ICT & Ageing

European Study on Users, Markets and Technologies

Preliminary Findings

October 2008

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WORK RESEARCH CENTRE

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For more information about the ICT+Ageing study, please visit **www.ict-ageing.eu**.

Executive summary

This document presents preliminary outcomes of an ongoing study entitled "ICT & Ageing - Users, Markets and Technologies". This two year research endeavour was launched in the beginning of 2008 by the European Commission, DG Information Society and Media.

Research background

The general background to this study derives from the trend towards accelerating population ageing as it has been observed across Europe and beyond for some time already. For Europe and many other countries around the world, the ongoing demographic development has significant socio-economic implications: in the future, there will be more older people in absolute as well as relative terms, there will be considerably more old people particularly in the upper age range, there will be fewer family carers providing informal support to these, and there will be a smaller productive workforce to contribute to the creation of economic wealth in general and to the financing of health and social services in particular.

During recent years, the social and economic challenges that tend to be connected to these developments have received increasing policy attention, and the potential offered by Information and Communication Technologies (ICT) for better coping with them as well. Recently, the European Commission has adopted an Action Plan on Information and Communications Technology for Ageing in the framework of its i2010 initiative. In this context, it is highlighted that better leveraging of the potential generally provided by ICT for independent living in an ageing society represents both a social necessity and an economic opportunity. More specifically, it is emphasised that ICT holds considerable potential for more efficient management and delivery of health and social care, as well as increasing opportunities for community care and self-care and service innovation more generally.

On the other hand, it has become evident that market forces alone have been insufficient to ensure the realisation of this potential.[1] As highlighted in the Commission's action plan, "the market of ICT for ageing well in the information society is still in its nascent phase, and does not yet fully ensure the availability and take-up of the necessary ICT-enabled solutions" (COM((2007)) 332 final, p.3). Although a considerable range of promising devices and systems has emerged from RTD efforts pursued in Europe and beyond for more than a decade, wider mainstreaming of ICT-enabled solutions within real world service settings has to a large extent yet to occur. As noted in the Commission's action plan, reasons for this seem to include insufficient understanding of user needs, an underdeveloped marketplace and lack of visibility of relevant solutions to potential deployer organisations and end users, as well as technical, infrastructural and regulatory barriers.

Part of the challenge is an RTD one, and there is much scope for technology development and testing in real-world trials. Various EU programmes and considerable funding is now being directed in this area. Another part of the challenge is to get a better understanding of how the market in this field operates and what factors facilitate or hinder market development. This 'market' in fact represents a complex public-private mix of players, from device manufacturers to health and social care service providers, that interact and have roles to play in ensuring that useful technologies are developed, implemented and used. There are a number of fields of application, including telecare and home telehealth, where technologies and applications are relatively mature and where a certain level of market and deployment progress can be detected, even if this has been very variable across countries and many barriers seem still to remain. Examination of these markets can prove particularly fruitful for gaining a better and more concrete understanding of the market potential and of the real-world factors that are facilitating or hindering market development in the general field of ICTs and independent living for older people. This has been a core focus of the current study, using a cross-country perspective to enable examination of commonalties and differences across countries that may arise because of

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[1] empirica and WRC (2005): Various Studies on Policy Implications of Demographic Changes in National and Community Policies. The Demographic Change – Impacts of New Technologies and Information Society, Final Report

different national social and health care systems, different levels of technological readiness, and so on.

Current level of 'market' maturity

The first phase of the study has focused especially on developing a baseline view of the 'market' situation in Europe and beyond. This concerns the level of market maturity that has been reached, as well as other market features such as costs, who pays and how much, and what players are involved in the service provision supply chain. Apart from providing a new contribution to the existing knowledge base, the results provide a basis for identification of key issues for more focused investigation in the next phase of the study

When looking at telecare applications, social alarms (first generation telecare) can be considered to be mainstreamed in the majority of countries, in the sense that they are available across the country and are provided/used on a regular basis. For more advanced telecare only so-called second generation telecare (mainly provision of additional sensors to enhance basic social alarms services) are yet to have any degree of mainstreaming. Even then, in no country can even second generation telecare be considered to be fully mainstreamed although the situation in the UK is now getting close to this. In a quite a number of countries there is some degree of mainstreaming, even if the situation varies a lot across these countries. Finally, for the most advanced (third generation) telecare, involving extensive activity monitoring and data gathering/analysis, the main visible activity to date has been in pilot/trial activity in the US and Japan, although considerable developments are now getting underway in Europe under the AAL programme.

Home telehealth is less mainstreamed than telecare (at least basic first generation telecare in the form of social alarms) at present. No country has 'full' mainstreaming in the sense that all mainstream providers, in all parts of the country include such services within their repertoire. Overall, the US shows most mainstream development, with many instances of mainstream services, including quite a number of services for older clients provided by the Veterans Administration and a growing number of examples of provision by private providers. Some European countries do have at least some examples of mainstream implementations of varying scope / scale. In many cases these are quite localised initiatives involving just one provider or cluster of integrated providers. In Germany, developments under integrated care initiatives, with reimbursement under health insurance, are resulting on more generalisable models even if these are still restricted to some areas/providers for now.

Initial overview of barriers identified

In relation to first generation telecare, the key factors of influence seem to vary considerably across countries. In fact, some countries may already be at 'saturation' point to a certain degree and thus have no concrete barriers, as such, to the achievement of higher penetration levels. Underlying this may be some important variability in perceptions of the role/value of social alarms in social care, and of where it fits in the spectrum of (human and other) services that are needed. More generally, where they exist the main concrete barriers appear to be limited public provision and lack of public funding / cost subsidy, and disparities in geographical availability/provision in some countries. It also seems that technology and, especially, technological change may be a limiting factor in some countries, for example upgrading old systems to work with new digital telecommunications networks and providing services to IP telephony users.

When it comes to more advanced telecare solutions, an important factor is the considerable variability across countries in infrastructural readiness. This includes both the basic social alarm infrastructure upon which more advanced telecare can be built and the capacity to supply and implement more advanced features and services. More generally, however, it seems that there are considerable differences even amongst countries where the capacity is in place. Again, these appear to be linked, at least in part, to the absence of a shared view on the role/value of advanced telecare in the overall social care system and/or on what are the priority aspects of the entire (human and other) service system that need to be addressed. Specific barriers in a number of countries include the lack of infrastructural capacity and lack of public reimbursement / funding. In those countries where these

barriers are less apparent, the lack of a demonstrated 'business' and/or 'quality' case seems to be limiting factor for social care providers. Ethical/regulatory issues around passive monitoring seem to be a potential barrier in some countries, also. More generally, there the challenge of transitioning from pilots to mainstream seems to be an issue in many countries, although a large part of this may be linked to the lack of infrastructural and/or more general system readiness in many countries. There are also barriers posed by the need for organisations to work together and the allocation of responsibilities (e.g. between social care and housing, or social care and health care), as well as the related issue of which parties pay the costs and which get the benefits. More generally, the challenges of organisational seem to a limiting factor, as well as more general social/professional resistance in some cases.

In relation to telehealth applications in Europe, and in contrast to the US, the lack of a recognised 'business case' for home telehealth seems to be an overarching barrier. In this regard, there is the more general challenge of establishing a clear 'business case' under many European healthcare systems. In addition, the fact that the business case may vary substantially for different players within a given country's healthcare system adds to the complexity. Linked to this is the lack of incentives to introduce new services for healthcare providers under many of the existing reimbursement systems to be found across Europe. There are also the complexities posed by existing boundaries and responsibility structures within healthcare systems, and a need to clarify and ensure fairness in the distribution of costs and benefits associated with the introduction of service innovations such as home telehealth. In some countries, another barrier is the fragmentation posed by devolution of healthcare policy and delivery to the regional and even local level. This makes it difficult to implement coordinated national policy in this and other fields. In some countries, also, there are medico-legal uncertainties in relation to home telehealth. For example, the extent to which even telephone consultation is allowed (and encouraged) varies considerably across countries.

Some initial policy conclusions

This study is perhaps the first effort to develop a systematic and coherent baseline and mapping of the market situation for telecare and telehealth for older people in Europe. One important contribution is the identification of what seem to be the most promising / important opportunities at present, and this helps sort the 'hype' that one often finds with regard to technological possibilities from the reality of what can be expected to be achieved in the near- to mid-term across Europe. On the basis of the analysis of market developments and of key drivers and barriers, four main areas that could be targeted in public policy at EU and national level are identified so far:

Ensuring that the basic infrastructural prerequisites are in place:

In regard to telecare roll-out, in particular, some countries do not yet have the basic pre-requisite of a nationwide social alarm infrastructure in place. Social alarms have proved a useful component of home care and, in practice they often represent the baseline infrastructure (technical and organisational) upon which more sophisticated solutions are introduced. This is an aspect that could be targeted for infrastructural investment at national level and also could be incorporated as an area for support under the EU Structural Funds. More generally, in some countries the necessary equipment and service supply chains for telecare and telehealth are not well developed. This is an area where innovative approaches to public-private partnerships can play an important role, with the public sector providing the main eventual 'market' but the private sector having a key role to play in supplying the necessary technology and also, in some cases, for out-sourcing various aspects of service provision as well. Innovative usage of public procurement at Member States level could be a useful mechanism for addressing the 'chicken-and-egg' barriers to supply and market evolution in this regard. However, the evidence from this study shows that the possibilities for innovative and pre-competitive public procurement in this field seem not to be very visible in policy or practice in most Member States to date. Awareness-raising and other support initiatives at EU level might therefore be useful.

Encouraging regulatory/organisational/professional acceptance

Although infrastructural issues are important, the evidence suggests that various issues around acceptance of telecare and telehealth within the mainstream social care and healthcare systems are amongst the biggest factors limiting market development to date. One dimension of this concerns lack of awareness and appreciation of the (potential) value of these types of service innovation at policy, service provider and practitioner levels. The evidence suggests that many public funding bodies, and private households, are faced with the challenge to provide efficient care with limited financial resources. Applications that go beyond 1st generation alarms are often considered as 'high cost' applications for which the business case is not immediately self evident. This is something that could be addressed both at Member State level and also at a European level through support for information exchange and other accompanying measures to develop and disseminate the necessary knowledge-base. As regards the knowledge base aspect, there is a need both to consolidate existing knowledge on the 'business' case and the 'value' case, and also to support the development of new knowledge. For this, support for large-scale trials seems to be an essential measure if sufficient real-life experience and knowledge is to be gained. There would also be value in dedicated cost-benefit research to provide a more solid evidence base and one that was better tuned to the varying situations across the Member States. This would be helpful in supporting the achievement of a shared view of the business and quality benefits that can be achieved, as well as ensuring a realistic perspective that avoids reliance on the type of 'hype' sometimes associated with technological innovations. Telecare and telehealth have important contributions to make but they are not a panacea.

The evidence also shows that challenges posed by lack of skills and capacity for organisational change and innovation to take advantage of new service concepts like telecare and telehealth can also be important barriers. Beyond mere technological innovation, introduction of ICT-enabled solutions into day to day care practices tends to require a considerable degree of organisational innovation. Apart from a need to overcome staff resistance to organisational change more generally, this may require training in the new skills and responsibilities required at the various stages of ICT-enabled service delivery (e.g. initial needs assessment, installation, maintenance and so on). More generally, telecare solutions may often involve a need for multi-disciplinary approaches and may even require the emergence of new occupational profiles. An initial overview suggests that a general policy shift towards integrated care provision seems to have taken place in many countries. However, organisational and managerial difficulties have been reported to act as barriers towards achieving integrated services provision in practice. Some countries have given specific attention to these aspects and support for exchange of experiences and capacity building should therefore also be part of the policy approach.

Finally, more formal aspects of medico-legal enablement of telecare and telehealth also need policy attention as these can pose barriers to exploitation of the potential. As regards telecare, an initial overview of the situation across the Member States suggests that there may not be especially strong legal/regulatory barriers in most cases, especially as regards social alarms and also for second generation telecare. However, in some countries concerns about privacy/surveillance have been raised in relation to passive sensors and legislation is in place to regulate their use. It can be expected that such issues will come more strongly to the fore when third generation telecare involving continuous activity monitoring and data processing become more visible in policy and practice. Establishment of a forum for exchange of experiences and perspectives across the different stakeholders, and across the Member States would be useful in this regard.

As regards telehealth, there are issues of professional acceptability / encouragement to be considered. Already there are considerable differences across Member States as regards regulation and practice in relation to telephone consultation and electronic consultations, and some of these may also come to arise in relation to home telehealth.

There is also the wider issue of the extent to which self-management of health is encouraged or discouraged, and how this may impinge on the market for home healthcare devices and services. Again, establishment of a forum for exchange of experiences and perspectives across the different stakeholders, and across the Member States would be useful in this regard. Finally, there is also a

cross-border dimension that may emerge as important as home telehealth services become more mainstream. This is linked to the more general cross-border mobility of patients seeking treatment that is now possible for European citizens, and the quite large numbers who avail of this. A realistic scenario, therefore, would be for a patient to be receiving home telehealth services in their country from a healthcare provider in another Member State. This is an aspect that also could be addressed through an appropriate EU-supported forum. Apart from the social/healthcare issues outlined above, there are also the more general regulatory issues associated with public procurement in the telecare and telehealth fields. As mentioned already, there is considerable potential for innovative utilisation of public procurement to stimulate the necessary supply and demand side co-evolution, but this seems little used in practice so far. EU-supported efforts to raise awareness and exchange experiences in this area would thus seem to be useful.

Making the incentive systems more transparent and conducive:

In addition to the acceptance issue, the lack of clear incentives seems to be one of the biggest barriers to widespread implementation of home telehealth, in particular, and also for telecare although to a somewhat lesser extent. Economic and financial incentives are a big aspect of this, but quality (of service and outcome) incentives also need to be considered. This issue of incentives arises both at the level of individual providers themselves (hospitals, clinics, doctors, etc.) and also in relation to the distribution of the costs and benefits more generally for particular components of the overall system (social care, housing, healthcare; primary care versus hospitals; and so on). It also arises for payers, those who fund or otherwise reimburse the services that are provided.

The preliminary evidence base suggests that clear economic/financial incentives for providers are not currently present in many European health and social care systems. In addition, what incentives are there often tend towards discouraging rather than encouraging service innovations such as home telehealth and, to a lesser extent, telecare. Policy in the Member States might therefore give particular attention to examining the incentives and disincentives that operate within their national systems and to re-orienting these to support wider deployment of telecare and telehealth where this is judged to be appropriate.

At the EU level it is clearly inappropriate to intervene in the incentive systems in the Member States, as such. However, the EU could play an important role in supporting knowledge development and sharing on how incentive systems operate the development of good practice and so on.

Supporting the further technological and other innovation that is needed:

As outlined above, our preliminary findings shed light on a number of barriers to the mainstreaming of ICT enabled solutions that are in principle available today. They also indicate a continuing need for further technological innovation. Many of the basic technologies and system components for telecare and telehealth are already available today, and the main market barriers relate to issues of acceptance and incentives. Nevertheless there is still a lot of RTD needed to improve existing products and develop new ones. Some important areas for attention emerge from the preliminary evidence base as follows:

- mobile devices and monitoring services
- end-user devices for telecare and telehealth
- monitoring and processing systems for telecare and telehealth centres, including upgrades to address new technologies and new capabilities
- clinical support systems to present relevant information and guidance to health and social care professionals
- improved interoperability between the various system components and the different products and services on the European marketplace

Beyond this, support for service and technology co-evolution is also important in order to address the 'chicken-and-egg' challenges in this marketplace, including innovative uses of public procurement to facilitate the public-private partnerships that are needed. Again, EU-supported efforts to raise awareness and exchange experiences in this area would seem to be useful.

1 Introduction

This document presents preliminary outcomes of an ongoing study entitled "ICT & Ageing - Users, Markets and Technologies". This two year research endeavour was launched in the beginning of 2008 by the European Commission, DG Information Society and Media.

Research background and brief of the study

The general background to this study derives from the trend towards accelerating population ageing as it has been observed across Europe and beyond for some time already. In Europe, average life expectancy has increased from 55 years in 1920 to over 80 years today. With the retiring baby boom generation the number of people aged between 65 and 80 years is expected to rise by nearly 40% between 2010 and 2030.[2] For Europe and many other countries around the world, the ongoing demographic development has significant socio-economic implications: in the future, there will be more older people in absolute as well as relative terms, there will be considerably more old people particularly in the upper age range, there will be fewer family carers providing informal support to these, and there will be a smaller productive workforce to contribute to the creation of economic wealth in general and to the financing of health and social services in particular.

During recent years, the social and economic challenges that tend to be connected to these developments have received increasing policy attention, and the potential offered by Information and Communication Technologies (ICT) for better coping with them as well. Recently, the European Commission has adopted an Action Plan on Information and Communications Technology for Ageing in the framework of its i2010 initiative.[3] In this context, it is highlighted that better leveraging of the potential generally provided by ICT for independent living in an ageing society represents both a social necessity and an economic opportunity. More specifically, it is emphasised that ICT holds considerable potential for more efficient management and delivery of health and social care, as well as increasing opportunities for community care and self-care and service innovation more generally. On the other hand, it has become evident that market forces alone have been insufficient to ensure the realisation of this potential.[4] As highlighted in the Commission's action plan, "the market of ICT for ageing well in the information society is still in its nascent phase, and does not yet fully ensure the availability and take-up of the necessary ICT-enabled solutions"[5]

Against this background, the primary aim of this study is to identify existing market barriers that hinder uptake of technologies for independent living and identify recommendations for action in order to address older peoples' needs and market potentials. More specifically, three different strands of work are pursued in the framework of the overall study:

- A core strand of work focuses on analysing the 'ICT and Ageing' market situation across 14 selected Member States and two key comparison countries outside the EU (USA and Japan). In terms of tangible outcomes this work will yield an overview of market barriers for relevant ICT based products / services including national reimbursement practices as well as a state-of-the-art picture in pre-competitive and innovative public procurement in the field under investigation. Moreover, good practice examples will be collated for different ICT application domains. Information collated throughout the research process and synthesised analyses will be made available through an online-knowledge base. On the basis of the analyses undertaken, policy recommendations will be developed on the possible mitigation of identified market barriers.

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[2] COM(2007) 332 final

[3] ibidem

[4] empirica and WRC (2005): Various Studies on Policy Implications of Demographic Changes in National and Community Policies. The Demographic Change – Impacts of New Technologies and Information Society, Final Report

[5] COM(2007) 332 final, p.3

- Another core strand of work focuses on analysing ethical issues associated with ICT based solutions that are relevant to independent living of older people. In terms of tangible outputs an overview of relevant issues will be generated with a view to providing guidance for the development of relevant policies. Again, good practice examples will be identified and made available through the online knowledge base.

- Finally, the study provides support to the clustering of ongoing RTD projects funded under relevant European framework programmes as far as these address ICT and Ageing matters. This includes the setting up and maintenance of an online platform enabling interaction of relevant projects as well as annual clustering workshops.

Focus the work and structure of this document

The main focus of the empirical and analytical work that has been carried out so far has been on identifying barriers hindering uptake of technologies directed towards the support of independent living and delivery of home care to older people. In methodological regard, this has involved a review of published sources of information as well as a dedicated information gathering effort in selected countries with help of a network of national correspondents. This work will be further deepened in empirical and analytical regard in the next phase. Outcomes generated so far are available at a dedicated web site: **www.ict-ageing.eu.**

The remainder of the document presents an overview of key findings that have been generated throughout the first phase of the overall project. This starts with a brief overview in Chapter 2 of some key features of the current marketplace for technologies directed towards independent living. The baseline situation concerning current market development in 16 countries (14 EU member States and 2 others, US and Japan) is then presented in Chapter 3. Following to this, Chapter 4 presents a discussion on key market drivers and barriers as they have been identified so far, and presents policy-related conclusions that can be drawn on the basis of the evidence available at this stage of the research process.

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2 The 'marketplace' for Ageing Well

The general picture that emerges from the available evidence base is that deployment of relevant technologies has up to now fallen below expectations, particularly in view of considerable research and technology development (RTD) efforts that have been pursued for more than a decade in many countries and at the European level as well. A key theme that has been frequently highlighted by previous research concerns the complex nature of the independent living domain as a market place for Information and Telecommunications Technology (ICT) based systems and services.

Different deployment sectors

As graphically summarised by Exhibit 1 overleaf, different deployment sectors have relevance in this context, each following its own rationale when it comes to the deployment of technologies in general and ICT in particular.

*Exhibit 1: Key ICT deployment domains and rationales*
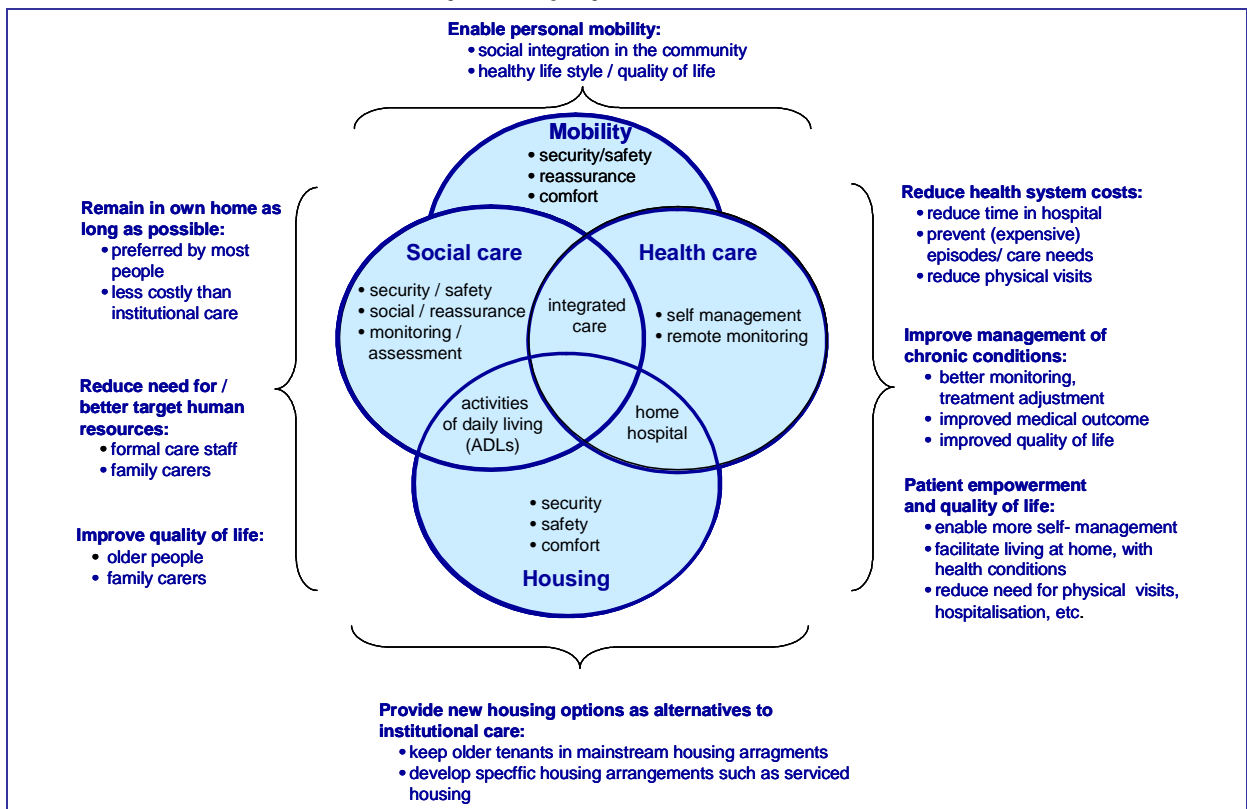
Source: The authors

A variety of technologies and services

Together these sectors comprise a rather fragmented socio-technical environment for the deployment of a potentially very wide range of ICT-based solutions. As graphically represented in Exhibit 2 overleaf, this concerns a diversity of devices and systems deployed in the immediate home environment of older persons with a view to enabling self-management and remote delivery of various support services. These may be supplied by the traditional players of the social care and health care arenas, but potentially by any new players that wish to tap into that field as well. Moreover, ICT-based solutions that have the potential to cater for the needs that older people may have when moving beyond their immediate home environment have to be taken into consideration.

Different types of ICT-enabled support services that have relevance for independent living have emerged as of today. In the social care sector so called 'social alarms' or 'community alarms' have started to be deployed since the 1980s already. These services (and associated equipment) enable help to be called by an older person when needed. The service typically involves a special telephone or portable alarm device that can be used to make a call to an alarm centre in the event of a need arising (e.g. a fall). The alarm centre then contacts family members or formal services. Social alarm services are often offered by municipalities, sometimes using their own call centre or sometimes contracting-out this to a private provider. Private sector companies may also offer this kind of service directly to older people and their families. Social alarms are frequently considered as the 'first generation' of telecare. Although they have been around for a long time and might be considered to be quite an old technology, they are often the baseline service upon which more sophisticated telecare services are introduced.

Exhibit 2: ICT devices & services relevant to the key deployment domains
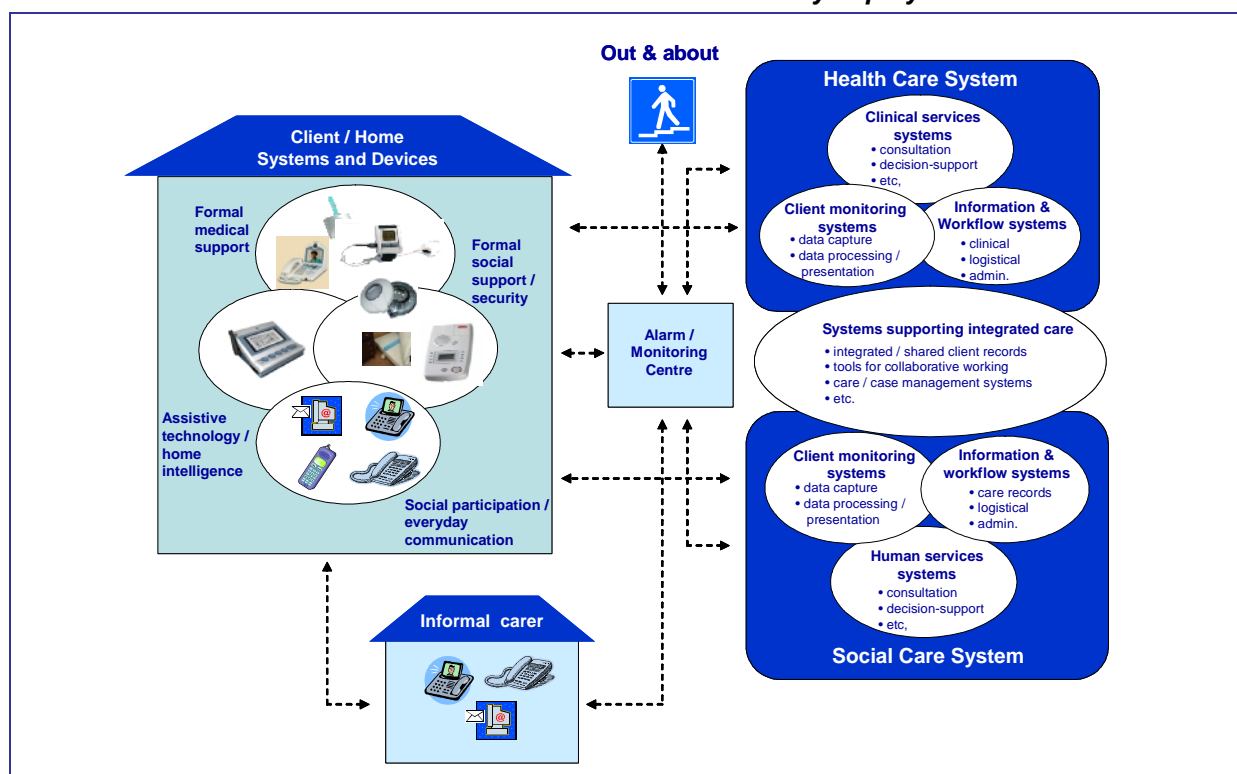
Source: The authors

The term 'second generation of telecare' is now commonly used to describe a range of enhancements to the basic social alarm service concept. For the purposes of this study, the term 'telecare' is thus generally used in relation to the provision of social care, i.e. non medical services, to the home. Typical examples include the provision of various sensors in the home (e.g. fall detectors, bed/chair occupancy sensors, smoke, gas and flood detectors, and so on) that alert social care services in the event of a problem arising in the home. Often, but not always, such telecare services are developed as add-ons to the basic social alarm services and are implemented over the social alarm infrastructure. In addition, videophone-based or other remote social care to the home can also be considered to be forms of 'second generation' telecare.

More recently, ICT-based solutions have started to emerge that aim at employing technology for the purposes of anticipating problems an older person may face even before they arise in order to enable proactive intervention. Such concepts aim for instance at establishing personal behavioural patterns with help of advanced monitoring technologies for the detection of various movement such of opening of doors, low use of water use or electrical appliances and the like. Such applications have come to be known as 'lifestyle monitoring' with view to enable evidence-based risk assessment in case of unusual

behaviour of the person in need of support. For the purposes of this study, such more preventative concepts are considered as 'third generation' telecare.

The term 'telehealth' is used in this study to refer to the use of ICTs in the delivery of medically-oriented care services to older people in their homes (or when out-and-about). It can include a variety of somewhat different services or applications, including telemonitoring (e.g. blood pressure, blood glucose, ECG, etc.), teleconsultation (e.g. online, by videophone, by telephone) and telerehabilitation (e.g. by videophone), as well as self-care devices to be used by people in their own homes to help them monitor and manage their health themselves. Some telehealth applications may be developed as add-ons to the basic social alarm services and are implemented over the social alarm infrastructure. However, they are often developed and implemented independent of this, in part because of the traditionally separate organisation of and demarcation lines between medical care and social care. Beyond this, combined approaches that include both telecare and telehealth dimensions have started to emerge, implying an integrated medical and social care approach.

A public-private mix of players

Overall, the market place for ICT-based independent living solutions comprises a diverse range of players. At a generic level, different key actor groups can be identified as graphically summarised in Exhibit 3. These include different types of services providers such as social care organisations, health care organisations and housing providers. Depending on the particularities of the national health and welfare system, these may include no-profit organisations from the public sector as well as commercial players which purchase ICT devices and systems for incorporation into existing service delivery schemes or into schemes that are to be newly developed. Beyond this, public emergency infrastructures may be involved in the service delivery chain as well, e.g. when it comes to responding to a crisis experienced by the service user. In most welfare/health systems, relevant services are currently paid for either by public or private insurance and/or the tax payer, a health management organization or similar organizations. To some extent out-of pocket payment may be involved as well, either in terms of co-payment or self-purchase.

*Exhibit 3: Monitoring / response service market structure and key players*
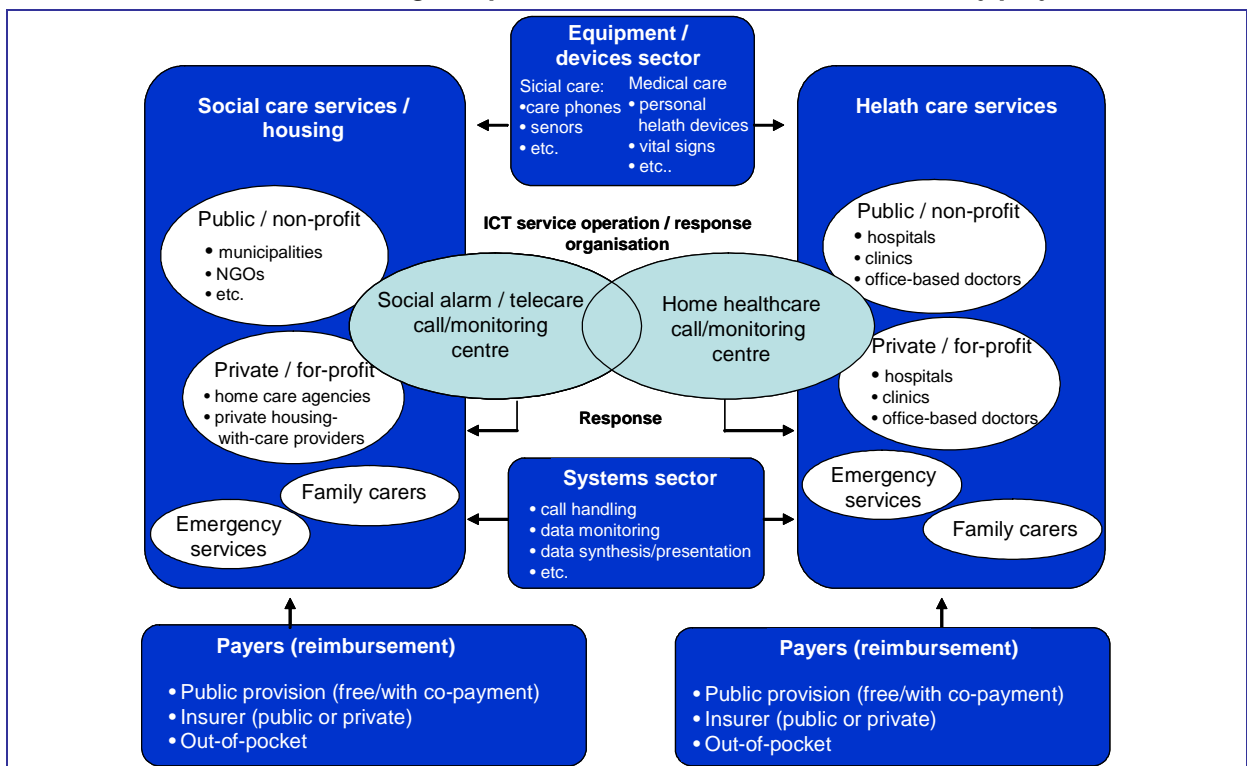
Source: The authors

A large market potential

Although the market potential for telecare solutions has largely remained untapped up to now, the demand that potentially exists already today across the European Union is considerable. Based on data generated in this study, current penetration levels of 'first generation' telecare, i.e. technically and organisationally well-established solutions which have been around for many years, range from below 1 % to 15% of the population aged 65 years and above in individual Member States (Exhibit 8). If these achieved deployment levels of 'first generation' telecare are taken as a proxy for immediately achievable uptake levels in relation to more advanced ICT-enabled social care solutions as well, between 2.5 and 12.7 million potential end users can be estimated already today across the EU27, depending on whether a 'low' penetration scenario of 3% of the current 65+ population or a 'very high' scenario of 15% are assumed (Exhibit 4). When considering current demographic projections this demand potential would increase during the coming decade to 3.1 million and 15.5 million potential end users respectively.

Exhibit 4: Estimated end user potential for telecare solutions according to different reach scenarios in the age range of 65 years and above (EU27)
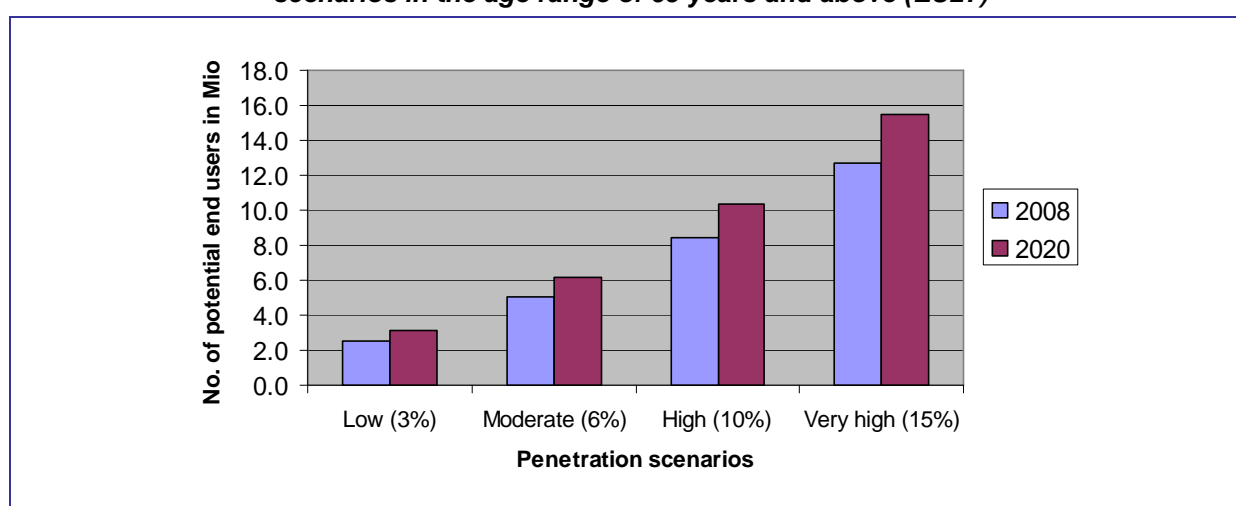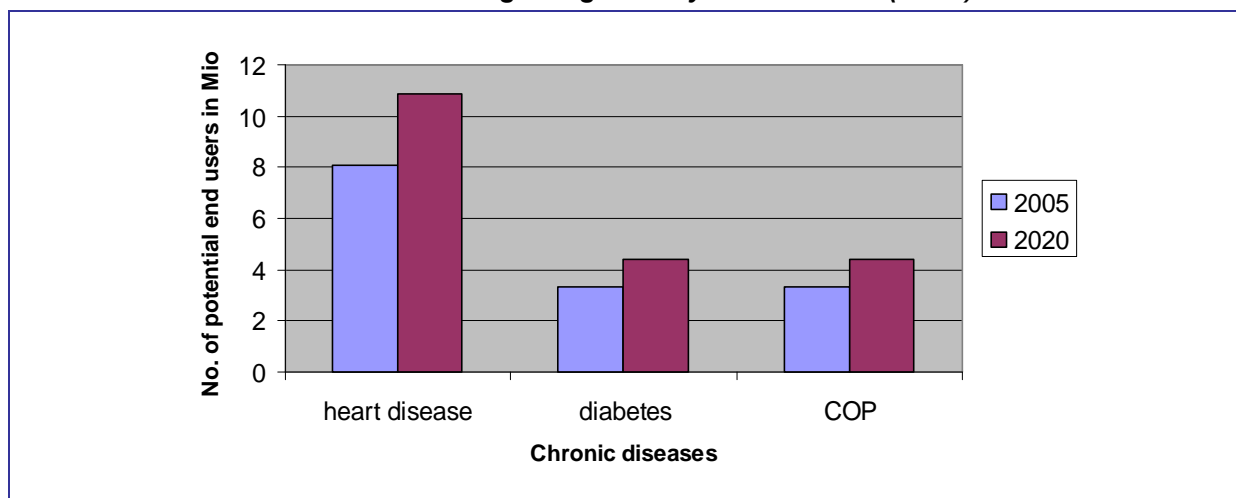

Source: Own calculation based on Eurostat demographic projection

Turning to telehealth solutions, remote management/monitoring of chronic diseases is an area of particular relevance to older people and to the relevant healthcare services and third party payers. Previous research suggests that, in particular, chronic respiratory diseases, diabetes and chronic heart diseases are very common among that population group. Expert estimation suggests that – depending on the age range under consideration – between 25% and 60% of older people suffering from these diseases might benefit from telehealth solutions[6].

As presented in Exhibit 5 overleaf, this would mean a current demand potential ranging from 3.3 million to 8.1 million potential users for the different chronic disease groups across the EU 25 population aged 60 years and above[7]. During the coming decade, these figures can be expected to rise to 4.4 million and 10.9 million potential users respectively due to the demographic development.

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[6] empirica and WRC (2005): Various Studies on Policy Implications of Demographic Changes in National and Community Policies. LOT 7: The Demographic Change – Impacts of New Technologies and Information Society, Final Report

[7] It needs to be noted that the estimated figures given for individual disease groups cannot simply be aggregated in order to arrive at an estimated overall demand potential. This is because the prevalences given for the individual diseases groupings are not necessarily independent and mutually distinct. This problem is unavoidable in view of the rather coarse-grained data base available.

Exhibit 5: Estimated end user potential for telehealth solutions according to selected chronic diseases in the age range of 60 years an above (EU25)

Source: Own calculation based on data available from empirica and WRC (2005)[8]

Need for better understanding of the marketplace

Although a considerable range of promising devices and systems has emerged from RTD efforts pursued in Europe and beyond for more than a decade, wider mainstreaming of ICT-enabled solutions within real world service settings has to a large extent yet to occur. As noted in the Commission's action plan, reasons for this seem to include insufficient understanding of user needs, an underdeveloped marketplace and lack of visibility of relevant solutions to potential deployer organisations and end users, as well as technical, infrastructural and regulatory barriers.

Part of the challenge is an RTD one, and there is much scope for technology development and testing in real-world trials. Various EU programmes and considerable funding is now being directed in this area.

Another part of the challenge is to get a better understanding of how the market in this field operates and what factors facilitate or hinder market development. This 'market' in fact represents a complex public-private mix of players, from device manufacturers to health and social care service providers, that interact and have roles to play in ensuring that useful technologies are developed, implemented and used. There are a number of fields of application, including telecare and home telehealth, where technologies and applications are relatively mature and where a certain level of market and deployment progress can be detected, even if this has been very variable across countries and many barriers seem still to remain. Examination of these markets can prove particularly fruitful for gaining a better and more concrete understanding of the market potential and of the real-world factors that are facilitating or hindering market development in the general field of ICTs and independent living for older people. This has been a core focus of the current study, using a cross-country perspective to enable examination of commonalties and differences across countries that may arise because of different national social and health care systems, different levels of technological readiness, and so on. Initial results are presented in the following Chapters.

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[8] Ibidem p.140

3 The baseline situation (now) in Europe and beyond

The first phase of the study has focused especially on developing a baseline view of the 'market' situation in Europe and beyond. This concerns the level of market maturity that has been reached, as well as other market features such as costs, who pays and how much, and what players are involved in the service provision supply chain. Apart from providing a new contribution to the existing knowledge base, the results provide a basis for identification of key issues for more focused investigation in the next phase of the study

3.1 Telecare

This section focuses on telecare services, defined for current purposes as ICT-supported remote social care services. They include social alarm services (so-called first generation telecare) and more advanced telecare services (including so-called second generation telecare involving additional sensors and other variants, and emerging third generation telecare concepts that involve more continuous activity monitoring and analysis).

An overview analysis of the situation across the 16 countries is first provided, followed by summary country profiles for each.

3.1.1 Overview analysis

The overview analysis provides a synthesis of the situation across the 16 countries in terms of various aspects of market maturity and other features of the markets in this field.

<u>Market maturity</u>

Degree of mainstreaming

The overall situation as regards degree of mainstreaming of telecare across the 16 countries surveyed is presented in Exhibit 6.

Exhibit 6: Level of mainstreaming

	Fully mainstreamed	*Partially mainstreamed*	*Pilot/trial activity*	*Little or no activity*
Social alarms (1st generation)	**DK, DE, ES, FI, FR, HU, IE, IT, NL, SE, UK, US, JP**	**PL, SI**		**BG**
Telecare (2nd generation)		**Leading: UK, (FI), (US)** **Others (with some mainstream availability/capacity): ES, IE, SI, DE, DK, NL, SE, JP, IT, FR, PL**	**HU**	**BG**
Telecare (3rd generation)			**US, JP** **(RTD/trials beginning in a number of EU countries)**	**(Majority of countries up to now)**

Source: The authors

It can be seen that social alarms (first generation telecare) can be considered to be mainstreamed in the majority of countries, in the sense that they are available across the country and are provided/used on a regular basis. In two countries (PL and SI), mainstreaming is only partial in that not all parts of the country are covered and/or services are not yet being used to any substantial degree. In one

country (BG), social alarms are not yet being addressed to any significant extent, even in terms of pilot/trial activity.

For more advanced telecare only so-called second generation telecare (mainly provision of additional sensors to enhance basic social alarms services) are yet to have any degree of mainstreaming. Even then, in no country can even second generation telecare be considered to be fully mainstreamed although the situation in the UK is now getting close to this. In a quite a number of countries there is some degree of mainstreaming, even if the situation varies a lot across these countries. The UK stands out as the most developed, with wide availability being driven by public policy and pump-prime funding. The US also can be mentioned because of the initiatives in this area being taken by the Veterans Administration and others, and Finland because of the apparently quite wide implementation of the WristCare system. In a number of other countries the capacity is there in principle (e.g. the possibility to offer additional sensors as well as basic social alarms is in place), but there has been little roll-out/take-up to date. In a few countries there is just pilot/trial activity or little or nothing happening.

Finally, for the most advanced (third generation) telecare, involving extensive activity monitoring and data gathering/analysis (a core aspect of the 'AAL' concept), the main visible activity to date is in pilot/trial activity in the US and Japan. This situation can be expected to change as the EU's AAL programme develops.
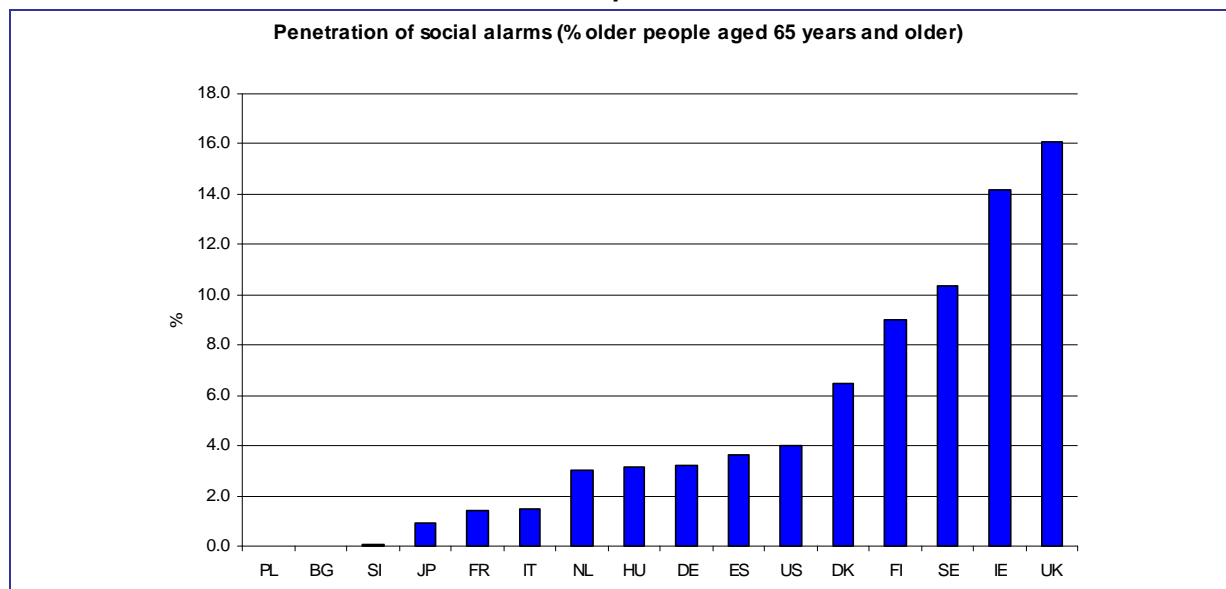
Levels of take-up

Apart from mainstreaming, another perspective on market development concerns the level of penetration or take-up of telecare services. As indicated in Exhibit 7 and Exhibit 8, levels of take-up vary considerably.

Exhibit 7: Levels of take-up

	Very high (>11%)	*High (6-10%)*	*Moderate (1-3%)*	*Low (<1%)*
Social alarms (1st generation)	IE, UK	DK, FI, SE	DE, ES, FR, HU, IT, NL, US, JP	BG, SI, PL
Telecare (2nd generation)			UK?	**Leaders: FI, US, (JP)...** **All others very low**
Telecare (3rd generation)				**All very low (practically non-existent)**

Source: The authors

For social alarms some countries (UK and IE) have a relatively high take-up at more than 11% of older people, some are a bit lower but still relatively high (DK, FI, SE) at between 6 and 10% of older people, most have a more moderate level at somewhere between 1 and 3%, and a few have low take-up at less than 1%. The wide range of penetration across countries is shown clearly in Exhibit 8 overleaf.

Exhibit 8: Take-up of social alarms

Penetration of social alarms (% older people aged 65 years and older)

Source: The authors

For second generation telecare, only the UK has a level of take-up that might reach or even exceed 1%, and most of the others have very low levels, with Finland and the US probably the most advanced of these. There is very little or no take-up of third generation telecare to date.

Different 'saturation' points

One important conclusion is that different national 'markets' may have different 'saturation' points as regards the number of potential telecare users. An indication that this may be the case can be seen in the different levels of take-up to be found in countries that have had well-developed social alarm infrastructures and provision systems in place for a long time. In such countries, levels of take-up seem to have stabilised at quite different levels - 15% in the UK, 6-10% in the Nordic countries, around 3% in Germany and the Netherlands, and so on. It seems that the perception of the role/contribution of telecare in the overall social care system may vary considerably and this is an important caution against any 'normative' view that all 'markets' are same.

Uncertainty / different perceptions of the value

Linked to this, it seems that there may be some uncertainty or even differing perceptions across countries of the extent of the value of telecare within social care. In some countries, both social alarms and second generation telecare have been actively promoted as a key way to achieve both cost-reduction and service quality goals. In others, a more cautious approach seems to have emerged so that, even where the technology and service infrastructure is in principle in place, other aspects of social care have so far been given more attention and priority.

Different levels of infrastructural readiness

There are differences across countries in level of infrastructural readiness for telecare. One aspect of this concerns the availability of a basic social alarm infrastructure, which is an important prerequisite for mainstream implementation of various forms of more advanced telecare services. Whilst a majority of countries have at least part of the necessary infrastructure in place, even basic prerequisites are lacking in some countries or parts of countries.

Apart from this there also seems to be considerable variability in the types of systems in place and levels of technology development in the response systems currently in place. This is important for capacity to extend to more advanced telecare. There are also issues as regards capacity to deal with digital telecommunications networks, IP telephones, mobile phones, GPS and other emerging

technology trends. More generally, the level of development of the technology supply side is an important factor, and this seems to vary considerably across countries.

Other market characteristics

Main providers of telecare services

Telecare services are most commonly publicly provided, either directly through alarm/response centres run by social care (or housing) services themselves or through various forms of outsourcing to or reimbursement of private sector providers. In most countries the bulk of current users can thus be considered to be 'public' clients, although there is also a strong private purchase market in some countries.

Exhibit 9: Main providers of telecare services

Public services / Municipalities / etc	NGOs	Private companies	Mixture
UK, FI, SE, DK, SI, ES, HU	DE	IE, PL	IT, FR, US, NL, JP

Source: The authors

Main payers and typical costs

As in the case of provision, the most common situation is one of publicly provided services that are sometimes completely free of charge but often involve some level of co-payment.   Most often, initial installation is free of charge for those eligible for public services/support but there is some level of ongoing (monthly) charge for the monitoring/maintenance service. Public support is mainly through the social care provision systems although in a few countries long-term care or other insurance provides the reimbursement. More generally, a number of countries have a mixed situation, with significant public, insurance-based and/or private payment/reimbursement systems.

Exhibit 10: Main payers / reimbursers of telecare services

Public social care services (sometimes with co-payments)	Insurers or other third party payers	Users	Mixture
UK, FI, SE, DK, ES, SI, HU	DE, NL	PL	IE, IT, FR, US, (JP)

Source: The authors

How response is organised

From the social care point of view, telecare services have two key components - the monitoring process and the organisation/delivery of a response. The latter aspect does not yet seem to have received much visible attention in the research and policy contexts but is an important factor for cost-benefit assessment and also, more generally, in relation to how the market can/will develop. In fact, the evidence suggests that quite different models are apparent. In some countries the main response is by formal care staff (at least during working hours) whereas in others there is a reliance on family carers, and in others some mixture of the two can be found. In some countries (such as NL), higher charges are implemented in cases where the user prefers a response by formal care services.

Exhibit 11: Response organisation

Formal care staff	Family carers	Mixture
FI, SE, DK, HU	ES, IE, IT, FR, PL	SI, DE, US, NL, JP, UK

Source: The authors

Equipment and systems market

Some countries have a well developed supply chain, with indigenous manufacturing and innovation capacity for alarm devices and sensors, and for monitoring centre systems, but in others this is much less developed. More generally, some countries have invested significantly in supporting technology innovation in relevant areas (e.g. FI) but others have not given this emerging market much attention as of yet.

There is also a more general issue for European competitiveness in the devices area. Many public sector markets are now becoming very price sensitive and thus introducing new competitiveness pressures on European manufacturers because of cheap imports from third countries. One issue here is that purchasing policies based only on price may limit the possibilities for introducing more advanced telecare later because the available stock of products may have more restricted functionality.

Finally, from an internal market perspective there are important issues as regards interoperability of devices and systems across the EU.

3.1.2   Country profiles

Bulgaria (BG)

First generation telecare (social alarms)

Social alarm services are yet to be implemented in Bulgaria. The national Red Cross organisation was planning a pilot initiative in this direction, but the lack of resources proved to be a major hurdle here. The main actor expected to drive future developments on a governmental level is the State Agency for Information Technologies and Communications (SAITC). It plans to organize a call for tender in January 2009 related to Objective 1.3 – ICT for ageing well, as stated in the draft EC ICT PSP Work Programme for 2009.

More advanced telecare

The fact that telecare services do not form part of a specific governmental policy or research, as well as the current state of public sector finances suggest that public allocations for new ICT-based services will be rather insignificant in the coming years. Limited marketing of telecare applications might be expected from private entrepreneurs instead.

At the annual fair 'BAIT EXPO' organised by the Bulgarian Association on Information Technologies from 4 to 8 November 2008 in Sofia, representatives of the IT industry announced the first phase of 'Palm Secure', a project that can offer various telecare solutions. The project is led by a holding of seven IT companies called Professional Information Management PRIMA.

Germany (DE)

First generation telecare (social alarms)

Social alarm services have been provided in Germany for more than 25 years and are available throughout the country. Nearly 90% of the social alarm services are provided by the six large social welfare organisations. The rest of the market is made up by commercial providers, such as Recontrol, Tunstall, Vitaphone, HausNotruf Service GmbH and Bosch. In addition, an increasing number of housing organisations are providing social alarm services, e.g. the housing societies in Wuppertal or in Gelsenkirchen within the framework of SOPHIA. Some of the service providers also offer mobile alarms offering GPS localisation. Mobile alarms are not widely in use, however, since reimbursement within the framework of the long term care insurance is not possible yet. The social welfare organisations that are providing the social alarm services often have their own call centres. There are around 180 call centres run by welfare as well as commercial organisations in Germany.

More advanced telecare

While some forms of telecare are widely available in the form of enhancements to basic social alarms (e.g. smoke detectors, gas detectors, fall detectors or movement detectors), in practice there is rather little usage of anything other than basic social alarms. Some social alarm providers offer additional services such as organisation of home- and outpatient services, and reminder calls (partly automated), although the latter appear not to be much in use.

Apart from social-alarm based telecare, there are only a few other telecare services up-and-running on the marketplace. One example is the SOPHIA service which is a commercial picture-based care and communication service for older people, operated as a regional franchise company which seeks to extend operations nationwide. The service model is for a new standard for safety and security, communication, comfort, telemedicine, multimedia and facility management. It is currently the only picture communication service and several other efforts to establish comparable services on the German senior market failed.

Telecare devices and services are yet not listed in the eligibility catalogues of insurers, which means that costs are not reimbursed under the insurance systems and have to be paid for out of pocket.

Denmark (DK)

First generation telecare (social alarms)

Social alarms are available nationwide in Denmark. Take-up is estimated at between 6 and 7% of older people aged 65 years or over. Municipalities are the main players and often provide the services themselves or may outsource the service whilst keeping overall control. In general, social alarm services are an integral part of the mainstream homecare services, with the response often provided by social care staff or contracted private services.

Social alarms are provided to both older people in their own homes and those in sheltered housing units, although the general policy in Denmark has been to encourage older people to live in ordinary homes in the community rather than sheltered housing.

End users of social alarm services are not charged where this enables them to remain at home.

More advanced telecare

Passive telecare systems (enhancements to basic social alarms with addition of extra sensors) have been available for a long time but seem not to be widely used. There is some limited availability / take-up as part of mainstream services but otherwise mainly being addressed through some trials/pilots. There has apparently been some resistance to passive monitoring because of the 'surveillance' aspect and there is legislation that regulates the circumstances under which it may be used.

Spain (ES)

First generation telecare (social alarms)

Social alarms are referred to as tele-alarms and telecare is known as tele-assistance. Tele-alarms are the most common form of ICT-based technology for independent living, and are available throughout the country. Take-up is estimated at between 3% and 3.5% of the population aged 65 years and older. The main providers are municipalities under the Autonomous Communities of Spain, who subsidise the service.

The Law on the Promotion of Personal Autonomy and Care of Those in Dependent Situations (39/2006) defines and sets the remit for tele-alarm and tele-assistance services. The aim of tele-alarms and tele-assistance under this policy is to contribute to ensuring that vulnerable people remain in their normal living environment, avoiding the important personal, social and economic costs which their uprooting from this setting would entail, making contact with their social and family network possible and ensuring immediate intervention in the event of a crisis and to avoid unnecessary admission to residential care.

As regards charging/reimbursement, each Autonomous Community determines the price of the tele-alarm service and the requirements for users to qualify for the different discounts available. Full cost might be between 15 and 20 euros per month, with a range of actual costs depending on level of discount (100%, 80%, 40% etc.).

More advanced telecare

Tele-assistance (telecare) services are also available nationally, at least in principle, although apparently only installed in the cases of greatest need. Take-up is less than 0.5% of tele-alarm users. Tele-assistance is an extension of the tele-alarm service and service provision and reimbursement arrangements are the same. Tele-assistance services are allocated according to the degree of dependence of the user, rather than according to their age. Where the service provider is a public entity, the service costs the same as the basic tele-alarm.

Finland (FI)

First generation telecare (social alarms)

Social alarm services are provided across the whole country as part of social welfare and health services. The Finnish Act on Social Services basically gives all citizens who are in need of care a right to get social alarm services if needed. The municipalities may either provide the services themselves or in cooperation with neighbouring municipalities or purchase from private or third sector service providers.

Social alarm services in Finland are provided both to people living in ordinary housing in the community and to those in service flats or sheltered housing. It seems that responses are provided by social care staff and/or informal carers.

There is no precise data available on the take-up of alarm services in Finland, although it can be estimated as being somewhere in the order of 8-10% of older people aged 65 years and older. End-users of the alarms living in ordinary housing in the community are charged an average €25 a month by municipalities. In service flats and sheltered housing, social alarm services are included in the payment for housing.

More advanced telecare

There is no formal telecare system in Finland, although the capacity is in principle available across the country through the social alarm infrastructure. Usage levels are still low and there are mainly pilots and trials taking place. However, there seems to be some degree of mainstreaming of new telecare products in sheltered housing and also for older people living in ordinary homes. One such product is Vivago WristCare, a commercially available solution that is marketed both to home users and to providers of sheltered or institutional care. If it registers a significant change in the user's activity level, it automatically sends an alarm to the alarm recipient. The product is now marketed in a number of countries and there are apparently somewhere between 10,000 and 20,000 users.

France (FR)

First generation telecare (social alarms)

Social alarm services are widely available throughout the country and are provided at the level of counties and municipalities. Service operation may include various players such as local fire departments, commercial organisations and insurance companies.

Uptake of social alarms is estimated at about 3% of the population aged 65 and above. Existence of considerable variation in end user charges across the country has been reported. It is estimated that the average monthly service charge ranged between 25 and 35 Euro. Beyond this, sometimes an initial installation charge may be imposed to the end user, which may amount to about 50 Euro. Social funding is estimated to range between 30% and 50% of monthly costs, while in some parts of the country the service has been reported to be provided free of charge. Users who are eligible to receive support under the social benefit scheme can receive full cost reimbursement.

More advanced telecare

More advanced telecare systems that go beyond simple social push button alarms seem to have mainstreamed to some extent under current alarm services schemes. Main market players have joined together within the Association of Teleassistance (AFRATA), with a view to developing quality standards and supporting wider service uptake.

As in the case of simple social alarms pricing seems to vary across the country. Average monthly service charges have been estimated at about 38 Euro. As in the case of simple social alarms, reimbursement under social benefit scheme may be possible in relation to certain eligibility criteria.

Hungary (HU)

First generation telecare (social alarms)

Since January 2008 each Hungarian municipality with over 10,000 inhabitants has an obligation to offer 'telecare home service' (basically social alarms) to elderly people (above 65) who live alone or with their partner, and whose medical condition makes support necessary. Municipalities may choose to provide the services themselves, or to outsource them.

As a consequence, social alarm services are available across the whole country with the exception of some smaller municipalities. Currently 3% of older people in Hungary are availing of social alarm services. It is estimated that 50,000 older people will be provided with social alarms by the end of 2008. Service providers (municipalities or private providers) may ask for co-payment, which is limited to a maximum of 2% of the monthly income of the recipient. Because of some problems with service quality, the current focus is on improving the quality of social alarm services by prescribing that only home care providers may offer the service.

More advanced telecare

Telecare services are not mainstreamed in the country yet. Some of the social alarm service providers (organised in the eVITA Alliance) are planning to offer telecare services on the basis of the business model used for social alarms. For this they plan to use the existing service network as the basis for implementation of value-added, higher-level telecare services. The current state of public sector finances, however, suggests that public budgets for implementation of new ICT-based services will be very limited in the coming years.

The National Office for Research and Technology (NKTH)'s Jedlin Anyos Programme is supporting research projects in the field of ambient technologies and on social telemonitoring and alarm systems.

Ireland (IE)

First generation telecare (social alarms)

Social alarm services are, in principle, available across the whole country. The services are mainly provided by private suppliers (mainly for-profit, some non-profit also). There is a publicly-funded scheme providing financial support for installation costs of social alarms which operates through voluntary and community based organisations. The estimated total take up is between 60,000 - 70,000 people, representing about 13 - 15% of those aged 65 or over in Ireland. The estimated total take up for people living in supported housing is about 75% of all units (about 2% of older people live in this type of housing). For services to people in ordinary homes in the community, the private sector providers set-up connections either directly to older people who apply themselves or via community and voluntary organisations. Social alarms provided in this way are not linked into the mainstream care services and family members and, where necessary, emergency services are alerted by the call centre. However, consideration is currently being given to the possible mainstreaming of social alarms services and other forms of ICT-based assistive technology into care services for older people.

In case of private subscription, initial installation charges are typically in the region of 300 euro, and annual monitoring / maintenance charges of between 66 and 90 euro per year. In the case of publicly-funded provision to older people living in normal housing, the installation fee is covered under the Scheme of Community Support for Older People but users must pay annual monitoring / maintenance costs themselves (about 80 euro).

More advanced telecare

There has been very limited take-up of more advanced telecare in Ireland to date, although some private and non-profit social alarm providers and social care providers now offer telecare 'extras' as part of their services. However, there have been a few pilot schemes in recent years and it is expected that telecare will receive more attention at national level in the coming years.

Italy (IT)

First generation telecare (social alarms)

Social alarm services are widely available, although many local service offerings seem to have emerged only during recent years. Today, the major municipalities in Italy seem to have initiated social alarm schemes and in some cases such schemes have been initiated by the Provinces. Uptake is estimated at between 1% and 2% of the overall population aged 65 years and above. In many cases the technical infrastructure, notably alarm centres, and the service itself are operated by commercial service providers or third sector organisations. This accords with the general situation in Italy where social and welfare service frameworks are determined on local or regional administrative levels and are often complemented by services provided by commercial and/or voluntary organisations. There seems to be no general charging model that applies across the whole country. Individual examples suggest that users tend to be charged a monthly service fee at about €20 - €40. Under certain circumstances users may be eligible to use the service free of charge.

More advanced telecare

More advanced telecare systems that go beyond simple push bottom alarms seem to have been implemented mainly in experimental settings as of today. However, some pilot services seem to have been mainstreamed in a local context. For instance, a telecare scheme (Non Piu Soli) involving psychological support and medical assistance has recently become available to older people living in the municipality of Rome. Overall, however, advanced telecare schemes have up to now played a negligible role in the market for community based monitoring services.

The Netherlands (NL)

First generation telecare (social alarms)

For a long time already, social alarms have been an important component of homecare and independent living in the Netherlands. Consecutively, new functions such as safety, comfort, access control etc. have been added to the basic social alarm systems. With this social alarm systems have been given even more importance. About 3% of those aged 65+ are currently availing of the service, which is available across the whole country and is provided to both older people in supported housing and ordinary housing. In general, the response service is provided either by the family carer or by a professional home care organisation (either public or commercial). If there is no family carer available, a person may choose for immediate follow up by a professional care worker. In the latter case, the monthly subscription fee will be higher. Eligibility for publicly funded social alarms is decided based on an assessment that includes care needs and personal circumstances, and includes means-testing. In a small minority of cases medical criteria may be invoked to enable social alarm reimbursement by an insurance company.

More advanced telecare

Telecare is mainly provided in pilot and trial activities. Fall detectors are hardly used, since the ones that are commercially available are not considered reliable or easy to use. There are some trials going on with add-on sensors, but there is no real mainstream incorporation of telecare in social care for older people as far as these sensors are concerned. Meanwhile, screen-to-screen contact pilots in which patients receive care via digital media are further developed. The Ministry of Health has taken a temporary measure for reimbursement of screen-to-screen telecare equipment and related services, as it is believed that this way of care can partly replace the visits of home care workers and postpone the intake in residential care homes or nursing homes, thereby lowering costs and increasing quality of life. Therefore a large number of trials are taking pace, but take-up is still below 1 % of the population 65+ (current estimates are that there are about 1000 users in the country).

Poland (PL)

First generation telecare (social alarms)

Poland has seen the development of a private market for social alarm services in recent years. A number of providers offer their services in the major agglomerations or even across the whole country, but the quality of the back-up services appears to vary significantly. The most widely available service appears to be "Line of life" by Polish Telecare System Sp. z o.o., which is marketed as a "national personal help calling system" in co-operation with the public emergency rescue services. Other major providers include Sara Care Centre, AMBER (which offers a "personal immediate help calling system"), and SpyTel. No data on numbers of users are available from providers or from other sources. To raise awareness about the usefulness of social alarm systems, in many Polish regions publicity campaigns have been organised in recent months in cooperation with the emergency rescue system. Until now, social alarm systems are not covered by universal insurance in Poland, and no public financial support from the State is available. Users need to pay for the service out of their own pockets. Prices include hire for the equipment (between €0 and €7 per month, depending on the provider), installation costs, and a subscription fee (between €14 and €20 per month).

More advanced telecare

As of yet, telecare applications play little role in the provision of long-term and social care in Poland. However, some private providers of social alarm services also include basic telecare applications in their offer. For example, "AMBER of Health Service" includes fall detection and home security features (detection of smoke, gas and flooding), with alarm response provided by the provider's own monitoring centre. This service is available across the country, and needs to be paid out of pocket. Telecare has not attracted any significant interest from policy-making so far in Poland.

Sweden (SE)

More advanced telecare

Social alarm services are available throughout the country. They are provided both to people living in ordinary (mainstream) housing and in sheltered housing ('service' houses or flats). Social alarms for those living in ordinary housing are generally provided by municipalities although recently some private companies are entering the marketplace. Standard social alarms are connected to an alarm centre that forwards the information to formal services (home-help services) and/or family members.

There is substantial provision of home care services in Sweden, and social alarms are routinely considered and, where needed, offered as part of this. It is estimated that a total of about 160,000 social alarms are installed across Sweden, indicating a take-up of about 10% amongst people aged 65 years and over. About one-half of these are in service flats and the other in ordinary (mainstream) housing in the community.

If a user receives home help, social alarm installation costs are generally covered by the municipalities. Users generally pay some of the service costs, and this can vary somewhat across municipalities although would generally be of the order of about 10 euro per month

More advanced telecare

There seems to be some degree of mainstreaming of more advanced telecare (social alarms with 'extras', such as movement and other environment sensors) by municipalities, but not in any consistent manner across the country. There are also a number of trials. In addition, some private services offer telecare and some municipalities offer videophone-based telecare on a mainstream or trial basis, for example the West Sweden city of Borås which in the ACTION project has tested videophone links with older people/their families. Currently, approximately seventy five families are using the service, which is now being tested in other municipalities as well. Although there is no specific policy, as such, in relation to telecare or an explicit statutory right to telecare services, such services at least in principle fall within the scope of social care for older people and/or assistive technologies. More generally, there is no one policy that applies to the whole country. Each municipality or county council sets their own policy in relation to care (including telecare, if this dimension is addressed), so there is considerable variation across the country.

Slovenia (SI)

First generation telecare (social alarms)

Overall, ICTs for independent living are at a very early stage of development in Slovenia. The Lifeline/Red Button social alarm service is only available in 5 regions and there are reported to be approximately 300 older and disabled people using the service in Slovenia. The service is provided by social care services in co-operation with municipalities, who also subsidise the service. The amount charged depends on the resources of the client. The introduction of a Lifeline program at national level is currently being discussed. There is general agreement that the proposed program has substantial merits, nevertheless the program has not yet been implemented.

The Government programme *Social Care of Older People in Slovenia to 2005* proposed a network of 15 regional social alarm response centres. Only some of the regions have implemented this as of yet.

More advanced telecare

Telecare services are in principle available in 4 regions. There is no exact figure on take-up, however it is extremely low, as the use of sensors in the home is very rare. Trial activities have recently been initiated in the context of the IRIS Smart Home project.

No specific policy has yet been developed for telecare, however an act on long-term care is in preparation, which will explicitly include telecare.

United Kingdom (UK)

First generation telecare (social alarms)

The UK has a well-developed infrastructure of community alarm services provided by local housing authorities, social services and the voluntary and private sectors. Social alarm services are provided to both people living in sheltered housing and in ordinary housing in the community. There is also a significant private subscriber market. Overall, there are an estimated 1.5-1.6 million people using some form of social alarm in the UK, representing about 15% of those aged 65 years or older.

Most local authorities run an alarm scheme, either directly provided themselves or with outsourcing to a private supplier.   In general, it seems that outside of the sheltered housing context, family carers are typically the main responders once the call centre has been alerted, although in some areas the social care services also provide a mobile response team in addition to the nominated informal carer response.

The charging/reimbursement situation varies across local authorities. As a general rule, it seems that equipment is provided free of charge to those with an assessed need and users pay a monthly usage charge unless they are eligible for waiving of this on the basis of low income. User costs may vary between 10 and 25 euro per month, depending on location and provider.

More advanced telecare

In recent years, social care authorities have been putting into place telecare sensor services (e.g. smoke, heat, flood detectors) and the UK is on the verge of taking telecare into the mainstream. This has been driven by policy and funding, including the Preventative Technology Grant in England and other programmes on telecare in Scotland, Wales and Northern Ireland.

It has been reported there were nearly 150,000 new telecare users in England in 2006/7, and a further 161,000 in 2007/8. If all of these involved enhancements to the basic social alarms through addition of sensors and so on, then this would amount to about 3% of the population aged 65 years or older having 'telecare'.

Provision and charging approaches vary considerably across local authorities. In general, the most common approach seems to be similar to that for social alarms although sometimes at a higher level because of the additional extras provided.

Japan (JP)

First generation telecare (social alarms)

In Japan, the history of personal security alarm services traces back to the early 1980s. Since then many services have emerged that are operated by the municipal fire departments, as well as services that have been contracted out to private companies and voluntary organisations. Beyond this, social alarm schemes are operated by commercial property security services. Also, municipal social alarm schemes have started to emerge that specifically target older people in the context of community care frameworks implemented at the regional level, e.g. in the Miyagi prefecture covering 71 municipalities. It is estimated that not more than 3% of the elderly population may currently use social alarms. There seems to be no general charging model. While purely commercial alarm schemes exist community based schemes that involve some form of public funding are available as well.

More advanced telecare

In view of the demographic development, telecare has received considerable attention on the part of the Japanese government already during the 1990s. A considerable number of pilot implementations have for instance been funded by the Ministry of Health and Welfare since then, e.g. a large scale model project (the so called Telemedicine Promotion Model Project) addressing municipalities with a view to encourage mainstreaming of a set of 20 telecare services directed towards older people living in the community. Previously, the ministry had issued a document entitled 'Guidelines for Implementing Information Technology in the Areas of Health, Medical Care and Welfare'. Despite such efforts and the existence of a strong industrial basis when it comes to equipment manufacturing, uptake of more advanced telecare applications has fallen below expectations as of today. Implementation of systems that go beyond simple push button alarms still largely concern pilot and trial activities. However, some local mainstreaming of passive alarm sensors, i.e. sensors that do not need to be actively triggered by the service users, has been reported.

United States (US)

First generation telecare (social alarms)

Social alarms are called personal emergency response systems (PERS) in the USA and are in principle available in all parts of the country. There are both national and local providers, including private companies, hospitals and social service agencies. It has been estimated that about 2.3% of the population aged 65 years and older use social alarms. The main forms of provision are either linked to healthcare facilities or through private companies. In the former case, the response may often be provided by staff employed by the healthcare facility; in the latter case, response would normally be by local, user-nominated contacts. Historically, the focus seems to have been especially on provision by hospitals or other healthcare facilities with a view to reducing bed-occupancy and other costs. There also has been provision by religious/charities as a more social welfare oriented service, and by manufacturers and security companies. Most PERS are purchased out of pocket by the individual or their family members. Purchase prices range from $200 to more than $1,500. There are additional charges for installation and monthly monitoring ranging from $10-$30.

More advanced telecare

There has been an overall increase in interest in telecare, with the emphasis/focus apparently more on healthcare than social care in a wider sense. Such 'telecare' services are provided by a range of providers including medical/clinical practice sites, hospitals and social service providers, both public and private. The availability of services varies from state to state with little or no coherence in application or utilization. The extent of take-up varies hugely across the country and there is no data available on the extent of take-up. To date, the Veterans Administration healthcare system seems to be the main provider of telecare services with an independent living focus, even though the main focus of its remote support/monitoring is telehealth. Some of the services have been mainstreamed. In Florida, for example, the Low ADL Monitoring Program (LAMP) is a Community Care Coordination Service (CCCS) program designed to address the needs of veterans with activities of daily living (ADL) dependence through care coordination and the use of home monitoring and communications technology.

3.2 Home telehealth

This section focuses on home telehealth services, defined for current purposes as ICT-supported remote healthcare services to support the health needs of older people in a manner that avoids unnecessary hospitalisation and/or visits. The main focus is on health telemonitoring, as well as related services linked to early hospital discharge ('home hospital').

An overview analysis of the situation across the 16 countries is first provided, followed by summary country profiles for each.

3.2.1 Overview analysis

The overview analysis provides a synthesis of the situation across the 16 countries in terms of various aspects of market maturity and other features of the markets in this field.

Market maturity

Home telehealth is less mainstreamed than telecare (at least basic first generation telecare in the form of social alarms) at present. No country has 'full' mainstreaming in the sense that all mainstream providers, in all parts of the country include such services within their repertoire. Overall, the US shows most mainstream development, with many instances of mainstream services, including quite a number of services for older clients provided by the Veterans Administration and a growing number of examples of provision by private providers.

Some European countries do have at least some examples of mainstream implementations of varying scope / scale. In many cases these are quite localised initiatives involving just one provider or cluster of integrated providers. In Germany, developments under integrated care initiatives, with reimbursement under health insurance, are resulting on more generalisable models even if these are still restricted to some areas/providers for now.

Exhibit 12: Level of mainstreaming

Fully mainstreamed	Partially mainstreamed	Pilot/trial activity	Little or no activity
	Leading (many instances): US **Others (with some localised instances): DK, ES, FI, UK, DE, SE**	**IT, FR, HU, NL, PL, (JP)**	**IE, SI, BG**

The main applications that can be found in mainstream services are use of home telehealth to support chronic disease management and also early discharge from hospital (hospital-at-home). In terms of chronic conditions, the main attention has been to such conditions as heart disease, chronic respiratory disease and diabetes, which are especially common amongst older people.

Main providers / payers

In the EU countries, the main providers of home telehealth services to date have been hospitals and, less commonly, other healthcare facilities, in some cases in collaboration with other players such as general practitioners. In the US various public and private healthcare facilities and providers have been involved.

As regard payers/reimbursement, the main model in Europe to date has been direct public provision without user charges. Some reimbursement by health insurers has also emerged (e.g. in DE). In the US there is a mix of provision by public agencies (e.g. Veterans Administration) and private healthcare providers/agencies (hospitals, HMOs etc.), with increasing reimbursement under the various insurance systems.

3.2.2 Country profiles

Bulgaria (BG)

There are currently no systematic home telehealth services available in Bulgaria. The main actor on a governmental level is the State Agency for Information Technologies and Communications (SAITC). In 2005, SAITC run a pilot project on telehealth in the region of 'Septemvri'. The National Heart Hospital (NHH) in Sofia has some ideas about launching a new telehealth pilot, to be based on the NHH information system, involving about 20,000 to 25,000 patients. The IT industry has shown interest in telehealth initiatives too. During the 'BAIT EXPO' fair in the first week of November 2008, the IT company Security Solutions Institute, part of the PRIMA holding, presented the first phase of its 'Stress' project. The project aims at establishing remote electronic blood pressure measuring and heart monitoring.

The lack of governmental coordination and interlink between the different initiatives might be the reason why telehealth developments in Bulgaria have been slow. A comprehensive policy on telehealth does not exist yet. A draft for National Health Strategy for 2009 referring to telemedicine and care for the elderly has been submitted for discussion in the Parliament. So far, the Ministry of Health and the National Health Insurance Fund (NHIF) had put their efforts into implementing a Strategy for the Introduction of E-Health in Bulgaria, in place since 2006. In reference to this, Inter Component Ware (ICW), in cooperation with Cisco Bulgaria and a Bulgarian IT company – Kontrax, run a small-scale pilot project in 2007, connecting four pharmacies, seven GPs and 1000 participants in two villages near Sofia for the introduction of the first electronic health cards. At the moment, NHIF is working on a strategy for nationwide roll-out of the cards.

More generally, the take-up of social communication technologies for older people is expected to develop somewhat in the foreseeable future. 'Life quality improvement through ICT usage' has been stated as a policy priority in the 'National Program for fostering the Information Society Development' (2008-2010). As a major obstacle in this respect, along with the lack or resources, can be identified the very low usage of computers and Internet among the elderly – just around 0.4%, according to the National Statistic Institute.

Germany (DE)

While home telehealth has not reached wide diffusion in Germany yet, there are many activities and the area is developing quickly. A number of health insurances offer large-scale home telehealth service programmes as part of the integrated healthcare programmes, while others are involved in a trial phase with a rather low number of participants.

Telemonitoring at home is one of the core focus areas of these programmes, in particular within the framework of innovative approaches to supporting chronically ill people.. Some medical heart- and/or diabetes centres in Germany provide e-health offers, such as the measurement of vital data (blood pressure, ECG, weight, blood sugar etc.) and monitoring services. Patient data are directly transmitted from the patients' home to the medical centre, where they are monitored. As regards chronic conditions, a particular focus seems to be on people with heart failure, asthma and diabetes. Many of the services are reimbursed by the health insurances.

Main providers include commercial monitoring services (for chronic diseases), non-profit organisations for chronic diseases (such as the Stiftung Telemedizin) and selected hospitals, clinics or GPs who provide outpatient services for elderly people. However, not all of these services are available in all parts of the country, with some of the health insurances being frontrunners and providing telemedicine services as nationwide pilot programmes and some of them being in regional test phases.

Telemedicine services provided by the health insurances are in principal open to all persons covered by the respective health insurance who suffer from the conditions (e.g. chronic heart disease, diabetes) that are being addressed by the service. One of the key factors towards implementing telemonitoring service programmes was the launch of the integrated healthcare programmes which now allow direct contracts between providers and statutory health insurances. Until the end of 2008 start-up funding is available from the government for integrated healthcare programmes after which the services have to sustain themselves. Some of the programmes may finish when this happens

Denmark (DK)

In Denmark there are several home telehealth pilots and trials running and it seems that some of these have been (locally) mainstreamed into medical care for older people. These involve hospitals cooperating with municipalities and GPs functioning as partners. There also seem to be some attention being given by private providers.

There are, however, no national ventures or overall national strategies running as of yet. A national program for telemedicine and home monitoring is under development and expected in 2009. After a period of decline in attention, there has been a radical shift and today telehealth in policy towards homecare etc is a very popular topic. Telehealth is seen as a source of both cost reduction and service quality improvement. At the moment, though, mainstream implementation and take-up is still low.

Interesting initiatives include TeleKOL which is piloting TeleCOPD in Frederiksberg and Aalborg, involving treatment of COPD patients in their own homes; and Better Breathing, an EU project which provides COPD treatment in patients' homes through an ICT supported home hospital service (eCare). The latter also comprises an online network for an ePatient Community to reduce the social isolation experienced by COPD patients, as well as to provide an infrastructure for delivering eLearning materials, which will assist patients in managing their disease.

Spain (ES)

Telehealth is at an early stage of development in Spain and provision consists mainly of pilot projects. There has, however, been some mainstreaming in a number of regions.

In Catalonia, some hospitals have developed hospital-in-the-home services. There is also some Telemonitoring available through health centres in Castile and Léon, Extremadura and Castile-La Mancha. These are public services.

In Spain, telephone consultations are available via the Regional Health Councils. They are publicly funded and free of charge. These services have only recently been developed and it is expected that provision will continue to expand. Online consultations are available, however they are more focused on providing information and medical appointments than on receiving a diagnosis.

The AVANZA 2006-2011 Plan sets out an online health work-plan that includes telehealth, consisting of actions to improve the quality of life of patients, to reduce costs, to develop tele-consultation and diagnosis in under-resourced areas and to connect primary and specialist care. The AVANZA Plan is co-ordinated in each Autonomous Region in accordance with their own Regional Strategy for the development of these services. The Regional Health Ministries of the different Autonomous Communities implement different programmes, mainly information and prevention focused.

Finland (FI)

The use of telehealth in Finland has started to expand in a limited and patchy manner across the country - monitoring of vital signs and blood glucose levels along with the monitoring of movement are spreading in home care. Internet-based access to services is also of growing importance. Although the technology is widely available in principle, uptake in home healthcare has been low to date.

One interesting example in Finland is Goodit m-health, which uses a mix of mobile phone, PDA and Internet to support homecare for diabetes patients; evidence suggests considerable cost-savings through reduction in complications and the high costs associated with these once they arise

Of more general interest is FinnWell, a government-funded programme with the objective to promote health and wellbeing through technology applications and service innovations. This supports RTD in various areas of relevance for home telehealth.

Overall, however, it seems that there is currently no developed policy on home telehealth in Finland. The organisational structure of healthcare in Finland is reported to be a barrier to take-up, with an absence of clear incentives and/or working arrangements that would encourage provision of home telehealth services.

France (FR)

In France, telehealth services have mainly been implemented in trial settings as of today. A considerable number of pilot implementations have emerged over the recent years, with funding under various national programmes. When it comes to services directed to older people in particular, relevant projects have to a large extent focused on service schemes involving public hospitals and care homes.

Initiatives which are of interest in relation to the support of older people in particular include:

TLEMD GIP RTR Midi Pyrenees: A pilot project involving a large number of actors, e.g. regional authorities, private clinics and sheltered housing facilities, that includes various applications such as telecommuting, teletraining and telecare

Teleregia: A pilot project involving various actors, e.g. Paris social services, caring homes and hospitals, that includes applications such as teleconsulting, tele-follow-up and teletraining.

H2AD: A pilot scheme that is expected to be mainstreamed that includes provision of a telehealth and telecare service platform for the provision of home services and medical assistance

Hungary (HU)

There are currently no systematic home telehealth services available in Hungary. Activity is limited to pilot projects and very limited numbers of general practitioners (<1% according to the pilot GP survey conducted by the eHealth-Indicators study in 2007) who provide telemonitoring services to their patients.

Hungary has a strong tradition in developing and manufacturing medical technology (the state-owned Medicor Inc. was one of the main suppliers of high-quality medical devices for the Warsaw Pact states). As a result, Hungary has several companies operating in the market for home telehealth solutions. Tensiomed, a Hungarian supplier of advanced medical devices in the field of blood pressure control, is marketing personal telemedicine systems to private practitioners in the country, as well as export markets (e.g. Austria).

Many of these companies are organised in the eVita initiative, which brings together research institutes and private industry and strives to foster development of telecare and telehealth in Hungary. They are also core players in a number of home telehealth pilots. In addition, the National Office for Research and Technology (NKTH)'s Jedlin Anyos Programme is supporting research projects dealing with medical telemonitoring for application in the home .

A policy on telehealth is not in place yet, but ICT-based provision of health services has started to attract attention in the context of the healthcare reforms which commenced in 2007. The need to make healthcare provision much more efficient has resulted in Hungarian authorities being much more keen to seriously consider new technological opportunities that could provide high-quality and sustainable public healthcare and social care services at an economically and socially affordable price. The main interest concerning telehealth, therefore, is on innovations which help reduce costs without endangering quality.

Ireland (IE)

Home teleHealth services are very under developed to date in Ireland and no major national pilots or trials have taken place. There have been some isolated, local small-scale trials, although these did not focus on older people. The main telehealth/telemedicine development has been confined to telemedicine services within hospitals and amongst medical staff; examples include Tele-Radiology, Tele-Cardiology and Tele-Oncology.

One non-profit social alarm provider includes home health monitoring as part of its service, although this has not yet been officially launched and there is no take-up yet. The focus is on recording vital medical information on a daily basis for sufferers of chronic diseases such as COPD, heart failure, asthma or diabetes, enabling health care professionals to detect any change in the patient's status as well as automatically raising an alarm if their condition deteriorates. Another has plans to offer home healthcare technology to older people, although the main target market will be pharmacies.

In practice, home telehealth services for older people appear to be generally unavailable across Ireland. They are not yet a feature of mainstream healthcare services and any provision of such services would have to be privately sourced and funded by the individual. Take-up is therefore minimal.

There is no national policy focusing on home telehealth. More generally, it is not clear where home telehealth would fit in the organisational structure of the health care system given the current public-private mix and generally not very integrated system. These factors seem to constitute significant barriers to the development of home telehealth at this time, and there appear to be no clear financial or other incentives to healthcare providers to provide such services at present.

Italy (IT)

There are mainly pilot telehealth schemes taking place in Italy at present, although some experiences seem to exist with mainstreaming of telehealth experiments in a local context. During recent years, there have been several institutional initiatives to promote and stimulate the development and piloting of telehealth services in Italy. Some Italian municipalities have promoted the development of telehealth services through regional trials.

In Italy local health units (ASL – Azienda Sanitaria Locale) and local hospitals seem to be the main institutional settings where health services are provided. These seem to serve as focal points where most of the current telehealth schemes have been implemented, often in cooperation with private product manufacturers or service provider organisations. There are no figures available in relation to the extent of take up in terms of end users involved.

The Airtem project represents an interesting trial which is of relevance to older people with chronic conditions. Overall, the project incorporates 600 patients. The objective is to explore all those activities that are linked to the realization of a virtual hospital in which the chronic patient could receive all the professional assistance needed without having to move from home.

The Netherlands (NL)

Home telehealth services such as tele-monitoring are not mainstreamed in the Netherlands yet. However, there are several pilots taking place across the country, varying from small schemes involving 20 patients to very large ones involving 200 patients. In most cases monitoring of patients in their own home is tested with diabetes and chronic heart failure patients. Philips has performed trials with tele-monitoring combined with screen-to-screen contact. Similar trials are being performed with the so-called Health Buddy, where patients with one or two of the large disease groups, heart failure, diabetes and COPD, are encouraged to live healthier, take medicine etc. These trials have reached several hundreds of patients, but mainstreaming is not foreseen yet.

The number of patients involved in telemonitoring and tele-consultation experiments is estimated to be about 1000. According to data from the eHealth Indicators survey in late 2007, about 3% of GPs have already tried out telemonitoring applications.

National policy does plan to introduce home telehealth in the medium term since it is considered to be able to contribute to more efficient and cost-effective health care. No concrete targets have been agreed upon yet. Currently, independent living and homecare for older people receive much more attention in the policy debate than home telehealth. Moreover, it appears that the main focus of public policy on home telehealth is on cost reduction, whereas quality improvement through disease self-management is seen as secondary.

Poland (PL)

The development of telemedicine system in the country is still at an early stage. Telemedicine is being piloted mainly to monitor cardiac patients, to make teleconsultations ('second opinion') and to a very limited extent to manage some chronic diseases in the patient's home environment.

Cardiologic telemonitoring systems are being piloted in a number of healthcare centres in Poland. The system comes in the form of a personal terminal or a multi-person terminal for public access that can be used by different patients at the same time. Telemonitoring is also being piloted to remotely monitor patients with heart diseases (tele-cardiology, tele-electrocardiogragraphy).

Some of the providers of social alarm services are also experimenting with combined telecare / telehealth services. Polish Telecare System Sp. Z o.o., a private provider, is currently piloting Care Line, a system which is targeted mainly at people suffering either from diabetes, problems with the respiratory system, or cardiologic problems. The system includes a reminding function which controls medicine intake and exercising. Another provider, Amber of Life, plans to extend its service range by enabling diagnostic tele-measurement of blood pressure, body weight, lungs capacity, ECG, etc.. The data are to be transmitted directly to the patient's GP.

The Polish government gives high priority to the task of improving the country's health-care system. Everybody agrees that waiting lists needs to be shortened, that patients should receive better value for money and, more generally, that the health status gap in relation to other EU Member States needs to be closed. Insofar as applications of telehealth are being perceived and promoted as potentially being part of the solution to these challenges, they attract considerable interest in the public debate.

Public policy papers show awareness of the extent of regional disparities in health-care availability (lack of certain specialists in more peripheral regions). Applications of telehealth are being mentioned as a means to improve service provision in rural areas of Poland, but there are no signs yet of any strategic policy activity in the area.

Sweden (SE)

There is ongoing development in Sweden in the area of telehealth, with some attention being given to home healthcare applications, such as support or consultations over the Internet and management of long-term conditions.

Some telehealth services are used throughout Sweden, like online patient journals and digital prescriptions. Also, some home telehealth pilot projects have been carried out, but usually have not yet been incorporated into mainstream medical care for older people. County councils are the main providers of such telehealth services as currently exist, but private companies develop the technology.

A relevant initiative is OLD@Home, a RTD project with support from Vinnova (the government innovation agency) addressing chronic conditions and integrated care for older people. The project developed a shared data system for home healthcare and primary healthcare, where home-care personnel, primary healthcare, relatives and the patient can access and update patient information.

Another initiative which has attracted considerable attention is the Sister Gudrun Project, a pilot project based in the primary care centre in Blekinge together with Affërsverken in Karlskrona that has since been mainstreamed. Thus uses an IPTV solution to support primary care centres deliver support to patients own homes.

Vinnova (Swedish Governmental Agency for Innovation Systems) is expected to financially support more research in the area in the future. More generally, however, there seems to be no overall policy on home telehealth in Sweden. Fragmentation of health care policy at local level in Sweden is reported to be a barrier, in that every county council sets their own policy regarding health care (and telehealth). Overall, there is increased interest within the health care sector although it is reported that changing old routines among front line service providers may be a challenge.

Slovenia (SI)

Telehealth services in Slovenia are under-developed to date. Some services have been developed but these are only at demonstration stage and have not been integrated within the mainstreamed home care services yet. The IRIS Smart Home project in Ljubljana includes trials of telerehabilitation and telemonitoring of blood pressure and pulse.

Telephone consultations are common, and reimbursement arrangements are in place for these. Online consultations are actively encouraged by legislation (the Act on Patients' Rights). Each doctor is expected to have an email account for the purposes of online consultation, however only a small number of doctors have taken this up so far. The Medical Chamber of Slovenia has argued that this is due to the provisions of the Slovenian Personal Data Protection Act which states that an individual's personal data should be unconditionally protected. For this reason, test results, prescription and renewal and appointment scheduling are not available online.

Compulsory health insurance does not cover telehealth services. Voluntary (additional) health insurance schemes may also cover the "red button" telecare service in some cases.

While an IT strategy for health care in Slovenia has been developed, this caters for eHealth and health care informatics rather than telehealth. There is no specific policy on home telehealth in Slovenia.

United Kingdom (UK)

It seems that home telehealth for older people and others with chronic conditions is beginning to take-off in the UK, even if such services are currently only available in some regions and are typically tied to specific hospital services and medical conditions. Some health-related devices/services have also been implemented within the broader approach to 'telecare' in the UK.

Examples of home telehealth include:

- Local schemes in Carlisle and Sheffield are working with people with respiratory disease (COPD). One clinical evaluation showed that so far the system has seen almost 1,000 bed days saved to date, with average stays reduced by almost 50% from 10 to 5.5 days.

- A number of telehealth programmes for NHS patients in Scotland, Wales, England and Northern Ireland have implemented the RemoteNurse Telehealth system, a Class II Medical device

- Northern Ireland's Department of Health and Social Services is getting set to issue a tender for the supply of telehealth services to cover 5,000 people by 2011. Northern Ireland will invest £46m in telemedicine services to support chronic disease management.

- The Whole System Demonstrators will include a focus on chronic heart disease, chronic obstructive pulmonary disease (COPD) and type 2 diabetes. For example, Kent County Council is distributing TeleHealth equipment to 250 patients. The equipment comprises a large touch-screen device, with sensors for measuring vital signs such as blood pressure, blood sugar, blood oxygen and weight – temperature and peak flow readings can also be manually input. Patients using the service monitor their vital signs in their own home, and the results are automatically sent via the telephone line to a secure server where they are available to their clinicians.

In principle, services are free to the end-user under the National Health Service.

Japan (JP)

In Japan, telehealth seems to have been mainstreamed to some extent under local/regional health care schemes. Usually a must validate the need for a person to obtain telehealth services. A number of stakeholders may be involved in the provision process. While government on the regional/local level tends to take an facilitating role, hospitals, primary care services and private companies may be involved in actual service provision. In practice, formal boundaries between telecare and telehealth services provision seem to be blurred to a certain extent.

Japanese industry has a long-established reputation for excellent manufacture of electronic equipment. For quite some time, attention by major market players has increasingly been directed towards the elderly care market driven by the demographic development. When it comes to service implementation, various types of telehealth services have been reported. These include video-based medical support, remote monitoring of vital signs and more back-office type systems enabling sharing of electronic information among health care and social care professionals and administrative bodies. As regards geographic coverage of relevant services, availability has been reported for municipalities located in various regions such as Hokaido, Yamagata and Mitoyio. Although there are no exact data available on the number of end users involved, actual usage levels are estimated to have remained on a rather low level overall.

United States (US)

Telehealth in general has been especially associated with rural states because of the difficulty in attracting and keeping physicians in rural communities. There has also been growing attention to home telehealth and telemonitoring, more generally, and a number of mainstreamed services are in place even if full mainstreaming across all providers and parts of the country has not yet emerged. Studies are being conducted by Medicare (CMS) to determine utility and feasibility of these services. The Veterans Administration have taken the lead in providing home telehealth service for their clients (army veterans). Overall, although the actual percentage of take-up is unknown, it is probably still very low in terms of overall home health for older people.

Some examples of up-and-running services include those under the Care Coordination Home Telehealth (CCHT) programme of the Veterans Administration. This is probably the most developed example of mainstreaming of home telehealth in the US. It combines care coordination and the use of technology to serve a variety of veteran populations that are high risk, high resource use, and represent high cost to the services. To facilitate early home placement, interactive systems being deployed include videophones, telemonitoring devices, in-home messaging devices, a PC Web-based interactive system, specialized instamatic cameras for wound care follow-up, and the telephone. Currently there are over 3,764 patients enrolled in the programs and over 7,000 patients have been treated in total.

Examples focusing on older patients include Lake City Tech Care (frail older adults with complex medical health problems and primary diagnoses of COPD, OHD and Diabetes); Ft. Myers Telehealth (frail medical patients with diagnostic categories of CHF, COPD and Diabetes); Miami T-Care: The T-Care program focuses on frail older adults (starting with a diabetic population they will expand to other diagnostic categories (e.g. CHF) over time).

Another relevant example in the US is the Jewish Home and Hospital Lifecare System, involving a series of pilot programmes on telehealth to address congestive heart failure and diabetes management.

One of the key factors influencing whether home telehealth services become mainstreamed is whether they are reimbursed by third part payers. This has become more common in recent years.

4 Initial synthesis and policy conclusions

Although the project has only completed the first phase of its empirical and analytic work, it is nevertheless useful to present an initial synthesis of the main messages that can be discerned so far and to draw some initial policy conclusions. Section 4.1 presents an overall analysis of key market drivers and barriers in the various domains and section 4.2 presents some initial policy conclusions that emerge from the results of the work to date

4.1 Key market drivers and barriers

4.1.1 Telecare

Social alarms

Because the levels of penetration and also the apparent market 'saturation' levels vary considerably across countries, the extent to which market drivers can be discerned and the types of drivers that are operative vary to a certain extent across countries. In general, however, the main driving forces to date have been public provision, public reimbursement and embedding of social alarms as part of mainstream social care and/or housing services. In some countries, especially those where a private market is substantial, security concerns of older people and/or their families seems to be an important driver. In some countries also, especially those with very high penetration levels, promotional efforts by the equipment / systems sectors also seem to have played a significant role.

> *Drivers*
>
> Ø *Main / most common drivers:*
> - *Public provision*
> - *Public reimbursement*
> - *Embedding as part of mainstream social care (and/or housing) services*
>
> Ø *Other drivers:*
> - *User / family security concerns*
> - *Commercial promotion in some countries*

As regards market barriers, the key factors of influence seem to vary considerably across countries. In fact, some countries may already be at 'saturation' point to a certain degree and thus have no concrete barriers, as such, to the achievement of higher penetration levels. Underlying this may be some important variability in perceptions of the role/value of social alarms in social care, and of where it fits in the spectrum of (human and other) services that are needed. More generally, where they exist the main concrete barriers appear to be limited public provision and lack of public funding / cost subsidy, and disparities in geographical availability/provision in some countries. It also seems that technology and, especially, technological change may be a limiting factor in some countries, for example upgrading old systems to work with new digital telecommunications networks and providing services to IP telephony users.

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Barriers

Ø *Key factors of influence vary across countries and some may already be at 'saturation' point*

Ø *Variability in perceptions of its role/value in social care may be a key factor in relation to this*

Ø *Specific barriers:*

- *Limited public provision / funding / cost subsidy*
- *Geographical disparities within (some) countries*
- *Technology challenges / change*

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More advanced Telecare

Overall, as regards market drivers there is no coherent or common pattern discernable across countries. Quite a number of countries have the infrastructural potential in place (well-developed social alarm infrastructure and capacity to supply and link-in additional sensors). From the experiences in those countries where there is significant mainstreaming, even if still partial, it seems that a combination of product innovation and social care service (or often healthcare service in the US) receptivity is the key to market take-off. Even in these countries, the specific drivers can be different however. In the UK, the implementation of a specific policy and public funding stream has been a key factor, with the presence of a strong supply industry also a relevant factor. In Finland, particular product innovations like WristCare seem to have been a factor in market development. In the US, the growing recognition of cost-benefits of the wider care dimension of telecare seems to be a factor in encouraging the more traditionally health-focused players to implement telecare.

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Drivers

Ø *No coherent / common pattern across countries*

Ø *Infrastructural potential now available in quite a number of countries, but 'market' has yet to take off*

Ø *Overall, seems that a combination of product innovation and service receptivity is needed*

Ø *In countries with more advanced developments, key drivers seem to have been:*

- *UK: policy/funding driven, also strong supply industry*
- *FI: product innovation (e.g. WristCare)*
- *US: growing recognition of positive cost-benefits*

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As regards barriers, an important factor is the considerable variability across countries in infrastructural readiness. This includes both the basic social alarm infrastructure upon which more advanced telecare can be built and the capacity to supply and implement more advanced features and services. More generally, however, it seems that there are considerable differences even amongst countries where the capacity is in place. Again, these appear to be linked, at least in part, to the absence of a shared view on the role/value of advanced telecare in the overall social care system and/or on what are the priority aspects of the entire (human and other) service system that need to be addressed.

Specific barriers in a number of countries include the lack of infrastructural capacity and lack of public reimbursement / funding. In those countries where these barriers are less apparent, the lack of a demonstrated 'business' and/or 'quality' case seems to be limiting factor for social care providers. Ethical/regulatory issues around passive monitoring seem to be a potential barrier in some countries, also.

More generally, the challenge of transitioning from pilots to mainstream seems to be an issue in many countries, although a large part of this may be linked to the lack of infrastructural and/or more general system readiness in some cases. There are also barriers posed by the need for organisations to work together and appropriately share responsibilities (e.g. between social care and housing, or social care and health care), as well as the related issue of which parties pay the costs and which get the benefits. More generally, the challenges of organisational change seems to be a limiting factor, as well as more general social/professional resistance in some cases.

Barriers

Ø *Infrastructural 'readiness' varies considerably*

Ø *Lack of shared view on its role/value in social care*

Ø *Specific barriers:*

- *Lack of infrastructural capacity*
- *Lack of reimbursement / funding*
- *Lack of demonstrated business case*
- *Low priority (and low perceived 'quality' value)*
- *Ethical/regulatory issues*
- *Transitioning from pilots to mainstream*
- *Allocating/agreeing responsibilities across the players*
- *Organisational inflexibility*
- *Professional/social resistance*

4.1.2 Telehealth

The extent of mainstreaming of home telehealth is very limited to date and in many countries no major drivers can yet be discerned. In the forerunner countries, somewhat different drivers have been apparent. In the US, the transparent and accepted cost-benefit rationale (savings in healthcare costs at various points in the system) has been a key driver, as well as the evolution of a (potentially) conducive reimbursement system, even if this is still to fully embrace home telehealth (as in the case of Medicare). In Germany, home telehealth has emerged in the context of a new approach to provision of integrated care and emerging reimbursement of this by insurers. This makes the German 'market' one of the most likely for take-off and widespread mainstreaming in the near future.

In other countries, existing efforts are more localised. Drivers have include availability of funding for pilots/trials and local 'champions. Product innovation in home healthcare devices and monitoring systems, and promotional efforts by the industry have also been a driving force in some European countries and in the US.

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Drivers

Ø   *No major drivers in most countries*

Ø   *In forerunner countries, key drivers have been:*

- *US: transparent cost-benefit rationale and (potentially) conducive reimbursement system*
- *DE: new approach to integrated healthcare and emerging reimbursement by insurers*

Ø   *In other countries, driving forces (to the extent they exist) have been:*

- *Availability of funding for pilots/trials*
- *Local 'champions'*
- *Product innovation (home healthcare devices and monitoring systems)*

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In Europe, at least, and in contrast to the US, the lack of a recognised 'business case' for home telehealth seems to be an overarching barrier. In this regard, there is the more general challenge of establishing a clear 'business case' under many European healthcare systems. In addition, the fact that the business case may vary substantially for different players within a given country's healthcare system adds to the complexity.

Linked to this is the lack of incentives to introduce new services for healthcare providers under many of the existing reimbursement systems to be found across Europe. There are also the complexities posed by existing boundaries and responsibility structures within healthcare systems, and a need to clarify and ensure fairness in the distribution of costs and benefits associated with the introduction of service innovations such as home telehealth.

In some countries, another barrier is the fragmentation posed by devolution of healthcare policy and delivery to the regional and even local level. This makes it difficult to implement coordinated national policy in this and other fields.

In some countries, also, there are medico-legal uncertainties in relation to home telehealth. For example, the extent to which even telephone consultation is allowed (and encouraged) varies considerably across countries.

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Barriers

Ø *Lack of recognised cost-benefit ('business case')*

Ø *Difficulty to establish a clear 'business case' under many European health-care systems*

Ø *Lack of incentives for healthcare providers under existing reimbursement systems*

Ø *Boundaries / responsibility structures in healthcare systems*

Ø *Regional fragmentation*

Ø *Medico-legal uncertainties*

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4.2   Some initial policy implications

This study is perhaps the first effort to develop a systematic and coherent baseline and mapping of the market situation for telecare and telehealth for older people in Europe. One important contribution is the identification of what seem to be the most promising / important opportunities at present, and this helps sort the 'hype' that one often finds with regard to technological possibilities from the reality of what can be expected to be achieved in the near- to mid-term across Europe. In this regard, the most coherent 'markets' for attention seem to be the telecare market to support social care and independent living and the home telehealth market to support chronic disease management and home hospital services. Other areas for attention include the smart housing sectors and the wider assistive technologies sector, but both are currently very fragmented.

An important contribution of the study is that by covering 14 EU member States and two key third countries (US and Japan), it takes into account the different national contexts and stages of maturity of these fields across EU and beyond. It thus enables identification both of common policy approaches that may be relevant across all European countries and particular policy issues tailored to the different contexts

On the basis of the analysis of market developments and of key drivers and barriers, four main areas that could be targeted in public policy at EU and national level are identified:

- ensuring that the basic infrastructural prerequisites are in place
- encouraging regulatory/organisational/professional acceptance
- making the incentive systems more transparent and conducive
- supporting the further technological and other innovation that is needed.

4.2.1   Pre-requisites

In regard to telecare roll-out, in particular, some countries do not yet have the basic pre-requisite of a nationwide social alarm infrastructure in place. Social alarms have proved a useful component of home care and, in practice they often represent the baseline infrastructure (technical and organisational) upon which more sophisticated solutions are introduced. This is an aspect that could be targeted for infrastructural investment at national level and also could be incorporated as an area for support under the EU Structural Funds.

More generally, in some countries the necessary equipment and service supply chains for telecare and telehealth are not well developed. This is an area where innovative approaches to public-private partnerships can play an important role, with the public sector providing the main eventual 'market' but the private sector having a key role to play in supplying the necessary technology and also, in some cases, for out-sourcing various aspects of service provision as well. Innovative usage of public procurement at Member States level could be a useful mechanism for addressing the 'chicken-and-egg' barriers to supply and market evolution in this regard. However, the evidence from this study shows that the possibilities for innovative and pre-competitive public procurement in this field seem not to be very visible in policy or practice in most Member States to date. Awareness-raising and other support initiatives at EU level might therefore be useful.

4.2.2   Acceptance

Although infrastructural issues are important, the evidence suggests that various issues around acceptance of telecare and telehealth within the mainstream social care and healthcare systems are amongst the biggest factors limiting market development to date.

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Awareness and appreciation of the (potential) value

One dimension of this concerns lack of awareness and appreciation of the (potential) value of these types of service innovation at policy, service provider and practitioner levels. The evidence suggests that many public funding bodies, and private households, are faced with the challenge to provide efficient care with limited financial resources. Applications that go beyond 1st generation alarms are often considered as 'high cost' applications for which the business case is not immediately self evident. This is something that could be addressed both at Member State level and also at a European level through support for information exchange and other accompanying measures to develop and disseminate the necessary knowledge-base. As regards the knowledge base aspect, there is a need both to consolidate existing knowledge on the 'business' case and the 'value' case, and also to support the development of new knowledge. For this, support for large-scale trials seems to be an essential measure if sufficient real-life experience and knowledge is to be gained.

There would also be value in dedicated cost-benefit research to provide a more solid evidence base and one that was better tuned to the varying situations across the Member States. This would be helpful in supporting the achievement of a shared view of the business and quality benefits that can be achieved, as well as ensuring a realistic perspective that avoids reliance on the type of 'hype' sometimes associated with technological innovations. Telecare and telehealth have important contributions to make but they are not a panacea.

Skills and capacity for organisational change and innovation

The evidence shows that challenges posed by lack of skills and capacity for organisational change and innovation to take advantage of new service concepts like telecare and telehealth can also be important barriers. Beyond mere technological innovation, introduction of ICT-enabled solutions into day to day care practices tends to require a considerable degree of organisational innovation. Apart from a need to overcome staff resistance to organisational change more generally, this may require training in the new skills and responsibilities required at the various stages of ICT-enabled service delivery (e.g. initial needs assessment, installation, maintenance and so on). More generally, telecare solutions may often involve a need for multi-disciplinary approaches and may even require the emergence of new occupational profiles. An initial overview suggests that a general policy shift towards integrated care provision seems to have taken place in many countries. However, organisational and managerial difficulties have been reported to act as barriers towards achieving integrated services provision in practice. Some countries have given specific attention to these aspects and support for exchange of experiences and capacity building should therefore also be part of the policy approach.

More formal medico-regulatory enablement

More formal aspects of medico-legal enablement of telecare and telehealth also need policy attention as these can pose barriers to exploitation of the potential.

As regards telecare, an initial overview of the situation across the Member States suggests that there may not be especially strong legal/regulatory barriers in most cases, especially as regards social alarms and also for second generation telecare. However, in some countries concerns about privacy/surveillance have been raised in relation to passive sensors and legislation is in place to regulate their use. It can be expected that such issues will come more strongly to the fore when third generation telecare involving continuous activity monitoring and data processing become more visible in policy and practice. Establishment of a forum for exchange of experiences and perspectives across the different stakeholders, and across the Member States would be useful in this regard.

As regards telehealth, there are issues of professional acceptability / encouragement to be considered. Already there are considerable differences across Member States as regards regulation and practice in relation to telephone consultation and electronic consultations, and some of these may also come to arise in relation to home telehealth. There is also the wider issue of the extent to which self-management of health is encouraged or discouraged, and how this may impinge on the market for home healthcare devices and services. Again, establishment of a forum for exchange of experiences

and perspectives across the different stakeholders, and across the Member States would be useful in this regard.

Finally, there is also a cross-border dimension that may emerge as important as home telehealth services become more mainstream. This is linked to the more general cross-border mobility of patients seeking treatment that is now possible for European citizens, and the quite large numbers who avail of this. A realistic scenario, therefore, would be for a patient to be receiving home telehealth services in their country from a healthcare provider in another Member State. This is an aspect that also could be addressed through an appropriate EU-supported forum.

Apart from the social/healthcare issues outlined above, there are also the more general regulatory issues associated with public procurement in the telecare and telehealth fields. As mentioned already, there is considerable potential for innovative utilisation of public procurement to stimulate the necessary supply and demand side co-evolution, but this seems little used in practice so far. EU-supported efforts to raise awareness and exchange experiences in this area would thus seem to be useful.

4.2.3 Incentives

In addition to the acceptance issue, the lack of clear incentives seems to be one of the biggest barriers to widespread implementation of home telehealth, in particular, and also for telecare although to a somewhat lesser extent. Economic and financial incentives are a big aspect of this, but quality (of service and outcome) incentives also need to be considered. This issue of incentives arises both at the level of individual providers themselves (hospitals, clinics, doctors, etc.) and also in relation to the distribution of the costs and benefits more generally for particular components of the overall system (social care, housing, healthcare; primary care versus hospitals; and so on). It also arises for payers, those who fund or otherwise reimburse the services that are provided.

The preliminary evidence base suggests that clear economic/financial incentives for providers are not currently present in many European health and social care systems. In addition, what incentives are there often tend towards discouraging rather than encouraging service innovations such as home telehealth and, to a lesser extent, telecare. Policy in the Member States might therefore give particular attention to examining the incentives and disincentives that operate within their national systems and to re-orienting these to support wider deployment of telecare and telehealth where this is judged to be appropriate.

At the EU level it is clearly inappropriate to intervene in the incentive systems in the Member States, as such. However, the EU could play an important role in supporting knowledge development and sharing on how incentive systems operate the development of good practice and so on.

4.2.4 Innovation

As outlined above, our preliminary findings shed light on a number of barriers to the mainstreaming of ICT enabled solutions that are in principle available today. They also indicate a continuing need for further technological innovation. This concerns both the development of new/improved systems and devices in general and the co-evolution of technology and services in particular.

RTD

Many of the basic technologies and system components for telecare and telehealth are already available today, and the main market barriers relate to issues of acceptance and incentives. Nevertheless there is still a lot of RTD needed to improve existing products and develop new ones. Some important areas for attention emerge from the preliminary evidence base as follows:

- mobile devices and monitoring services
- end-user devices for telecare and telehealth

- monitoring and processing systems for telecare and telehealth centres, including upgrades to address new technologies and new capabilities
- clinical support systems to present relevant information and guidance to health and social care professionals
- improved interoperability between the various system components and the different products and services on the European marketplace

Service and technology co-evolution

As mentioned earlier, support for service and technology co-evolution is also important in order to address the 'chicken-and-egg' challenges in this marketplace, including innovative uses of public procurement to facilitate the public-private partnerships that are needed. Again, EU-supported efforts to raise awareness and exchange experiences in this area would seem to be useful.