

## **Design in the ICT Industry: The Role of Users**

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Currently there is a boom in the management literature on the topic of “customer-orientation”. A random exploration of some contributions shows that their arguments are often based on examples drawn from business cases or anecdotes of everyday experience and events where the customer was treated as a nuisance and his or her interests were not taken into consideration at all. These arguments then often go on to draw very general conclusions, making some critical notes on how to improve the organisation of the production or of the distribution chain in order to improve the interaction between the customer related inter-firm departments.

Such analyses often present examples of the “best practice” which have been achieved by successful companies<sup>1</sup> which, we are told, know how to segment their customers. It is pointed out how such firms employ adequate empirical methods to assess customer needs, define their marketing mix accordingly, run customer services well (e.g. via hotlines, complaint management) and have incentives and programmes to convert their first contact customers into steady customers (RKW 1996). In industry, especially as a consequence of efforts to promote Total Quality Management, programmes such as “customer focus” have now been running for some years. But as we know from our own experience in the field of industrial software (Konrad and Paul 1999), these have not affected market shares substantially.

All the good advice offered in the business literature and in the discourses about customers within corporations seems to take for granted the assumption that with better methods, better marketing, better management and better technology the problem can be solved within existing product development structures. This assumption needs to be questioned. There are good reasons to argue that a “user-orientated product design” should take the Human Factor usability studies (Karamjit 1996) and the related ergonomic discussion seriously. This would mean a very different kind of approach to product development, one which would involve users more and which would investigate their requirements during the design process. It would certainly entail questioning assumptions about the “average user”. And we argue in more depth later in this article that the resulting design should aim to be inclusive of as many users as possible, moving in the direction of “Design for All”- although this concept would itself need more pragmatic clarification since at the moment it is a highly normative aspiration.

If the above illustrates the general terrain which this chapter explores, it is useful to add some extra observations about the specificities of design in the industry we are about to examine: the industry developing information and communication technologies (ICTs). Here the above mentioned approaches to developing a better combination of technology and marketing have even less of a tradition. Previous research has charted the extent to which innovation remains technology-driven, with ideas largely generated and championed by technical staff (Cawson, Haddon and Miles 1995). It would seem that in the ICT industry the virtues which are more often paramount include being the first to market in the ever increasing race for new features, greater storage and faster processing

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<sup>1</sup> See for example Staminski 1998.

speed. Most new technology-centred product development targets early adopters such as the technical expert and the advanced high-tech fan, hoping for a trickle down effect with products reaching the mass consumer after a time lag. The problem here is that there is less chance that user needs and interests other than those of technically oriented consumers will have significant impact on product development.

These general concerns result from fact that the two communities of usability experts and practical designers in industry interact only to a limited extent. The role of this chapter, which starts from these concerns, is to examine in more detail the various arguments for user-centred design and to chart the extent to which it exists in the contemporary European ICT industry. In the first part of this chapter we argue in the tradition of analysts who are sceptical of the extent to which various ICTs symbolising the information age are accessible to everyday ICT users, at the same time indicating that one key factor identified by a number of writers is the goal of design within this industry. Using the example of computers in particular, we indicate how the desirability of more user-centred design has been stressed by various authors. The next part of the argument looks at the relative neglect within the design community of elderly and disabled users in particular and related moves to promote more “inclusive” design, under the heading of “Design for All”. The proponents of this concept argue that such design serves to develop applications which are more acceptable for a wider range of users than are often targeted, leading to gains for both industry and consumers in general.

The second part of the chapter reviews a recent European study of design within the ICT industry, charting the consideration given to a) end users in general b) elderly and disabled users in particular and c) the Design for All approach. Apart from indicating the limited extent to which all of these are considered, the main emphasis of this section is on the reasons why a more user-centred and ‘inclusive’ orientation among designers is still far from being prevalent, although some examples of the positive strategies which are used by firms are provided.

### **The Usability of ICTs**

It is a common belief that societies are undergoing a rapid transformation towards the information society. Government initiatives and EU programmes such as IST<sup>2</sup> hail this change while promoting the technical infrastructure and the development of new technologies which should improve living and working conditions in the information age. The underlying assumption is that ICT products are fast becoming an integral part of the transaction and interaction networks in our society and that more and more people work with ever-improving technology in high-tech jobs or in the information processing service sector. Highly qualified “knowledge workers” who solve, identify and broker problems by manipulating symbols (Reich 1994) are seen as helping to build the workforce of tomorrow and set the pace for people who want to keep up with the future demands of the labour market. In this process the boundaries between work and leisure seem to blur. Many of today's adverts operate with the smart looking, young businessman

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<sup>2</sup> Information Society Technologies

(and to a lesser extent business-woman), who holds a portable PC in his or her hand in some leisure context, musing over the advantages of home-banking, life-insurance, etc. The mobile “all in one” laptop PC is a symbol of how flexible work can exist almost everywhere, with the technology providing all kind of features which serve the informational and leisure needs of its owner. Nowadays to take part in the world significantly seems to be impossible without a computer.

But for millions of people who have no computer at home this form of participation is not possible. And there are still further millions who may have a PC but never use it or else use it only occasionally for writing a letter or for playing a computer game. Growth rates for the penetration of home computers have been rather moderate in the late 90s and - apart from some European exceptions such as Finland - only a small minority of Europeans have Internet access. In fact, there is a large number of people who are indifferent to, and sometimes even scared of, using the computer at home. One study estimates that between 30 and 40 percent have vague feelings of “techno-stress” (Weil and Rosen, 1997). These people feel insecure and humiliated by their incapacity to handle new technologies and thus try to avoid what they perceive to be unpleasant contact with them (Focus No. 35, 24 August 1998, p. 114). Such customers are rarely approached by the computer-industry.

Norman draws attention to role of product life cycles, arguing that the ICT industry is in many aspects still in its adolescent stage. Technology-driven innovations and new interesting but complicated features designed for the high performance of specific tasks target the needs of technology enthusiasts and early adopters<sup>3</sup> Early adopters are pragmatic users who want to profit as quickly as possible from the advantages offered by these new devices, even though they know that the first versions have shortcomings. However, the majority of users are actually later adopters. These people enter the market only after the technology has matured, when the product has improved in quality and provides both reliable solutions and convenience.

*"The problem faced by the technology company is that the strategy for dealing with the customer in the early phase of a technology is contradictory to a strategy required in the mature phase. At first, the selling point is the technology and the list of features. At maturity, the selling points require that the attributes of the technology be minimised. The buyers now focus on solutions and convenience, on their experience with the product. They want to talk with experts in their problem, not experts in technology"* (Norman 1998, p.34).

In fact, Norman (1988) is convinced that one reason why people abstain from acquiring the personal computer is that it is a multi-purpose machine, which makes the device too complex and too difficult to understand. Its development is still driven by “rampant featurism”.

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<sup>3</sup> In innovation research a classification of customers into innovators, early adopters, early majority, late majority and laggards is common, following the concept of Product Life Cycle as developed in the early 60s. See Rogers, 1962.

*"The personal computer is perhaps the most frustrating technology ever. The computer should be thought of as an infrastructure. It should be quiet, invisible, unobtrusive, but it is too visible, too demanding. It controls our destiny. Its complexities and frustrations are largely due to the attempt to cram far too many functions into a single box that sits on the desktop. The business model of the computer industry is structured in such a way that it must produce new products every six or twelve months, products that are faster, more powerful, and with more features than the current ones. The result is that the entire industry is trapped by its own success, trapped into a cycle of ever-increasing complexity from which it cannot escape"* (Norman 1998, introduction, p. VIII).

Norman's conclusion is that only human-centred product development can overcome these obstacles, which takes the user's experience into account (through field studies, models and rapid prototyping, user tests, etc.) and which involves the user in product development.

Such sentiments are echoed in other related fields. For example, Landauer (1997) starts his book by looking for reasons why productivity in the service sector has not increased - in spite of massive investment in computer technology (called the "computer productivity paradox"). He then quotes several studies which show that a user-including, user-centred design results in high degrees of improved efficiency (Landauer 1997, p.222 f.). Case studies show that there a variety of ways exist to arrive at a more user-centred design and that the benefits of usability assessment are larger relative to its cost.

### **Usable products for whom?**

Analysts such as Norman, who have raised their voice for many years<sup>4</sup> promoting a user-orientated design, form part of a chorus composed of interface designers, work psychologist, specialists in ergonomics and other usability experts. Rooted in ideas of a human-centred production and the social shaping of technology approach (Williams and Edge 1992) which has been articulated since the 70s<sup>5</sup>, a rich body of knowledge of human-centred systems has now been developed (Shneiderman 1997). To a certain extent this knowledge has been taken up: important principles of usability<sup>6</sup> have been implemented as national industry norms. But generally ergonomics in a wider sense has been mostly restricted to business applications because customers such as large service-providing firms would simply not buy software products and other high-tech products which were complicated, hard to learn and of little use for the everyday practice and tasks of their employees. In contrast, average home computer users have for many years been left to cope with indecipherable handbooks, so called "self-explaining" programs which in practice are not and updates that have been a reaction to the worst shortcomings of the system. We still see an ever-increasing flood of "how to" books and journals offering to

<sup>4</sup> See also Norman, 1988.

<sup>5</sup> For example in the German programme "Humansisierung des Arbeitslebens" and in the North-Rhine Westfalia program "Sozialverträgliche Technikgestaltung", and later in the European Commission programmes on anthropocentric systems.

<sup>6</sup> For example the possibility for individual users to adjust software to their particular purposes and skills.

“make computing easy”, publications which are needed to translate the demands of a well functioning system onto the horizons of the average user.

Admittedly, and as the empirical work described in this chapter illustrates, the usability departments in the more advanced firms or sectors which by definition have had to serve a broad public, such as the national telecoms companies, have tried to improve the usability of their products for the average consumer. However, on the whole the requirements of groups like elderly or disabled people have more rarely been included in ICT design, in part because they have not been regarded as promising customer segments. Instead, the informational needs of people with impairments have been delegated to specialist firms in different ICT sectors which provide assistive technologies. Such companies have had a far slower pace of development compared to the “normal” ICT market - with the result that the gap between the range of products on the market for “special” and for “normal” customers has increased. Meanwhile, and neglecting demographic trends which indicate a growing number of elderly people with substantial high purchasing power, ICT firms have generally not developed strategies and products for this so-called “silver market”. This is despite the fact that human interface experts have accumulated valuable insights as regards how to proceed in design in such a way as to take into account the requirements of such groups (Steenbekkers and van Beijsterveldt 1998).

In the 90s advocacy groups responded to the obstacles that make products for elderly and disabled people lag behind mainstream telematics ICT-products and services, and which thus hinder the possibilities for them to live independently. The advocacy groups launched a discussion of how a non-excluding design could be fostered such that there are now almost identical definitions and conclusions in the American discussions of “Universal Design” and “Accessibility” and in European ones of “Barrier Free Design”, “Usability”, and “Design for All”. All of these agree upon the American TRACE Centre definition of Universal Design which is *“The design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialised design”*<sup>7</sup>. This normative concept implies that designers have to look at a person who has an impairment just as they look at any other person. This is exactly the aim of the Design for All principle, which can be defined as the *“designing of products, services and systems that are flexible enough to be directly used, without assistive devices or modifications, by people within the widest range of abilities and circumstances as is commercially practical”* (in Porrero and Ballabio 1998, p.96).

Hence, the message of the Design for All approach is that adapting products and services to those who make some of the strongest demands on accessibility may ultimately benefit the average user as well. If a user with limited eyesight can use a product, someone with normal eyesight no longer needs to squint. By providing on-line services in text format for visually impaired readers, those with older computers may also profit from them. Bank services which offer voice control might also benefit someone who is driving or travelling. A public Internet terminal that caters to the needs of wheelchair users might be

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<sup>7</sup> [http://trace.wisc.edu/docs/ud\\_princ/ud\\_princ.htm](http://trace.wisc.edu/docs/ud_princ/ud_princ.htm).

better accessible to someone carrying a child or a suitcase. While clearer visual interfaces might be of particular benefit to people with reading problems, they might also help those who speak another language. And larger buttons and instructive and self-explaining interfaces, designed with older users in mind, might help all of us to learn how to program our video recorders.

## **The Study**

In 1998 we had the chance to assess the obstacles to such a Design for All approach within the European ICT industry.<sup>8</sup> In a study for the European TIDE<sup>9</sup> programme more than 80 intensive interview were conducted in various European countries.<sup>10</sup> These interviews were with experts, mostly middle- and high-ranking managers, from marketing, product management, design and the usability departments of firms in the ICT sector (e.g. hardware producers, software houses, telecom operators, Web-service providers, etc.).

An interview guide which started with general information about the firm and the market then investigated how the innovation process was organised, exploring how companies gained knowledge of their (actual and potential) customers and what forms of user-involvement were employed during the different stages of design. A further section of the interview explored whether and how products and the marketing strategy of the company catered to any specific needs of elderly and disabled customers. The last part of the interview centred on Design for All principles, investigating to what extent these were known, appreciated or implemented within firms and whether interviewees felt there were good examples of these principles in practice. Respondents were also asked what they regarded as being the main obstacles to a practical implementation of Design for All both within their own company and in the whole industry sector and what they felt the limitations were as regards their own ability to cater for elderly and disabled people.

## **Considering End Users in Design**

A proportion of firms were simply not interested in feedback from end users because they measured success solely in terms of increasing sales figures, assuming that these were sufficient to show that the product met user demands. On the other hand, some form of user involvement in concept, prototype and usability testing was routine in some, especially large, firms. However, while a majority of interviewees in firms where user involvement was practised accepted the desirability of such practices, even here a few project managers had reservations about the value of some of these exercises (e.g. due to the perceived artificiality of trials or doubts about the benefit of testing radical concepts on focus groups). Secondly, while some firms which had collected information about

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<sup>8</sup> For more details, see the main report on this study: TIDE Report, December 1998.

<sup>9</sup> Telematics for the Integration of Disabled and Elderly people.

<sup>10</sup> The bulk of interviews occurred in Germany, the Netherlands and the UK, with additional studies in all the Scandinavian countries, Italy, Spain and France.

users were able to feed this feedback into on-going or future design, others were less successful in systematically integrating such data into new product development. Finally, there were the companies, more often but by no means exclusively smaller ones, which had very little or no user involvement. In general, key practical restrictions were time and financial pressure, which sometimes impeded even post-launch feedback and re-design.

The interviews rendered the impression that interactions and feed-back loops between the departments in charge of the definition, design and production of a new device were too scarce and not systematically considered. Differences in style, culture and notions of the customers' needs in the departments of marketing, design and product-management were further obstacles. Shortage of time, financial restrictions and reliance on proven practices contributed to the prevalence of a traditional way of product development. In this process, design is one functional element of a sequential process (see Kiss 1999, p.12).

The technology-orientation of some ICTs companies meant that they only considered a restricted range of users rather than the full spectrum of a mass market. ICT developers were mostly engineers who had acquired little or no knowledge about human-centred design in their professional training. The engineering attitude of thinking in terms of technical solutions was dominant among developers who often saw users as technophile people like themselves, although in some of the larger firms attempts were currently being made to change the company culture in order to be more sensitive to the market. Other factors limiting the search for user feedback included the belief by some companies that they served the user's needs sufficiently by the application of certain established design principles derived from "good" ergonomics, such as a commitment to simplicity, error-friendliness, allowing self-explanation, building in help functions, etc. Meanwhile some firms which were being monitored closely by their competitors were actually reluctant to test out certain new products with potential users for fear that other companies in the market would be alerted too soon.

Some firms, especially larger enterprises, had set up units which specialised in gathering data about end users, in the form of market research departments, social science R&D units, Human Factors or units specifically focusing on ageing and disability. However, while these achieved some success in raising the profile of end users, their influence was uneven across and even within firms for a whole range of reasons. One key problem was the structure of such companies, giving rise to communication problems between the different units and which even led to resistance from fairly independent subsidiaries and profit centres to staff who they regarded as being "outsiders". Sometimes it was difficult for end-user oriented units to track all the innovations within a company, to identify key decision makers or know how best to influence them. Hence, diffusing the knowledge of users which had been acquired in such usability units became a difficult task. But also some of the staff in these profit centres were sceptical of any such inputs, and so were less receptive to feedback about users.

There were also issues concerning how networks of firms with complementary assets collaborated (e.g. hardware, software, service providers). Some of the actors in such

collaborate initiatives could define the limits of design for others, constraining how much the latter could build upon their knowledge of end-users. For example, operators offering communication channels could set constraints on design, in terms of guidelines as to what can appear on screen. Or service providers for mobile telephony as well as hardware companies could determine what facilities were available on their phones, terminals, TV sets.

In addition, any system of sharing knowledge about users could often be very complicated, even though access to such information was especially important for those designers in sectors which were one stage removed from contact with actual end-users (e.g. in firms developing generic hardware). Some firms did not feel obliged to pass on their feedback about end users to their commercial partners, or else they were selective in what they did choose to pass on. And often where collaboration involved many partners, as in the case of a new banking terminal, there was a zone of uncertainty as regards who exactly had to seek and provide any feedback about end-users, with the partners sometimes mutually regarding each other as the key actor in this respect. As a result responsibility could evaporate.

### **Considering Elderly and Disabled Users**

In spite of a broad awareness of the 'silver market' constituted by elderly people, the firms interviewed often felt that they lacked precise information on its market potential as well as information about the special needs of the elderly. Perhaps even more of a barrier to considering elderly users was the various stereotypes which designers had concerning older people: such as assumptions as to what would and would not be of interest to elderly people and the view that since the elderly belonged to a particular pre-computer generation this implied a low level of technical skills and reluctance to learn new practices.

Equivalent, equally misleading, images occurred in relation to disabled people. Only some forms of impairment tended to be considered, predominantly those relating to mobility problems (e.g. people in wheelchairs) and to visual ones. Even in firms where special ageing and disability units had been established, or where very committed individuals drew attention to the needs of these disabled users, these staff acknowledged that within their companies there were different levels of awareness about impairments. Advocacy groups were rarely consulted and existing specialist research institutes concerned with older and disabled people were largely unknown within the ICT industry and seemed to have little prestige and influence among these firms. So, for example, the needs of emerging Internet networks of senior citizens (Erkert 1998) were not served.

As a consequence, although with some important exceptions, neither older people nor people with disabilities, nor the institutions representing them, currently played a significant role in the design of ICTs. In a number of cases, firms did not consider elderly people or disabled people to be part of their target group and they certainly did not regard them as being a relevant growth area. A different response was simply to see elderly people as being part of the mass market for whom they catered - yet in such cases there

were few examples where we could observe designers making a special effort to think about the particular implications of design for these older people. Again, cost and time pressures or the need to develop a radical innovation rapidly were mentioned as reasons why disabled or the elderly people's interests could not be considered.

One further consideration which needs to be discussed is the availability of information about or awareness of accessibility issues. Although there were some complaints about the difficulty of finding out about accessibility issues, this varied by industry and by the nature of the ICT in question. For example, in some countries, there was evidence that at least some young engineers entering firms had increasingly encountered accessibility issues in their educational courses. And with regard to different industry sectors, in areas such as public access terminal design there was some readily available material. At the other extreme, some designers of interactive services felt they were at the cutting edge of innovation where very few available guidelines existed detailing just what the accessibility issue might be. In between, for example in web-site design, there were the, mostly self-taught, designers who had learnt their skills mainly from the limited reference books which were on the market - books which also failed to deal with accessibility issues. The absence of any discussion about elderly or disabled users in the professional magazines was also mentioned in this respect.

We should point out that apart from some problems of language translation<sup>11</sup> we found in principle no impediments which would prevent someone who was really interested from accessing the rich body of literature on usability and accessibility in all the countries visited. The trouble was that too often this knowledge remained within the academic realm or else was communicated only through the very narrow channels of the special interest and advocacy groups and institutes, which had not yet developed a systematic dialogue with industry.

### **Considering the "Design for All" approach**

Only a few of the respondents were aware of the term "Design for All", more so in large companies whose staff were obliged to read the international literature and to attend conferences where they encountered the idea. With some exceptions, small companies were not generally well informed about the concept, nor were many of the designers who were operating in relatively new sectors.

It was clear that some respondents who did not recognise the actual terminology nevertheless subscribed to the concept even prior to the interview. And a few more could understand the principle when it was discussed in the interview - although many more tended to think of Design for All as simply providing extra potential markets of disabled and elderly people, rather than realising that this might lead to a more general improvement in the product, hence benefiting a far wider range of users.

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<sup>11</sup> Most important documents on accessibility are in English which is only widespread and well understood in the Northern European countries.

Apart from the various barriers to considering impairments which were discussed previously, one chief concern raised specifically about Design for All related to the limits of the concept. Even those who were somewhat sympathetic to Design for All noted, reasonably, that some design features cost more than others to implement. So in some cases it might be more sensible to make a product accessible not by changing the generic design but by offering an accessory at additional cost - more so if a more severe impairment was involved. As we ourselves had acknowledged before the empirical study and while in deliberation with other researchers, Design for All may be the mobilising slogan, but “Design for nearly all” or “Design for more than at present” might be the more practical implementation.

A second major negative response to Design for All emerged arguably as a reaction to the words 'For All'. Amongst a number of those interviewed these words immediately evoked connotations of mass market products, of a single design, at a time when, if anything, they saw a trend towards market segmentation with diverse and differentiated offerings for different groups of people. However, we should note that in principle this should not invalidate considering the aspirations of Design for All. For example, if a firm is developing a product aimed at children of a certain age, then one can still ask whether children with certain impairments would have any problems using it. Or if a firm is in the process of creating a product which is in some sense 'for beginners' rather than being 'for advanced users', one can ask whether older beginners are taken into account. In other words, Design for All considerations can still be applied to products aimed at market segments.

In the light of these comments, it is worth adding one final observation about a potential development in design which are not driven by Design for All principles as such or indeed by any particular concern about elderly and disabled users. Yet this development has some potential to reconcile the Design for All goal with the desire to meet individual or small group needs. This was the trend, in various guises, towards making products more flexible and customisable - aided by the inherent flexibility of many ICT products. Examples of such flexibility involved allowing users to have multiple ways of navigating around a system or Internet web-site, allowing them to change the size of fonts or the appearance of the screen, allowing them to customise the settings on (e.g. phone) terminals through such devices as smart cards, etc. While some of those interviewed had been inspired to think about this approach precisely through their involvement with groups with impairments, others were moving towards flexibility because in their eyes it was simply better design, catering more for the differences among customers.

### **Strategies to Promote User-Sensitivity and Inclusive Design**

Having conveyed the main message concerning the barriers to considering users in general, elderly and disabled users in particular and the Design for All concept, this penultimate section briefly considers more positive strategies that some, albeit relatively few, companies have adopted.

The fact that, mainly large, companies have actually set up units specifically to consider input about end users<sup>12</sup>, and end user champions have emerged in yet other companies, means that there are some initiatives where firms are attempting to be more customer focused. Certainly these individuals and units aspire, with various degrees of actual success, to change the culture of the company and to influence other staff. Again more so in larger firms, inputs about or actually from users via a number of mechanisms were used at various points in the innovation processes, sometimes, albeit rarely, extending to the concept stage itself. At the other end of the innovation time scale, some companies had instituted mechanisms for collecting post-launch feedback in order to influence both re-design and future product development.

Within large companies there were examples of efforts to overcome the communication problems noted above, for example, by trying to monitor product development and involve technical staff in discussions about users, sometimes via interdisciplinary and inter-departmental design teams. Meanwhile, there were efforts to gain visibility for the work of units specialising in end users both within and outside the firms concerned. As regards collaboration between firms, there were a few examples of firms sharing not only feedback about end users but also sharing conceptual frameworks for understanding them.

Units, as well as individuals, championing the cause of elderly and disabled users had experienced mixed success, but there were a few examples where they had made or were still trying to make a difference to the design process. Their strategies included trying to

carefully about their product, compared to the practice of starting from a conception of the “average user”.

## **Conclusions**

The fact that the last section could point to promising examples should not detract from the main message of this chapter: end-users in general were only considered to a limited extent, elderly and disabled users were considered even less and the principles of Design for All were known to very few. That said, there were differences between different ICT sectors. For example, some former state owned enterprises such as telecoms and transport (i.e. those which addressed the general public) were relatively more conscious of usability and accessibility issues through their historical, and often legal, requirement to cater for all sections of the population. In contrast, some of the newly emerging and booming sectors like the Internet-related services, had very little knowledge about such matters.

This chapter has also indicated many of the key factors at work that have served to bring this state of affairs about. Failure to consider important potential and real user groups occurs not just because of cognitive problem of designer, although the perceptions of ICT developers - as regards the value of user-research and testing, perceptions of elderly and disabled users and of Design for All - can in themselves be a barrier in this respect. But in addition there are substantial structural variables such as the rapid product cycles which lead to a focus on innovators and early adopters, the communication practices within companies, the mode of collaboration between firms, etc.

From this snapshot of the current state of play it is difficult to forecast future developments. But it is at least encouraging that there are firms trying to develop strategies on all these fronts while other agencies, such as advocacy groups and the European Commission, are trying to promote a design process which is more user-sensitive and inclusive. In this process, the fight for better technical norms, anti-discrimination acts and other legal measures can be regarded as necessary but insufficient steps towards a non-excluding design practice. Social exclusion cannot so easily be abolished by better laws and regulations. Inclusive design in the ICT sector needs also to have a strong normative basis, whereby industry itself can be persuaded to see the benefits of developing products that far more people than at present can use, without barriers, in order to have the chance to participate in the full range of offers and benefits of the Information Society.

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