8. From concept to reality

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Developing a novel product or service, rather than a new version of an existing product or service, is always a challenge. With the increasing number of people with disabilities, many of whom will be over retirement age, it is wise to include them as potential consumers. However, for companies with limited experience working in this area, there are a number of pitfalls which could easily be avoided with appropriate planning.

The points outlined below are mainly derived from the detailed analysis in the previous chapters and may assist developers in meeting the needs of the growing market of older people and people with disabilities.

8.1 New technologies

There are finite resources which can be allocated to research and development, so it is important to optimise this allocation. A useful indicator is services which have proven to be beneficial in one country even if they have not been adopted in others.

- SMS-based emergency services are useful for deaf people.

Chapter 2.3.5

Other services proven to be useful:

- Broadband for deafblind users
- Distance education for people with mild aphasia
- Digital distribution of talking books
- Broadband for people with an intellectual impairment
- Distance education using sign language.

Chapter 2.3.1

As well as developing novel services, more basic research will be essential if people with disabilities are to fully benefit from next generation networks.

Research priorities:

- Improve robustness of speech recognition systems
- Accurate sign language recognition
- Conversion of pictures and graphics into a non-visual format for blind users.

Chapter 2.2.2

There has been significant interest in developing location-based services to help people with disabilities but none are in widespread use at the present time.

Location and navigation services:

- Satellite navigation systems have potential to help disabled travellers
- Use appropriate combination of technologies depending on the environment (e.g. GPS outdoors with RFID in a shopping mall)
- Unmet need for these services, but sufficiently detailed accurate digital maps are not readily available.
- Maintain consistent user interface irrespective of the technology employed.

Chapter 2.2.1

Frequently it is the ability to connect a range of devices with adaptable user interfaces which determines the potential usefulness to people with disabilities. This is particularly important in the area of smart housing.

Smart housing:

- The availability of domestic broadband offers many new possibilities
- Short-range wireless systems significantly reduce the cost of installation, but the lack of maturity of this technology is a hindrance
- Adaptable and adaptive user interfaces will make systems easier to use by people with disabilities.

Chapter 3

In the longer term, ambient intelligence could have a major beneficial effect on the lives of people with disabilities. However for this to happen the telecommunications industry needs to radically rethink their approach to developing services for customers with disabilities.

Ambient intelligence:

- The potential of ambient intelligence to help people with disabilities is considerable
- User centred design will be essential to ensure that real needs are addressed
- Guidelines are needed to cover ethical and privacy aspects.

Chapter 4

8.2 The development process

The development of new products and services has often been led by designers thinking of what could be provided rather than by demand from their customers. This is not a major problem when the designers have a good understanding of the needs and aspirations of the user group, but this is rarely the case when the users are people with disabilities.

• It is vital to commit to continuous and structured dialogue and consultations between industry and all users - including people with disabilities and older people.

Chapter 6

8.2.1 Assess user requirements

Technology industries have developed a number of tools to assist in assessing user requirements but there have been problems in using these tools with people with disabilities. One issue is the range of impairments that can affect individuals differently. Two people who appear to have the same combination of impairments can have very different requirements for a telecommunications service.

Too often designers have worked with simplistic concepts of disability (for example, the fallacy that all visually impaired people are totally blind, read Braille and have bionic hearing), and then tested the prototypes on a very small number of unrepresentative users. Not surprisingly the resultant products frequently fail to sell in significant quantities.

Most people with disabilities are reluctant to use a product if it looks as if it had been designed for "the disabled". For domestic use the aesthetic design of the product must be appropriate; in the case of older users, this may mean a conventional look. The size of the product is also important since space in the living room may be limited, so devices with a small footprint are often preferred.

There is no simple solution to assessing requirements for people with disabilities. However some steps may alleviate the situation:

(a) Provide disability training to the product designers

(b) Use existing guidelines

(c) Test with an appropriate cross-section of potential users.

Once a realistic estimate has been derived for the likely take up of a new product or service, it will be necessary to allocate resources to undertake the research and development. Since there will be a finite limit on these resources, it will be necessary to prioritise. Some services might be of enormous benefit to a small group (eg those who are both deaf and blind) whereas others may be of modest benefit to a very large number of users.

• Mobile telephony can help people with dementia.

Chapter 2.3.4

8.2.2 Quantify potential demand

The prevalence of various disabilities can be based on clinical measures (e.g. so many dBs of hearing loss at a particular frequency) which can be useful for the medical profession. The advantages of these measures are that they are repeatable, but the disadvantage is that they give little indication of the user's needs particularly for those with multiple disabilities.

Therefore there are a number of functional definitions in use. These define a particular task and then measure the number of people who cannot do the task or have great difficulty doing it without the use of assistive devices. These measures give a better indication of the numbers but only apply for the task specified. For instance about 0.1% of the population in Europe has to rely on non-auditory methods of communication (eg text telephony) but about 6% have problems using a conventional telephone; this number might rise to 10% if the telephone was in a noisy environment such as on a bus.

The prevalence of various disabilities, however measured, has little relation to the take up of novel telecommunication products and services. This is for a number of reasons including the high average age, the reluctance to use technological systems which may not work 100% of the time, a lack of awareness of what is available, and a caution in investing money in systems which may be obsolete

within a couple of years. Reliable, easy-to-use products that are marketed in innovative ways will have more success.

Often a product or service is developed, and user groups are asked to participate in usability testing once the product or service is ready to go to market. This is often too late as users may provide feedback stating that significant changes should be made; these changes represent time and money for industry. If the changes are not made, then the product or service may not meet the users' needs and consequently fail in the marketplace.

- Remote sign language interpretation using 3G video telephony has had high take up when priced affordably.

Chapter 2.3.2

It is therefore important to involve user representatives early in the product design cycle. This is referred to as user-centred design. Some large international corporations employ this technique to assist development teams produce more appropriate products. It focuses on the active involvement of the user in the design process, trying to obtain a clear understanding of the exact task requirements, involving an iterative design and evaluation process, and utilising a multi-disciplinary approach. The key focus of user-centred design is that users play a critical role in the design of easy-to-use products throughout the entire development process. Interaction throughout the design process is necessary between users and developers in order to understand and define the context of use, the tasks, and how users are likely to work with the future product or system.

8.2.3 Training of user repreentatives

An important part of any development process, be it research or standards-writing, is the training of consumer representatives. While some organisations may claim to represent specific user groups, it is necessary to include a broad spectrum of user groups. There are several components of user testing. The most traditional is usability testing of a product or service prototype. This may include a large number of users in a variety of situations. While laboratory testing with users is the favoured method, being economical and easily managed, it may not give the most

accurate results. Field testing using a combination of observation and interviews will provide a more well-rounded result as it reflects the real life of the end-user. However, it may be more costly. There needs to be a balance between the various approaches.

Evaluation:

- Accessibility, like quality, needs to be considered at all stages in the design process
- Testing of accessibility features, with an appropriate cross-section of potential users, should be the norm in the telecommunications industry.

Chapter 6

There should also be a reference group of skilled user representatives that interacts with the design or production team on a regular basis. This group will offer a more wide-ranging and strategic view and may even input into the development process itself.

To achieve a body of skilled user representatives, there needs to be training and mentoring programmes. These ensure that user representatives may learn more about technologies as well as the legislative and regulatory framework. In addition, skills can be taught such as meeting procedure, public speaking and the principles of representing group interests rather than their own accessibility interests. Some of this may seem common sense to industry professionals. However, people with disabilities need to learn to combine their personal experience of disability with professional skills in order for the best results to be achieved.

There have been user representative training programmes developed under European Commission projects. However, these need to be ongoing and further developed in more European countries.

8.2.4 Service providers

The organisation offering telecommunications services may be different from the manufacturer of the terminal or the network operator. This means that there needs to be close collaboration between all parties when developing new services. The development of a business case may be complex if various parts of the supply chain are in different countries since different countries may apply different levels of subsidy to various services for people with disabilities.

8.2.5 Appropriate marketing

With a new feature for an existing service, consumers can often quickly appreciate the potential benefits. However if the service is totally new, it is often only by trailling a system that it is possible to estimate whether the service is likely to be commercially viable. Even then developers can seriously under or over estimate the likely take up; SMS is just one example.

Marketing to people with a disability can present particular challenges since the normal marketing techniques may be inappropriate; for instance printed advertisements may have little impact on blind customers. There are additional problems in explaining to people with intellectual impairments the potential benefits of a new service; this may go some way to explaining the low take up of new telecommunication services by this group of customers.

Some unmodified services are popular with people with disabilities if they are affordable; for instance SMS is heavily used by many deaf people. Other services use standard terminals in conjunction with a service centre. For people with an intellectual impairment, a mobile phone can transmit location information and a picture of the immediate environment to a remote service centre where a human operator can guide the user to their required destination. Such a service would be invaluable to an intellectually impaired or blind person travelling alone on public transport when there is a disruption to their routine.

Marketing which is directed at a particular section of the disability community with a product "for the disabled" can be less effective than marketing the same product to the general public and mentioning that it can also be of benefit to people with impairments. Many consumers, particularly those who are ageing, do not like to consider themselves 'disabled' but do admit that their abilities are not as good as they used to be.

8.2.6 Training and support

Customers with disabilities will need support which may be additional to that provided to non-disabled customers. For instance a blind user may not be able to read the instructions for setting up and using the equipment; in this case it may be necessary to provide the instruction books in alternative formats on demand (e.g. Braille, large print and audio) or at least in electronic format that can easily be converted into formats offering speech output. For a deaf person, customer support centres might need to able to respond to text calls. For someone with an intellectual impairment, the instruction book might need to be written in a language which is easy to understand and has clear pictures or diagrams.

It is vital to ensure accessibility has been considered from the point of customer interaction within the sales chain and onwards through the experience.

A particular problem is when the system has a malfunction, since it may not be easy for the user with a disability to ascertain where the fault is located or to run diagnostics even with help over the telephone. Therefore consideration needs to be given to providing appropriate support services. However, identifying the source of a fault is difficult for the majority of end-users and therefore an intuitive system backed up with well-trained staff in customer service are essential for any customer-oriented company.

8.3 Legislation and regulation as drivers

When the market does not deliver the required result, national regulators have stepped in with mandatory requirements. In addition some countries have discrimination legislation such as the Disability Discrimination Act in the UK; such legislation can also be found in countries such as USA and Australia. However the trend is towards less regulation in the telecommunications area, so the role of legislation at national or European level may become more significant. Legislation such as European Directives tied to particular standards may become more significant in future. This is particularly the case with the Public Procurement Directive.

In the USA, government procurement requirements have been used as a way of influencing manufacturers to provide information and communication technology systems which incorporate accessibility features. Since there is no easy way to measure accessibility, the approach has been to take each technology component and specify accessibility requirements. Although this approach does improve accessibility and is measurable, it has the disadvantage that it does not look at the ease of use of the whole system by people with disabilities.

A mechanism needs to be devised that allows manufacturing and service provider companies to make decisions in developing products safe in the knowledge that legislative duties have been met.

The European Commission has indicated through a Directive that it intends to use government procurement to require accessible systems. Traditionally the European approach has been to use formal standards (eg from CEN, CENELEC and ETSI), and then have Directives which make particular standards mandatory. This is likely to be the case with public procurement incorporating accessibility requirements. The European Commission will call upon the standards bodies to develop accessibility guidelines to be referred to from the Directive.

In addition, the U.S. accessibility guidelines for public procurement purposes are being reviewed in 2007 and it is anticipated that there will be collaboration between the European and U.S. guidelines developers. This will provide a clearer path for product developers in designing equipment that meets accessibility requirements and thus for industry to more successfully increase their sales through supply to government agencies as well as to the wider market.

Regulation:

- While there is a trend towards less regulation in the telecommunications sector, the question of how to protect the interests of disenfranchised people in a free market will become a key issue and consideration needs to be given to the provision of services for people with disabilities
- The scope of the Universal Service Directive could have significant implications
- Government procurement can require the provision of accessible equipment, but what is accessible will need to be defined in standards
- Inclusion of Design for All principles in standards should become as commonplace as reference to quality standards.

Chapter 5

8.4 Conclusions

This outline of some of the measures taken to successfully bring many of the concepts detailed in previous chapters to reality should indicate that catering, for many companies, to a new and strongly emerging market of older people and people with disabilities can bring rewards. These rewards may result in several positive benefits.

Firstly, in a saturated market such as mobile phone terminals, the development of products and services that are more user-friendly as well as providing suitable features for older people and people with disabilities can offer companies who are prepared to be flexible and adapt their practices, additional market share and very likely increased income. This may also apply to highly competitive emerging technologies such as VoIP and next generation networks.

Secondly, the provision of more accessible and usable products and services to older people and people with disabilities means that industry participates as good corporate citizens and contributes to their triple bottom line. This will naturally improve their corporate image. The dividend in getting it right first time though are

very much greater - user loyalty to the brand is likely to be substantially greater if a product appears to be accessible from the outset without a struggle.

Finally, people with disabilities have the opportunity of participating more strongly in the community, increasing their employment prospects and contributing to society and their economy.

If the future is going to be truly inclusive, organisations need a coherent strategy for moving from concept to reality in the development of new services.

Challenges:

- The disability community, together with key stakeholder groups, needs to agree on and define what makes a product accessible
- Development of methodology for specifying design requirements from a statement of user needs
- Need for increased understanding among disability organisations of the potential offered by next generation networks
- The use of appropriate marketing strategies by telecommunication companies.

Chapter 7