- Avoid using bought-in e-mail lists, as you could be labeled as a spammer.
- Avoid spammy-sounding words in your e-mail. It is also recommendable to avoid the use of "*click here*", unsubscribe instructions and/or explanation of why the recipient is on the list.
- Use a recognizable, short, and consistent "*From*" Address.
- Avoid the "*Subject*" line words written all in small case or all caps.
- Send your e-mail campaign to several test accounts to prove whether some ISPs are falsely treating it as Spam.
- Maintain address list cleanliness, regularly remove invalid e-mail addresses.
- Find out the validity of your e-mail list (the real contact rate) by incorporating regularly the "confirm reading" function into your e-mails.

Designing the Questionnaire

- Find out, how most of your respondents are getting on-line (dial-up or broadband connection like DSL and cable) because it determines the reasonable file download time.
- Introduce the Web questionnaire with a welcome and attractive screen that is motivational and emphasizes the ease of responding.
- Use a personal salutation at the beginning of the questionnaire to prevent computer-mediated communication with participants from being perceived to be more anonymous than the traditional communication.
- Present each question in a conventional format similar to that normally used on paper questionnaires with self-explanatory and intuitive instruments.
- Restrain the use of too many colors and design features that may distract respondents' concentration from the questions. One commonly used rule is to use three colors. Take color blindness into account.
- Ensure that the font is big enough within different screen configurations.

- Do not sacrifice practicality for style, like extensive graphics, features and automated data checks, since browser incompatibility may result in a longer download time and accordingly in higher end user costs
- Be aware that the user can disable Java, JavaScript, Cookies and Active X elements. Stick to the strategy of the smallest common denominator.
- Use sparingly drop-down-boxes and other instruments that require several simultaneous mouse movements.
- Minimize the number of control functions (automated data checks, where respondent is asked to control or to improve the value). They may not only frustrate participants but also be generally more time-consuming and cause a higher burden, particularly to respondents who make mistakes.
- Be aware that on-line readers read more quickly and impatiently. For questions known to be subject to mistakes, highlight important parts and include instructions that remind respondents to pay attention.
- The important text passages should be in the reader's view and should not occupy the whole width of the screen.
- Construct Web questionnaires so that respondents can scroll down from question to question. Avoid the necessity to scroll sideward.
- Use a multi-page design merely for automatic skipping, conditional branching or adaptive questionnaires. If using a multiple-page design, a progress indicator should be utilized showing respondents how close they are to the end.
- Try to use the same layout and alignment of scales in the Internet and the paper version of the questionnaire, to avoid possible influence of the visual layout and question order on the responses.
- Incorporate a reset option.
- Allow respondents to interrupt and reenter the survey in case they were disturbed or wish to continue the answering process at a later time-point.
- Be aware that an increasing number of Internet users disable "pop-up" windows in their Internet browsers.
- Use different forms for different kind of questions: for example, square checkboxes for multiple-choice questions and round radio-buttons for single-choice questions.

- Make sure that the Web form is printable in case participants want to save a hardcopy of their responses.

Analyzing the Results

- Analyze whether there are differences in results across modes (item non-response, validity and reliability criteria) and systematically analyze the sources of these differences (questionnaire design, coverage, selection bias etc.).
- Check whether sample characteristics of Web respondents are comparable to those of traditional paper respondents.

Giving Feedback

- Use the Internet as an additional platform for personal contacts with the respondents (for example Season's Greetings), for the display of additional information (frequently asked questions) and attractive output (customized reports).
- If possible, create an Intranet facility as a distinct member privilege, accessible by a unique password.
- Regularly gather feedback about user satisfaction from participants to identify the strengths and weaknesses of your Website.
- Assure adoption of on-line questionnaires to the constantly changing Internet environment and be aware of the increasing requirements of the end-users.

Security

- Create awareness among your participants about a safe handling of their IDs and passwords. Instruct them not to share their access information with anyone except they are assured that the request has been posed by an authorized party.
- Regularly up-date your anti-virus and ensure that Spyware applications and anti-Trojan packages have been added to virus list.
- It is also advisable not to save the information about your participants in the address book of your Outlook or another email software, but in a separate file (an Access or an Excel file, for example), as some viruses are configured to scan this areas and automatically to send an infected file to all addresses found.
- Use SSL (Secure Socket Layer) protocol to ensure encryption of server-client exchanges.

▪ **Web Resources**

Web Survey Methodology Website: <http://www.websm.org>

The site is dedicated to the methodological issues of Web surveys, but it also covers the broader area of interaction between modern technologies and survey data collection

A.O.I.R. - Association of Internet Researchers Website: <http://www.aoir.org>

The Association of Internet Researchers is an academic association dedicated to the advancement of the cross-disciplinary field of Internet studies

Internet Survey Software: Check the Web Survey Methodology (WebSM) Website for an extensive list of available internet survey software: <http://www.websm.org>

Bounded Sender Program is designed to ensure that legitimate emails are not inadvertently caught in spam filters: <http://www.boundedsender.com>

Lyris ContentChecker filters a message through several SpamAssassin tests to determine if it has characteristics typical of unsolicited Spam mail: <http://www.lyris.com/contentchecker/>

WindowsSecurity: <http://www.windowsecurity.com/>

This site contains extensive information on Windows security issues, including news, articles, free security software and up-dates. It offers a series of free newsletters on the most recent security topics.

▪ **Recommended Books**

Batinic, B., Reips, U.D., Bosnjak, M. (2002): *Online Social Sciences*. Hofgreffe

Dillmann, D. A. (2000): *Mail and Internet Surveys – The Tailored Design Method*.

Schonlau, M., Fricker, R. D., Jr., & Elliott, M. N. (2002): *Conducting Research Surveys Via E-Mail and the Web*. Santa Monica, CA: Rand.

Samuel J. Best, Brian S. Krueger (2004): *Internet Data Collection*. Thousand Oaks, CA : Sage Publications

Hewson, C. M., Yule, P., Laurent, D., Vogel, C. M. (2003): *Internet Research Methods: A Practical Guide for the Social and Behavioural Sciences*. British Psychological Soc: Leicester.

OECD (2003): *Business Tendency Surveys – A Handbook*. Paris

OECD(2005): *Communications Outlook 2005*. Paris

Glossary

Acrobat: see PDF

ActiveX: A language which enables dynamic content on a Web page in the form of animations, video sequences and virtual reality displays. ActiveX controls include Shockwave and RealAudio. A technology developed by Microsoft.

Applet: A small program embedded in a Web page which can perform a particular task. See also Java.

ASCII: American Standard Code for Information Interchange is the technical term for plain text files which consist only of characters. (Word documents are not necessarily plain text as they include further complicated coding, such as tab, fonts etc.)

Bitmaps, pixels and resolutions: Web graphics are bitmaps, which means they consist of a fixed number of pixels (dots) in width and height, each one of which is assigned a specific color. Resolution refers to the number of pixels per inch (or centimeter) at which the graphic will display—most screens are at a fairly low resolution, around 72 pixels per inch.

Blind link: A link which doesn't lead anywhere.

Blacklist: Is a list of IP addresses that are associated with spammers.

Browser: A browser interprets HTML for display on the respondent's system. The most popular programs are Netscape's Navigator and Microsoft's Internet Explorer. Other browsers are also available (Mozilla Firefox, Opera etc.).

Cache: In Web parlance, an area of memory set aside for storage of previously downloaded pages. PCs and proxy servers make use of cache memory for quicker retrieval of material. They first access the cache when a request is received. Providing the requested page from the cache if so available allows for a quicker response to the user's request without having to access the source server for the information.

CAI: Is an acronym that stands for Computer-Assisted Interviewing.

CGI: Common Gateway Interface – a method for passing information back and forth between the user's computer and the Web server. This is necessary when an element of processing is required giving a customized response to the user. Usually this is what's used to process the respondent's data and save it to a data file.

Cookie: An ASCII text file downloaded onto a computer's hard drive by a site which then retains information about the user when they access the remote site again. The profile kept on the user's own computer is intended to identify the user. For ethical reasons, the user should be required to accept or be informed about cookies before allowing them access. However the user can configure their computer to refuse cookies, but this may make some sites inaccessible.

Dial-up vs. Full Time/Permanent/LAN Connections: These are different ways to connect through an ISP to the Internet. It is important to know how most of your respondents are getting on-line because it determines what a reasonable file download time is. Almost all private users and a significant percentage of businesses use conventional telephone lines, often at speeds around 28.8kbps (kilobytes per second). Large corporations and businesses use full-time high speed connections, usually accessed through their office server.

DNS lookup/ reverse DNS: DNS (Domain Name System) lookup is a method of resolving an IP address into a domain name. One of the applications of reverse DNS is Spam filter. Typically, a Spammer uses an invalid IP address. A reverse DNS lookup program inputs IP addresses of incoming messages to a DNS database. If no valid name is found to match the IP address, the server blocks that message.

DSL & ISDN: DSL (digital subscriber loop) and cable modems are replacing ISDN (integrated services digital network) as the latest and greatest Internet connections.

Firewall: a program or device that filters information coming through an internet connection and blocks packets that the user has identified as threatening.

Frame: A means of opening more than one file (HTML page) at a time in the same window. A typical use of multiple frames in the same window is to present a menu in one frame, site logo in another and content pages in the main frame. This way, the menu and site heading do not need to be replicated on each page and retain the same position and consistency, and remain visible regardless of scrolling in another frame.

- FTP:** File Transfer Protocol – a protocol for the exchange of files between computers on the Internet. Used to download files or upload Web pages to a server.
- HTML:** HyperText Markup Language is the standard format for Web documents. The language has been successful because it is simple and compact, allowing small file sizes for rapid downloads.
- IFRAME:** Internal frames in HTML pages that create pop-ups on the screen and set in place hidden tracking devices. They are commonly used in viruses, and some virus-blockers will block them in HTML e-mails.
- Intranet/Extranet/Internet:** These are three very similar words for the same technology; the only difference is the application. An Intranet is for internal company use, while an Extranet is used by a company to provide information and tools to vendors, partners or customers. The Internet is the general public domain (of which the World Wide Web is one part).
- Internet Survey:** Survey methodology that uses Internet based questionnaires, i.e. e-mail, Web or pop-up questionnaires.
- IP Address:** The four sets of numbers separated by periods which make up an Internet address. The Domain Name System (DNS) converts this numbering system into the more easily recognized URLs.
- ISP:** Internet Service Provider, a company that provides access to the Internet, usually for a monthly fee. Among the largest national and regional ISPs are AT&T WorldNet, IBM Global Network, MCI, Netcom and AOL.
- Java:** A programming language used to create interactive and animated Web pages. It is downloaded onto the user's computer when a page containing the applet is accessed.
- Java Applets:** These are full self-contained programs that can be embedded in a Web page or stand alone. While suitable for very small self-contained applets, they tend to be slow and do not have good support for platform-specific functions.
- Java-enabled:** Means a browser is capable of interpreting Java programming language.
- JavaScript:** A script language created by Netscape allowing various actions to occur on a Web page either automatically or as a result of user's actions. Such actions may include a pop-up menu appearing, or a graphic changing during a mouse rollover. Though most browsers support JavaScript, they may interpret it in slightly different ways.
- Mail survey:** Survey that uses a printed hard copy of the questionnaire.
- Metadata:** Information about information.
- MIME:** Multipurpose Internet Mail Extensions standard consists of the definition of a few new message headers, which indicate what sort of content is in a message (plain text, HTML, graphics, etc.) and how it is encoded.
- MP3:** A format for compressing sound into files. May require the downloading of an MP3 player if the browser does not have a player built-in.
- PDF:** Portable Document Format – a file format created by Adobe which preserves the original appearance of a document. Ideally suited to reproducing and distributing exact copies of journal or magazine articles, and brochures.
- Perl:** Is one of the most common languages used for CGI programming across Unix and Windows NT platforms. Its complexity and power rivals that of C/C++.
- Phishing:** When unsolicited emails attempt to acquire an internet user's sensitive information, such as credit card numbers or passwords by pretending to be a trustworthy person or institution.
- Plug-in:** A program that can be downloaded and installed as part of the browser in order that certain file formats can be viewed, played or accessed in some way. If the browser does not have the appropriate plug-in to view a file, a prompt is given to download the relevant plug-in.
- Pop-up questionnaire:** The questionnaire appears inside a new window – the pop-up screen.
- Pop-up stopper/blocker:** Prevents new windows from automatically opening when you visit a Website (available for example from Google).
- Portal:** A term used for a site that proposes to be an entry point to the World Wide Web, the intention of which is to retain the visitor rather than merely forward them to another site.
- Proxy Servers and Firewalls:** These are the guardians of a company's internal network, standing between the server and its Internet connection. A proxy server's job is to monitor outgoing traffic. Often it will log who requested what page, and to increase performance it will cache (save locally) copies of frequently requested

pages. A firewall is the side that monitors inbound information, including attempts to log-in from the outside, screening messages for viruses, or other potential security problems.

Spam: Is unsolicited commercial e-mail from an unknown sender.

Spyware: programs that are loaded onto a computer without consent and that track users' online activities, as for example Trojans. But also Cookies can be broadly regarded as Spyware.

SSL: Secure Socket Layers is a standard technology to establish an encrypted connection between the WWW server and the user and is designed to provide privacy. It is the most widely deployed security protocol in the world and is suitable for securing a wide variety of kinds of traffic: File transfer (FTP), e-mail transmission (SMTP), etc. Its successor is Transport Layer Security (TLS).

Trojan: A program that contains a sub-program that works undetected by the user. Trojans can transmit credit card information and other confidential data in the background. They are often not caught by virus scanning engines, because these are focused on viruses, not Trojans.

TSL: Transport Layer Security (see SSL)

UMTS: Standing for Universal Mobile Telecommunications System, UMTS represents an evolution in terms of capacity, data speeds and new service capabilities for mobile networks. UMTS supports up to 1920 kbit/s data transfer rates.

URL: Uniform Resource Locator. A Web page's address.

VoIP: Voice over Internet Protocol requires the customer to have a broadband connection, such as cable modem or DSL.

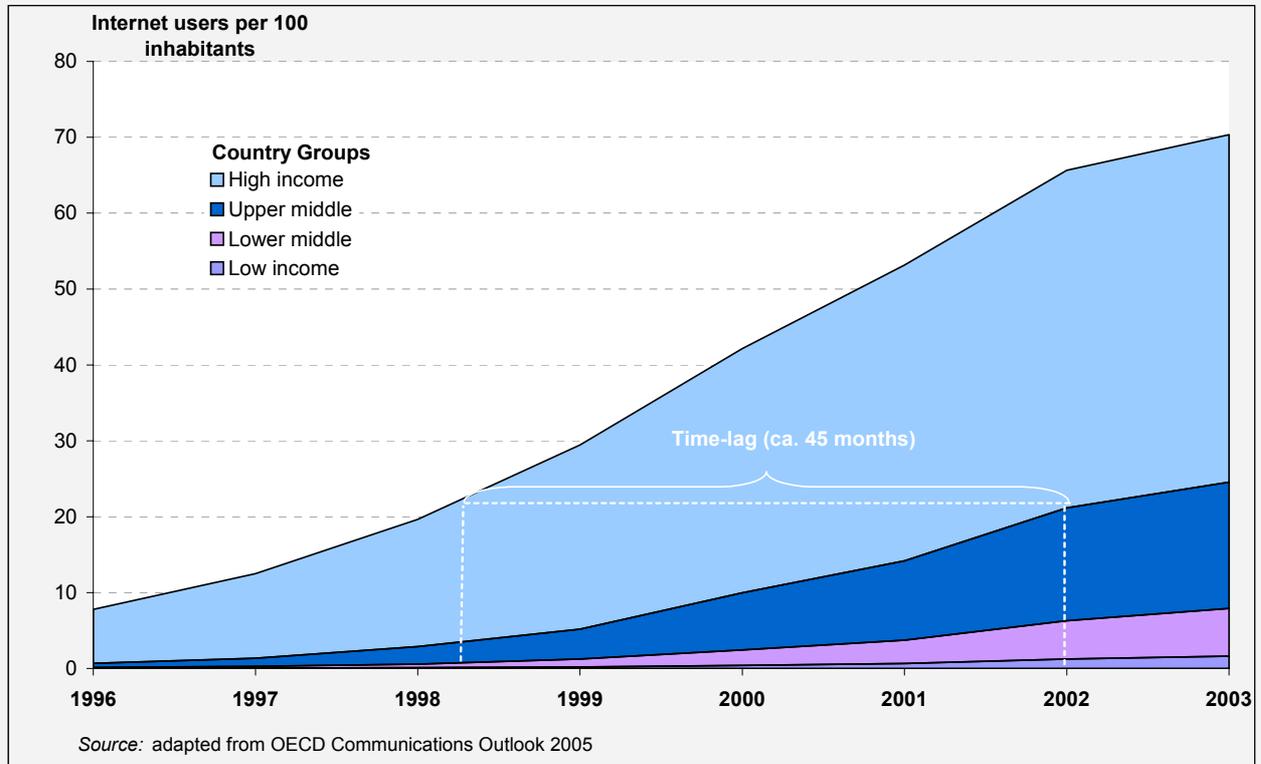
Web bug: is a graphic on a Web page or in an e-mail message designed to monitor who is reading the page or message (for example the IP address). Web Bugs are often invisible and typically only 1-by-1 pixel in size.

Web Server: Web servers fulfill requests for Web pages and run programs such as those for saving survey data. Unix is the favorite for high-usage Web servers.

Web survey: A type of survey that uses Websites to display the questionnaire and to collect the responses.

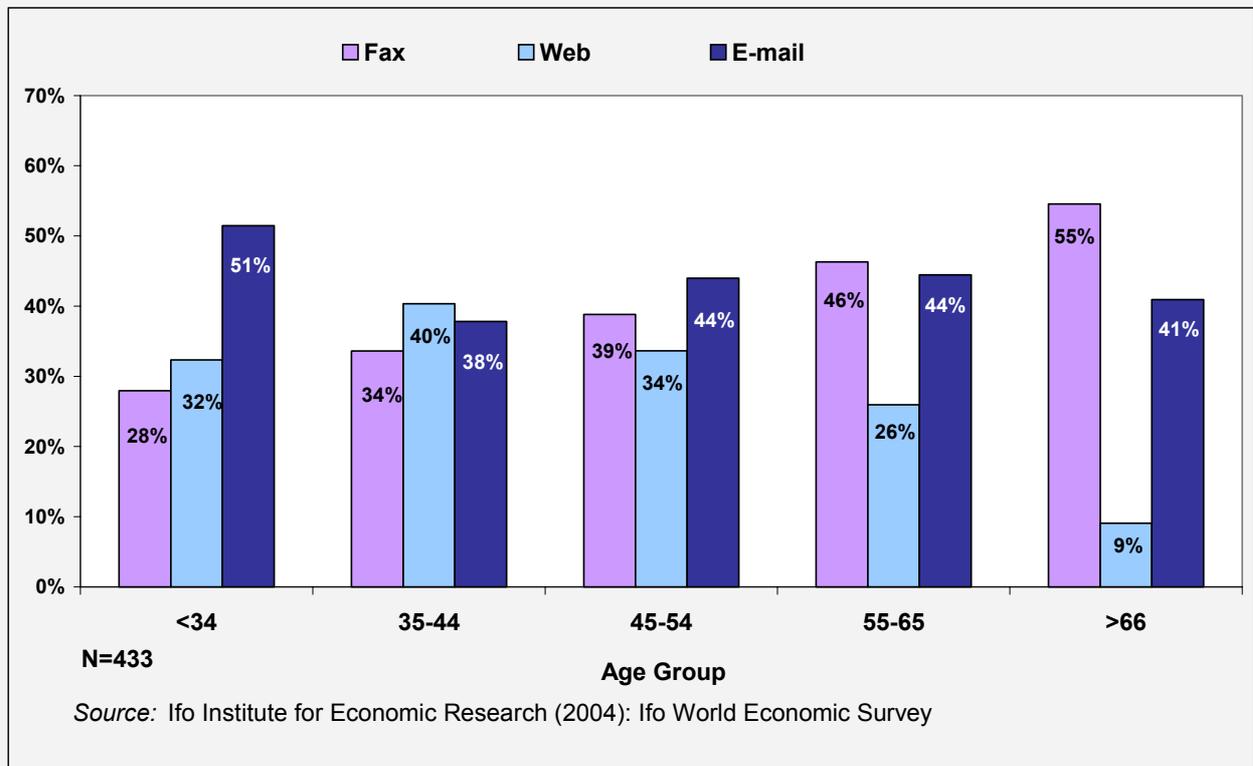
XML: Extensible Markup Language – XML is a format for specifying data structures in such a way that servers can easily display views of the information.

Annex

Box 1. Internet users per 100 inhabitants, by country-income level

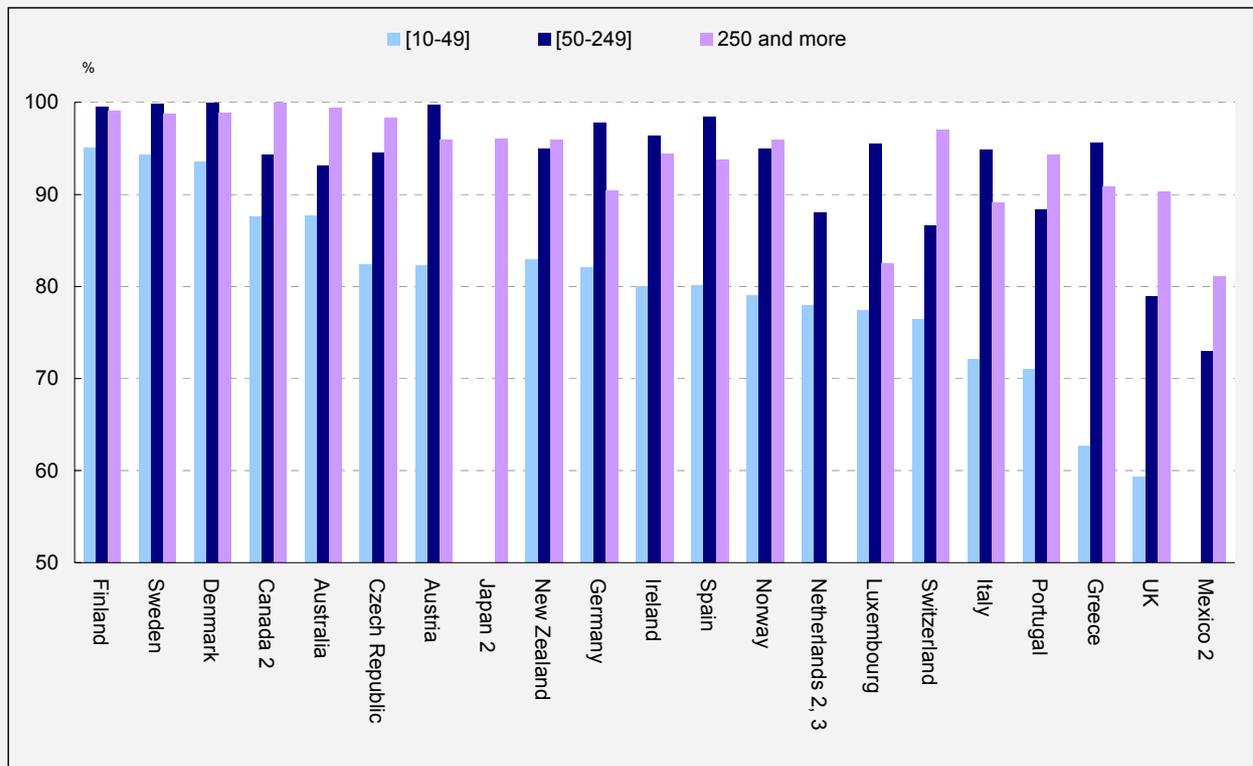
The recent data show that people around the world have much better access to the Internet than they did even four years ago. Though the penetration level in absolute figures is considerably higher in high-income countries, the data show that also in the middle-income and in low-income countries the development has accelerated during the past five years. Looking at development figures the time-lag between country-groups can offer valuable clues. In 2002, the share of Internet users per 100 inhabitants in upper middle-income countries was almost as high as in high-income countries by the middle of 1998. Thus, though in high-income countries the absolute figures are more than three times higher than in the middle-income countries, in 2002 the time-lag amounted only ca. 45 month. Looking at this progress, one may expect that in the course of the coming years similar penetrations levels can be achieved also in the lower-income countries. Several economies with relatively low income levels, such as Bulgaria, Romania, Belarus, and Moldova and at higher income levels, economies such as Chile, Latvia, Estonia, Slovenia, Chinese Taipei, Malaysia and Hong Kong, are catching-up relating the Internet infrastructure, according to the OECD Communications Outlook 2005.

Box 2. Fax, Web and e-mail Survey Preferences Among an International Business Survey Participants Audience (*multiple-choice*)



According to a worldwide study of the Ifo Institute that surveyed over 400 managerial executives in 78 countries in August 2004, there are as expected, differences across age-groups concerning the mode preferences (see Figure 1). Over 60% of business survey respondents in the age group younger than 44 years prefer to answer to a questionnaire via the Internet (either e-mail or Web), among respondents younger than 34 this share amounts about 70%. The e-mail appears to be equally popular among all age groups – about 40% of business survey respondents prefer to participate via e-mail. However, respondents to business surveys are usually in the age group 40+, and thus, in the generation of paper respondents. But we can expect that in the coming years we will automatically experience a shift towards higher preferences for Internet surveys.

Box 3. Percentage of businesses with ten or more employees using the Internet, 2001 or latest available year.



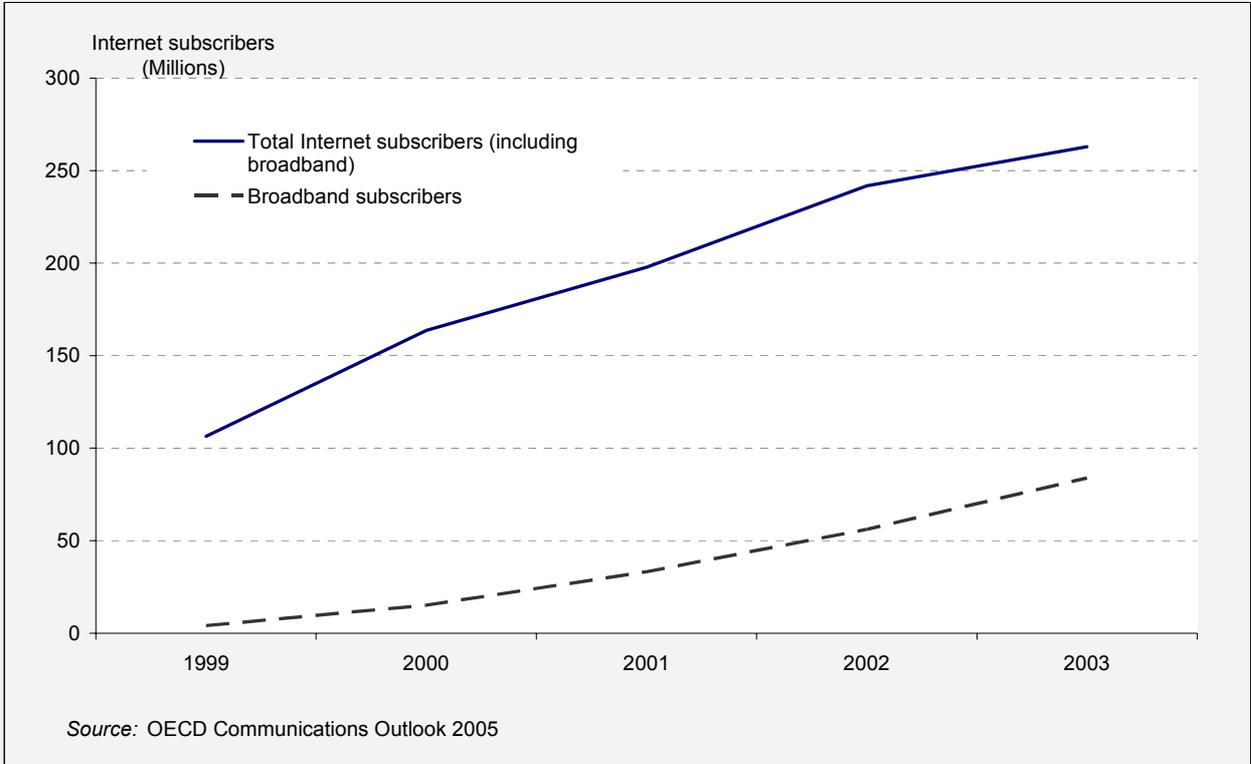
1. In European countries, only enterprises in the business sector, but excluding NACE activity E (electricity, gas and water supply), NACE activity F (construction) and NACE activity J (financial intermediation), are included. The source for these data is the Eurostat Community Survey on enterprise use of ICT. In Australia, all employing businesses are included, with the exception of businesses in general government, agriculture, forestry and fishing, government administration and defense, education, private households employing staff and religious organisations. Canada includes the industrial sector. Japan excludes agriculture, forestry, fisheries and mining. New Zealand excludes electricity, gas and water supply, and only includes enterprises with NZD 30 000 or more in turnover. Switzerland includes the industry, construction and service sectors.

2. For Canada, 50-299 employees instead of 50-249 and 300 or more instead of 250 or more. For Japan, businesses with 100 or more employees. For the Netherlands, 50-199 employees instead of 50-249. For Switzerland, 5-49 employees instead of 10-49 and 5 or more employees instead of 10 or more. For Mexico, businesses with 21 or more employees, 21-100 employees instead of 10-49, 101-250 instead of 50-249, 151-1 000 instead of 250 or more.

3. Internet and other computer-mediated networks.

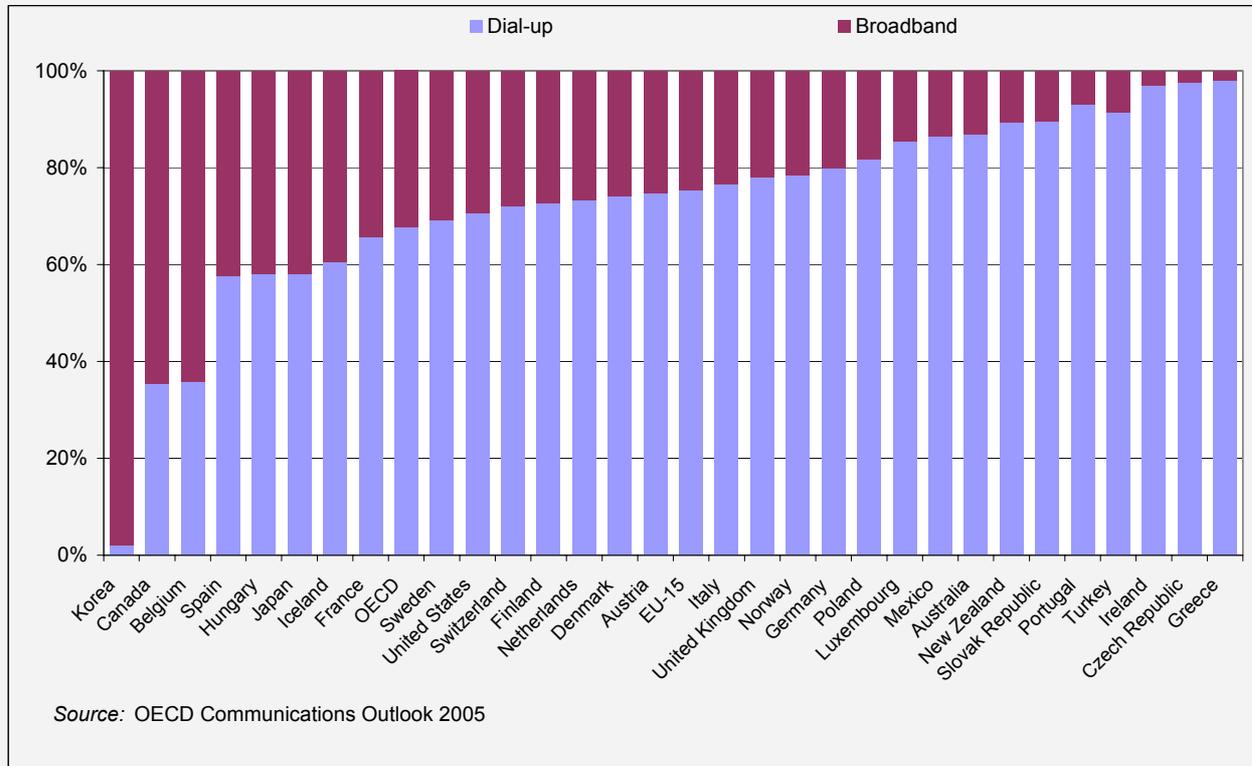
Source: OECD, ICT database and Eurostat, Community Survey on ICT usage in enterprises 2002, May 2003.

Box. 4. Internet subscribers and broadband subscribers in total for OECD countries



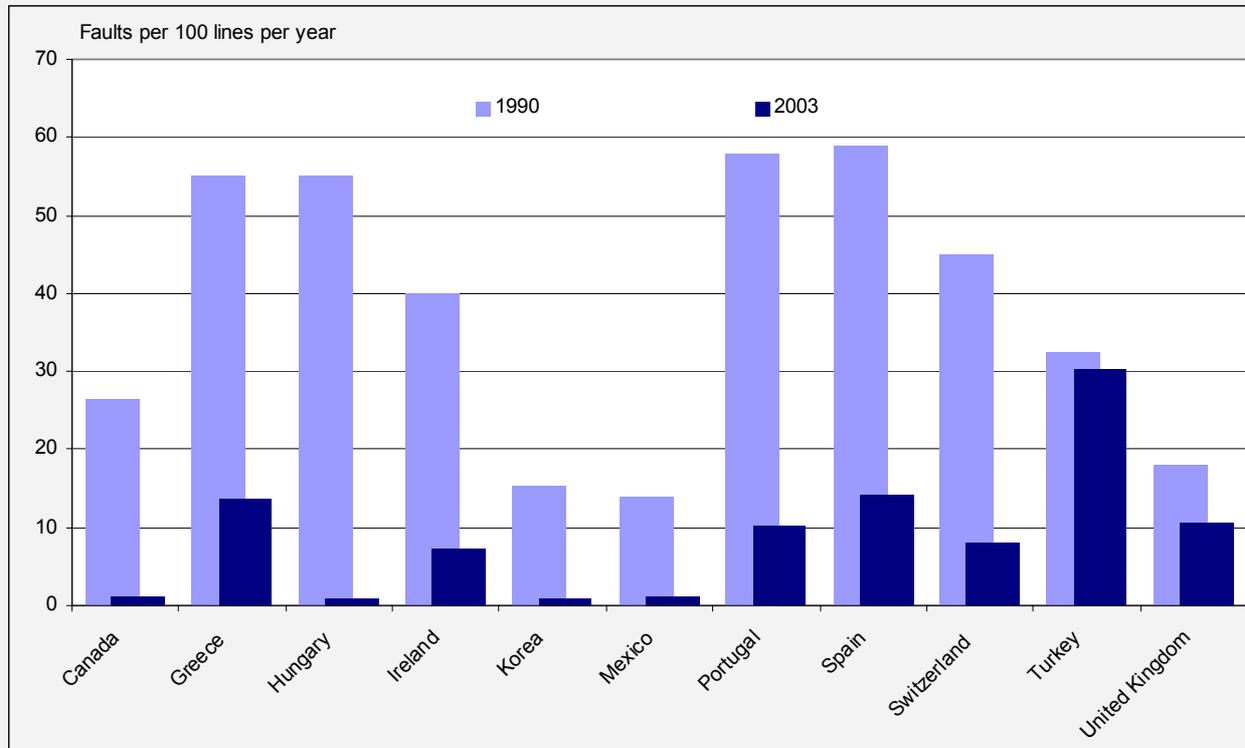
At the end of 2003, there were around 260 million active Internet subscribers with fixed Internet connections in OECD countries, up from around 106 million in 1999 or by almost 26% per annum. However, the scope and the quality of Internet depend upon the bandwidth. The annual growth rate of broadband Internet subscribers in OECD countries between 2000 and 2003 is almost three times higher, at about 77% per annum (84 million broadband Internet subscribers in 2003 – up from 15 million at the end of 2000), indicating a fast adoption of the new and important technology.

Box. 5. Dial-up and broadband shares of total fixed Internet subscribers, December 2003



By the end of 2003 dial-up subscribers accounted for about 68% (numbered 175 million), compared to 96% (102 million) in 1999. However, there are very strong differences among countries: Dial-up subscribers accounted for just 2% of fixed Internet subscriptions in Korea, compared with more than 95% in Greece and Czech Republic. But also in Canada and Belgium, dial-up access accounted for less than 50%. But, there is a strong catch up among countries with low broadband subscriptions, as for example in Greece, Ireland and Hungary, according to the OECD Communications Outlook 2005.

Box. 6. Quality of service improvements in selected OECD countries 1990 and 2003

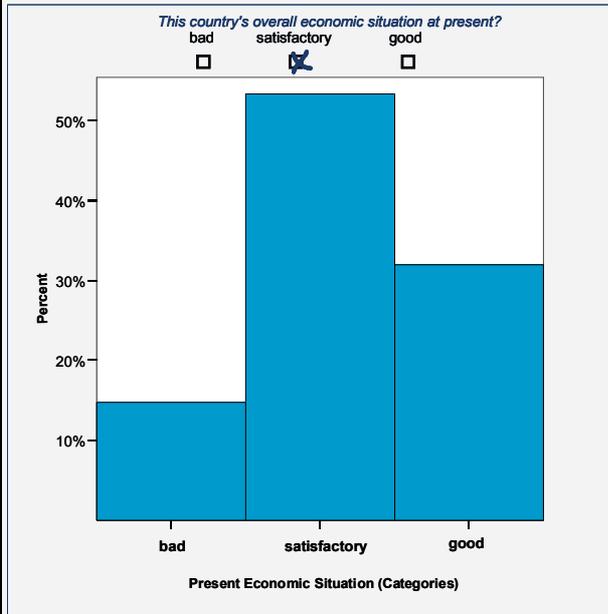


According to the latest OECD Communications Outlook 2005, OECD countries are continuing to increase network reliability. The number of network faults is expected to further decrease with the implementation of fibre optic lines. Fibre optic networks can be reconfigured via a computer terminal and usually do not require a technician to physically connect and disconnect wires as it is common with copper networks.

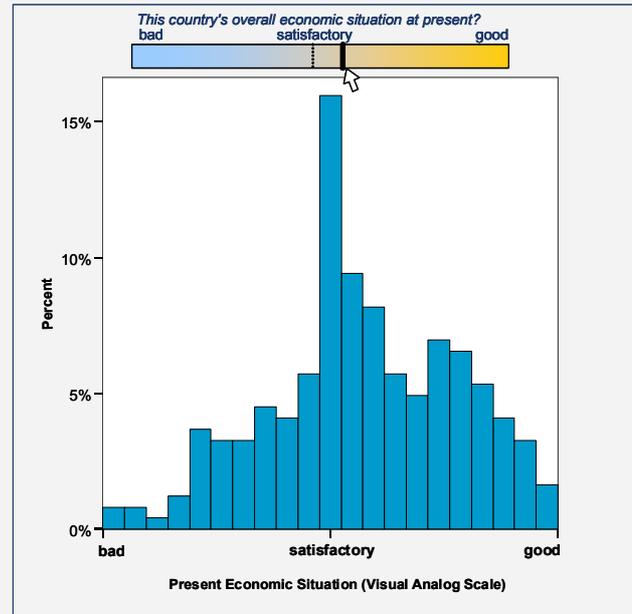
Source: OECD Communications Outlook 2005

Box. 7. New Instruments: Results from Categorical and Visual Analog Scales Applied to the Ifo World Economic Survey (WES)

Categories



Visual Analog Scale



The Visual Analog Scale (VAS) is now applied by the Ifo Institute in two major surveys: World Economic Survey and the German Industry Survey. The respondents' reaction to the new scale was very positive according to the responses in the "Comments"-field provided below the graphical scale. The vast majority of participants was generally very positive about the new opportunity to give a more detailed response than it was possible within three categories. The low amount of clicks that was registered in the background (without the respondent to take any notice of it) suggests that the respondent's choice of the cursor position happens intuitively.

The above results are based on the Ifo World Economic Survey that polled 244 Web respondents from 61 countries in April 2005. The results show that the Analog Scale opens the black-box of the central category and allows a much deeper discrimination between positive and negative responses. While within the categorical scale the proportion of respondents who opted for the central category amounted over 53 percent, in the case of the Visual Analog Scale only 16 percent of the same respondents put the cursor around the tolerance interval of the central mark ($\pm 2\%$ of the scale length). This fact leads to the conclusion that for the remaining 37% who opted for the central option within the categorical scale the present economic situation of their country hasn't yet reached a personal benchmark which would make them choose an extreme option. In the case of the Visual Analog Scale those respondents can express not only the direction of their assessment, but also the intensity.

Source: Ifo Institute for Economic Research, Munich, Ifo World Economic Survey Q2/2005