CARICT

ICT-based solutions for caregivers:
Assessing their impact on the sustainability of long-term care in an ageing Europe

Contract Number IPTS-2010-J04-44-RC

Deliverable 3.6
Final report on the
“Methodological Framework”

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Vienna, 21st December 2011
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This document has been carried out with the support of all project partners. An important feedback on the methodological framework and on the overall project was provided by the external experts who attended the Expert Validation Workshop (Brussels, 21-22 June 2011), who validated the intermediate project results and elaborated recommendations for further improvements of the methodological framework (collected in chapter 5): we would like to thank all of them (see the complete list in Annex 2A), and in particular Kevin McKee (Dalarna University) for a precious feedback on chapter 5. Furthermore, we would like to thank all the external experts who attended the Policy Makers’ and Experts’ Validation Workshop (Brussels, 21-22 November 2011) (see the complete list in Annex 2B): they validated the final project results and elaborated some additional recommendations for the methodological framework (integrated in chapter 5). Moreover, information gathered by project partners for deliverable 4.3, *Final report containing case-by-case detailed description and analysis of 12 good practices*, provided the basis for the analysis in chapter 6. We would like to thank also initiative coordinators of the 12 ICT-based solutions and external experts who collaborated in order to give useful and detailed data on the services, in particular: Licia Boccaletti (Anziani e Non Solo), Trinidad Carrión (University of Malaga), Carla Fiori (CUP 2000 SpA), Elsa Marziali (University of Toronto), Heidrun Mollenkopf (Heidelberg University), Elisabeth Persson (Ippi AB), Celia Price (Just Checking), Martina Saalmüller (SOPHIA Franken), Jon Simonsson (Ippi AB), Richard Schulz (University of Pittsburgh).
Introduction

Aims of Work Package 3
The Final report on the ‘Methodological Framework’ (deliverable 3.6) is part of the activity of the WP3: Methodology Development of the CARICT project.
In particular, WP3 is divided into four main stages:

- to identify the main profiles of persons cared for and differences in terms of their needs for care, capacities and possibilities to engage with information and communication technologies (ICT), either directly or with the involvement of the carer. These dependency scenarios constitute deliverable 3.1, ‘Dependency scenarios’ proposal;
- to review available sources on Impact Assessment methodologies in the fields investigated by the project and identified by the overall conceptual framework. This literature review and relative selection of methodologies constitute deliverable 3.2, Literature review and selection of methodologies;
- to develop a methodological framework for assessing relevant dimensions of impact of ICT-based initiatives for carers. Such framework constitutes deliverable 3.3, Methodological framework proposal, which has been enhanced with a cross-analysis on the basis of the 12 case studies (selected and analysed in-depth in WP 4) in the present deliverable 3.6, Final report on the "Methodological Framework";
- to validate the methodological framework and the project results during an Expert Validation Workshop (Brussels, 21-22 June 2011), and a Policy Makers’ and Experts’ Validation Workshop (Brussels, 21-22 November 2011). Experts validated the work done by the consortium, including the methodological framework. They provided feedback and recommendations that have been included in this deliverable.

Methodology for developing the overall methodological framework and related changes recommended by external experts
The methodological framework has been elaborated in accordance to the specific project methodology, even if some changes occurred in between because of major constraints.
First of all, a coherent conceptual framework was elaborated (chapter 1). This was a necessary step to clarify the focus of the project, the actors that should be taken into account and their interrelations – in one word, to have a clear picture of the object of the study. This conceptual framework was meant to be able to consider the multidimensional
impact of ICT on individuals (micro-level), on social relationships and organisations – like local care providers and employers (meso-level) –, as well as on the overall care and social protection systems (macro-level).

A second stage dealt with the review of current available IAMs in the field of home care (chapter 2, see also deliverable 3.2 Literature review and selection of methodologies), analysing the dimensions of impact to consider for the methodological framework and possible standardised measures that could be included.

On these two bases, a prototype of IAM was created in order to evaluate the multidimensional effects of ICT in home care (chapter 3, see also deliverable 3.3 Methodological framework proposal). Such IAM was built upon seven main dimensions of impact concerning the quality of life of the carer (both informal and formal) and of the care recipient, the quality of care provided, the care efficiency and sustainability, the acceptability of the services, and the infrastructure and accessibility.

However, experts involved in the first Expert Validation Workshop (Brussels, 21-22 June 2011) clearly pointed out that the work done by project consortium in the first six months (December 2010-June 2011) was remarkable but not sustainable within the planned deadlines and budget constraints. In fact, they saw tremendous value in the work done so far and recognised CARICT partners had carried out a lot of work in a short period of time (see deliverable 3.4, Minutes of the Expert’s Workshop with a set of “Expert’s Recommendations for the Methodological Framework”).

They also recognised that the project has been influenced by several major constraints (i.e. time and budget) that influenced negatively the workflow and limited the project’s capacity to achieve all planned objectives: the development of the methodological framework was only one of the four main project aims, the other three dealing with the mapping and analysis of over 50 good ICT-based initiatives in Europe (see deliverable 2.3, Analysis and Mapping of 52 ICT-based initiatives for caregivers), the selection and in-depth analysis of 12 good practices through testing the developed methodological framework (see deliverable 4.3, Final report containing case-by-case detailed description and analysis of selected 12 good practices), and the elaboration of policy recommendations on the basis of the identified, most relevant policy challenges for sustaining ICT solutions for carers (see deliverable 5.3, Final “Integration report”).

In particular, the experts who attended the June meeting recommended that the project, from that point on, should narrow its focus to only one or two core objectives, to allow it to make the most of the results already achieved. Otherwise, in trying to achieve too much, the whole project could have become unsustainable and the overall quality of the study’s outputs adversely affected.

Consequently, IPTS and project consortium agreed on an updated workplan that revised the remaining tasks. The major issue was found to be the testing of the methodological framework, which was thought to be carried out through a limited number of interviews with carers of the 12 selected initiatives (5 users per case) and initiative coordinators (2 managers per case). Since the interviews to users were statistically insignificant and all analyses related to cost-benefits and cost-effectiveness were judged as impossible within the project constraints, IPTS and project consortium agreed to substitute the testing of the methodological framework with qualitative in-depth analysis which should have had three aims:
• to collect all the impact assessment and evaluation data available from within the service or project, in order to show in the most comprehensive way the actual impact of the service as it had been measured. This included documenting the evaluation methods use, and providing references to the original studies;
• to explore what sort of Impact Assessment and evaluation had been carried out along the lifetime of the service, the methods used, the limitations and gaps, and the conditions under which this evaluation had been made, and use this also to provide a test of the scope of the proposed IAM;
• to provide an account of the development of the service over time in order to contextualise the impact assessment, and provide the information necessary to inform the analysis of potential for scaling transferability and development. This description identified key enabling factors, barriers to development and how they were overcome, the actors, the way the technology, financial and professional support was developed, the decision points, the way that evidence of impact was used to inform decisions.

The 12 case studies carried out served as basis for the cross-analysis presented here (chapter 6). In this analysis, evidence of the impact of ICT on home care contexts is discussed, taking into account related implications for the methodological framework developed. The assumption is that evidence from the fieldwork can give an important contribution to understand if the methodological framework works and what improvements are eventually necessary.

Furthermore, the external experts who attended both the first and second Validation Workshops (21-22 June and 21-22 November) found some critical points concerning the methodological framework and developed recommendations for further improvements (see chapter 5). The conceptual framework, according to their view, should be wider and should integrate also actors from the formal care system (which was not considered at first in the project itself, since the focus was on home care – i.e. informal carers and privately paid care assistants). Some discussion also on the three-level structure (micro, meso, macro) was done: major points dealt with the necessity to rethink the position of families and kinship relationships (currently at meso-level), including both primary and secondary carers in the picture, as well as professionals from the formal sector. Also the IAM was discussed and some critical points recognised, in most cases concerning the indicators developed and the measures selected. The experts recommended also the development of a more detailed guidance for applying the methodology: even if guidelines for practitioners are still provided (chapter 4), some more efforts should be done in order to address all possible methodological issues in using such a framework.

Since the project was carried out in one year (December 2010-December 2011) with a limited budget (120,000 euros), it was recognised by both parts (IPTS and consortium), as well as by all external experts involved in the validation process (41 experts), that initial ambitions should had been reduced and adapted to the state of things. However, even if the methodological framework was not fully developed and tested during project lifetime, CARICT is still the first attempt to build a comprehensive instrument for assessing the
impact of ICT-based initiatives in Europe. Such primate is clearly an added value of the project that provides a prototype of methodology to be further developed in the future and next directions of research in the field. In particular, CARICT underlined what has been done so far in research and in practice, identified current gaps to be filled (in theory and in practice), made a picture of the overall state-of-the-art of such ICT-based solutions in Europe (mapping over 50 initiatives and creating the biggest available data-set at this time) and provided recommendations for policy makers in order to make these initiatives more and more integrated into the care systems. All these results, original ones and achieved through a complex project methodology, deserve attention and consideration by researchers who will deepen such issues in the future. The two Validation Workshops properly underlined these aspects and validated all project results, including the methodological framework presented in this deliverable.

**Aims of deliverable 3.6**
The aim of the deliverable 3.6 is to provide the methodological framework developed by the project consortium, including a conceptual framework and a prototype of Impact Assessment Methodology (IAM) in the field of home care that consider all relevant aspects of an ICT-based initiative. This is the outline of the report:

- dimensions of impact have been identified through the conceptual framework underpinning the project (see chapter 1);
- a literature review on the identified dimensions leads to a selection of measures and tools for the proper methodological framework (chapter 2);
- an impact assessment methodology (IAM) has been developed on the basis of the seven dimensions that propose indicators and measure for the assessment (chapter 3);
- guidelines for practitioners have been provided for those who want to apply the methodological framework and adapt it to the specific contexts (chapter 4);
- recommendations from external experts who attended the Expert Validation Workshop on 21-22 June 2011 and the Policy Makers’ and Experts’ Validation Workshop on 21-22 November 2011 have been included in order to give suggestions on future steps that are necessary to further develop the methodological framework (chapter 5);
- finally, an analysis of 12 case studies provides the basis for new implications for the methodological framework developed, underlining possible needs for further improvements (chapter 6).
1. Conceptual framework

1. Matching needs of carers and ICT-supported initiatives

In our ageing societies, long-term care could not be managed without the strategic support of informal carers, as over 80% of care is still provided by the family. Furthermore, in the last decades we can observe an increasing shift towards ‘ageing in place’ policies, aimed at allowing the dependent person to be cared for at home, thus reducing institutionalisation. To some degree, the combination of these two trends might be conflicting with the EU’s 2020 strategy to increase employment rates, in particular for women, who are the main providers of informal care. Within this context, ICT initiatives might play a supporting role by allowing informal carers both to remain in employment (and/or increase their working time) and to release them from some of their most burdensome caring activities, which can in turn ensure they have time to engage in social and health promotion activities.

As many independent studies show, there is an urgent need to take into account carers’ needs, particularly in term of maintaining their health and their capacity to work. This goal is both an end in itself and one which has wider macro-economic implications. Indeed, many carers do not consider themselves as such and are often not taken into account when it comes to social policy planning. Therefore, making them more visible will increase awareness among policymakers about the need to design and deliver more tailored and carer-centred support services, as well as to increase their ability to respond efficiently and effectively to the specific needs of carers (as well as of care recipients, who are however less the focus of this study).

In the light of the above reflections, empirical evidence shows that the support needs of informal carers and paid assistants can be summarised along the following categories:

- **psychological support**: support provided by the formal care sector (including professionals with formal training in support and counselling, or health and care practitioners such as nurses) in order to overcome emotional or psychological difficulties by the carer;
- **training & education**: training to informal carers aimed at improving care quality.
- **“static” information**: basic information available to carers (e.g. on existing services or characteristics of disease suffered by the care recipient) without active interaction with or external help from professionals;
- **advice & counselling** (“dynamic” information): information and advice granted to carers through interaction with the formal care sector (including professionals with
formal training in support and counselling, or health and care practitioners such as nurses);

- **self-support**: support to better face the carer's personal situation through interaction with other carers in self-help groups (no involvement of formal sector);
- **social participation**: support to the carer aimed at facilitating his/her interaction with friends and peer groups through reactivation of personal social networks;
- **leisure**: support to the carer aimed at granting him/her respite from the caregiving situation through free time for leisure/entertainment activities;
- **reconciliation with work**: support to the carer aimed at facilitating the reconciliation between care and working activities;
- **advocacy**: support aimed at facilitating the representation of carer’s interests towards different stakeholders (e.g. service providers, policy makers);
- **language/culture**: support to the migrant carer aimed at facilitating caregiving activities and/or social inclusion through translation and education services;
- **protection of rights**: support aimed at ensuring information on and protection of carer’s rights;
- **match between supply and demand**: support to facilitate the match between the demand of care workers coming from the care recipients’ families and their supply in the labour market.

Information and communication technologies (ICT) can provide support to carers concerning the above mentioned needs. By the context of the CARICT project and of this work, we define an **ICT-supported initiative** as

*a service provided by any private or public organisations that addresses one or more carers’ (i.e. informal carers or privately paid assistants) and/or care recipients’ needs through technological devices that allow any kind of telecommunication (among the users and/or between users and care providers or professionals) integrated or not in a wider intervention programme (which can include other non-telecommunication facilities). Even if a service addresses primarily care recipients’ needs, it has been included in this study if there is evidence of a (direct or indirect) positive impact on the carers. Furthermore, we considered services that are mainly based on telecommunication tools or just one component of a wider intervention (but still as important as the other components).*

All included technologies (e.g. landline and mobile phones, radios, video monitoring systems, on-line platforms) can be tools to access (i.e. use) the service, but they cannot be considered by themselves interventions. The services are crucially dependent on the content of the information that is communicated, which can be uni-directional (e.g. a website with no message exchange) or bi-/multi-directional (e.g. any form of phone, e-mail or videoconference).

Simply taking into account the communication content with the technologies is not enough to classify the intervention. The logistics or organisation of the human actors, within the
ICT-supported intervention their roles, knowledge and behaviours need to be considered. The intervention is made up of all the above elements.

In principle all of the above technologies could be available to and being used by carers. The ICT field is also very dynamic with new solutions being generated worldwide everyday – with potential to introduce confounders. However, carers (and care recipients) may or may not use the pre-existing technology or new ones for care activities. The pervasiveness of the listed ICT technologies in everyday life in European Union (EU) states varies; their use for care purposes also varies.

Even within this fragmented European context, it has been argued that carers’ and care recipients’ needs can be addressed by means of ICT-supported initiatives in different ways. First of all, we need to consider the different types of available technologies. The project identified four different types:

- **ICT for Independent Living:** technology systems to allow elderly dependents to stay at home without continual formal or informal care support, thus relieving pressure on care-giver. It may allow caregiver to leave recipient alone, or help them in the caregiving. Examples: social alarms; call centres; monitoring, wandering alarms, granny cams, ICT assisted living and ambient assisted living technologies; environmental controls (e-health can be included if relevant to support of carers);
- **ICT for Information & Learning:** tools that give access to information and training about caregiving, health and care issues for the dependent older persons, information and training about coping with caring; training for life - language, other work skills, accreditation of skills etc. Examples: on-line (or maybe standalone electronic form) information (websites); training materials (websites, video, games, interactive etc); learning support services – including telephone (and face to face);
- **ICT for Personal Support and Social Integration:** this provides social, emotional & peer support, leisure, relief of isolation and chances for participation in work, civil society etc. Examples: social networking systems for peer support; volunteer call networks (mobile, internet); call centres for counselling; access and support for internet access for ecommerce, e-government services, entertainment, family communication etc.
- **ICT for Care Coordination:** tools for coordinating formal sector and informal and family employed carers. Allows organisation of respite, sharing information on recipient’s and carers needs etc. Examples: organisational systems with carer access, or for use by networks of carers both formal and informal.

Furthermore, the support functions of initiatives should be taken into account. In this regard, five functions were identified:

- **Support to dependent older person:** these are functions that are aimed at the dependent older person, with the aim of improving their care, or changing the conditions of care – for example an initiative that uses an ICT in some way to help them remain at home (alarm, surveillance etc), a system to plan and monitor care
between formal and informal carers, services to support ‘self-care’. The carer is not the primary focus of this initiative, but will be implicated in the service;

- **Support Quality of Care through carer:** this is an initiative that aims at improving or changing the conditions of care of the dependent older person by supporting or assisting the informal carer or family employed care assistant in providing care at home, and improving the quality of care given: this might be in the form of education and training, online support, information on health conditions of the dependent older person, a smart home that is designed to help a carer etc. The carer is the object of the initiative;

- **Support carer’s quality of life:** this is an initiative that aims to support the carer themselves in their personal and emotional life, and in the case of family-employed care workers, to enable them to balance their work with other aspects of their life. These may help combat loneliness, relieve anxieties, share experience, provide respite from constant caring demands etc. It may include online communities, caregiving relief, psychological counselling etc.;

- **Participation:** these are initiatives aimed at enabling carers of all types to 'participate' in aspects of life outside the home. This will include reconciliation of family and work for working age informal carers; to carry out everyday activities such as banking, shopping, interaction with government services; enable family-employed carers to develop other skills, participate in the labour market, know their rights etc; enable informal carers to take part in active communities lobbying, raising awareness etc around issues related to their caring role and the conditions of the cared for family member;

- **Migrant-related:** this includes initiatives that are aimed at the particular issues facing family-employed migrant care workers of all statuses. It may include language learning, cultural integration, translations of skills training and advice, combating specific isolation issues of migrants etc.

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### 2. Conceptual framework for CARICT: assumptions and levels of analysis

On the basis of the previous conceptualisation of carers’ needs and ICT functions, a specific conceptual framework has been developed. It is based on the project goals and takes into consideration feedback received during the kick-off meeting by IPTS and the project partners.

The first assumption for building the theoretical framework is to define the object of the study, which can be summarised by the following research question:

**What are the consequences and the potential of the adoption of ICT-supported initiatives in supporting carers of dependent older people?**

Indeed, the object is the **carer-care recipient dyad**, to be investigated through the fundamental relation which ICT-supported initiatives try to impact. In this regard, the key issue of the study is the carer of a dependent older person and the ways ICT are useful for improving his/her wellbeing: this is a challenge for policymakers to facilitate the adoption
and use of such tools at an individual level in dependency contexts, as well as at the organisational level in optimising care services and relative resources. However, ICT is perceived also as a potential instrument that can improve welfare and care policies because of its possible adoption at a large scale of ICT solutions for carers and their impact on social protection and care systems.

This led us to the second assumption of the framework: we cannot only consider the individual level of the impact, but we should also cover wider dimensions of the effects, such as the ones in organisations providing care or in policy-makers’ initiatives. The focus of the analysis can be split into three levels:

- **micro-level**: it represents the smallest level of analysis. The micro level deals with the interactions between the people involved in the considered dyad (carer and care recipient) and with human behaviours associated. At this level, the study investigates the relationship between carer and care recipient, as well as the care responsibilities shared between relatives and other assistants (paid or unpaid);
- **meso-level**: it is a middle level in which social networks and organizations will be considered (e.g. communities, neighbourhoods, companies). These social institutions are bigger than individuals (micro-level) but still smaller compared to other broader social systems (macro-level). In this sense, local care providers are supposed to benefit from an efficient use of ICT-supported initiatives in order to balance care services and relative resources. Moreover, ICT can also improve other meso dimensions like community living (e.g. social group memberships) and local business organisations (e.g. reconciliation issues);
- **macro-level**: it is the biggest level of the social institution analysis. Such broad institutions are composed of many organisations and still have a coherent approach to at least one sector of society. Concerning the ICT impact, these institutions are deeply interrelated and deal mainly with economic issues (e.g. the social protection system) and care-related ones (e.g. care policies).

3. Definition of main actors

In order to develop the conceptual framework in depth, the actors involved in an ICT-supported initiative have to be described, considering the three levels presented above.

3.1 Micro-level: types of carers and care recipients

At a micro-level, the ICT initiative influences both the carer and care recipient. This influence could be direct (e.g. the provision of a video-communication channel between relatives and dependent older people) or indirect (e.g. carers could be trained in caregiving via ICT tools with indirect consequences for the older person).

Concerning the carer dimension, we should take into account the different kinds of obligations they have in providing care to the older person (Tab. 1: the categories of caregivers in the yellow cells are those on which the project is focused on): they face the caregiving activities in different ways, in some cases also in coordination between them (e.g. a relative may be supported by a paid assistant or a friend). First of all, we should
consider relatives as the closest carers to the dependent older person (although in some cases families delegate all caregiving activities to external carers). Relatives usually provide care because they have a moral obligation based on family relationships. Moreover, they are emotionally involved in some way.

Secondly, other unpaid carers provide care to somebody who is not their relative: this is the case of friends and neighbours, which are mainly motivated by friendship and civic obligations (they know who is the cared-for person and they want to help him). Furthermore, volunteers are also involved in providing care because of civic obligations, even if they may not know the care recipient (their obligation stems from deep civic participation or exchange of volunteering activities).

Finally, paid assistants should also be considered. Their obligation relies on a contract (even if it is not in a written form or it is irregular): they assure the provision of care because of the motivation to get a salary for this activity. This is the common obligation for the different types of assistants. In some cases, one of the main obstacles for an efficient provision of care depends on the knowledge of language and culture: migrant assistants (migrant care workers, as well as undocumented and undeclared migrants) may not fluently speak the language of the destination country. This could be a barrier for the caregiving activities as well as the social integration and participation of the migrants.

Concerning the care recipient dimension, types of impairments influence the support demand by older people: care provided to a person with physical impairment is different if compared with cognitive or psychological ones.

### 3.2 Meso-level: social groups and organisations

The two main individual actors are always involved and embedded in a bigger social context – the social environment in which they carry on their private life in social relationships and activities, as well as demanding support for caregiving. The social environment is not to be intended as a unique and specific actor, but as the whole set of human experiences in relation to social participation and access to public services. This is the meso level of families, peer groups, companies & civil society organisations, and local care providers: all these actors represent a fundamental part of the carer’s life, as well as of the care recipient's one (even if he would have less chances to be engaged in social relations because of his dependency, ICT tools can help in partly overcoming these barriers). Also in this case, the ICT-supported initiative impact could be direct (e.g. an online tool for matching supply and demand of care activities) or indirect (e.g. ICT can give relief to the carer who may increase his participation in social activities).

In particular, families and peer groups are often included in sociological analyses at the micro-level because they are small primary social groups. However, the core of the CARICT project is to focus on the carer: assuming the carer-care recipient dyad as the fundamental relation object of the study, our investigation on social groups (small or big ones) depends on their relation to the dyad. Indeed, we do not consider the individual relationships between the carer or care recipient and other relatives or friends (the ones not involved in care), but only the relationships with the different social networks they belong to.
<table>
<thead>
<tr>
<th>Definition</th>
<th>Position with regard to the following dimensions:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main</strong></td>
<td><strong>Sub-categories</strong></td>
</tr>
<tr>
<td>Informal Carers (unpaid)</td>
<td>Relatives</td>
</tr>
<tr>
<td></td>
<td>Friends &amp; Neighbours</td>
</tr>
<tr>
<td></td>
<td>Volunteers</td>
</tr>
<tr>
<td>Formal Carers (paid)</td>
<td>Undocumented Migrants</td>
</tr>
<tr>
<td></td>
<td>Undeclared Migrants</td>
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<tr>
<td></td>
<td>Illegally Employed Nationals</td>
</tr>
<tr>
<td></td>
<td>Migrant Care Workers</td>
</tr>
<tr>
<td></td>
<td>Care Workers</td>
</tr>
<tr>
<td></td>
<td>Workers of Care Organisations*</td>
</tr>
</tbody>
</table>

^: in some cases however these carers might receive allowances or be formally hired to provide care.  
°: although in some countries and for some categories of care workers the opposite might be true.  
*: this category of carers is not analysed in this report, since it does not represent a focus of this study.

| Table 1. Categories of carers considered by the CARICT project. |

### 3.3 Macro-level: social protection and care systems

Finally, we should consider the macro-level of the social system: as before, it is not a unique actor but an interrelation of different key sectors that influence both the social environment in the meso-level and the dyad of the carer and care recipient (e.g. through legislation or economic policy). Moreover, at the same time these sectors can be influenced by the other actors (e.g. through the availability or unavailability of qualified carers that leads to different care policies or the public investments in ICT services to population). At this level, we are referring to all the stakeholders that are part of the economic & social protection system and of the health & social care system.

However, in some cases relations between the micro- and the macro-levels remain indirect and mediated by the meso-level institutions as proxies. The care system can influence the local care providers in different ways (e.g. financial support) with an indirect effect on users (e.g. if financed by care system, local care providers can provide new services to users). Also the protection system is able to influence the meso-level of organisations and social networks through benefits (e.g. work regulation) with an impact on users (e.g. if protection system support telework through new legislation, companies are able to adopt such contracts and make carer situation more flexible and comfortable).
4. Processes leading to changes at different levels

Figure 1 represents a development of the main processes that lead to behaviour change (at micro-level), improvement of services, relationships and organisations (at meso-level), and policy implementation (at macro-level), thanks to ICT-supported initiatives in the contexts of dependent older people.

4.1 Micro-level: changing human behaviour

For what concerns the micro-level, ICT-supported initiatives aim to make some changes in individual behaviours, both for carers (e.g. improving the quality of the care they provide, adopt new coping strategies in relation to stress and burden) and care recipients (e.g. improving social relationships with relatives and friends, improving independence in daily activities). However, ICT-supported initiatives can influence directly three types of factors that can lead to a successive behavioural change:

a) predisposing factors: are those factors antecedents to behaviour that provide the rationale or motivation for the behaviour, such as knowledge, attitudes, beliefs and skills. In the predisposing factors we can include, for instance, training, education,
and information activities, as well as services linked to language and culture of migrant care workers;

b) **reinforcing factors**: are those factors following a behaviour that provide continuing reward or incentive for the persistence or repetition of the behaviour, such as peer influence or satisfaction feeling. In the reinforcing factors we can include, for instance, psychological and self support services, as well as advice and counselling;

c) **enabling factors**: are those factors which provide adequate means and concrete resources to the person in order to allow him/her to overcome practical or physical obstacles for behaviour change. These are, for instance, the availability of ICT devices enabling the initiative services.

### 4.2 Meso-level: changing social relationships and services

Concerning the social environment, we take into consideration different sub-actors at meso-level and their related **enabling factors** (to be considered as programs, services, and resources necessary for behavioural and environmental outcomes to be realized). Social networks play a crucial role at meso-level (e.g. within communities), as they provide structured linkages between between people and address certain social functions. Also organisation membership and access to public services are important elements within the study. The actors identified at this level are the following ones:

- **families**: relationships within families are fundamental to the wellbeing of both carer and care recipient. Family and kinship social networks are the first level of social environment in which people are embedded and concern activities based on moral and emotional obligations, such as caring (e.g. parenting and grand-parenting), house holding, as well as providing entertainment (e.g. spending free time with relatives). They provide support, both in financial and emotional ways; in some cases, on the opposite, there is need to consider family conflicts, resentment and problematic behaviours influencing carers’ life. The enabling factors for improving this kind of networks include, for instance, the activation of new communication channels with relatives (e.g. video-communication devices). The activation of these factors leads to a change in provided family activities and in their relation with carer and care recipient behaviours. Anyway, the involvement of carers in family activities is often possible in an indirect way because of a major relief provided by the ICT-supported initiatives (e.g. smart homes);

- **peer groups**: social relationships in the private life of both carer and care recipient are important in order to assure adequate levels of health and quality of life. These relationships deal with both support (emotional or practical one) and recreational activities (no goal other than leisure and entertainment). The enabling factors for improving this kind of social participation include for instance the activation of new communication channels with friends (e.g. social networks). The activation of these factors leads to a change in provided activities and in their relation with carer and care recipient behaviours. Anyway, the involvement of carers in activities organised by groups of peers is often possible in an indirect way because of the major relief provided by ICT-supported initiatives (e.g. smart homes);
• **companies & civil society organisations:** this category includes all actors involved in a productive relation with the carer (as we are referring to dependent older people, we are assuming they cannot be engaged in such relations): work, volunteering, political participation, etc. The enabling factors for this category include, for instance, the activation of new forms of work through ICT tools (e.g. telework). The activation of these factors lead to a change in provided productive activities and in their relation with carer behaviour;

• **care providers:** they refer to the whole set of services provided by private or public institutions in order to support care recipients (in their dependency situation), as well as carers (for what concerns caregiving-related diseases or health problems, such as burden and anxiety). In this category many different types of organisations can be individuated, for instance public care providers (e.g. hospitals, health and social care services), non- and for-profit organisations (e.g. non-governmental organisations, private hospitals), and user-led organisations. The enabling factors for this category include, for instance, the integration of ICT tools with health services (e.g. social alarms) or the match between supply and demand of care workers (e.g. on-line site). The activation of these factors leads to a change in the provided caregiving activities and in their relation with the carer and care recipient behaviours.

### 4.3 Macro-level: changing policies

At the macro-level, the main areas influenced by changes at micro- and meso-levels concern the welfare policies developed by public institutions through legislation and other types of intervention, such as financial support. In some cases the social protection and the care areas may overlap, but it should be clear that not only the care system is involved in such a framework: the role of public welfare is important, for instance for what concerns work reconciliation and migrants’ integration. In particular, the following ones are the domains covered by the macro-level:

• **economic and social protection system:** this category includes all public institutes aimed at developing adequate welfare policies for population. Their influence covers mainly the domains of work and social participation (including families and peer groups) with the aim of developing strategies for social inclusion and social cohesion;

• **health and social care system:** in this case, the care system includes all public institutes aimed at developing adequate care policies for population. Their influence covers mainly the domains of health and social care, with the aim of developing strategies for social support at macro-level;

### 5. Linking theory to practice: how to measure the impact at different levels

As one of the project aims is to develop an Impact Assessment Methodology (IAM), it is necessary to analyse the impact of ICT-supported initiatives in all these three levels in order to have a comprehensive picture of ICT potentiality in elderly care contexts. The
conceptual framework considers all the dimensions to be assessed as requested in the Technical Annex (pp. 13-14) and adapted into a single and coherent theoretical approach to the evaluation of ICT initiatives supporting carers and dependent older people. The question we have now to answer is the following:

**What are the relevant dimensions at all levels (micro-, meso-, and macro-) that should be assessed in an ICT-supported initiative in order to gain the most comprehensive knowledge on its impact on individuals and society?**

The IAM developed in this study aims to allow a comprehensive evaluation of how ICT-supported initiatives are able to support carers. The main focus of the project relies on the carer and his/her consequences in using such solutions. Indeed, some cross-cutting domains of the impact of ICT-supported initiatives on carers can be identified (Fig. 2). ICT-supported initiatives can have a direct impact on: **carer wellbeing** (including informal carers and paid assistants), **care recipient wellbeing**, **carer-care recipient relationship**, **social participation**, and **use of care services**. An indirect impact can be seen also on the **economic and social protection system**, as well as on the **health and social care system**: both can influence and be influenced by a spread use of ICT solutions.

Such areas have been fixed into seven main dimensions of impact that try to include all the previous considerations. Starting from the impact at micro-level on the carer-care recipient dyad, these dimensions cover all aspects correlated to the use of such ICT solutions, developing them at micro, meso and macro levels (Fig. 3). The dimensions of impact identified are:

1. **Quality of Life of Informal Carer**: this dimension covers all the relevant areas of individuals, such as reconciliation between care and work, social life (including social participation), psycho-physical health and life satisfaction;
2. **Quality of Life of Paid Assistant**: paid assistant's quality of life needs a different analysis because it deals with other conditions (e.g. salary, working time etc.);
3. **Quality of Life of Care Recipient**: this dimension covers the direct impact on dependent older people. Even if these initiatives are mainly focused on care recipients (e.g. telecare), they may give some kind of relief to the carer;
4. **Quality of Care provided by Informal Carer and Paid Assistant**: ICT-supported initiatives may be aimed at improving carer's knowledge, skills, and competences about caregiving with an indirect impact on care recipients through the carers;
5. **Care Efficiency & Sustainability**: this dimension covers the direct effects of ICT-supported initiatives in relation to many economic-related issues, such as the efficiency of the service (considering both the quality of care provided and costs);
6. **Acceptability**: it refers to the impact of ICT-supported initiatives on the use itself. Even if a device is efficient and less expensive than other solutions, it could be unacceptable to the final user;
7. **Infrastructure & Accessibility**: it is important to verify the relation between ICT-supported initiatives and their prerequisites in order to understand the impact of such devices on the users and the established care services.

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Figure 2. The impact of an ICT-supported initiative at micro, meso and macro levels.

Figure 3. The seven dimensions of impact developed at micro, meso and macro levels.
Indeed, this typology of dimensions does not treat only the impact of ICT-supported initiatives on individuals (micro-level), but also the effects on social participation and use of care services (meso-level), as well as the whole protection and care systems (macro-level). The following Table 2 shows the dimensions identified above (with relative sub-dimensions) and examples of indicators at all levels.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Micro</th>
<th>Meso</th>
<th>Macro</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Quality of Life of Informal Carer</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Reconciliation between care and work</td>
<td>E.g. Possibility to balance well care &amp; work activities</td>
<td>E.g. Efficiency at work</td>
<td>E.g. Number of carers that balance care &amp; work activities</td>
</tr>
<tr>
<td>1.2 Social life</td>
<td>E.g. Positive social contacts &amp; relationships</td>
<td>E.g. Reduction in family conflicts</td>
<td>E.g. Increased social cohesion &amp; inclusion</td>
</tr>
<tr>
<td>1.3 Health-related quality of life</td>
<td>E.g. Psychophysical health &amp; life satisfaction</td>
<td>E.g. Number of non-stressed carers</td>
<td></td>
</tr>
<tr>
<td><strong>2. Quality of Life of Paid Assistant</strong></td>
<td>E.g. Psychophysical health and independence level</td>
<td></td>
<td>E.g. Number of non-stressed carers</td>
</tr>
<tr>
<td><strong>3. Quality of Life of Care Recipient</strong></td>
<td>E.g. Physical level; Psychological level; Independence level</td>
<td>E.g. Number of care recipients with higher life satisfaction</td>
<td>E.g. Target number of dependent older people supported</td>
</tr>
<tr>
<td><strong>4. Quality of Care provided by Informal Carer and Paid Assistant</strong></td>
<td></td>
<td>E.g. Improvement of caregiving activities by direct (e.g. training) or indirect (e.g. decreasing burden of carer) factors</td>
<td></td>
</tr>
<tr>
<td><strong>5. Care Efficiency &amp; Sustainability</strong></td>
<td>E.g. Care efficiency (in terms of quality and cost containment) and sustainability for care recipients and families</td>
<td>E.g. Efficiency and Sustainability for care providers</td>
<td>E.g. Efficiency and Sustainability for Social Protection and Care systems</td>
</tr>
<tr>
<td><strong>6. Acceptability</strong></td>
<td>E.g. Acceptability by carer and care recipient</td>
<td>E.g. Marketability of ICT devices (from ICT device producer point of view)</td>
<td>E.g. Resources of Care system to support adoption of ICT devices (e.g. public investments in ICT devices)</td>
</tr>
<tr>
<td><strong>7. Infrastructure &amp; Accessibility</strong></td>
<td>E.g. Accessibility of initiative by carers</td>
<td>E.g. Availability of services (from care provider point of view)</td>
<td>E.g. Availability of services (from care system point of view: e.g. device diffusion rate)</td>
</tr>
</tbody>
</table>

Table 2. Dimensions and sub-dimensions to be assessed through relative indicators (the ones mentioned are mere examples).
2. Literature review and selection of methodologies

Introduction
On the basis of the dimensions identified in the previous chapter, the literature review deepened both theories and practical tools in order to collect evidence of impact assessment, with a specific focus on ICT role.

Each dimension ends with a summary including the evidences from the review at various levels (micro, meso, and macro) and a list of possible indicators, chosen at this first stage to build the first draft of the Impact Assessment Methodology. This list can be improved, thanks to both external inputs (i.e. adding, cutting or modifying already selected indicators) and internal changes (i.e. adapting indicators for a different level, merging indicators).

1. Quality of Life of Informal Carer
The Handbook ‘Measuring Progress: Indicators for care homes’ which is one of the major outputs of a project ‘Quality management by result-oriented indicators’ funded by the Progress programme of DG Employment, Social Affairs and Equal Opportunities dedicates one chapter to the methodological and conceptual challenges of indicators measuring quality of life. It explores how “outcomes of care interventions frequently lack satisfactory evidence and reliable indicators, but this is even more the case when applied to quality of life. The terms ‘quality of life’, satisfaction’ or ‘wellbeing’ which are used in this connection have been taken up by various branches of research, but without being integrated into an overall conceptual understanding of what older people want from quality of life. The term ‘quality of life’ is closely connected with ‘welfare’. Accordingly, quality of life is a complex, multi-dimensional concept simultaneously comprising both tangible and intangible, objective and subjective, individual and collective aspects of welfare, with the emphasis on ‘better’ rather than ‘more’. Since the 1970s, welfare research has also increasingly been focused on the partial aspect of the subjective dimension, known as ‘subjective wellbeing’. Apart from this branch of research, psychologically oriented wellbeing and health research (Abele/Becker, 1991; Mayring, 1987) also attributes great significance to the subjective aspects of quality of life. Although it has so far been unable to establish a uniform conceptual understanding of quality of life in old age, ageing science has identified ‘wellbeing’ and ‘satisfaction’ as key indicators of a successful ageing process. Concerning research with older people, it should be noted that in recent years progress has been made to measure the subjective and objective quality of life with regard to the areas of health-related quality of life, home environment and aspects of participation and social support.
Accordingly, quality of life essentially comprises two dimensions, a subjective as well as an objective dimension. The objective dimension can be measured with the help of suitable ‘objective’ indicators of the individual’s situation in life. Here, relevant aspects are the socioeconomic status, the home and its environment, social relationships and social support as well as the degree of participation in public life. However, this presupposes that these are important features for that particular individual, unless they have been identified as being important by the individual. The focus of the individual component here is more on the individual assessment of their situation, that is their perception of the quality of life in these and other areas, which includes cognitive and emotional as well as behavioural aspects. In this context it is important to note that individually perceived quality of life not only includes relevant areas of life, but also intangible and collective values such as ‘freedom’, ‘justice’ or the degree of ‘autonomy’ as experienced by the individual. This is of special importance for the quality of life of care home residents whose scope for determining and influencing their own objective living environment is limited and also highlights the significance of other intangible components such as ‘dignity’, ‘privacy’ or ‘safety’.

In positive cases, the agreement between both perspectives (‘good’ objective conditions and subjective assessments) can be taken as an indicator of a high or good quality of life, while in negative cases (‘poor’ objective conditions and subjective assessments) the quality of life can be regarded as low or ‘poor’. But often the connection between subjective quality of life and objective criteria is only meagre (inter alia Kane, 2003), a phenomenon also known as the ‘paradox of ageing’, with research results indicating that especially older people with declining objective resources show a high level of satisfaction (Mayring, 1987; Smith et al., 1996; Staudinger, 2000). However, not all quality of life researchers regard this empirically verifiable phenomenon as a paradox, but sometimes also interpret it as an effect of the plasticity of old age (Lehr, 1997) and/or a successful coping strategy. Basically, these findings also invariably raise the question of validation (validity) of the answers from residents. Kane (2003) describes validation of the subjective phenomena as one of the fundamental challenges in research about quality of life, even though there is no conclusive answer to this question.

However, the consequence of restricting investigations exclusively to examine objective criteria for the quality of life would lead to the exclusion of an essential aspect, since particularly the findings from health-related research about quality of life (inter alia Idler, 1993; Filipp/Mayer, 2002; Lehr, 1997; Lehr/Thomae, 1987; Mossey/Shapiro, 1982) overwhelmingly demonstrate the significance of the subjective aspect. There is more or less universal agreement concerning this general conceptualisation and the distinction between subjective and objective components. With regard to measuring the subjective quality of life, however, different views exist about approaches and methods. For instance, a distinction is made here between the cognitive component of ‘satisfaction’ and the emotional component of ‘happiness’. Another approach to conceptualisation following Lawton (1984) distinguishes four aspects of subjective quality of life:

- a negative emotional factor,
- a positive emotional factor,
• happiness as the conviction that the positive emotions exist on a long-term basis, and
• goal congruence, i.e. the conviction of having reached one’s personal goals.

Here, happiness represents an important factor of wellbeing, comprising current (a state) as well as habitual wellbeing (a trait). Current wellbeing includes a person’s present experience, positive emotions, moods and physical feelings as well as the absence of discomfort (Abele/Becker, 1991: 13). Habitual wellbeing covers “statements about the wellbeing that is typical for the individual, i.e. assessments of aggregated emotional experiences”. It should be noted that the term ‘wellbeing’ in this context is to be understood normatively (positively). Often discussed is the connection between the quality of long-term care and the quality of life. Empirical research provides no uniform answer to the question of how the quality of life and the quality of caregiving are interrelated.

In everyday theory, it is assumed that there is a positive correlation between the resident’s quality of life and the quality of care-giving. According to such assumptions, quality of life could serve as an indicator for the quality of care-giving. The available research results on this topic are only scanty, and they present an inconsistent picture, depending on which aspects of the quality of life and care-giving have been investigated. However, the studies carried out so far often show no connection between the quality of care-giving and the quality of life (Challinger et al., 1996; Rubinstein, 2000; Sowarka, 2000). The relationship between quality of care-giving and quality of life is linked to the question of how quality of life is understood and defined. If quality of life is understood as synonymous with conditions (of life), it amounts to an input analysis (Veenhoven, 1997; Filipp/Mayer, 2002). In that case, the quality of life is seen as a condition depending on the quality of care-giving. If, on the other hand, quality of life is defined as a person’s subjective, individual view (Veenhoven, 1997; Filipp/Mayer, 2002), a connection between the quality of care-giving and the quality of life does not necessarily exist.”

1.1 Reconciliation between care and work

This issue has received considerable attention in the last few years at a European level, although almost always neglecting the role of ICT as a possible tool to achieve a better balance between professional and care responsibilities. Just to give an example, a recent overview of the many transnational EU-funded initiatives identified as good practices in the field of reconciliation reported only one (the project GALCA: Gender Analysis and Long-term Care Assistance) which mentioned the issue of ICT as one of the key areas requiring improvement (European Commission 2007); and this suggestion was formulated in a very traditional way, since although it underlined the necessity of “encouraging the use of ICT in care services (for example, tele-care services)”, this area was kept distinguished by that which asked for a stronger “promotion of the needs of carers (free legal advice, social help desks, medical and psychological support)”. In the light of this situation, it is therefore not surprising that most research findings concerning the relevance of the reconciliation issue across Europe do not include considerations concerning the role of ICT. Limiting our reflections to cross-national studies and reviews, we can start our analysis again by mentioning the results emerging from the EUROFAMCARE study, according to which over 40% of family carers of dependent older
people across Europe are represented by employed persons (Czekanowski et al. 2008). This amount increases however to over 50% when we consider only carers in the age group 45-64, in which most carers of older people are actually concentrated (Principi et al. 2011). If we focus on this latter group age group of informal working carers1, we observe that a relevant number of them suffers from a series of work restrictions due to their engagement in caregiving activities:

- almost 20% of female and over 15% of male carers report that they have to reduce their working hours, almost all of them (94%) experiencing for this reason also a negative impact in terms of income (i.e. as a consequence of the reduced working hours);
- one out of ten women and 6% of men cannot develop their professional career due to their caring duties, while for the same reasons a similar amount of carers can work only occasionally;
- a relevant number of carers is already out of the labour market in connection to the their caregiving engagement, since 12% of female and 10% of male carers had to give up work for this reason, and 16% of women and 11% of men are unable to work at all for the same ground.

With almost no exception, we observe that women report care-related work restrictions to a larger extent than men: for this reason, the gender differences should be taken into account.

The above findings represent therefore a clear call for specifically considering these dimensions when assessing the impact of ICT-based initiatives aimed at supporting informal carers, in order to better understand what ICT can do to facilitate their contribution to the labour market, while controlling for other dimensions of the overall quality of life.

These conclusions are confirmed and integrated by the findings collated by a Europe-wide review on family care and its socio-economic impact, recently carried out by a joint research team of the University of York and Vilans (Glendinning et al. 2009a). According to the empirical evidence emerging from this study, the likelihood of quitting paid employment is quite high for carers in Austria, particularly when combined with a generous LTC allowance and a high dependence level of the care recipient (Pochobradsky et al. 2005). While similar results are reported also for Flanders – especially when carers with a disability pension where accounted for (PFSC 2003) – recent findings on Dutch carers show that the risk of reduced working hours is highest for those caring for their partner and for those providing the most intensive care in terms of hours per week (de Boer 2009). Similar conclusions were reached also by Arksey and colleagues (2005) with regard to England and Wales, with the further specification that carers seem to report (compared to non-carers) both longer periods of absence from work and, once (re)employed, longer periods of permanence in the labour market, thus suggesting a sort of stronger “inertia” or lower mobility (Haitmueller and Inglis 2004). With regard to gender differences, evidence based on the UK Family and Working Lives Survey shows that British

1 These findings are basically confirmed, although with slightly different percentage rates, for the whole sample, too (Lamura et al. 2007; Glendinning et al. 2009a).
caring women stopped working or continued not working remarkably more frequently than men (Henk 2004).

To summarise, these findings suggest that a comprehensive impact assessment of ICT-based solutions focused on reconciliation issues should include, in addition to the items indicated above from the Eurofamcare study, also an evaluation of aspects such as the duration of absence from and/or permanence in the labour market, and to control for aspects such as the intensity of care provided, level of possible care allowances received and kin relationship to the cared-for person.

A further, more recent comparative study focused on the qualitative analysis of reconciliation issues and carers’ strategies in four European countries (Germany, Italy, Poland and UK), shows that caregiving can have a significant impact on several dimensions of life, such as work, family and social relationships, health and finances (Kohler et al. 2011). Limiting our attention to the conflicts and problems arising with regard to work, to its reconciliation with life and care, and common to all four countries, we observe that many carers are affected by stress, tiredness and anxiety and find it difficult to concentrate when they are on the workplace. This is, on the one hand, due to the fact that they are worried about the person in need being left home alone and, on the other hand, related to the lack of understanding carers receive from line managers and colleagues. As a consequence, many of them report also a higher than average number of days of absence, since they have to look after the person in need in case of emergencies, visits to doctors or hospital stays. Also the impossibility to attend training courses and the risk to completely give up the job are possible indicators of the carer’s situation.

On the whole, the overall impact of the above described circumstances can be summarised in terms of a strong risk of lower productive efficiency or of reduction in the number of working hours. The productivity issue is very important to be addressed from both carer’s and employer’s points of view: developing strategies to facilitate reconciliation patterns will produce benefits for both of them. In this case, some measures of productivity are available and need to be adapted in each single case (according to the job peculiarities): for instance, the labour productivity based on gross output and the one based on value added (OECD 2001) are the most useful measures of such dimension. From the employer’s side, the calculation of the staff retention rate can be useful in order to understand the overall context of the organisation and the impact of caregiving activities on the turnover (IRS Employment Review 2000).

In the light of these findings, it is evident that any systematic assessment of ICT-based solutions should include a set of measures able to capture also its impact in terms of reduction of problems/conflicts on the workplace. This include more subjective aspects such as stress, lack of concentration and conflicts with colleagues, but also more objective measures such as days of absence, productivity indicators and attendance of training courses.
### Definition of the sub-dimension

The reconciliation between care and work concerns the possibility for the informal carer to keep his/her job, assuring anyway enough time to dedicate to caregiving activities. Other related aspects concern the possibility, for carers who do not work, to enter into the labour market and, for carers who still work, to improve the work condition and the availability of personal resources (e.g. time).

### Evidence

- **Micro**: care has a negative impact on number of working hours, income level, developing career, training, permanence into the labour market, quality of life at workplace, relationships with colleagues.
- **Meso**: care has a negative impact on productivity, retention rate.
- **Macro**: care has a negative impact on general workforce.

### Indicators chosen

<table>
<thead>
<tr>
<th>Micro-level</th>
<th>Evidence (direct/indirect, quantitative/qualitative)</th>
<th>Relevance (high, medium, low)</th>
<th>Feasibility (high, medium, low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.ML1 Number of working hours</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ML2 Possibility to continue or restart working</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ML3 Income level</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ML4 Efficiency in the workplace</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ML5 Relationships with colleagues</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ML6 Wellbeing at the workplace</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Meso-level</th>
<th>Evidence (direct/indirect, quantitative/qualitative)</th>
<th>Relevance (high, medium, low)</th>
<th>Feasibility (high, medium, low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.ME1 Leaving work because of care</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ME2 Reducing working hours</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ME3 Not developing their career</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ME4 Not attending training</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ME5 Experiencing absenteeism, interruptions or other events</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ME6 Negative relationships with colleagues</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.1.ME7 Experiencing stress or burden due to care-related issues</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Macro-level</th>
<th>Evidence (direct/indirect, quantitative/qualitative)</th>
<th>Relevance (high, medium, low)</th>
<th>Feasibility (high, medium, low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.MA1 Work less to have more time for caring</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>1.1.MA2 Work or work more and reducing caring time</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
</tr>
</tbody>
</table>

### Main tools to adapt

1.2 Social life

Marie-Dröes et al. (2006) discuss the impact of ICT on the social contacts of carers. Deeken et al. (2003) surveyed instruments on the quality of life of carers and found few examples in the literature, with the authors making the case for the use of Weitzner's Quality-of-Life Index-Cancer. However it should be noted that its applicability to a non-cancer environment has not yet been tested. Magnusson et al. (2005) used the PREP model of nursing interventions which assesses the impact of an intervention on preparedness and enrichment, i.e. rewards and satisfaction from, as well as the predictability of the carers’ situations. They argue, for example, that some devices such as multimedia training like ACTION might well improve the first two dimensions, but might fail to improve the predictability of a caring situation, where respite care services would be needed. The assessment of social relationships of carers is a priority as they are crucial into personal life of each one. Such social life can be investigated through items available in different questionnaires, like EUROFAMCARE (2005), Portland State University (2001), National Caregivers Library (2009), and International Wellbeing Group (2006).

Kinney (2003) found concerns over safety to be a major source of distress for carers, which could be eliminated e.g. via door alarms. Mahoney (2010) and Mahoney et al. (2003) found that home-monitoring technology has a positive effect on carers and their relationship to the care recipient: no perceived intrusion, no isolation of the older person due to ICT devices, but rather an increased quality of telephone conversations (e.g. because the carers did not need to remind the older relative of taking pills anymore for instance). The sense of closeness of carers was reported as a consequence of video-calling in a literature review by Bledsoe et al. (2010), and Marziali & Donahue (2006) (cited in Bledsoe et al., 2010) report a significant decrease in carers’ stress levels following online support group membership. Similar results are cited for telephone support groups and internet-based multimedia training.

With regard to the meso-level, one of the main issues to be considered here concerns the ability of support services to break the isolation characterising many carers and thus facilitate their involvement in social networks of different kinds within their local community, including volunteer groups (Nolan et al. 2008). One out of four carers in Europe state furthermore that supports helping them in dealing with family disagreements are “very important” to them (Lamura et al. 2008b), thus underlining how an indicator at meso-level in this area would be most appropriate. Another relevant dimension in this respect concerns the possible association existing between the quality of the relationship between the carer and the cared-for person, on the one hand, and that of the carer’s support networks, on the other hand (Glendinning 2009a). At a macro-level, this could be monitored through the use of indicators concerning the active participation of carers in different societal activities (leisure, civic etc.), as well as their contribution to web-forums, blogs or other virtual interaction spaces.
**Summary**

**Definition of the sub-dimension**
The social life concerns all the aspects related to carers’ social relationships, social participation, and their interactions with significant others.

**Evidence**
- Micro: care has a negative impact on social contacts, quality of relationships, time to receive support from significant others.
- Meso: care has a negative impact on the use of local care services, quality of relationships with older people, activities in the community.
- Macro: care has a negative impact on participation in national supporting initiatives and social activities.

<table>
<thead>
<tr>
<th>Indicators chosen</th>
<th>Evidence (direct/indirect, quantitative/ qualitative)</th>
<th>Relevance (high, medium, low)</th>
<th>Feasibility (high, medium, low)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Micro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.MI.1 More/less time for maintaining existing social networks and contacts</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.2.MI.2 More time to maintain quality relationships with family, friends, peers, and/or work colleagues</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.2.MI.3 More/less time to receive different types of support (emotional, physical, and financial as well as feedback).</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td><strong>Meso-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.ME.1 Reduced number of contacts made with local social services due to family conflicts</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.2.ME.2 Increased number of carers reporting enhanced relationships with the older person and extending and strengthening informal support networks</td>
<td>direct to carers, quant.</td>
<td>medium</td>
<td>medium</td>
</tr>
<tr>
<td>1.2.ME.3 Increased number of carers being able to take part in various activities in their local community, with their peer groups and/or voluntary organisations</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>medium</td>
</tr>
<tr>
<td><strong>Macro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2.MA.1 More activity on internet fora</td>
<td>direct to carers (projection), quant.</td>
<td>medium</td>
<td>medium</td>
</tr>
<tr>
<td>1.2.MA.2 Participation in a greater number of social activities including membership to leisure activities/hobbies/civic engagements</td>
<td>direct to carers (projection), quant.</td>
<td>medium</td>
<td>low</td>
</tr>
</tbody>
</table>

**Main tools to adapt**
1.3 Health-related quality of life

With regard to the quality of life and general situation of carers, a useful source is provided by the research project EUROFAMCARE. The comparative approach underlying this study is reflected in the data available on the project’s website (http://www.uke.de/extern/eurofamcare/), where it is possible to download national reports for 23 European countries, which include also a section on the role of new technologies in supporting family carers of older people. Although the project successfully ended four years ago – a lapse of time long enough to represent almost a “generation” in the ICT-world characterised by continuous innovation – some basic findings in terms of what factors constitute core dimensions of quality of life for family carers in different contexts remain a valuable source of information, especially for the many small- and medium-sized countries from Southern and Eastern Europe.

A relevant contribution is furthermore derived from the comparative reports made available by the project, such as the Pan-European Background Report (Mestheneos and Triantafillou 2005) and the Trans-European Survey Report (Lamura, Döhner and Kofahl 2008a). The latter publication contains in particular the results of a survey carried out in 6,000 households across the different European care regimes, focused on the support needs of family carers and on the main characteristics which support services should have to properly meet them. This set of information represents a crucial background to be kept in mind when analysing the impact of ICT-based initiatives across Europe, especially when considering the different needs characterising the variety of situations faced by family carers. It has indeed been suggested to distinguish them into homogenous clusters, three of them representing the groups of carers most in need of support: cohabiting, non-employed daughters of highly impaired older people; non-cohabiting, employed daughters of moderately impaired care recipients; and spouses of a moderately to highly impaired partner (Lamura et al 2008).

The COPE Index developed by the EUROFAMCARE consortium is a cross-nationally validated tool which is able to assess three dimensions related to the quality of life of carers: the negative impact deriving from caregiving; the carer’s ability to attach a positive value to the caregiving experience and the quality of support received from formal and informal sources (Balducci et al. 2008; McKee et al. 2008). Data concerning these three dimensions might be collected by means of a mix of quantitative and qualitative methods (e.g. semi-structured questionnaires), in order to take into account how the use of ICT-based initiatives impacts on the different dimensions of well-being of family carers mentioned above.

Valuable sources in this field are also represented by the semi-structured questionnaires based on the Carers’ Assessment of Difficulties Index (CADI), the Carers’ Assessment of Managing Index (CAMI) and the Carers’ Assessment of Satisfaction Index (CASI) (Nola, Grant and Keady, 1998; McKee et al. 2009; Guat Tin et al. 2007). These scales comprise a series of statements about carers’ experiences in terms of difficulties, satisfactions, and ways of dealing with the informal care challenge. It also represents a useful assessment tool for in-depth work with family carers of older people and as a research instrument for large-scale studies of family care (McKee et al 2009; Guat Tin et al. 2007).
Drawing upon the experiences of previous EU programmes such as EQUAL used to measure social and economic outcomes, several psychometric tools are also available to assess the impact of ICT-based solutions, since life satisfaction measures and the social impact assessment can be used as methods to obtain more quantifiable and representative results (Murray et al., 2010). Other examples of studies assessing the impact of ICT interventions on the quality of life of carers are those by Jarrold and Yeandle (2009), who have been focusing on the impact and benefits of telecare for family carers, by Read and Blackburn (2005) on the implication of internet use for social and health care services, and by Torp and colleagues (2008) on the impact of ICT in terms of health promotion among older spouses who are also carers.

In an extensive analysis Jarrold and Yeandle (2009) find that the impact of telecare on carers means that the latter 1) improve their sleeping patterns (which reduces exhaustion and helps them sustain their caring role); 2) reduce anxiety and stress, as there is less need to worry about the safety of the care recipient; 3) report improvements to the relationship with the cared-for person; and 4) can sustain paid work alongside a substantial caring role (which without telecare support would be very difficult to manage). The objective was to explore the impact and potential benefits of telecare for carers in Scotland, where the following methods were used:

- Interviews and focus groups with carers;
- Stakeholder perspectives (a series of informal interviews was conducted with a range of people whose professional roles gave them particular insights);
- Observation (these were also important in clarifying specific aspects of how telecare services are delivered);
- Review of literature and documentation (drawn from existing sources including academic publications, policy evaluation reports and expert presentations).

Her conclusions are based on a literature review of studies made of the impact of telecare. The study reports how some carers “emphasised that they really welcomed the change telecare had made to their lifestyles and reported that it had given them free time they did not have before. Having telecare in place alleviated some of the stress associated with being away from the person they cared for. These benefits were particularly underscored by carers who lived in a different household from the person they cared for.” Nevertheless the perception that “telecare will replace or ‘de-humanise’ care has nevertheless often been highlighted as a possible concern of carers (and paid workers)”. Telecare also seems to be able in some cases to reduce presenteeism: “Some of the carers emphasised feeling less tired, and reported that they no longer felt they were constantly ‘on call’ whilst at work. Telecare has enabled a few carers to remain in a job they might otherwise have had to give up, and (in one case) to gain employment”.

Cummnis and Huges (2007) at Carers Australia made a large survey among family carers to measure their quality of life. They applied three major outcome measures to estimate the quality of care. The first is the Personal Wellbeing Index, which is a standard measure of wellbeing. The Index score is the average level of satisfaction across seven aspects of personal life – health, personal relationships, safety, standard of living, achieving in life, community connectedness, and future security. The other two outcome measures are sub-
scales taken from the Depression, Anxiety, and Stress Scale (Lovibond and Lovibond, 1995). This is a highly regarded scale and the sub-scales of Depression and Stress have been used for the Carers Australia study. The findings from their survey confirm the results from other studies, i.e. that carers have a low collective wellbeing compared to the general population, and are more vulnerable to physical pain and have a weak financial situation. The project ISISEMD (http://www.isisemd.eu/) addresses the needs of informal carers by applying rating scales. Quality of Life (QOL) of informal carer is measured by the Scale of Quality of Life of Care-Givers (SQLC, Glozman scale). Burden of care is measured by the Zarit Burden Interview (ZBI).

### Summary

**Definition of the sub-dimension**
The health-related quality of life covers all the aspects of a carer’s wellbeing other than social participation and work. This sub-dimension concerns the health of the carer, its prerequisites and effects.

**Evidence**
- Micro: care has a negative impact on physical abilities, mental and psychological wellbeing, personal identity, stress and pain.
- Meso: care has a negative impact on productivity at workplace and social relationships.
- Macro: care has a negative impact on the workforce.

<table>
<thead>
<tr>
<th>Indicators chosen</th>
<th>Evidence (direct/indirect, quantitative/qualitative)</th>
<th>Relevance (high, medium, low)</th>
<th>Feasibility (high, medium, low)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Micro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3.MI.1 How the use of ICT can improve their physical abilities, including the ability for their own activities of daily living (particularly for older carers regarding mobility)</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.3.MI.2 How it affects their mental health/psychological wellbeing and related coping strategies</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.3.MI.3 How it affects their personal identity</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.3.MI.4 How it affects their pain-discomfort</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.3.MI.5 How it improves/reduces their energy/fatigue</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.3.MI.6 Possibility to adapt the home of the carer/care recipient</td>
<td>direct to carers, quant.</td>
<td>medium</td>
<td>high</td>
</tr>
<tr>
<td><strong>Meso-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3.ME.1 Better performance/efficiency in the workplace (less difficulty to concentrate on tasks)</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>1.3.ME.2 Better relationships with other family members (more time for leisure activities)</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td><strong>Macro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.3.MA.1 More efficient workforce for the whole</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>Economy who report less days off work</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
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<tr>
<td>----------------------------------------</td>
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</tbody>
</table>

**1.3.MA.2 Healthier workforce requiring less attention from the social and health sectors**

Main tools to adapt
2. Quality of Life of Paid Assistants

With regard to migrant care workers, the striking lack of ICT-based initiatives to support their role despite their widespread presence across many European countries (Kluzer, Redecker and Centeno 2010), has so far prevented the implementation of studies assessing the impact of such initiatives on their quality of life. Therefore, the methodological framework to be applied in their case has necessarily to be at least partly derived and adapted from studies and instruments developed for formal long-term care staff in general.

A useful tool in this respect is certainly one provided by the Senses Framework (Nolan et al. 2006; Help The Aged 2007; Faulkner 2006), which represents a comprehensive attempt to assess the core dimensions of the performance achieved by the different actors involved in the care provision: sense of security; belonging; continuity; purpose; achievement; and significance. Its ability to include aspects which are relevant to the quality of life of care staff makes it indeed a valuable tool to assess how, and to what extent, ICT-initiatives are able to improve both the quality of care provided by privately employed migrant workers, as well as their own quality of life.

However, in order to also consider aspects which are related to the specific condition of being a migrant, it is crucial to integrate the above with the conceptual tools provided by the research developed in the field of immigrant and ethnic minority studies (Watson 2004; Guaranatman 2006). According to these studies, a series of difficulties characterises the everyday experience of migrants along their life course, thus creating specific needs and access barriers which are often not recognised by professionals and service providers across Europe (Watson 2004). Crucial means to overcome these barriers have been identified in the following categories: provision of clear and simple information in the migrants’ languages; training native staff to work with culturally sensitive methods; collaboration with migrants’ organizations and representatives and improving the availability of interpreters. The assessment methodology to be developed for this project will therefore need to be able to evaluate to which extent the use of the ICT-initiatives has an impact on any of the above categories.

A potentially helpful framework to this purpose has been recently developed by Iecovich (2011) with regard to live-in migrant care workers in Israel. Based on a broad literature review, this study focused on the factors impacting on the job satisfaction of migrant care workers. To this purpose, the 12-item Job Satisfaction Scale by Grau, Chandler, Burton and Kildlitz (1991) was used to identify both intrinsic job satisfaction and satisfaction with benefits with different items. At the same time, information was collected on perceived workplace characteristics and on the quality of the relationship with the care recipient, by means of Pickhart and colleagues’ (2001) measure of work psychosocial characteristics, which includes 30 items on six dimensions: effort at work; reward at work; job demand; job decision authority; social support at work; job variety. Furthermore, quality of relationships was assessed through the Relationships in Elder Care measure of Lyonette and Yardley (2003), which was adapted in order to evaluate the perception of both the migrant care worker and of the care recipient. The results emerging from this study show that migrant care workers’ job satisfaction is related to the level of education, experience at work, work autonomy, job variety and quality of the relationship with the care recipient. Although this study did not focus on the use of ICT-tools, its conceptual framework could
be usefully adapted to assess the impact of ICT-based solutions on the job satisfaction of migrant care workers. This dimension is indeed a crucial one to ensure retention of this workforce, and the implications emerging from this study show that more job discretion and autonomy, together with ongoing training to improve care qualifications and skills, can improve job satisfaction.

One main limitation of the previous study is its restricted focus on the issue of job satisfaction, which of course represent only one – although a major one – of the different dimensions which affect the quality of life of migrant care workers. Therefore, in order to be comprehensive, the impact assessment of ICT-based solutions used by migrant carer workers will have to include other crucial aspects of their experience. These include the capacity of ICT to reduce the isolation in which they usually carry out their work, to improve their linguistic skills and their opportunities to receive training and information on care-related tasks, as well as the possibility to reduce the risk of experiencing abusive situations (Lamura et al. 2010a).

### Summary

**Definition of the sub-dimension**

The quality of life of paid assistant covers all the aspects of a carer's wellbeing including social participation and work. This sub-dimension concerns the health of the carer, its prerequisites and effects, as well as the social life and work-related aspects.

**Evidence**

- Micro: care has a negative impact on physical abilities, mental and psychological wellbeing, personal identity, stress and pain, leisure.
- Meso: care has a negative impact on productivity at workplace and social relationships.
- Macro: care has a negative impact on the workforce.

**Indicators chosen**

<table>
<thead>
<tr>
<th>Micro-level</th>
<th>Evidence (direct/indirect, quantitative/qualitative)</th>
<th>Relevance (high, medium, low)</th>
<th>Feasibility (high, medium, low)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.MI.1 How the use of ICT can improve their physical abilities, including the ability for their own activities of daily living</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>2.MI.2 How it affects their mental health and related coping strategies</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>2.MI.3 How it affects their pain-discomfort</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>2.MI.4 How it improves their energy/fatigue</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>2.MI.5 Feeling that the older person asks for more help than he/she needs</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>2.MI.6 Possibility to participate in leisure and social activities</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
</tbody>
</table>

**Meso-level**

<p>| 2.ME.1 Better performance/efficiency in the workplace (less difficulty to concentrate on tasks) | direct to carers, quant. | high | high |</p>
<table>
<thead>
<tr>
<th>2.ME.2 Better relationships with own family members (more time for leisure activities)</th>
<th>direct to carers, quant.</th>
<th>high</th>
<th>high</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Macro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.MA.1 More efficient workforce for the whole economy who report less days off work</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>2.MA.2 Healthier workforce requiring less attention from the social and health sectors</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>2.MA.3 Paid assistants who feel their personal skills and abilities are recognised</td>
<td>direct (projection), quant.</td>
<td>medium</td>
<td>low</td>
</tr>
</tbody>
</table>

**Main tools to adapt**
3. Quality of Life of Care Recipient

Given the focus of the study on the carers, the information concerning the quality of life of the care recipients as well as the quality of the care received by him/her will be mainly gathered using the carer as a proxy. Main areas to be covered in this respect are physical, psychological, social and environmental quality of life domains, for which the quality of life assessment tools developed by the World Health Organisation represent a useful instrument (Skevington et al. 2004). Care recipient may be affected by different types of impairment, such as physical, psychological or cognitive, as well as by other kind of diseases and illnesses like stress and pain. In addition, also in this case the Senses Framework represents a useful tool in evaluating the wellbeing of dependent older people (Nolan et al. 2006; Help The Aged 2007; Faulkner 2006). Thanks to this framework, it is possible to identify some core dimensions of impact particularly significant for older people: sense of security; belonging; continuity; purpose; achievement; and significance. Studies assessing the impact of ICT interventions on the quality of life of (dependent) older persons have a long tradition in the German speaking area, and might provide useful insights for the purposes of this project (Heusinger 2005; Mollenkopf 2003; Gericke 2008; Heeg and Volpp 2008).

Marie-Döes et al., 2006 and Mitseva et al., 2010 suggest possible indicators of well-being; possibility of self-care (users with dementia); social interaction; ability to locate and operate technology. Mitseva et al. 2010 analyse the impact of ICT in the timeliness of care and its continuity. The increased safety (e.g. via monitoring technology) might also decrease the autonomy/privacy of cared-for persons (trade-off), see e.g. (Kinney, 2003) or (Mahoney, 2010). Abuse is a phenomenon of growing importance (Soares et al. 2011) and needs to be addressed, also in relation to the dignity of the older person.

CANE (Camberwell Assessment of Need) Framework to assess the needs from the perspective of patients, carers and professionals serves to identify (un)met needs and compare perceptions of different stakeholders. If ICT solutions is perceived as (immediately) useful (especially for “critical events” such as accidents), privacy concerns are less important to older persons. Rather, the maintenance of “meaningful relationships” via technology is a main priority to them, while sensitivity of activity (e.g. it must be possible to turn on/off the device) is important to adapt to specific needs/concerns (Lorenzen et al., 2010; based also on Carstensen’s Socio-emotional Selectivity theory, 1999).

Summary

**Definition of the sub-dimension**
The quality of life of care recipient covers all the aspects of the older person’s wellbeing including relationships with relatives and others in general. This sub-dimension concerns the health of the care recipient, its prerequisites and effects, as well as the social relationships he/she can count on.

**Evidence**
- Micro: care recipient’s dependency can be related to physical abilities, mental and psychological wellbeing, stress and pain, carer’s support, social contacts, dignity.
- Meso: care recipient’s dependency can be related to the senses of achievement, purpose, significance, continuity.
Macro: care recipient’s dependency can be related to the understanding of abuse situation.

<table>
<thead>
<tr>
<th>Indicators chosen</th>
<th>Evidence (direct/indirect, quantitative/qualitative)</th>
<th>Relevance (high, medium, low)</th>
<th>Feasibility (high, medium, low)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Micro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.MI.1 How the use of ICT can improve their physical abilities, including the ability for their own activities of daily living</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>3.MI.2 How it affects their mental health/psychological wellbeing</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>3.MI.3 How it affects their pain-discomfort</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>3.MI.4 Feeling that the older person requires less support from the carer</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>3.MI.5 Possibility to maintain social relationships</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>3.MI.6 Feeling that their rights are acknowledged and acted on and that they are involved in decision-making about their own care</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td><strong>Meso-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.ME.1 Having a sense of Achievement</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>3.ME.2 Having a sense of Purpose</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>3.ME.3 Having a sense of Significance</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>3.ME.4 Having a sense of continuity</td>
<td>direct to care rec., quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td><strong>Macro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.MA.1 Possibility to be better informed (and therefore protected) on the different types of abuse</td>
<td>indirect, quant.</td>
<td>medium</td>
<td>low</td>
</tr>
</tbody>
</table>

**Main tools to adapt**
4. Quality of Care provided by Informal Carer and Paid Assistant

Quality of Care: how to measure the impact of ICT use on informal carers and paid assistants? We will have to refer to outcomes which are measurable through the caregiver, such as, for instance, the level of knowledge and new skills acquired. At the macro-level, evidence points out that ICT can reduce for instance the health care use and the hospitalization rates, and increase the degree of independent living (Wang et al., 2010, ADOPT model). Of course, it is difficult to measure the prevention of institutionalization or the impact on disease progression (see Mitseva et al., 2010). However “using an assistive device in a preventive fashion to provide security and avoid injuries (...) may ultimately be an important factor in achieving improved quality of life and cost-savings by avoiding acute episodes that lead to chronic functional problems.” (Agree, Freedman/Assistive devices).

The PERSONA project (http://www.aal-persona.org/) has developed a framework for measuring improvements in quality of life based on 1) Activity-Professional evaluation, 2) Participation-Everyday Living, 3) Body –Health condition and 4) Environment and Personal factors - Contextual factors. They also recognize that SF-36 can be used to measure the health related quality of life (HRQL). The SF-36 survey is used in PERSONA project as a supporting method for defining the user profile. DREAMING (http://www.dreaming-project.org/) is another project that uses SF-36 to measure HRQOL, at the beginning, midterm and the end of trial period. Otherwise, the most common measure used in Europe for measuring HRQL is the EQ5D measure developed by the EuroQol group (www.euroqol.org/). These measure can however not be recommended to be used for evaluating the impact on quality of life for the caretaker, since these measures primary aim is to measure the health related QoL and not QoL as such.

The project ISISEMD (http://www.isisemd.eu/) addresses the needs (QoL) of the caretakers by applying rating scales and indicators: Cognitive functioning for patients (MoCA/MMSE); Katz's Scale for activities of daily living (ADL) and Lawton and Brody's scales for instrumental activities of daily living (IADL); Quality of Life (QOL) of patient with mild dementia – Quality of Life – Alzheimer’s disease (QOL-AD, Logsdon scale).

A useful source to estimate whether the use of the different ICT initiatives might have an impact on the overall availability of qualified informal carers can be indirectly found in the EUROFAMCARE data. These have indeed identified an indicator to assess the informal carers’ propensity to continue providing care (Mnich et al. 2008), i.e. the likelihood for an informal carer to continue playing his/her role over time. This can contribute to the estimation of the impact that a given ICT-initiative might have on the number of potentially qualified carers available over time. These projections will have to take into consideration also cultural and care-regime related differences existing across Europe, since these might affect the intensity of the effects deriving from a variation in the propensity level, which in some countries might lead to the institutionalisation of the cared-for older person to a much greater extent than in others (Lamura et al. 2007). The estimates regarding this dimension will take into account the dependency scenarios developed in the previous phase of the project, in order to consider the different typologies of needs characterising the main carer profiles. To this purpose, it will also be important to include the assessment of the carers’ overall expectations, of their perceived need for these technologies to be implemented, and of their compatibility with existing care routines, similarly to what has
already been acknowledged for professional care staff (Carlfjord et al. 2010), since these can be expected to represent major factors to ensure a large scale implementation of new ICT-based solutions.

Deeken et al. (2003) surveyed several burden and needs instruments for carers and analysed them on the bases of their validity and reliability and their results point towards: a) Given's Carer Reaction Assessment or Bakas’ Caregiving Outcomes Scale as being the most appropriate for assessing burden of care-givers; b) not one instrument more adequate than the others in relation to carers’ needs. One discussion to have is to what extent instruments developed to measure need, burden and QoL are measuring fundamentally different dimensions in relation to caring (Deeken et al., 2003).

Despite the dearth of studies on this topic, especially in relation to the use of ICT-based solutions – not differently to what happens in the field of professional nursing with regard to telecare (Bowles and Baugh, 2007), although some feasibility studies are increasingly appearing in this area, too (SCIE 2006) – some useful insights can be gained through the pioneering work carried out by Iecovich on migrant care workers in Israel (2007). In her study, Iecovich analyses the perceived satisfaction of home care recipients on the home care provided by migrant care workers, and compared it with that delivered by live-out caregivers.

The study – whose findings show, by the way, that care recipients were more satisfied with live-in migrant care workers - was based on the Home Care Satisfaction Measure (HCSM), a tool consisting of 60 items covering five different areas of home care: homemaker service; home health aide service; care management service; home-delivered meal service; and grocery service (Geron et al. 2000). Although its current version neglects the area of ICT, this instrument could be usefully employed to assess the impact of ICT-based solutions on the care provided by privately paid assistants, thanks to its comprehensiveness of the different areas in which home care can be delivered.

At the same time, it could be used to understand to which extent, and for which sub-areas, the use of ICT-solutions might affect the quality of the assistance provided by migrant care workers, thus relieving the families of dependent (older) people from the most burdensome care activities, such as housework and personal care, but also more delicate ones (e.g. the administration of medicines). Up to the point of possibly leading to a “reshuffling” of elder care tasks by means of a “repositioning” of professional care services in restricted care segments (such as more sophisticated personal care and transportation), and to a refocusing of families’ role on more emotional and organisational activities (Di Rosa et al 2011).

<table>
<thead>
<tr>
<th>Definition of the sub-dimension</th>
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<tbody>
<tr>
<td>The quality of care concerns the necessary prerequisites and the outcome of the care provided by carers, both paid and unpaid ones. In this case, the carer is considered as a proxy: the quality of care is investigated through the carer's activities.</td>
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<table>
<thead>
<tr>
<th>Evidence</th>
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<tbody>
<tr>
<td>• Micro: the care provided to the older person can be enhanced through training and knowledge increasing of the carers.</td>
</tr>
</tbody>
</table>
- Meso: the better care provided to the older person can impact on the carers’ sense of worth.
- Macro: the better care provided to the older person can impact on institutionalisation and hospitalisation levels.

<table>
<thead>
<tr>
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<th>Relevance (high, medium, low)</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Micro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.MI.1 Level of care-related knowledge reached by carer/paid assistant through training</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>4.MI.2 Possibility of carer/paid assistant to improve his caring activities through increased knowledge of best practices.</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td><strong>Meso-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.ME.1 Possibility to get training online and provide better quality care through feeling more valued as a workforce</td>
<td>direct to carers, quant.</td>
<td>medium</td>
<td>high</td>
</tr>
<tr>
<td><strong>Macro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.MA.1 Delaying of institutionalisation</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>4.MA.2 Reduced need for the health care use (visits to doctors, hospitalisation etc) and reduced disease burden/better health</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
</tr>
</tbody>
</table>

**Main tools to adapt**
5. Care Efficiency & Sustainability

One of the defining characteristics of long-term care services is that these can be characterised as being at the boundaries between health and social care. The development of a methodology for assessing the efficiency of ICT-based measures in long-term care will therefore draw from the literature concerning both health care and social services. Given the strong health care content that some of the ICT-based initiatives mapped in this project are expected to have (e.g. telecare) one obvious source of information will be the literature on efficiency of care in health services.

Regarding the dimension of cost-containment, the perspective from which the impact of ICT is analysed is that of the provider organisation of the service (independent of its nature, i.e. public, private or non-for-profit). However, from the point of view of individuals (care recipients and carers) and households, cost containment is still an important mean in order to have major relief and face the long-term care expenses in a sustainable way (e.g. Rasell, Bernstein & Tang 1994).

Although demographic ageing and other societal transformations alluded to before could mean that an increased demand for long-term care services is to be expected in the future, providers of these services also face challenges in supplying adequate care. Most notably, they are faced with potential labour shortages or/and high staff turnover. Paradoxically they may also be faced with reduced streams of revenues in the face of raising costs with care, which render services unaffordable for users, or policy reforms that reduce public contributions to the costs of care. Furthermore, when providers operate in the market-like environment of quasi-markets, as they do in many countries, efficiency may become a primary concern in order to secure users and the long-term sustainability of their organisations. There seems to be however a dearth of research on the potential impact of ICT measures on providers of long-term care (Empirica & WRC, 2005, Empirica & WRC, 2010, Kluzer et al. 2010). One of the main reasons for this is that research on the potential cost-saving nature of ICT initiatives usually takes the perspective of the welfare state as purchaser or provider of care, thus providing limited information on its impact on other actors.

In the context of demographic ageing and societal transformations such as increased tendency to live alone in old-age (Huber et al. 2009), the issues of financial sustainability and ‘value for money’ have featured prominently in the debate surrounding long-term care (see for example OECD, 2005 or European Commission, 2009). Despite this, the definition of efficiency of care and how to measure it remain somewhat contentious, not least of all because long-term care addresses the effects of dependency, while health care will act on its causes (Netten, 1993). Thus, in the majority of cases, long-term care will not bring about a complete and absolute reversal of the state of dependency, which is not to say that a decline is irreversible or that no improvement is possible – thus the room for rehabilitation as one of the services included in long-term care. This makes the assessment of outcomes in long-term care quite different from health care. While in the latter it is possible to devise crude measures of outcome based on morbidity or mortality of patients, in the former these measures lose their convenient applicability as complete recuperation may not be 

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2 Given the scope of this research project, potential consequences on the costs incurred in the tendering and contracting process, such as those reported by Ferguson and Keen (1996), were not considered here.
attainable (for a discussion on assessing the performance and outcomes in long-term care see Netten et al, 2005 and 2010, Challis et al., 2006, and Glendinning et al, 2009).

One important starting point will be the comprehensive review by RAND of the existing body of academic and gray literature on efficiency measures, which also identified gaps in theoretical, methodological, and empirical knowledge in healthcare efficiency (RAND, 2008). The OECD (OECD, 2010), reviews both the policy implications and discussion around ICT use and efficiency in health care, as well as case studies on ICT-based initiatives, their evaluation and results. These two sources will be further supplemented by additional reviews on the subject (see Hussey et al., 2009, for a recent example), as well as examples from specific countries that have carried out evaluations on ICT-based initiatives in health care (Department of Health, 2005). The indicators devised by the OECD under its System of Health Accounts (SHA) (OECD, 2000) may also be used for evaluation of the potential impact of ICT at the macro-level.

In the field of health care, technology in broader terms has long been recognised as a driver of expenditure (Maguire & Serra-Sastre, 2009). However, increased ICT use in long-term care holds some promise of allowing for the containment of costs without reducing quality of care. One of the ways through which this might take place is by allowing productivity gains in a sector that is traditionally labour intensive and prone to suffer from the ‘cost disease’ that Baumol and Bowen (1965) described. The idea behind this is that productivity gains in labour intensive sectors such as the care sector will not accompany the productivity gains of the rest of the economy, thus raising the relative price of professional care (wages in the care sector must nonetheless increase beyond the meagre productivity gains, if employers are to be able to attract workers).

In what could be presented as an example of the potential for ICT to increase productivity, Valkila & Saari (2011) present evidence that the introduction of a voice link between users and nurses in an assisted living facility allowed for a decrease in the number of calls made by users, as they felt safer in their living environment, and a better time-management by staff and thus increased productivity.

In another study, Hoenig et al. (2003) report that assisted living devices, not strictly ICT measures, may modify the process of disablement and thus contribute to a reduced need of personal assistance. By improving independent living and the ability to maintain social networks, ICT could thus impact care efficiency at an the individual level: i.e. ICT could improve the individual’s own ability to care for him/herself and thus limit the need for personal assistance.

However, despite the above examples, the evidence concerning possible cost-saving effects associated with ICT use in long-term care remains thin. Furthermore, in a caring relationship individuals value the development of relationships (Glendinning et al. 2000) and although the decision to take personal care services is viewed as difficult and even postponed as much as possible, the human contact associated with it is valued by individuals receiving care (Valkila et al. 2010). This imposes a ceiling to the productivity gains that can be achieved through technology without diminishing the wellbeing of users.

Although it can be argued that the discussion regarding measurement of outcomes and efficiency of care is probably more developed in health care, these concerns have also reached social care services. The above referenced research by Challis et al. (2006) will be
a central piece in developing indicators to measure efficiency of care, particularly those that aim to capture the wider social impacts of the measures (e.g. through the above mentioned HTE and VTE). This will be supplemented by an analysis on recent policy developments that seek to improve the measurement of outcomes of social care, namely in the UK (Department of Health, 2009, Appleby, 2005), as well as with evidence collected in previous research on ICT-based solutions in long-term care (Empirica and WRC, 2005, Empirica and WRC, 2010, Kluzer et al. 2010).

In the evaluation framework for the impact assessment of an ICT pilot project for elderly with dementia, Mitseva et al. (2010) provide a blueprint for the potential efficiency gains that ICT could entail for formal providers. The work analyses to what extent the measure allowed for a transfer of tasks from formal providers to informal providers. Savings on personnel costs, time and travel (for formal providers); increased number of users covered; time committed to care and related tasks (e.g. transport), and/or possibility to undertake other activities (leisure, care for other dependents such as children, employment, access to essential services such as health, improved health condition or absenteeism) (for family carers) (Mitseva et al., 2010, Hogenbirk et al., 2005). Thus, efficiency gains could arise from increased number of users served (e.g. due to reduced travel times between users in their homes); savings in personnel, namely due to the possibility to reallocate some tasks to less qualified staff, or to the increased number of users cared for by each member of staff; and from the possibility to widen the recruiting pool of caregivers.

However, the correct assessment of the costs involved in ICT (valid not only for the assessment of the impact on providers, but also on a societal level) should also bear in mind some potential caveats. Thus, Whitten et al. (2002) point to the relative short duration of most ICT initiatives, which makes it difficult to assess the costs and benefits accrued when the initiative reaches a mature stage where, for example, the efficiency gains could be greater due to increased familiarity with ICT. Stroetmann et al. (2006) point to the need to take not only functioning costs into consideration, but also investment costs, which can substantially increase the time needed to recoup the investment and make the initiative a cost-effective one. The time dimension of the assessment is thus crucial, for even under relatively favourable conditions Bayer et al. (2007) estimate that for an ICT initiative the potential for cost-savings is only apparent over the long run – and this without even considering any set-up costs.

Efficiency and sustainability of care as discussed as follows refer to the macro-level, i.e. the analysis refers to the allocation of resources on a societal level that comprises the social protection system (health and long-term care), as well as informal carers. In this respect, it concerns the extent to what one entity or stakeholder can be made better-off without placing another entity or stakeholder in a worst situation (RAND, 2008: 25). For example, provision of informal care by family members may be regarded as preferable by older people and less onerous by the State and yet be a costly solution on a societal level if it prevents carers from participating in the labour market, or if it has negative consequences on their health (and consequently on health and long-term care costs).

Following the classification proposed by Drummond et al. (2005), the economic evaluation of ICT measures applied in long-term care may consist of:
a. **Cost Analysis (CA):** whereby the costs of implementing a programme are compared to alternative uses for the resources employed, or what in economic terms is also referred to as 'opportunity costs', without however, being able to consider the outcomes of the measures or programmes (see Lowson et al. 1981).

b. **Cost-Effectiveness Analysis (CEA):** represents an upgrade from the cost-analysis as it allows for costs to be weighed against outcomes, which typically in the field of health care have been measured in terms of years of life gained. However, cost-effectiveness is still a limited form of evaluation as it allows for only one outcome to be assessed (Dávalos et al. 2008).

c. **Cost-Benefit Analysis (CBA):** it allows for the comparison of measures or programmes with multiple and different outcomes by assigning them monetary values. This way it is possible to account for the time value of money (i.e. to account for the flow of benefits and costs over a period of time by taking their 'present value') and directly compare programmes with different outcomes (Weisbrod et al, 1980, Stroetmann et al. 2006, and Dávalos et al, 2008);

d. **Cost Utility Analysis (CUA):** similarly to CBA it allows for the comparison of different outcomes as it transforms these into a single common unit of measurement: Quality Adjusted Life Years (QALY) (see Newman et al, 2000 and Mortimer & Segal, 2008).

However, in a review of literature on economic evaluation of telemedicine Dávalos et al. (2008) point to the fact that even when using the most sophisticated of the above mentioned methods (CBA) evaluations have mostly focused on the costs, while taking only a narrow view of the benefits brought by telemedicine. Furthermore, they have focused for the most part on only a small group of people involved, thus failing to consider the implications for all those directly involved (e.g. staff and users or patients). In the case of long-term care these difficulties are likely to be compounded by the lack of the aforementioned consensual measures of outcome on a macro-level. Another gap identified in the literature review conducted by Dávalos et al. (2008) refers to the lack of long-term assessments of the costs and benefits of the initiatives, which limits the possibility to assess the sustainability of potential cost-savings or efficiency gains brought by ICT.

Although CBA permit the comparison of quite different measures and outcomes by assigning monetary values to different outcomes, Jacob et al. (2008) caution against the possibility that monetised methods such as this could introduce a bias in favour of impacts that can easily be monetised. Dobrev et al. (2008) on the other hand, warn that in assessing the socio-economic impact of ICT, the evaluation is often carried out not on the average ICT initiative, but on the frontrunners or the 'leaders in the field' – an important caveat to bear in mind when extrapolating potential savings or efficiency gains from single projects to the wider social protection systems.

Another strand of the literature makes the case for the assessment and presentation of outcomes and overall evaluation of ICT measures not through a single aggregate indicator, but making use of a tabular format (Coast, 2004, and Jacklin et al, 2003). This would avoid some of the controversies associated with measurement of QALY, allow for a wider range of factors to be taken into consideration (e.g. equity, qualitative measures) and highlight the trade-offs associated with the decision-making process.
Challis et al. (2006) propose two concepts that are valuable not only to analyse the wider social impacts of long-term care, but also relate to the non-financial goals with which long-term care policies are usually concerned: Horizontal Target Efficiency (HTE) and Vertical Target Efficiency (VTE). The former relates to the extent that those in need are receiving appropriate care and can be seen as a measure of targeting or unmet needs. The latter refers to persons with equal care needs been provided with equal care (e.g. care of similar type or intensity).

Challis and his colleagues refer that VTE may provide a measure of the need to “better target appropriate populations to different forms of intervention” (p. 109). In the particular case of ICT, HTE may provide information on how appropriate is the targeting of the measure; while VTE may show how some groups of carers, for example, may be less able to benefit from ICT-based solutions, which in turn can be linked to specific barriers to the take-up or transferability of the initiative. Through these measures it will also be possible to assess the impact of ICT programmes on one of the key topics that Sorenson et al. (2008) and Huber et al. (2008) identified as a priority: equity, fairness and access to care.

According to RAND (2008), efficiency at this broader level is also very much concerned with the relationships between the several stakeholders operating in long-term care: “The test for social efficiency is whether imperfect relations between various entities lead to situations in which the value to be shared among entities is less than was possible” (p. 26). Efficiency and sustainability of care in relation to ICT measures may therefore also relate to the institutional features that could provide the ‘wrong’ incentives to providers, purchasers or consumers to produce or consume services beyond/below a societal optimal level, as it has been documented for health care (see Dranove & Satterthwaite, 2000). For example, the use of particular ICT tools may give some providers a dominant position (i.e. permit them to act as monopolists) and therefore allow for a price higher than the input costs to be charged.

Because one of the focuses of the ICT measures included in the present research is on informal carers, the efficiency and sustainability of care must also take into consideration the challenges involved in ‘valuing the invaluable’. While the topic of valuing informal care has drawn considerable attention (see Netten, 1990, van den Berg et al, 2006, Koopmanschap et al. 2008 just to cite a few) it has nevertheless failed to be included in most evaluations. Koopmanschap et al. 2008 provide a review of methods for valuing informal care, particularly time spent by informal carers, and although their review refers to healthcare it is easily and directly applicable to long-term care. The authors discuss in some details the characteristics and advantages and disadvantages associated with each of the seven methods surveyed, of which only a much summarised account is provided here:

- **Proxy Good Method (PGM):** a market value (usually the price of equivalent care services) is assigned to the tasks conducted by informal carers. Despite its simplicity, this method implicitly assumes perfect substitutability between the formal and informal care.
- **Opportunity Costs Method (OCM):** the market value assigned to informal care is that of an ‘average’ wage of the economy, which assumes that all informal carers could be employed and deals away with marginal valuation of hours of care (i.e. the first hour of care provided is assumed to be as satisfying as the $n$th hour).
- **Contingent Valuation Method (CVM):** calculates a measure of the ‘willingness to pay’ for the carer to reduce care-giving by one hour. It may however, prove different from the revealed preferences and difficult to avoid double-counting (carers may not be assessing only their individual willingness to pay, but also take into consideration the preferences of those to whom they provide care).
- **Conjoint Measurement (CM):** whereby carers are faced with alternative scenarios that they must value, which although it is cognitively demanding it may be less prone to strategic answers than the CVM.
- **Valuation of Health Effects (VHE):** whereby the impact of caregiving on health-related quality of life is analysed, although the causality effect may be hard to prove.
- **Valuation of Well-Being (VWB):** this is an extension of the VHE that takes into consideration other aspects of quality of life beyond health, for example by using CarerCol (Brouwer et al., 2006) or the Caregiver Quality of Life Instrument (Drummond et al., 1991).
- **Objective and Subjective Burden:** informal care is measured both in terms of time and tasks (objective burden) and how these are perceived by the carer, namely in terms of available support (subjective burden), although it may prove difficult to assign monetary values to these burdens.

Koopmanschap et al. (2008) warn against making any definitive statement about which method may be preferred, given that this is still a relatively recent area of research. Notwithstanding this, they do provide some guidelines as to the use of these different methods, namely on the preference for the use of CVM or CM in the context of cost-benefit analysis, or on the need of broader evaluation frameworks to accommodate for non-monetary valuation methods (such as VWB).

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**Summary**

**Definition of the sub-dimension**
The care efficiency and sustainability concerns both the economic sustainability of the initiative and the efficiency in terms of costs and quality of the final outcome.

**Evidence**
- Micro: care has an impact on the care recipient/carer financial resources and sustainability.
- Meso: care has an impact on the local care services in terms of costs, effectiveness, efficiency, and sustainability.
- Macro: care has an impact on the care and social protection systems in terms of costs and sustainability.

<table>
<thead>
<tr>
<th>Indicators chosen</th>
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<th>Relevance (high, medium, low)</th>
<th>Feasibility (high, medium, low)</th>
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</thead>
<tbody>
<tr>
<td><strong>Micro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.MI.1 Cost containment for care recipients and/or their families</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td><strong>Meso-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.ME.1 Cost effectiveness analysis</td>
<td>direct to local care provider,</td>
<td>high</td>
<td>medium</td>
</tr>
<tr>
<td>Category</td>
<td>Tool Description</td>
<td>Delivery</td>
<td>Utility</td>
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<tr>
<td>5.ME.2 Cost minimisation</td>
<td>direct to local</td>
<td>quant.</td>
<td>high</td>
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<tr>
<td>Macro-level</td>
<td></td>
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<tr>
<td>5.MA.1 Cost utility analysis</td>
<td>direct to local</td>
<td>quant.</td>
<td>high</td>
</tr>
<tr>
<td>5.MA.2 Cost benefit analysis</td>
<td>direct to local</td>
<td>quant.</td>
<td>high</td>
</tr>
<tr>
<td>5.MA.3 Return on investment</td>
<td>direct to local</td>
<td>quant.</td>
<td>high</td>
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</table>

### Main tools to adapt
6. Acceptability

Even if ICT services may be efficient and effective in improving carer condition, we should deal with their level of acceptability. The acceptability of the service concern many different aspects: at individual level, it deals with the usability of the ICT tool, the functions of the service (e.g. effectiveness and user satisfaction), its organisation (e.g. schedule), the training and support for using the ICT tool (e.g. maintenance) and the overall service (e.g. interaction with professionals).

As evidence shows (EUROFAMCARE 2006) “the paradoxical situation often exists where, despite considerable need for support, carers do not always make full use of the limited help available. This is because they frequently do not see such services as appropriate to their needs, or of acceptable quality”. Carers’ judgements concern of course the ‘costs and benefits’ of support: they reject help if the former outweigh the latter (Clarke 1999, Montgomery & Kosloski 2000). The main point is that (EUROFAMCARE 2006) “carers want to be reassured that those providing support are ‘up to the job’ (Brereton & Nolan 2003, Brereton 2005), and if formal carers do not have the requisite knowledge, skills and attributes then help will be unacceptable”. Unfortunately, services are often ‘disconnected’ and ‘distant’ (Wuest & Stern 2001) from the carers’ needs and expectations, ‘disintegrated’ rather than ‘integrated’ (Gilmour 2002). Acceptability is strictly connected with the quality of the personal relationship and rapport between professionals and carers (Scottish Executive 2005), as this determines whether carers have ‘confidence and trust’ in the individuals involved (Brereton & Nolan 2003, Brereton 2005). The acceptability of a initiative is also linked to other factors such as the organisation of the overall service. Nolan et al. (1996) argue that “the best services are those in which there are overt, planned and systematic attempts by service providers to complement carers’ efforts and to provide support that is sensitive and responsive to the caregiving dynamic and the ‘expert’ knowledge held by carers” (EUROFAMCARE 2006). Finally, there is a strong need by the carers to better understand which are the final goals of the service.

The adoption of an ICT-supported initiative by a carer deals with all these issues: if the service impact negatively on user’s factors, we can expect also a complete reject of the tool (Bronsan 1998) and a consequent abandoning and drop out from the initiative.

In particular, there is need to separate the acceptability of the support service on one hand, and of the one of the particular ICT tool on the other. The first type of acceptability deals with the overall service, including also aspects other than the ones related to ICT. Professionals’ behaviours, amenities of care, effectiveness of the service, cost containment, organisational aspects of the initiative are only few of the non-technological issues to be addressed in order to make the service acceptable for the final users. For instance, in their report on e-prescribing systems and electronic health records, Dobrev et al. (2008) refer to two additional factors that are likely to impact the adoption of e-health services, such as the organisational structure and culture, and the existing reimbursement schemes. Such initiative-related factors deeply influence the users’ acceptability of care services. This kind of acceptability can be measured in relation to many different aspects of social and health care services (e.g. EUROFAMCARE 2006; Challis et al. 2006).

This type of acceptance can be related also to the social influence to the users, as the one by opinion leaders and significant others. Environment and social relationships impact on the
process of accepting behavioural changes (in this case, towards from non-ICT to ICT-supported activities), even if people are not completely “obliged” by these boundaries. Psychological and practical factors remain the most responsible ones for the acceptance of a technology, especially in a context such as the caregiving one, in which the carer and the dependent older person are most interested in the effectiveness of the devices instead of the social representation connected to the use. In this case, the willingness to use (e.g. in relation to carers’ technological skills, perceived additional benefits or impact on the care burden) and user satisfaction (e.g. with technology characteristics, or with consultation through ICT in comparison with face to face consultations) are predominant factors (Hogenbirk et al. 2005), compared to lifestyle and social acceptance of technologies, which are just secondary factors.

For what concerns the second type of acceptability (the one strictly related to the ICT tools), we have to deal with the adoption of such innovations and related prerequisites (Rogers 2003), as well as the technology design, the training and on-going support issues, the social context of adoption, and the receptiveness of an individual.

In order to assess the acceptance by users of these technologies, there is need to focus on the preliminary steps of using the ICT tools. Assessment methodologies for accessibility and usability (as use-related factors), as well as for satisfaction and willingness to use (reinforcing factors), are available in literature in a fragmented way, investigating them from different perspectives: disciplines involved into this topic range from information systems to social psychology and organisational theories (Compeau & Higgins, 1995; Davis et al. 1989; Davis et al. 1992; Moore & Benbasat, 1991; Taylor & Todd 1995; Thompson et al., 1991; Venkatesh & Davis 2000; Venkatesh et al. 2003). In particular, research in this field focused mainly on two perspectives: one concerns the so-called social information processing model (SIPM), in which social constrains and relationships influence the adoption of new behaviours and attitudes towards technologies (Salancik & Pfeffer 1978); the other approach focuses on individual reception of technology in terms of usefulness and user-friendliness (Venkatesh et al. 2003).

In order to overcome a “normative” approach of ICT adoption by users (which is not coherent with our perspective), it should be stressed the importance of several factors at individual level facilitating or limiting the adoption of new devices. One of the most used approach is the Technology Acceptance Model (TAM), which has been developed with the aim of understand how users accept and use devices (Davies et al. 1989). In particular, two factors influence the adoption of a technology: the perceived usefulness, to be intended as the “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davies et al. 1989); the perceived ease-of-use, “the degree to which a person believes that using a particular system would be free from effort” (Davies et al. 1989). Further evolutions of the model have been developed, namely TAM 2 (Venkatesh 2000; Venkatesh & Davies 2000) and TAM 3 (Venkatesh & Bala 2008).

The Unified Theory of Acceptance and Use of Technology (UTAUT) is another model developed by Venkatesh et al. (2003). Its purpose is to integrate and unify eight different models from behavioural studies in order to reach a coherent framework to assess the intentions to use a technology device and associated behaviour. The theory deals with four key determinants of usage intention and behaviour: performance expectancy, effort
expectancy, social influence, and facilitating conditions. Some other factors mediate the influence of the determinants, like gender, age, experience, and voluntariness of use. UTAUT is based on the following theories and relative early adaptations to the context of information system usage: Theory of Reasoned Action (TRA) (Fishbein & Ajzen 1975; Davis et al. 1989), Technology Acceptance Model 2 (TAM 2) (Venkatesh & Davis 2000), Motivational Model (Vallerand 1997; Davis et al. 1992), Theory of Planned Behavior (TPB) (Ajzen 1991; Taylor & Todd 1995b), Combined TAM and TPB (C-TAM-TPB) (Taylor & Todd 1995a), Model of PC Utilization (MPCU) (Thompson et al. 1991), Innovation Diffusion Theory (IDT) (Rogers 2003), and Social Cognitive Theory (SCT) (Bandura 1986; Compeau & Higgins 1995).

The Model of Information Systems Success (DeLone & McLean 1992) explains the success of an information system through a multidimensional assessment instrument. The most updated version of the model (DeLone & McLean 2003) provides six dimensions: information, system and service quality, (intention to) use, user satisfaction, and net benefits. From DeLone and McLean's point of view, an information system may be evaluated through information, system, and service quality dimensions: these factors influence the successive (intention to) use and user satisfaction. The final output of using the system regards the benefits to the user. Even if the focus of the Model is on information systems, it could be applied also to technology devices in a broader sense, including ICT in contexts of caregiving.

The Accelerating Diffusion of Proven Technologies for Older Adults (ADOPT) Model deals with key factors affecting technology adoption (Wang et al. 2010). This includes three perspectives: older adults, with their cognitive and physical limitations, health status and disease conditions, and perceived usefulness of technology; collaborators, with relative access to technology, cultural and societal factors, and their presence; context, in relation to the relation between policy and technology (including reimbursement, interoperability and privacy considerations), as well as economic and other resources. ADOPT is partly based on Rogers’ Diffusion of Innovation Model (Rogers 2003) and Cain and Mittmann’s ten critical factors for diffusion (2002).

Concerning the issue about diffusion of technologies and their reception, the Diffusion of Innovations (DOI) Model (Rogers 2003) treats innovations as messages spread through communication channels over a specific time and within a determined social system. The willingness to adopt and use innovations differs within the same population: it is possible to divide it into five categories of target individuals with different behaviours in respect to adoption. These categories are: innovators, early adopters, early majority, late majority, laggards (Rogers 2003). The adoption of such innovation depends by five factors: relative advantage, compatibility, trialability, observability, and complexity (this latter is negatively correlated). However, other factors may influence the adoption process (e.g. the impact of a new technology on an old one with the same functions and target users).

Cain and Mittmann (2002) developed their 10 Critical Dynamics of Innovation Diffusion on the basis of DOI. These dynamics are: relative advantage; trialability; observability; communication channels; homophilous groups; pace of innovation/reinvention; norms, roles and social networks; opinion leaders; compatibility; infrastructure. The stages in
which the innovations are adopted are taken from Rogers (2003): knowledge; persuasion; decision; implementation; confirmation.

The Technology Profile Inventory is a concrete tool for measuring people’s attitudes towards computers and internet (DeYoung and Spence 2004). It is a 5-point Likert scale (from Strongly Disagree to Strongly Agree) that aims at assessing seven dimensions: interest; approval; confidence; anxiety; internet transactions; entertainment; complex design preference.

Many instruments have been developed in order to assess the acceptability of technologies by individuals. Most works focus on assistive technologies: literature about this field has been carried on in Western countries and has recently produced useful assessment tools (Lenker & Paquet 2003). Although they are originally planned for evaluating assistive devices, some of them present good chances to be adapted to the context of ICT.

One of the most used is the Quebec User Evaluation of Satisfaction with Assistive Technologies (QUEST) 2.0, which measures user satisfaction in relation to the service and the device itself (Demers et al. 2000, 2004). This tool comprehends assessment on two components, device and services and it is considered very easy for users to reply.

The Psychosocial Impact of Assistive Devices Scale (PIADS) measures the impact perceived by user on quality of life (Jutai & Dai 2004). Three dimensions are assessed: functional independence, well-being, and quality of life. It measures important variables like the clinical condition and functional features of the device, but also the perceived experiences of users. In these terms, the PIADS takes into account the psychosocial factors associated with the use of assistive technology.

Individual Prioritised Problem Assessment (IPPA) measures the effectiveness perceived by user in solving problems (Wessels et al. 2004). The IPPA score refers to the level of dependency of an individual as perceived. In order to evaluate the effectiveness of the device, the interview is repeated in a follow up (Wessels et al. 2000).

The Matching Persons and Technology tool has been developed with the aim to investigate the predisposition of users to an assistive technology, in order to (try to) predict if it will be abandoned or not (Scherer 1998; Scherer & Craddock 2004). This analysis is useful for understand the general acceptance of technology by users. The questionnaire has two parts: one to be filled in by the user, the other one by the interviewer. At the end, both of them will discuss the questionnaire results. In relation to the drop-out issue, also Chiu and Eysenbach (2010) make an analysis of the drop-out rate of carers and to what extent the take-up of the service by carers changed over time.

For what concerns the producers of ICT devices, the technology marketability should be also treated within this dimension. For instance, it is important to understand if skilled technical staff is easily available for installing the systems and what are the practical consequences of having a technical problem (can the problem be easily solved? By whom? etc.): if there is no “market” for a technology, it is hard to put pressure on users (micro-level) and providers (meso- and macro-level) for adopting it.

For care providers it is widely known that there is need for an assessment of services in terms of outcome, in particular for assistive technology provision (DeRutyer 1995; Gelderblom & DeWitte 2002; Heaton & Bamford 2001). However, the role of ICT in facilitating the provision and availability of care services has not been discussed in detail:
for instance, some barriers arise from the lack of interoperability between the systems used, and by the fragmentation of administrative responsibilities of health and social care systems in many countries (Empirica & WRC 2010). The issue of investments is crucial for improving the acceptability of ICT devices. Financial investments are often a barrier for the adoption of technologies in the health sector because of the limited resources available by the involved actors (users, care providers, care systems) (Poon et al. 2006). In this case, accessibility means low cost of ICT devices and possibility to have reimbursements and grants.

### Summary

**Definition of the sub-dimension**
The acceptability concerns the aspects making the initiative attractive towards the main actors at all levels. For the carers, it includes both external (e.g. organisation, effectiveness) and internal (e.g. satisfaction) factors.

**Evidence**
- Micro: the tool has an impact on carers’ adoption/rejection patterns in terms of satisfaction and willingness to use.
- Meso: the tool has an impact on ICT companies and local care providers in terms of a large-scale production and of a broader access to target users.
- Macro: the tool has an impact on/is influenced by the public investments in that field.

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Micro-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.MI.1 Satisfaction of users</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>6.MI.2 Willingness to use the ICT tool</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td>6.MI.3 Drop-out rate</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
</tr>
<tr>
<td><strong>Meso-level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.ME.1 Market opportunities for ICT producers</td>
<td>direct to ICT companies, quant.</td>
<td>high</td>
<td>medium</td>
</tr>
<tr>
<td>6.ME.2 Facilitating provision of care services</td>
<td>direct to local care provider, quant.</td>
<td>high</td>
<td>medium</td>
</tr>
<tr>
<td><strong>Macro-level</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>6.MA.1 Public investments on ICT tools</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
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**Main tools to adapt**
7. Infrastructure & Accessibility

For users, access to care services is an important issue. This is a prerequisite for the use of ICT tools and services provided that concerns also the infrastructure dimension. For instance, in countries where the digital divide is still evident, the access to internet or telecommunication is poor: this fact should be taken into account during the planning phase of ICT-supported initiatives.

Moreover, digital divide does not refer only to a geographical gap, but also to a literacy or skill gap: some groups of people (e.g. older people) may be not familiar with new technologies. They should be put in condition to improve their knowledge and competences in order to use efficiently the ICT devices (Junge & Hadjivassiliou 2007).

ICT tools may have an impact on accessibility to care services. In fact, such technologies allow the users to access to services overcoming barriers related to place and time of provision and demand.

For what concerns users’ digital skills, many studies have been conducted on ICT literacy and relative development of assessment tools. The study COMPEd tested a questionnaire (30 multiple choices) in order to measure computer related knowledge, skills, and insights in different countries (Collis & Anderson 1994). The questionnaire is divided into three parts: computers as part of information technology (general knowledge on computers); applications (functions and possible uses of computer); user strategies (digital skills). Some studies have had adults or older people as primary target of the research (e.g. Oderkirk 1996).

For what concerns the access to services, the Behavioral Model for Health Services Utilisation (BMHSU) is useful to understand the enabling factors (community and personal ones) and perceived needs (that actually trigger service utilisation) related to the use of care services by users (Andersen 1995, 2008). It states the importance of population characteristics, healthcare system, and external environment in predicting health behaviours.

The Strategic Niche Management (SNM) approach has been developed in order to facilitate the diffusion of socio-technical experiments through the support of relevant stakeholders (Kemp et al. 1998, 2001; Elzen et al. 2004). Its aim is to stimulate sharing of knowledge between involved actors and make sure that the new technology will be sustainable at social and institutional level.

Technology companies that produces ICT devices to be used in such contexts can fail in the market if their product is not carried on by a sustainable business model: for instance, in personal health record (PHR) diffusion, there is lack of a proven business, beyond the undoubtful benefits of the technology (Tang et al. 2006). In this regard, the Diffusion of Innovation (DOI) Theory explains that a strong business model should be supported by different means (reimbursements, grants, partnerships) in order to survive and penetrate into the market (Rogers 2003). Also the efforts for improving quality of product (e.g. user-friendliness) should be part of a coherent business strategy.

It is important to consider also the assessment of the integration with other established services (health or long-term care), as ICT initiatives many times start as pilot-programmes and their integration (or lack of) with mainstream services could diminish their scalability.
(Hogenbirk et al. 2005). Some authors also mention the importance of “technology champions” (Wang et al. 2010).

**Summary**

**Definition of the sub-dimension**
The infrastructure and accessibility concerns the impact of infrastructure facilities on the access by the users to the ICT-supported services.

**Evidence**
- Micro: familiarity of users with the ICT tool is required to use it.
- Meso: possibility for an ICT tool to be adopted in a specific local context.
- Macro: availability of the ICT tool and related prerequisites at national level.

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td><strong>Micro-level</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7.MI.1 Level of digital skills and competencies required</td>
<td>direct to carers, quant.</td>
<td>high</td>
<td>high</td>
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<tr>
<td><strong>Meso-level</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7.ME.1 Availability of ICT tools within local communities</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
</tr>
<tr>
<td>7.ME.2 Availability of skilled carers in ICT use within local communities</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
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<tr>
<td><strong>Macro-level</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7.MA.1 Availability of ICT tools at national level</td>
<td>indirect, quant.</td>
<td>high</td>
<td>medium</td>
</tr>
<tr>
<td>7.MA.2 Availability of skilled carers in ICT use at national level</td>
<td>indirect, quant.</td>
<td>high</td>
<td>low</td>
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**Main tools to adapt**
3. Impact Assessment Methodology: a prototype

Introduction
The prototype of Impact Assessment Methodology (IAM) presented here includes a series of indicators that have been selected among a range of standardised and validated published instruments, which may need some kind of adaptation to the specific peculiarities of the ICT-based initiatives for carers. This objective has been achieved by means of a literature review on the seven dimensions of impact (see previous chapter) identified by the conceptual framework underpinning the project (see first chapter). Through this process, a primary methodology of data collection has been proposed for each indicator, on the basis of available tools, by selecting and adapting quantitative or qualitative items, for which detailed references are reported (more details on data collection methodology in chapter 4, “Guideline for practitioners”).

The IAM developed should be considered as the first attempt to create an impact assessment tool in the field of home care in Europe. Such prototype will be the basis for future developments of the IAM (see chapter 5, “Recommendations for the methodological framework”).

What is provided in the next pages is the IAM as it has been developed by the project consortium and validated during the Experts’ Validation Workshop held in Brussels on 21-22 June 2011 (for more information, see Annexes). The meeting has been attended by 22 external experts (from EU and North America) who discussed and validated preliminary results of the project, including the IAM, elaborating also recommendations for future improvements (see chapter 5). Moreover, the IAM was discussed again in the Policy Makers’ and Experts’ Validation Workshop held in Brussels on 21-22 November, leading to some more recommendations for further developments (see chapter 5).

Methodology
According to the conceptual framework developed so far, seven different dimensions have been identified to be assessed in the context of an ICT-supported initiative to carers. These seven dimensions have been deeply investigated through a comprehensive literature review that has summarised the results in the different scientific fields (see previous chapter). Each dimension has been further developed in order to find out:
• the most useful *indicators* that allow to determine the main aspects of dimensions with standardised definitions (explaining exactly what is being measured);
• the most useful *tools* that allow to assess each indicator, to be intended as the specific quantitative or qualitative items/questions to be administrated to interviewed people, or the related formula which enables the calculation of the indicator itself.

The overall aim is to investigate the impact of ICT-based initiatives on micro, meso, and macro level of societies. Each level deals with different kind of information and related methodologies of collection.

Research design at micro-level can be based on *randomised controlled trials* with one experimental group and one control group (receiving no interventions). If possible, the ICT variable can be isolated through multiple treatment groups: one group receiving the whole support (ICT+non-ICT features); one group only the non-ICT features; one group no intervention. If randomised trials are not possible, an alternative can be the *within-subjects design* (repeated-measures design) where the same subjects are treated with different interventions in different times. Another alternative can be the *interrupted time series design* in which data are collected at multiple instances over time before and after the ICT-based initiative. In any case, each group should count on at least 20 participants in order to have a sufficient amount of data on the impact of initiatives; best methodology deals with both pretest and posttest, as well as follow-up. Such designs allow to understand both global and individual (i.e. longitudinal) trends.

In some cases, meso-level indicators refer to individual data collected through these designs and cumulated within a single organisation (e.g. company) or a local community. In others, information on initiatives is required in order to calculate related formulas (e.g. dimension 5): such information can be provided by initiative coordinators through qualitative interviews. Other sources can provide information for what concerns some meso and macro level indicators, like national surveys and censuses (e.g. availability of internet access points).

For more information on the methodological issues concerning the application of the IAM, see chapter 4 that includes guidelines for adapting and using it.

**Level of impact**

The information drawn from the micro level analysis (on how caring affects their health and propensity to work) can be used to make projections and predictions on the potential long-term benefits ICT initiatives can have on the labour market and the burden to the social and health system. The conceptual framework tries to take into account these different perspectives by looking at the various actors by sub-dimension. The indicators have been separated by dimension (at the micro, meso and macro level) and by actor (the carer, care recipient, provider) in order to obtain a complete pictures of their preferences. Clearly one cannot only take into account the quality of life of the carer (or care recipient) without also considering the budgetary consequences this might have on the social/health system. Similarly one cannot only take into account the provider’s perspective without
seeing how this will affect the carer’s quality of life and in turn his health. One of the challenges is to measure the length and quality of life both of the carer and the care recipient, as there is resistance to measure the latter in monetary terms. However one way around this methodological challenge is to look at the benefit in terms of his/her capacity to choose the allocation of time, whether this be in more time for work and/or engaging in leisure activities. Such micro level data can help to channel such preferences into the policymakers’ macroeconomic perspective. Indeed the case of the UK illustrates that though “there are likely to be considerable costs if local authorities are to intervene systematically to sustain carers in employment by providing services to cared-for people, (...) there could also be wider financial gains, for instance through reduced claims for Carers’ Allowance, lower NHS expenditure on carers’ health and higher tax and national insurance contributions from carers in employment” (Pickard 2011). Thus although there might be considerable costs if the government was to invest huge resources in providing ICT-based support services to carers and their recipients, there might be longer-term savings in another area of the “public sector, for example from reduced benefits claims and improved carers’ health” (Pickard 2011).

**Lessons drawn for policy makers**

One of the challenges for policymakers is how to balance these trade-offs, particularly in times of financial strain. One way is through a cost-benefit analysis where it is up to policymakers to put the weight on the different variables which includes:

- quality of life of the carer;
- accessibility to the ICT service;
- quality and efficiency of care;
- cost to the health and social systems (for e.g. savings through less illness of carers and less need for care recipients to be hospitalised/taken into care homes but a higher cost due to investment in ICT initiatives as well as potential training costs);
- high tax income through more employment of carers (and possibly job creation of formal carers).

Further added to this complexity are the cultural variations in preferences across countries, whereby in some countries there is a preference for the care recipient having more autonomy from the carer (see Eurobarometer Survey Question 19:1, 2008) which might induce a preference for investing in certain types of ICT. In other countries ICT initiatives might be better to ensure that there is close proximity with the carer where emotional support is a priority. Decision makers would use the information provided in the table below (used as an example) to make decisions or, if desired, they could also use monetary valuation or discrete choice experiments to obtain utility values for the different elements. “The relative efficiency of different options would depend on the implicit or explicit values attached by decision makers to the different elements of cost and outcome.” (Coast 2004).
Simplified cost-consequence analysis of hospital at home care:

<table>
<thead>
<tr>
<th></th>
<th>NHS cost/patient (£)</th>
<th>Patient and carer cost/patient (£)</th>
<th>Mortality 6%</th>
<th>Mortality Mean (SD) score on social activities scale*</th>
<th>Mortality Mean (SD) score on physical functioning scale</th>
<th>Mortality Patient satisfaction</th>
<th>Mortality Carer satisfaction</th>
<th>Mortality Mean (SD) score for carer burden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital</td>
<td>2000</td>
<td>50</td>
<td>6%</td>
<td>-1.5 (3.2)</td>
<td>1.9 (3.7)</td>
<td>Significant differences in only one of seven questions (privacy); wide confidence intervals</td>
<td>Significant differences in only one of four dimensions (discussions with staff); wide confidence intervals</td>
<td>-3 (2.1)</td>
</tr>
<tr>
<td>Hospital at home</td>
<td>3200</td>
<td>130</td>
<td>6%</td>
<td>2.6 (5.8)</td>
<td>2.6 (4.2)</td>
<td>-1 (3.2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NB: A negative value indicates a decrease in activity, functioning, or burden.

One could easily adapt this table to look at how ICT-based initiatives at home compare in relation to hospitalization of the care recipient, or home care with no support (i.e. the carer being full time in the home of the care recipient).

**Limitations**

There are several methodological limitations to be considered for the principle reason that carers are only starting to be considered at national level, appearing in national surveys such as for example the National Censuses in the UK and Ireland. This general lack of secondary data limits the possibility to use wide data. In this sense, macro-level indicators can be thought mainly as a prediction on a large scale of the results at micro- and meso-levels.

In addition, there can be a lack of time and resources for applying the methodology in small or medium initiatives: validity of the evaluation process may be compromised if the research design is not taken under control.
Notes

In the next sections, indicators are explained in each dimension with related assessment tools chosen. Each indicator is identified by an univocal code, built as follows:

- first number is related to the number of the dimension (possible values: 1-7);
- possible second number is related to the number of the sub-dimension: it concerns only the first dimension (possible values: 1-3);
- letters are related to the level of analysis – micro-, meso-, or macro-one (possible values: MI, ME, MA);
- third number is related to the consequential number of the indicator.

For instance, the indicator “Number of working hours” is included into the first dimension “Quality of Life of Informal Carer”, into the first sub-dimension “Reconciliation between Care and Work”, into the micro-level of analysis, and it is the first one in the list. Indeed, its code is 1.1.MI.1.

Another example: the indicator “Willingness to use ICT tools” is included into the sixth dimension “Acceptability”, into the micro-level of analysis, and it is the first one in the list. Its code is 6.MI.1 (please note that, without the sub-dimension number, the code is shorter than the previous).

Each indicator is presented in a box containing:

- Definition: the indicator is conceptualised and made operative;
- Role of ICT: it is explained why it is important to assess such indicator in the context of ICT-based solutions for carers;
- Method of collection: the type of measure (e.g. questionnaire to users, formula) and administration are indicated;
- Conceptual or methodological limitations: limits of the indicators are discussed;
- Sources: in this section there are the main references that can provide standardised measures for data collection.
1. Quality of Life of Informal Carer
1.1. Reconciliation between Care and Work

List of selected indicators for the sub-dimension:

- **Micro-level:**
  - 1.1.MI.1 Number of working hours
  - 1.1.MI.2 Possibility to continue or restart working
  - 1.1.MI.3 Income level
  - 1.1.MI.4 Efficiency in the workplace
  - 1.1.MI.5 Relationships with colleagues
  - 1.1.MI.6 Wellbeing at the workplace

- **Meso-level:**
  - 1.1.ME.1 Leaving work because of care
  - 1.1.ME.2 Reducing working hours
  - 1.1.ME.3 Not developing their career
  - 1.1.ME.4 Not attending training
  - 1.1.ME.5 Experiencing absenteeism, interruptions or other events
  - 1.1.ME.6 Negative relationships with colleagues
  - 1.1.ME.7 Experiencing stress or burden due to care-related issues

- **Macro-level:**
  - 1.1.MA.1 Work less to have more time for caring
  - 1.1.MA.2 Work or work more and reducing caring time
### 1.1.MI.1

**Number of Working hours**

<table>
<thead>
<tr>
<th>Definition:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of working hours can be calculated by comparing the hours worked before and after the ICT initiative was introduced to the carer, to see what impact it had on the carer's time allocation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role of ICT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combining paid employment with caring duties is a major challenge for many carers. ICT can play a critical role by allowing carers to reduce some of their tasks (for example installing a detector in case the older person falls, or leaves the house unexpectedly) which would otherwise have meant they must remain in the house of the care recipient. This can free up some of the time of the carer (as well as providing peace of mind) which can then increase the number of working hours in paid employment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method of collection:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measure: Direct question.</td>
</tr>
<tr>
<td>Administration: Self-administered questionnaire to carers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conceptual or methodological limitations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: EUROFAMCARE 2005.</td>
</tr>
</tbody>
</table>
**1.1.MI.2**

**Possibility to develop career and/or to attend training/studies**

**Definition:**
With regards to the development of the career, one objective would be to measure the propensity for the carer to be able to minimize his/her schedule changes which would allow him/her to take on more responsibility. One of the challenges carers are often faced with is the erratic schedule caused by unpredictable events (Yeandle et al., 2002). This could be a fall, a breakdown of the formal care arrangements, or a sudden worsening of the older person’s illness) which can also be a cause of stress and anxiety. One other indirect measure would be to examine which job the carer held before and after the qualification/training to see if it had any effect on his/her career development path. This has been referred to as ‘work accommodation’ (Stone and Short, 1990, cited in Arber and Ginn, 1995). This broad term can potentially cover a wide range of strategies for combining paid work with substantial caring duties. These responses include:

- changing to a less demanding job;
- moving close to the place of work;
- not applying for better jobs;
- becoming self-employed which can have more risk in terms of income flow.

**Role of ICT:**
ICT initiatives can support the carer to develop his career in several ways:

1. By allowing the carer to attend trainings/continuing education as ICT can increase the efficiency of certain care tasks;
2. By allowing the carer to have more peace of mind when he/she is at work, thus giving him/her more self-confidence that the carer can take on more demanding tasks/accept a promotion without the fear of letting down his/her colleagues;
3. By allowing the carer to be more mobile (certain ICT initiatives will reduce the number of interventions the carer needs to have in the home of the care recipient during the day) so that he/she can increase his/her geographical choice of career prospects that may be further away from the house of the care recipient.

**Method of collection:**
**Measure:** Direct question.

**Administration:** Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
4: Stone & Short 1990.
### 1.1.MI.3

**Possibility to continue or restart working**

**Definition:**
This indicator can measure the possibility of the carer to begin working again following a period where he/she could not leave the house without worrying about the wellbeing of the older person. With an initiative such as a smart house, one can measure the amount of hours the carer worked before and after the care recipient began living in an assisted living facility.

**Role of ICT:**
ICT initiatives can help the carer to either continue or restart working in the following ways:

1. By giving the carer peace of mind and thus giving him/her the self-confidence needed to leave the house with the care recipient unattended;
2. By allowing the carer to delegate certain tasks to ICT technology which lowers the burden of caring tasks, thus freeing up time which could be spent in employment;
3. ICT can offer the opportunity to the carer to further train/reorient his skills which can allow him/her to begin employment again in a new direction.

**Method of collection:**
*Measure:* Direct question.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
| 1.1.MI.4  
<table>
<thead>
<tr>
<th><strong>Income level</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition:</strong></td>
</tr>
<tr>
<td>One way to measure this indicator would be to look at the income level before and after the ICT initiative was introduced.</td>
</tr>
<tr>
<td><strong>Role of ICT:</strong></td>
</tr>
<tr>
<td>ICT can support the carer by freeing up some time which can then be allocated to the pursuit of income.</td>
</tr>
<tr>
<td><strong>Method of collection:</strong></td>
</tr>
<tr>
<td><strong>Measure:</strong> Direct question.</td>
</tr>
<tr>
<td><strong>Administration:</strong> Self-administered questionnaire to carers.</td>
</tr>
<tr>
<td><strong>Conceptual or methodological limitations:</strong></td>
</tr>
<tr>
<td>In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.</td>
</tr>
<tr>
<td><strong>Source:</strong></td>
</tr>
<tr>
<td>1: EUROFAMCARE 2005.</td>
</tr>
</tbody>
</table>
### 1.1.MI.5

**Efficiency in the workplace (care leaves, interruptions, absenteeism etc.)**

**Definition:**
One way to measure this indicator would be to look at the number of absences from work. (For example the carer having to take unpaid leave of absence to take care of his care recipient unexpectedly). This has been referred to as ‘work accommodation’ (Stone and Short, 1990, cited in Arber and Ginn, 1995). This broad term can potentially cover a wide range of strategies for combining paid work with substantial caring duties. These responses include:
- working different hours;
- using lunchtimes;
- taking time off work;
- using holiday entitlement;
- taking sick leave.

**Role of ICT:**
ICT can help to: (a) increase the efficiency in the workplace by reducing the stress level of the carer, giving him/her peace of mind that the care recipient is in a safe environment at home; (b) ICT can help to reduce interruptions in the workplace (e.g. phone calls from or about the older person, see Seddon et al., 2004); (c) ICT can increase efficiency by helping the carer get more rest during the night; and (d) ICT can reduce absenteeism if the carer is better able to manage the care situation at home and therefore does not have to take days off unexpectedly which could reduce the efficiency of paid employment.

**Method of collection:**
*Measure:* Direct question.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
4: Stone & Short 1990.
### 1.1.MI.6

**Relationships with colleagues**

**Definition:**
One way to measure this indicator is to look at the Sense of belonging of the carer in the organisation/company he/she works for.

**Role of ICT:**
ICT can help: (a) to improve relationships with colleagues if the carer feels that he can be more reliable and therefore requires less flexible arrangements, as many carers believe that working flexible hours can cause ill-feeling among fellow workers (Seddon et al. 2004); (b) ICT can also allow more free time to the carer who can then socialise more with the colleagues after work and therefore reduce the risk of social exclusion; and (c) ICT can also support the relationship with colleagues by reducing the stress levels of the carer thus reducing the potential for irritability/negative work atmosphere.

**Method of collection:**
*Measure:* Direct question.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Nolan et al. 2006.
### 1.1.MI.7

**Wellbeing at the workplace (anxiety, stress, depression etc.).**

<table>
<thead>
<tr>
<th>Definition:</th>
<th>One way to measure the indicator could be to look at the number of days of sick leave due to stress-related illnesses, and/or to look at the number of days of sickness presenteeism.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role of ICT:</td>
<td>ICT can help: (a) to increase the wellbeing in the workplace by reducing the stress level of the carer, giving him/her peace of mind that the care recipient is in a safe environment at home; (b) to improve the wellbeing at the workplace; and (c) to reduce the risk of depression if it allows the carer to remain in/take up employment, thus reducing the risk of the carer being in an isolated environment. Working can enable carers to avoid social isolation or exclusion (Becker, 2000).</td>
</tr>
<tr>
<td>Conceptual or methodological limitations:</td>
<td>It might be difficult to attribute the illnesses such as depression only to the caring role and therefore even if the ICT initiative can have a positive impact it might not be the main cause behind it.</td>
</tr>
</tbody>
</table>
1.1.ME.1
Leaving work because of care

**Definition:**
One way to measure this indicator could be to look at exit interviews and to see how many carers actually leave their employment because the burden of caring and working is too high.

**Role of ICT:**
1. Can help prevent employees from leaving their employment as ICT can support carers by making the home a safer environment where carers can have peace of mind
2. ICT can also increase efficiency of certain care tasks and therefore allow the carer to remain in paid employment.

**Method of collection:**
*Measure:* Direct question. Collect the answers (items n. 1) from all the interviewed within the initiative and elaborate the rates of people who leaved the work because of the burden before to begin the initiative and of people who continued to work. Then, collect the answers (items n. 2) after the initiative or in intermediate times and elaborate the rates of people who continued to do not work and of people who started or restarted working.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Nolan et al. 2006.
### 1.1.ME.2
Reducing working hours

**Definition:**
One way to measure this indicator could be to see how many carers reduced their working hours as a result of a high caring burden.

**Role of ICT:**
Combining paid employment with caring duties is a major challenge for many carers. ICT can play a critical role by allowing carers to reduce some of their tasks (for example installing a detector in case the older person falls, or leaves the house unexpectedly) which would otherwise have meant they must remain in the house of the care recipient. This can free up some of the time of the carer (as well as providing peace of mind) which can then increase the number of working hours in paid employment.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers with caring burden-related reduced working time on the carers who reduced working time: (n. of carers with caring burden-related reduced working time / n. of carers with reduced working time) * 100.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
### 1.1.ME.3

**Not developing their career**

**Definition:**
One way to measure this dimension could be to analyse the number of promotions taken by the carers before and after the ICT initiative was introduced.

**Role of ICT:**
ICT initiatives can support the employer to develop the career of the carer in several ways:

1. By allowing the carer the time/peace of mind to attend trainings/continuing education as ICT can increase the efficiency of certain care tasks;
2. By allowing the carer to have peace of mind when he/she is at work, thus giving him/her more self-confidence to take on more demanding tasks/accept a promotion without the fear of letting down his/her peers/supervisor;
3. By allowing the carer to be more mobile and travel more for work (certain ICT initiatives will reduce the number of interventions the carer needs to have in the home of the care recipient during the day).

**Method of collection:**

**Measure:** Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers who had promotions on the carers who were involved into the initiative: (n. of carers who had promotions / n. of carers involved) * 100.

**Administration:** Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
### Not attending training

**Definition:**
This dimension will measure the number of carers who attended trainings before and after the ICT initiative.

**Role of ICT:**
1. Trainings can improve the employee's performance and self-esteem if he/she feels that he is being appreciated and valued at work;
2. Attending trainings/team building events can also reduce potential turnover if the carer/employer feels he is part of the team/organisation. ICT can support the carer by allowing him/her more flexibility to attend such workshops.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers who were able to attend training courses on the carers who were involved into the initiative; (n. of carers who attended training courses / n. of carers involved) * 100.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
### 1.1.ME.5

**Experiencing absenteeism, interruptions or other events affecting efficiency**

<table>
<thead>
<tr>
<th>Definition:</th>
</tr>
</thead>
<tbody>
<tr>
<td>One way to measure this indicator could be to look at the number of carers who are experiencing absenteeism, interruptions or other events affecting efficiency before and after the ICT initiative was introduced. A review by Phillips (1995) noted the lack of energy at work, making mistakes due to tiredness, taking long lunch breaks (or having to use the lunch break to catch up on work), re-arranging work schedules, declining to go on training courses. All of these problems have hidden costs for employers (Arksey, 2002; Phillips, 1995).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role of ICT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ICT initiatives can support the carer by creating a safe environment for the care recipient at home so that unnecessary check-ups and interruptions can be greatly reduced/avoided</td>
</tr>
<tr>
<td>2. Efficiency can also be improved at work if the ICT initiative helps the carer to sleep better at night and to feel less anxious when he/she is at home.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method of collection:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure:</strong> Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers who experience absenteeism because of caring-related situation on the carers who were involved into the initiative: (n. of carers who experience absenteeism because of caring-related situation / n. of carers involved) * 100.</td>
</tr>
</tbody>
</table>

| **Administration:** Self-administered questionnaire to carers. |

<table>
<thead>
<tr>
<th>Conceptual or methodological limitations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source:</th>
</tr>
</thead>
</table>
# 1.1.ME.6

## Negative/positive relationships with colleagues

### Definition of the dimension:

A better work atmosphere is always more conducive to productive work and will therefore be encouraged by employers.

### Role of ICT:

1. ICT can help to improve relationships with colleagues if the carer feels that he can be more reliable and therefore requires less flexible arrangements. Many carers believe that working flexible hours can cause ill-feeling among fellow workers (Seddon et al., 2004);
2. ICT can also allow more free time to the carer who can then socialise more with the colleagues after work and thus reduce the risk of social exclusion;
3. ICT can also support the relationship with colleagues by reducing the stress levels of the carer thus reducing the potential for irritability/negative work atmosphere.

### Method of collection:

**Measure:** Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers who experienced worst relationships with colleagues on the carers who were involved into the initiative: (n. of carers who experienced worst relationships with colleagues / n. of carers involved) * 100.

**Administration:** Self-administered questionnaire to carers.

### Conceptual or methodological limitations:

The negative/positive relationships with colleagues might not be only linked with the introduction of the ICT initiative so it might be conceptually difficult to see the effect.

### Source:

## 1.1.ME.7

**Experiencing stress or burden due to care-related issues**

<table>
<thead>
<tr>
<th>Definition:</th>
</tr>
</thead>
<tbody>
<tr>
<td>A better work atmosphere is always more conducive to productive work and will therefore be encouraged by employers. Stress will tend to reduce efficiency at work so employers will look to measure how the ICT initiative can reduce care-related stress.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role of ICT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT can help to reduce the stress level of the carer, which is good for the employer as it reduces potential turnover (carers who quit if the burden gets too high), and improves efficiency at work as stress can reduce concentration and cause absenteeism/sickness presenteeism due to stress-related illnesses etc.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method of collection:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure:</strong> Direct question.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Administration:</th>
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</thead>
<tbody>
<tr>
<td>Self-administered questionnaire to carers.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Conceptual or methodological limitations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The negative/positive relationships with colleagues might not be only linked with the introduction of the ICT initiative so it might be conceptually difficult to see the effect.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Source:</th>
</tr>
</thead>
</table>
### 1.1.MA.1

**Work less to have more time for caring**

**Definition:**
One way would be to look at the number of carers which have had to reduce their working hours in order to care, which would be looking at part-time work. If possible in national surveys, one could look at the trend in the share of employed carers before and after ICT initiatives were installed in the respective countries. The gender issue is of particular relevance as employment rates of women who are also carers are much lower.

**Role of ICT:**
ICT can help carers who have had to reduce their working time in order to care more by making the home a safer place, and/or by giving them peace of mind with technology which can improve communication flows between the carer and care recipient.

**Method of collection:**
National surveys can provide data on the number of workers who also have to care for a dependent older person. Through adequate proportions, make estimations at national level on the possible increase/decrease of the number of workers who care because of the initiative (in order to understand it's possible impact on the workforce on a large scale).

**Conceptual or methodological limitations:**
There is need for information at national level on the numbers of carers who are employed: data may be fragmented and/or not easily available.

**Source:**
### 1.1.MA.2

**Work or work more (and reduce caring time)**

<table>
<thead>
<tr>
<th><strong>Definition:</strong></th>
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</thead>
<tbody>
<tr>
<td>One way would be to look at the number of carers which have increased their working hours, which would be looking at those going from part-time to full-time work. If possible in national surveys, one could look at the trend in the share of employed carers before and after ICT initiatives were installed in the respective countries. The gender issue is of particular relevance as employment rates of women who are also carers are much lower.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Role of ICT:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT can help carers work more by making the home a safer place, and/or by giving them peace of mind with technology which can improve communication flows between the carer and care recipient.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Method of collection:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>National surveys can provide data on the number of workers who also have to care for a dependent older person. Through adequate proportions, make estimations at the national level on the possible increase/decrease of the working time of carers because of the ICT initiative (in order to understand its possible impact on the workforce on a large scale).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Conceptual or methodological limitations:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>There is need for information at national level on the numbers of carers who are employed: data may be fragmented and/or not easily available.</td>
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</table>

<table>
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<tr>
<th><strong>Source:</strong></th>
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</table>
1. Quality of Life of Informal Carer
1.2. Social Life

List of selected indicators for the sub-dimension:

- **Micro-level:**
  - 1.2.MI.1 More/less time for maintaining existing social networks and contacts
  - 1.2.MI.2 More time to maintain quality relationships with family, friends, peers, and/or work colleagues
  - 1.2.MI.3 More/less time to receive different types of support (emotional, physical, and financial as well as feedback).

- **Meso-level:**
  - 1.2.ME.1 Reduced number of contacts made with local social services due to family conflicts
  - 1.2.ME.2 Increased number of carers reporting enhanced relationships with the older person and extending and strengthening informal support networks
  - 1.2.ME.3 Increased number of carers being able to take part in various activities in their local community, with their peer groups and/or voluntary organisations.

- **Macro-level:**
  - 1.2.MA.1 More activity on internet fora;
  - 1.2.MA.2 Participation in a greater number of social activities including membership to leisure activities/hobbies/civic engagements
### 1.2.MI.1

**More/less time for maintaining existing social networks and contacts**

**Definition:**
The issue to measure is whether the carer is able to maintain existing networks and/or develop new informal support networks as a result of the ICT intervention as we know that carers often quickly become isolated and lose their existing networks and ICT has the potential to provide them with new peer support networks.

**Role of ICT:**
ICT can facilitate the communication for the carer who has very little free time to remain in touch with former colleagues/peers/relatives who may not be in geographical proximity. Even if they are in geographical proximity the carer might not have time to get out of the house very often to meet with friends so ICT initiatives can provide him with additional fora to do so. ICT initiatives can also free up some time for the carer/increase the independence of the care recipient, so the carer who would then have more time to enjoy leisure activities.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers who experienced isolation on the carers who were involved into the initiative: \( \frac{n. \text{ of carers who experienced isolation}}{n. \text{ of carers involved}} \times 100. \)

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
### 1.2.MI.2

**More time to maintain quality relationships with family, friends, peers, and/or work colleagues**

<table>
<thead>
<tr>
<th>Definition:</th>
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<tbody>
<tr>
<td>The issue to measure is whether the carer is able to maintain existing relationships with family, friends, peers, and/or work colleagues and/or develop new relationships as a result of the ICT intervention as we know that carers often quickly become isolated and lose their existing networks and ICT has the potential to provide them with new peer support networks.</td>
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<table>
<thead>
<tr>
<th>Role of ICT:</th>
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<tbody>
<tr>
<td>ICT can support the carer who has very little free time to maintain quality relationships (particularly those that allow visual and audio contact) with former colleagues/peers/relatives who may not be in geographical proximity.</td>
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<table>
<thead>
<tr>
<th>Method of collection:</th>
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</thead>
<tbody>
<tr>
<td><strong>Measure:</strong> Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers who maintained quality social relationships on the carers who were involved into the initiative: (n. of carers who maintained quality social / n. of carers involved) * 100.</td>
</tr>
</tbody>
</table>

**Administration:** Self-administered questionnaire to carers.

<table>
<thead>
<tr>
<th>Conceptual or methodological limitations:</th>
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<tbody>
<tr>
<td>In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.</td>
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<tr>
<th>Source:</th>
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</table>
### 1.2.MI.3

**More/less time to receive different types of support**

**Definition:**
The issue to measure is whether the carer is able to maintain existing relationships with family, friends, peers, and/or work colleagues and/or develop new relationships as a result of the ICT intervention. As we know carers often quickly become isolated and lose their existing networks and ICT has the potential to provide them with new peer support networks.

**Role of ICT:**
1. ICT can support the carer to get additional types of support (emotional such as through carers’ fora) which he/she can get from the comfort of his/her own home;
2. ICT can support the carer to receive information on which financial benefits/services the carer is entitled to including the support from professional care services;
3. ICT initiatives may give the carer time for reflection in order to pursue a social security claim.

**Method of collection:**

**Measure:** Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers who gained time for receiving more support on the carers who were involved into the initiative: \((\text{n. of carers who gained time for receiving more support} / \text{n. of carers involved}) \times 100\).

**Administration:** Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
### 1.2.ME.1

**Reduced number of contacts made with local social services due to family conflicts**

**Definition:**
One way to measure this indicator is to see how many contacts were made by carers to local social services before and after the ICT initiative was introduced in the family.

**Role of ICT:**
1. ICT can support the carer by freeing up some of his/her time so that the carer can spend more quality time with his/her family, particularly the *sandwiched generation*;
2. ICT can support the carer by reducing the stress level caused by certain caring tasks, which can in turn positively affect the family atmosphere in the home, particularly if the care recipient is residing in the home of the carer.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of reduced contacts with local social services (n. of contacts after the initiative / n. of contacts before the initiative) * 100.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
<table>
<thead>
<tr>
<th>1.2.ME.2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Increased number of carers reporting enhanced relationships with the older person and extending and strengthening informal support networks</strong></td>
</tr>
</tbody>
</table>

**Definition:**
One way to measure this indicator is to assess to what extent the relationship has improved between the carer and the care recipient as a result of the introduction of the ICT initiative.

**Role of ICT:**
1. ICT can support the carer and carer by freeing up some of his/her time so that the carer can focus more time on emotional support to the care recipient which can be more satisfying for both;
2. ICT initiatives can reduce the dependency between the care recipient and the carer, so this can in turn put less pressure on the relationship;
3. ICT can support the carer by reducing the stress level caused by certain caring tasks, which can in turn positively affect the relationship between the carer and the care recipient.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Nolan et al. 2006.
### 1.2.ME.3

**Increased number of carers being able to take part in various activities in their local community, with their peer groups and/or voluntary organisations**

**Definition:**
One way to measure this indicator is to look at the number of carers who have been able to sign up for various activities in their local community before and after the ICT initiative was set up.

**Role of ICT:**
1. ICT can support the carer and carer by freeing up some of his/her time so that the carer can focus more time on emotional support to the care recipient which can be more satisfying/quality time for both;
2. ICT initiatives can reduce the dependency between the care recipient and the carer, so this can in turn allow the carer to allocate more time for leisure activities.

**Method of collection:**
**Measure:** Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers who take part in community life on the carers who were involved into the initiative (n. of carers who take part in community life / n. of carers involved) * 100.

**Administration:** Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
### 1.2.MA.1

#### More activity on internet fora

**Definition:**
One way to measure if the carer’s social participation has increased is to look at the number of carers who have registered on social platforms before and after the ICT initiative was introduced.

**Role of ICT:**
ICT can increase social participation of carers by allowing them to join various internet platforms and other social arenas within the comfort of their own home. ICT initiatives can also encourage meetings in ‘real space’ for people who share similar interests to them.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins. It is possible to calculate the percentage of carers who take part in virtual communities on the carers who were involved into the initiative (n. of carers who take part in community life / n. of carers involved) * 100.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
1.2.MA.2

Participation in a greater number of social activities including membership to leisure activities/hobbies/civic engagements...

<table>
<thead>
<tr>
<th>Definition:</th>
</tr>
</thead>
<tbody>
<tr>
<td>One way to measure if the carer’s social participation has increased is to look at the number of carers who have registered for social activities before and after the ICT initiative was introduced.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role of ICT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT can increase the social participation of carers by freeing up some of their time and therefore allowing them to spend more time in leisure activities of their choice.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method of collection:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measure:</strong> Direct question to ask before and after the initiative begins. Basing on national surveys, it is possible to make estimations of the number of carers involved in social activities at national level and possible effects of the initiative on a large scale.</td>
</tr>
<tr>
<td><strong>Administration:</strong> Self-administered questionnaire to carers.</td>
</tr>
</tbody>
</table>

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<td>In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.</td>
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<tr>
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<tbody>
<tr>
<td>1: EUROFAMCARE 2005.</td>
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</table>
1. Quality of Life of Informal Carer

1.3. Health-related Quality of Life

List of selected indicators for the sub-dimension:

- **Micro-level:**
  - 1.3.MI.1 How the use of ICT can improve their physical abilities, including the ability for their own activities of daily living (particularly for older carers regarding mobility);
  - 1.3.MI.2 How it affects their mental health/psychological wellbeing and related coping strategies
  - 1.3.MI.3 How it affects their personal identity;
  - 1.3.MI.4 How it affects their pain-discomfort;
  - 1.3.MI.5 How it improves/reduces their energy/fatigue.
  - 1.3.MI.6 Possibility to adapt the home of the carer/care recipient

- **Meso-level:**
  - 1.3.ME.1 Better performance/efficiency in the workplace (less difficulty to concentrate on tasks);
  - 1.3.ME.2 Better relationships with other family members (more time for leisure activities).

- **Macro-level:**
  - 1.3.MA.1 More efficient workforce for the whole economy who report less days off work;
  - 1.3.MA.2 Healthier workforce requiring less attention from the social and health sectors.
### 1.3.MI.1

<table>
<thead>
<tr>
<th>How the use of ICT can improve their physical abilities, including the ability for their own activities of daily living (particularly relevant for older carers)</th>
</tr>
</thead>
</table>

**Definition:**

One way to measure this indicator is to assess the carer’s ability to perform Activities of Daily Living before and after the ICT initiative was introduced, which will be relevant particularly for older carers who may themselves suffer from physical and or emotional frailty.

**Role of ICT:**

1. ICT can improve the physical abilities of the carer through information gained, as well as carers’ fora which provide advice/feedback/best practice on caring practices (for example how to carry the older person without harming him/herself)
2. ICT can free up time for the carer who can then use this time for health promotion activities including medical check-ups etc.

**Method of collection:**

*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**

In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**

### 1.3.MI.2

**How it affects their mental health/psychological wellbeing and related coping strategies**

#### Definition:
This dimension tries to capture how an ICT initiative can help improve the mental health of the carer, as well as improve coping strategies caused by the high burden of caring.

#### Role of ICT:
1. ICT can improve the mental health of the carer through information gained, as well as carers’ fora which provide advice/feedback/best practice on coping strategies.
2. ICT can free up time for the carer who can then use this time for health promotion activities as well as coping strategies including medical check-ups etc.

#### Method of collection:
**Measure:** Direct question to ask before and after the initiative begins.

**Administration:** Self-administered questionnaire to carers.

#### Conceptual or methodological limitations:
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

#### Source:
1.3.MI.3
How it affects their personal identity

**Definition:**
This dimension examines the fact that many carers do not become carers by choice. They are often confronted with the situation of ‘if not me then who?’. ICT initiatives can support them into entering their caring role, not from the point of view of their new caring responsibilities, but rather how to embrace their new role/identity.

**Role of ICT:**
1. ICT initiatives (such as ‘Helping you to care’) can improve the personal identity of the person as a carer, whereby the initiative focuses on information, education and support perceived by the carer to help him/her feel more confident and secure in their caring role.
2. ICT initiatives can also help the carer with the dimensions of Preparedness, Enrichment and Predictability on how to enter the caring role.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Schumacher et al. 1998.
5: Department of Health 1999.
### 1.3.MI.4
**How it affects their pain/discomfort**

**Definition:**
This dimension will assess how much the pain/discomfort of the carer has changed since the ICT initiative was installed.

**Role of ICT:**
1. ICT can increase efficiency of certain tasks and therefore free up time for the carer to take care of his/her own health including pain management, which is particularly relevant for older carers who might find certain caring tasks a high burden on their physical health.
2. ICT initiatives can also be helpful to the carer by providing information on the best care practices which can reduce the risk of injury and therefore pain/discomfort.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
### 1.3. MI.5  
**How it improves/reduces their energy/fatigue**

**Definition:**
This dimension will assess how much the energy of the carer has changed since the ICT initiative was installed.

**Role of ICT:**
1. ICT initiatives can reduce some of the stress of caring which can therefore lead to lower levels of fatigue;
2. ICT initiatives can reduce the dependency on the carer which can in turn improve sleep patterns during the night with fewer interruptions.
3. ICT initiatives can increase the efficiency of certain care tasks which can reduce the burden of care and therefore reduce to some degree feelings of fatigue.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
### 1.3.MI.6

**Possibility to adapt the home of the carer/care recipient**

<table>
<thead>
<tr>
<th><strong>Definition:</strong></th>
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<tbody>
<tr>
<td>This dimension will assess how the adaptation of the home of the carer and/or care recipient can improve the health-related quality of life of the carer.</td>
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<td>1. ICT initiatives can reduce the dependency on the carer which can in turn improve sleep patterns during the night with fewer interruptions;</td>
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<td>2. ICT initiatives such as smart homes can considerably reduce the burden on the carer and therefore allow the carer to engage in other activities as well as reducing his/her stress levels.</td>
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</table>
**1.3.ME.1**  
Better performance/efficiency in the workplace (less difficulty to concentrate on tasks)

**Definition:**
One way to measure this indicator would be to look at the number of absences from work. (For example the carer having to take unpaid leave of absence to take care of his care recipient unexpectedly). This has been referred to as 'work accommodation' (Stone and Short, 1990, cited in Arber and Ginn, 1995). This broad term can potentially cover a wide range of strategies for combining paid work with substantial caring duties. These responses include:
- working different hours;
- using lunchtimes;
- taking time off work;
- using holiday entitlement;
- taking sick leave.

**Role of ICT:**
1. ICT can help to increase the efficiency in the workplace by reducing the stress level of the carer and therefore the risk of stress-related illnesses;
2. ICT can increase efficiency by helping the carer get more rest during the night;
3. ICT can reduce absenteeism/sickness presenteeism if the carer is better able to manage the care situation at home and therefore does not have to take days off unexpectedly which could reduce the efficiency of paid employment.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
2: Stone & Short 1990.
**1.3.ME.2**

**Better relationships with other family members (more time for leisure activities).**

**Definition:**
Health problems (both physical and psychological) can reduce the propensity of the carer to socialise and can also reduce the quality of the relationships when such meetings take place.

**Role of ICT:**
ICT can help to reduce the stress level of the carer and therefore the risk of stress-related illnesses which can reduce the time/energy to engage in quality relationships with family members.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
### 1.3.MA.1

**More efficient workforce for the whole economy who report less days off work**

**Definition:**
Health problems (both physical and psychological) of employees can affect the operations of the organisation/business, with high absenteeism having a high cost to the overall economy. One way to measure this dimension is to look at the number of employees who reported sick leave or other absences in the last year before and after the initiative was set up.

**Role of ICT:**
1. ICT can help to reduce the stress level of the carer and therefore the risk of stress-related illnesses which can increase the risk of absenteeism and/or sickness presenteeism;
2. ICT can support employees to delegate certain caring tasks which reduces the risk of the employee having to take time off work unexpectedly (or use up sick leave) to care for the older person.

**Method of collection:**
National surveys can provide data on the efficiency of workers who also have to care for a dependent older person. Through adequate proportions, make estimations at national level on the possible increase/decrease of the efficiency of workers who care because of the initiative (in order to understand it's possible impact on the workforce on a large scale).

**Conceptual or methodological limitations:**
There is need for information at national level on the numbers of carers who are employed and their efficiency at the workplace: data may be fragmented and/or not easily available.

**Source:**
1: EUROFAMCARE 2005.
1.3.MA.2

Healthier workforce requiring less attention from the social and health sectors

**Definition:**
Health problems (both physical and psychological) of employees puts considerable pressure on the health and social care system, one way to measure would be to look at the number of such interventions before and after the ICT initiatives were introduced.

**Role of ICT:**
ICT can help to reduce the stress level of the carer and therefore the risk of stress-related illnesses which can increase the likelihood of requiring medical treatment.

**Method of collection:**
National surveys can provide data on the health of workers who also have to care for a dependent older person: in particular, data on the use of health and social care services by these workers are needed. Through adequate proportions, make estimations at national level on the possible increase/decrease of the use of care services by workers because of the initiative (in order to understand it's possible impact on the workforce on a large scale).

**Conceptual or methodological limitations:**
There is need for information at national level on the numbers of carers who are employed and on the access to care services: data may be fragmented and/or not easily available.

**Source:**
1: EUROFAMCARE 2005.
2. Quality of Life of Paid Assistant

List of selected indicators for the dimension:

- **Micro-level:**
  - 2.MI.1 How the use of ICT can improve their physical abilities, including the ability for their own activities of daily living;
  - 2.MI.2 How it affects their mental health and related coping strategies;
  - 2.MI.3 How it affects their pain-discomfort;
  - 2.MI.4 How it improves their energy/fatigue
  - 2.MI.5 Feeling that the older person asks for more help than he/she needs;
  - 2.MI.6 Possibility to participate in leisure and social activities

- **Meso-level:**
  - 2.ME.1 Better performance/efficiency in the workplace (less difficulty to concentrate on tasks);
  - 2.ME.2 Better relationships with own family members (more time for leisure activities).

- **Macro-level:**
  - 2.MA.1 More efficient workforce for the whole economy who report less days off work;
  - 2.MA.2 Healthier workforce requiring less attention from the social and health sectors;
  - 2.MA.3 Paid assistants who feel their personal skills and abilities are recognised.
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<tr>
<th>2.MI.1</th>
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<td><strong>Definition:</strong></td>
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<td>One way to measure this indicator is to assess the paid assistant’s ability to perform Activities of Daily Living before and after the ICT initiative was introduced, to see how the caring activities have limited him/her in his/her mobility and health.</td>
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<td>3. ICT can improve the physical abilities of the paid assistant through information gained which provide advice/training opportunities/best practice on caring practices (for example how to carry the older person without harming him/herself)</td>
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<tr>
<td>4. ICT can free up time for the paid assistant who can then use this time for health promotion activities including medical check-ups etc.</td>
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<td>In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.</td>
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2.MI.2
How it affects their mental health and related coping strategies

**Definition:**
This dimension tries to capture how an ICT initiative can help improve the mental health/psychological wellbeing of the paid assistant, as well as improve coping strategies caused by the high burnout of caring.

**Role of ICT:**
1. ICT can improve the mental health of the paid assistant through information gained, as well as fora which provide advice/feedback/best practice on coping strategies, particularly for migrant carers who may suffer more acutely from social exclusion and are therefore at high risk of mental health problems;
2. ICT can free up time for the paid assistant who can then use this time for health promotion activities as well as coping strategies including medical check-ups etc.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
### 2.MI.3
#### How it affects their pain/discomfort

**Definition:**
This dimension will assess how much the pain/discomfort of the paid assistant has changed since the ICT initiative was installed.

**Role of ICT:**
1. ICT can increase efficiency of certain tasks and therefore free up time for the paid assistant to take care of his/her own health including pain management.
2. ICT initiatives can also be helpful to the paid assistant by providing information on the best care practices which can reduce the risk of injury and therefore pain/discomfort.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
2.MI.4
How it improves/reduces their energy/fatigue

**Definition:**
This dimension will assess how much the energy of the paid assistant has changed since the ICT initiative was installed.

**Role of ICT:**
1. ICT initiatives can reduce some of the stress of caring which can therefore lead to lower levels of fatigue;
2. ICT initiatives can reduce the dependency on the paid assistant which can in turn improve sleep patterns during the night with fewer interruptions;
3. ICT initiatives can increase the efficiency of certain care tasks which can reduce the burnout of care and therefore reduce to some degree feelings of fatigue.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
2.MI.5
Feeling that the older person asks for more help than he/she needs

**Definition:**
This dimension will try to assess the feeling of over-dependency of the care recipient towards the paid assistant.

**Role of ICT:**
1. ICT can reduce the feeling of over-dependency from the perspective of the paid assistant which can in turn reduce his/her burnout;
2. ICT can help reduce the feeling of guilt if certain initiatives help the care recipient feel secure and therefore less needy/dependent on the paid assistant.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
### 2.MI.6
Possibility to participate in leisure and social activities

**Definition:**
The paid assistant and particularly the migrant carer may not be socially included in the community where he/she lives. This dimension will try to capture to what extent he/she can participate in activities in the community and/or social activities.

**Role of ICT:**
1. ICT can support the paid assistant in freeing up some of the care tasks, thus enabling him/her to engage in leisure and social activities;
2. ICT can support the paid assistant by providing information on leisure/social activities existing in the area.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

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| **Role of ICT:** | 1. ICT can help to increase the efficiency in the workplace by reducing the stress level of the paid assistant, this can reduce the likelihood of stress-related illnesses and therefore sickness presenteeism and/or difficulty to concentrate on tasks;  
2. ICT can increase efficiency by helping the carer get more rest during the night if he/she lives in the home of the care recipient;  
3. ICT can help provide up to date information on the most efficient caring practices. |
| **Method of collection:** | **Measure:** Direct question.  
**Administration:** Self-administered questionnaire to carers. |
| **Conceptual or methodological limitations:** | In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation. |
| **Source:** | 1: EUROFAMCARE 2005.  
### 2.ME.2
Better relationships with own family members

**Definition:**
The issue to measure is whether the paid assistant is able to maintain existing relationships with family, friends, peers, and/or work colleagues and/or develop new relationships as a result of the ICT intervention as we know that in particular migrant carers often quickly become isolated and lose their existing networks and ICT has the potential to provide them with new peer support networks.

**Role of ICT:**
ICT can support the paid assistant who has very little free time to maintain quality relationships (particularly those that allow visual and audio contact) with former colleagues/peers/relatives who may not be in geographical proximity.

**Method of collection:**
**Measure:** Direct question.

**Administration:** Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
## 2.MA.1

**More efficient workforce for the whole economy who report less days off work**

**Definition:**
Health problems (both physical and psychological) of paid assistants can affect the performance of the care tasks performed, with high absenteeism having a high cost to the overall economy. One way to measure this dimension is to look at the number of paid assistants who reported sick leave or other absences in the last year before and after the initiative was set up.

**Role of ICT:**
ICT can help to reduce the stress level of the paid assistant and therefore the risk of stress-related illnesses which can increase the risk of absenteeism and/or sickness presenteeism.

**Method of collection:**
National surveys can provide data on the efficiency of paid assistants who care for a dependent older person. Through adequate proportions, make estimations at national level on the possible increase/decrease of the efficiency of paid assistants because of the initiative (in order to understand it's possible impact on the workforce on a large scale).

**Conceptual or methodological limitations:**
There is need for information at national level on the numbers of paid assistants who are privately employed and their efficiency at the workplace: data may be fragmented and/or not easily available.

**Source:**
1: EUROFAMCARE 2005.
### 2.MA.2

**Healthier workforce requiring less attention from the social and health sectors**

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<td>Health problems (both physical and psychological) of paid assistants puts considerable pressure on the health and social care system, one way to measure would be to look at the number of such interventions before and after the ICT initiatives were introduced.</td>
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<tr>
<td>1: EUROFAMCARE 2005.</td>
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### Definition:
This dimension will try to assess to what degree the paid assistant feels that his/her personal skills and abilities are recognised, before and after the ICT initiative was set up.

### Role of ICT:

#### Method of collection:
- **Measure:** Direct question.

#### Administration:
- Self-administered questionnaire to carers.

#### Conceptual or methodological limitations:
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

### Source:
1: Schumacher et al. 1998.
5: Department of Health 1999.
3. Quality of Life of Care Recipient

List of selected indicators for the dimension:

- **Micro-level:**
  - 3.MI.1 How the use of ICT can improve their physical abilities, including the ability for their own activities of daily living;
  - 3.MI.2 How it affects their mental health/psychological wellbeing;
  - 3.MI.3 How it affects their pain-discomfort;
  - 3.MI.4 Feeling that the older person requires less support from the carer;
  - 3.MI.5 Possibility to maintain social relationships
  - 3.MI.6 Feeling that their rights are acknowledged and acted on and that they are involved in decision-making about their own care.

- **Meso-level:**
  - 3.ME.1 Having a sense of Achievement
  - 3.ME.2 Having a sense of Purpose
  - 3.ME.3 Having a sense of Significance
  - 3.ME.4 Having a sense of continuity

- **Macro-level:**
  - 3.MA.1 Possibility to be better informed (and therefore protected) on the different types of abuse.
### 3.ML.1

**How the use of ICT can improve their physical abilities, including the ability for their activities of daily living**

#### Definition:

One way to measure this indicator is to assess the care recipient’s ability to perform Activities of Daily Living before and after the ICT initiative was introduced.

#### Role of ICT:

1. ICT can help reduce to a minimum the admission into hospital which is often affiliated with a loss of independence/deterioration of the capacity to perform activities of daily living (for example: continence).
2. ICT can improve the physical abilities of the care recipient through information gained, as well as carers’ fora which provide advice/feedback/best practice on treatment for specific illnesses for example;
3. ICT can through certain initiatives (for example smart homes) improve the independence of the older person so that he/she feels confident to perform certain actions and maintain a feeling of being mobile.

#### Method of collection:

*Measure:* Direct question.

*Administration:* Self-administered questionnaire to care recipient (or carer as a proxy).

#### Conceptual or methodological limitations:

In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

#### Source:

1: Dröes et al. 2006.
2: Mitseva et al. 2010.
### 3.MI.2
How it affects their mental health/psychological wellbeing

**Definition:**
This dimension tries to capture how an ICT initiative can help improve the mental health of the care recipient, as well as improve coping strategies caused by the high risk of social isolation.

**Role of ICT:**
1. ICT can improve the mental health of the care recipient by reducing social exclusion, i.e. providing him/her with possibilities to be in touch with the community and/or relatives who are not living in geographic proximity (particularly ICT initiatives which have audio and visual);
2. ICT can be a large source of information for care recipients who suffer from cognitive decline to try and control some of the symptoms and be better informed about the illness.

**Method of collection:**
*Measure:* Direct question.

*Administration:* Self-administered questionnaire to care recipient (or carer as a proxy).

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Dröes et al. 2006.
2: Mitseva et al. 2010.
### 3.MI.3
How it affects their pain/discomfort

**Definition:**
This dimension will assess how much the pain/discomfort of the care recipient has changed since the ICT initiative was installed.

**Role of ICT:**
ICT initiatives can be helpful to the care recipient by providing information on the best care practices which can reduce the risk of injury and therefore pain/discomfort.

**Method of collection:**
*Measure:* Direct question.

*Administration:* Self-administered questionnaire to care recipient (or carer as a proxy).

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Dröes et al. 2006.
2: Mitseva et al. 2010.
### 3.MI.4

**Feeling that the older person requires less support from the carer**

**Definition:**
This dimension will try to assess the feeling of over-dependency of the care recipient towards the paid assistant.

**Role of ICT:**
1. ICT can reduce the feeling of over-dependency from the perspective of the paid assistant and/or carer which can in turn reduce his/her burden/burnout;
2. Various ICT initiatives can help the care recipient assert his autonomy/independence and therefore increase the feeling that the care recipient is less dependent on a family member/paid assistant which can also increase his sense of worth.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to care recipient (or carer as a proxy).

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Dröes et al. 2006.
2: Mitseva et al. 2010.
### 3.ML5

#### Possibility to maintain social relationships

**Definition:**
A KEY ISSUE for older people, particularly those with impairments in their activities of daily living is the risk of social exclusion. The possibility to maintain social relationships is critical to their psychological wellbeing.

**Role of ICT:**
ICT can support the care recipient in facilitating social relationships through online fora and other social platforms, as well as devices such as Skype which can facilitate the contact with family members who are not in geographic proximity.

**Method of collection:**
**Measure:** Direct question to ask before and after the initiative begins.

**Administration:** Self-administered questionnaire to care recipient (or carer as a proxy).

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Dröes et al. 2006.
2: Mitseva et al. 2010.
5: Nolan et al. 2006.
### 3.MI.6

**Feeling that their rights are acknowledged and acted on and that they are involved in decision-making about their own care**

<table>
<thead>
<tr>
<th>Definition:</th>
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</thead>
<tbody>
<tr>
<td>This dimension will look at the importance of the rights of the older person, this will be relevant in particular for those who are in extreme frailty (concerning end-of-life care choices, or whether to receive hospice care or be sent to hospital for e.g.). Furthermore the dimension will assess the extent to which the risk assessment is done in negotiation with the older person and whether or not he/she maintains ownership over care decisions. Effort should be made to ask all residents adapting questions for individuals with cognitive impairment.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role of ICT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ICT can support the care recipient in providing information on his/her rights;</td>
</tr>
<tr>
<td>2. ICT can provide support to the care recipient to receive information on the various options of treatment for a particular illness and to feel part of the decision-making process which will increase his/her sense of control over one's life and therefore a sense of satisfaction/worth.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method of collection:</th>
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</thead>
<tbody>
<tr>
<td><strong>Measure:</strong> Direct question to ask before and after the initiative begins.</td>
</tr>
<tr>
<td><strong>Administration:</strong> Self-administered questionnaire to care recipient (or carer as a proxy).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conceptual or methodological limitations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.</td>
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<table>
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<tr>
<td>1: Dröes et al. 2006.</td>
</tr>
<tr>
<td>2: Mitseva et al. 2010.</td>
</tr>
</tbody>
</table>
### 3.ME.1

#### Having a Sense of Achievement

**Definition:**
This indicator will assess the opportunities of the care recipient to meet meaningful and valued goals, to feel satisfied with one's efforts, to make a recognised and valued contribution, to make progress towards therapeutic goals as appropriate.

**Role of ICT:**
1. ICT can support the care recipient in providing information on his/her rights;
2. ICT can provide support to the care recipient to receive information on the various options of treatment for a particular illness and to feel part of the decision-making process which will increase his/her sense of control over one's life and therefore a sense of satisfaction/worth.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to care recipient (or carer as a proxy).

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Dröes et al. 2006.
2: Mitseva et al. 2010.
### 3.ME.2
#### Having a Sense of Purpose

**Definition:**
This indicator will assess the opportunities that ICT initiatives offer to the care recipient to engage in purposeful activity facilitating the constructive passage of time, to be able to identify and pursue goals and challenges, to exercise discretionary choice.

**Role of ICT:**
1. ICT can support the care recipient in providing information on his/her rights;
2. ICT can provide support to the care recipient to receive information on the various options of treatment for a particular illness and to feel part of the decision-making process which will increase his/her sense of control over one's life and therefore a sense of satisfaction/worth.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to care recipient (or carer as a proxy).

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Dröes et al. 2006.
2: Mitseva et al. 2010.
### 3.ME.3

**Having a Sense of Significance**

**Definition:**
This indicator will assess the potential of ICT initiatives to help the care recipient feel recognised and valued as a person of worth, that one's actions and existence are of importance, that he/she 'matters'.

**Role of ICT:**
1. ICT can support the care recipient in providing information on his/her rights;
2. ICT can provide support to the care recipient to receive information on the various options of treatment for a particular illness and to feel part of the decision-making process which will increase his/her sense of control over one's life and therefore a sense of satisfaction/worth.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to care recipient (or carer as a proxy).

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Dröes et al. 2006.
2: Mitseva et al. 2010.
**Having a Sense of Continuity**

**Definition:**
This indicator will assess the potential of ICT initiatives to help the care recipient feel that even after he/she is housebound due to severe frailty he/she can still play a role in the community.

**Role of ICT:**
ICT can support the care recipient through various social platforms to remain in touch with relatives/friends/formal colleagues etc.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to care recipient (or carer as a proxy).

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: Dröes et al. 2006.
2: Mitseva et al. 2010.
3.MA.1
Possibility to be better informed (and therefore protected) on the different types of abuse.

**Definition:**
This indicator will assess the potential of ICT initiatives to improve the information flow on the different types of abuse that the older person should be aware of, which can increase social cohesion as a whole.

**Role of ICT:**
ICT initiatives can support the care recipient through various information platforms which can improve the knowledge base of the care recipient and help improve social cohesion.

**Method of collection:**
National surveys can provide data on the knowledge of older dependent persons on abuse issues. Through adequate proportions, make estimations at national level on the possible increase/decrease of the knowledge of these care recipients on abuse because of the initiative (in order to understand its possible impact on a large scale).

**Conceptual or methodological limitations:**
There is need for information at national level on the knowledge of care recipients on abuse issues: data may be fragmented and/or not easily available.

**Source:**
1: Dröes et al. 2006.
2: Mitseva et al. 2010.
4. Quality of Care Provided by Informal Carer and Paid Assistant

List of selected indicators for the dimension:

- **Micro-level:**
  - 4.MI.1 Possibility for the carer/paid assistant to be tested on the training to check if the knowledge has been assimilated (education assessment)
  - 4.MI.2 Through various other ICT initiatives, the carer/paid assistant to improve his caring activities through increased knowledge of best practices.

- **Meso-level:**
  - 4.ME.1 Possibility to get training online and provide better quality care through feeling more valued as a workforce

- **Macro-level:**
  - 4.MA.1 Delaying of institutionalisation
  - 4.MA.2 Reduced need for the health care use (visits to doctors, hospitalisation etc) and reduced disease burden/better health
<p>| Definition: | This indicator will assess how much of the training on care practices has been assimilated, possibly through an online questionnaire. |
| Role of ICT: | ICT initiatives can provide a platform for the carer and/or paid assistant to be tested on the training to check if the knowledge has been assimilated. |
| Method of collection: | Measure: Direct question to ask before and after the initiative begins. Administration: Self-administered questionnaire to carers. |
| Conceptual or methodological limitations: | In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation. |</p>
<table>
<thead>
<tr>
<th>4.M1.2</th>
<th>Through various ICT initiatives, the carer/paid assistant can improve his/her caring activities through increased knowledge of best practices.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition:</strong></td>
<td>This indicator will assess how ICT initiatives can provide knowledge on best practices for caring activities through a variety of different channels.</td>
</tr>
<tr>
<td><strong>Role of ICT:</strong></td>
<td>ICT initiatives can provide a platform for the carer and/or paid assistant to gain knowledge on best practices for caring activities including the most up to date information on certain illnesses, as well as informal information from other carer/paid assistants for example through carers’ fora which can improve the quality of care.</td>
</tr>
</tbody>
</table>
| **Method of collection:** | **Measure:** Direct question to ask before and after the initiative begins.  
**Administration:** Self-administered questionnaire to carers. |
| **Conceptual or methodological limitations:** | In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation. |
| **Source:** | 1: EUROFAMCARE 2005.  
### 4.ME.1
Possibility to get training online and provide better quality care through feeling more valued as a workforce

**Definition:**
This indicator will assess how ICT initiatives can provide knowledge on best practices/online trainings which in turn can increase the sense of worth of the paid assistant/carer.

**Role of ICT:**
ICT initiatives can provide a platform for the carer and/or paid assistant to gain knowledge on best practices which can increase the 'Sense of Purpose' of the carer/paid assistant -who feels valued- which can also reduce turnover. Having a sense of continuity (meaning that there is a trust relationship built between the care recipient and paid assistant) also increases the quality of care, particularly for care recipients suffering from cognitive decline who can find a frequent change of carers distressing.

**Method of collection:**
- **Measure:** Direct question to ask before and after the initiative begins.
- **Administration:** Self-administered questionnaire to carers.

**Conceptual or methodological limitations:**
In most cases it will be difficult to measure the exact effect of the ICT initiative as it may have been in place for some time when the study takes place. In order to overcome this limitation, i.e. to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Source:**
1: EUROFAMCARE 2005.
5: Nolan et al. 2006.
### 4.MA.1

**Delaying of institutionalization**

**Definition:**
This indicator will measure the degree to which the care recipient can avoid/delay institutionalization.

**Role of ICT:**
ICT initiatives can improve the support of the care recipient in the home as well as certain telecare initiatives which can improve the mobility/independence of the care recipient as well as his/her feeling of security which can benefit the economy by delaying/avoiding institutionalization into nursing homes and increasing independent living.

**Method of collection:**
National surveys can provide data on the institutionalisation rate of older dependent persons. Through adequate proportions, make estimations at national level on the possible increase/decrease of the institutionalisation rate of these care recipients because of the initiative (in order to understand its possible impact on a large scale).

**Conceptual or methodological limitations:**
There is need for information at national level on the institutionalisation rate of care recipients: data may be fragmented and/or not easily available.

**Source:**
1: EUROFAMCARE 2005.
5: Wang et al. 2010.
### 4.MA.2
**Reduced need for the health care use (visits to doctors, hospitalization etc) and reduced disease burden/better health**

<table>
<thead>
<tr>
<th><strong>Definition:</strong></th>
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</thead>
<tbody>
<tr>
<td>This indicator will measure the degree to which the care recipient can avoid hospitalisation/unnecessary medical checkups due to the use of ICT.</td>
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<table>
<thead>
<tr>
<th><strong>Role of ICT:</strong></th>
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</thead>
<tbody>
<tr>
<td>ICT initiatives can improve the quality of care through various initiatives (smart home etc) which can increase the sense of security by reducing accidents and even improving the health status which has a beneficial effect by reducing the burden on the health system (“bed blocking” phenomenon in hospitals).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Method of collection:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>National surveys can provide data on the hospitalisation and health care use of older dependent persons. Through adequate proportions, make estimations at national level on the possible increase/decrease of the health care use rate of these care recipients because of the initiative (in order to understand its possible impact on a large scale).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Conceptual or methodological limitations:</strong></th>
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</thead>
<tbody>
<tr>
<td>There is need for information at national level on the health care use rate of care recipients: data may be fragmented and/or not easily available.</td>
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</table>

<table>
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<th><strong>Source:</strong></th>
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</thead>
<tbody>
<tr>
<td>1: EUROFAMCARE 2005.</td>
</tr>
</tbody>
</table>
5. Care Efficiency & Sustainability

List of selected indicators for the dimension:

- Micro-level:
  - 5.MI.1 Cost containment for care recipients and/or their families
- Meso-level:
  - 5.ME.1 Cost effectiveness analysis
  - 5.ME.2 Cost minimisation
- Macro-level:
  - 5.MA.1 Cost utility analysis
  - 5.MA.2 Cost benefit analysis
  - 5.MA.3 Return on investment
**5.MI.1**

**Cost Containment by care recipients and/or their families**

<table>
<thead>
<tr>
<th>Definition:</th>
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</thead>
<tbody>
<tr>
<td>Costs for care services can affect negatively household finances. Long-term care needs to be sustainable for care recipients and their families. In this regard, cost containment is an important area to assess in order to verify the impact of ICT in facilitating the access to services more than ordinary ones. Cost containment is defined as the rate of growth or reducing of household expenditures for long-term care services (related to the dependent older person).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Role of ICT:</th>
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</thead>
<tbody>
<tr>
<td>One of the challenges for ICT is the growing interest</td>
</tr>
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<table>
<thead>
<tr>
<th>Method of collection:</th>
</tr>
</thead>
</table>
| **Measure:** Direct question to ask before and after the initiative begins. Both for care recipient and carer, the amount should be intended as spent for care recipient’s use of health care services or products. The cost containment for care recipients/carers can be calculated in the following way, where CCR is the cost paid by the care recipient (in an ordinary situation – CCR\textsubscript{std} – or after the use of ICT tools – CCR\textsubscript{ICT})), CR is the cost paid by relatives and friends (in an ordinary situation – CR\textsubscript{std} – or after the use of ICT tools – CR\textsubscript{ICT}):

\[
(\text{CCR}_{\text{std}} + \text{CR}_{\text{std}}) - (\text{CCR}_{\text{ICT}} + \text{CR}_{\text{ICT}})
\]

<table>
<thead>
<tr>
<th>Items:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- How much do you spend per month for health care (including medications)? (open question)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Administration:</th>
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<tbody>
<tr>
<td>Self-administered questionnaire to care recipients and carers.</td>
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</table>

<table>
<thead>
<tr>
<th>Conceptual or methodological limitations:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Among the cost-saving effects brought about by ICT that should also be quantified is the possibility that less qualified formal carers are able to carry out some of the tasks.</td>
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</table>

<table>
<thead>
<tr>
<th>Source:</th>
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<tbody>
<tr>
<td>1: Koopmanschap et al. 2008.</td>
</tr>
<tr>
<td>4: Maguire &amp; Serra-Sastre 2009.</td>
</tr>
</tbody>
</table>
### Definition:
Cost Effectiveness Analysis (CEA) refers to the cost of achieving a determined outcome, which in the case of a care provider could be calculated in reference to avoiding permanent transfers to an institutional care home or hospital (or to calculate it against a similar measure: time to permanent transfer to institutional care) – thus incorporating the health and wellbeing of the consumer of care.

### Role of ICT:
The total cost of providing care with and without the ICT initiative in place are therefore compared against the number of permanent transfers to care homes. This allows for gains in efficiency to be estimated in terms of (potential) reduction of costs\(^3\) for similar outcomes (the number of permanent transfers to care homes is not significantly reduced, but the operating costs may be), or/and in terms of potential improvement of outcomes (if ICT initiatives bring about a reduction in the transfer to institutional care).

### Method of collection:
The cost-effectiveness ratio can be calculated through the relation between:

- Total cost per consumer (with and without use of the ICT measure: TC\(_{ICT}\) and TC\(_{std}\)), which importantly should be risk-adjusted to reflect the varying health conditions of consumers of care that impact the transfer to institutional care;
- Time till permanent transfer to institutional care (measured since the consumer first started to receive care by the provider) or records on permanent transfer of consumers to institutional care (TI\(_{ICT}\) and TI\(_{std}\)).

\[
\frac{TC_{ICT}}{TC_{std}} \div \frac{TI_{ICT}}{TI_{std}}
\]

Time till institutionalization and total costs should be adjusted for the case-mix of users.

The ICT measure will be cost-effective in comparison with the comparative (standard) if the ratio is below 1 (for example if costs are similar but the time till institutionalisation is higher under the ICT measure, i.e. there is delayed institutionalisation).

### Conceptual or methodological limitations:
Among the cost-saving effects brought about by ICT that should also be quantified is the possibility that less qualified formal carers are able to carry out some of the tasks. The evaluation of the care-efficiency at the meso level may be translated into the wider picture of fiscal sustainability of long-term care, by assessing the possible perverse incentives that financing rules and reimbursement schemes may have on the providers behaviour.

### Source:
1: Koopmanschap et al. 2008.
4: Maguire & Serra-Sastre 2009.

\(^3\) Although the text refers to “reduction of cost” and thus implies a positive impact on costs from a given ICT measure this should be taken as an example only.
**5.ME.2**

**Cost Minimisation**

**Definition:**
Cost minimization aims to assess the least costly way to bring about a given outcome, assuming that the outcome is the same for both interventions. It may be alternatively defined in relation to an output if outcomes are difficult to be evaluated.

**Role of ICT:**
For instance, it is important to consider information regarding number of contacts with consumers of care to provide routine information could potentially be measured against the cost of providing such information (in presence as against at the distance through the use of ICT). Similarly in the case of the use of ICT as an alternative to monitor consumers’ health condition or safety (e.g. watching over patients with dementia).

**Method of Collection:**
The total cost of achieving a given similar outcome (or producing an output) with and without the ICT initiative in place are compared. The cost minimisation can be calculated through the following formula, where NS is the Net Saving, TC\text{std} the Standard Total Cost, and TC\text{ICT} the ICT Total Cost:

$$NS = TC_{\text{std}} - TC_{\text{ICT}}$$

The ICT measure will produce cost savings if the value of NS is positive. Adjustments should be made to the case-mix of users.

**Conceptual or methodological limitations:**
However, the conditions for this to hold are quite restrictive: outcomes, risks and utility derived from interventions must be identical. Cruder measures of cost-minimisation could be devised that take output rather than outcomes as measure. For example, in health care it could be possible to compare screening for certain illnesses as it could be assumed that the outcome achieved with such screening would be similar. In long-term care however, such an identification between outputs and outcomes may be questionable. For example, ICT initiatives may reduce time spent per consumer of care by a formal carer, thus producing cost savings, while the outcome in terms of quality of life of the consumer could potentially be diminished as interpersonal contact may be an intrinsic positive and valued outcome of the care process.

**Source:**
1: Koopmanschap et al. 2008.
4: Maguire & Serra-Sastre 2009.
### 5.MA.1

**Cost Utility Analysis**

**Definition:**
The Cost-Utility Analysis (CUA) allows for the direct comparison of ICT initiatives that produce different outcomes for it monetises the costs (assigns pecuniary values to all costs incurred with the measure: both investment and running costs), while transforming the outcomes into a common unit of measure: Quality Adjusted Life Years (QALY).

**Role of ICT:**
In order to isolate the effects that can be attributed to the introduction of ICT measures, it may necessary to perform randomized trials, involving identical groups of carers and persons in need of care that are randomly assigned to a treatment group (benefiting from the ICT measure) and a control group (not benefiting from the ICT measure). This study design will allow for the effects arising from the ICT measure to be isolated, but could be cumbersome to implement and depending on the choice of target and control groups the results may be more or less suitable for generalisation.

**Method of collection:**
Index to be calculated through the relation between:

- Total costs associated with the ICT initiative (investment and running costs) \((TC_{ICT})\) and similar cost for identical care services that do not benefit from the ICT initiative under study \((TC_{std})\). These costs should be collected over an identical time span period and ideal should be estimated once the ICT initiative has reached a maturity stage (costs taken at initial stages may underestimate savings associated with the familiarisation with ICT).

- Depending on the method used to estimate the value of informal care it could be necessary to estimate costs of formal care tasks (for the proxy good method), a wage equation for the economy (for the opportunity cost method) or one of the several instruments to assess quality of life (e.g. Caregiver Quality of Life Instrument, CarerQol). In any case, the time spent caring by informal carers using the measure should be collected (outcome values with and without ICT: \(OV_{ICT}\) and \(OV_{std}\)).

\[
\frac{TC_{ICT}}{TC_{std}} \frac{OV_{ICT}}{OV_{std}}
\]

Estimate the outcomes in terms of QALY (see Newman et al, 2000 and Mortimer & Segal, 2008) and assign a monetary value to the QALY.

**Conceptual or methodological limitations:**
In the case of long-term care there might be additional complications arising from the fact that: i) indirect effects that are felt on the carers may be difficult to quantify – although time spent caring can nevertheless be quantified using proxy good methods to wellbeing valuation methods (see Koopmanschap et al, 2008, for more details); ii) it may be difficult to disentangle the impact on carers from the impact on those receiving care (for example, double counting may arise because the adverse wellbeing experienced by the informal care is actually a reflection of the ill-health of the person cared for, which is already accounted for).

The evaluation of ICT measures using CUA and the above mentioned QALY may prove a quite cumbersome, costly to implement and raise ethical or measurement questions, namely as to how to value QALY or assign monetary values to health outcomes. It is also not completely clear if QALY are the best measure of outcome for interventions that do not impact the health condition of people but rather their wellbeing (e.g. providing information on available social benefits, increasing social interaction and contact with relatives and friends). Furthermore, it may be ill-suited to account for other outcomes or spillover effects, such as, reduced social alarm from having older people subject to abuse or neglect or quantifying different outcomes in terms of equity.

**Source:**
1: Koopmanschap et al. 2008.
4: Maguire & Serra-Sastre 2009.
5.MA.2
Cost Benefit Analysis

**Definition:**
An even more comprehensive method to evaluate the societal impact of an ICT initiative is to perform Cost Benefit Analysis (CBA), which assigns monetary values not only to the costs but also to the benefits, such as health improvements (see Dávalos et al., 2008, and Drummond et al., 2005, for more details).

**Role of ICT:**
Similar to the Cost Utility Analysis, the Cost Benefit Analysis concerns the monetary value of the outcome instead to keep the outcome measure in the index. In this sense, it is important to understand the possible value of ICT outcome, considering both benefits for quality of services and cost saving from a monetary point of view in order to better evaluate the efficiency at national level.

**Method of collection:**
Index to be calculated through the relation between:

- Total costs associated with the ICT initiative (investment and running costs) \( (T_{C,ICT}) \) and similar cost for identical care services that do not benefit from the ICT initiative under study \( (T_{C,Std}) \). These costs should be collected over an identical time span period and ideal should be estimated once the ICT initiative has reached a maturity stage (costs taken at initial stages may underestimate savings associated with the familiarisation with ICT);
- Depending on the method used to estimate the value of informal care it could be necessary to estimate costs of formal care tasks (for the proxy good method), a wage equation for the economy (for the opportunity cost method) or one of the several instruments to assess quality of life (e.g. Caregiver Quality of Life Instrument, CarerQol, for the valuation of well-being) (outcome monetary values with and without ICT: \( OMV_{ICT} \) and \( OMV_{std} \)). In any case, the time spent caring by informal carers using the measure should be collected.

Estimate the outcomes in terms of QALY (see Newman et al, 2000 and Mortimer & Segal, 2008) and assign a monetary value to the QALY.

\[
\frac{T_{C,ICT}}{OMV_{ICT}} / \frac{T_{C,Std}}{OMV_{std}}
\]

Outcomes and total costs should be adjusted for the case-mix of users.

QALY are assigned monetary values. Alternatively to QALY, effects could also be measured in terms of outcomes (e.g. delayed institutionalization) and monetary values assigned to it (e.g. delayed institutionalization and cost per day in institution).

The ICT measure will be cost-effective in comparison with the comparative (standard) if the ratio is below 1 (for example if costs are similar but QALY achieved under the ICT measure are higher).

It can also be calculated as a Net Benefit (NB), where \( MB_{ICT} \) is the monetary benefit thanks to ICT use and \( MB_{std} \) the monetary benefit thanks to standard care services:

\[
NB = (T_{C,ICT} - T_{C,Std}) - (MB_{ICT} - MB_{std})
\]

**Conceptual or methodological limitations:**
In the case of long-term care there might be additional complications arising from the fact that: i) indirect effects that are felt on the carers may be difficult to quantify – although time spent caring can nevertheless be quantified using proxy good methods to wellbeing valuation methods (see Koopmanschap et al, 2008, for more details); ii) it may be difficult to disentangle the impact on carers from the impact on those receiving care (for example, double counting may arise because the adverse wellbeing experienced by the informal care is actually a reflection of the ill-health of the person cared for, which is already accounted for).

**Source:**
1: Koopmanschap et al. 2008.
4: Maguire & Serra-Sastre 2009.
### Definition:
The Return on Investment (RoI) may be calculated to compare the total costs incurred with the ICT initiative against the benefits accrued to the system, both in terms of reduction of costs (e.g. days spent in hospital, transfer to institutional care) and increased revenues (e.g. through increasing the tax based by allowing informal carers to participate in the labour market).

### Role of ICT:
Concerns over the fiscal sustainability of long-term care systems have placed a greater emphasis on the search for cost-efficient solutions for delivering care. While ICT holds some promise of enhancing care efficiency, technology in broader terms has proven to be a driver of expenditure in health care (Maguire & Serra-Sastre, 2009). In order to assess of the possible impact of ICT on the fiscal sustainability of long-term care a more focused analysis may be required, i.e. one that assesses the impact of ICT on the expenditure and revenue of health and social protections systems.

### Method of collection:
Index to be calculated through the relation between:

- Assessment of the variation in hospitalisation/transfer to institutional care, or the number of days spent in hospital or the average number of days till transfer to institutional care and assignment of the monetary value associated with each (from the state’s perspective) (difference between the monetary benefit and the total costs in using ICT: $MB_{ICT}$ and $TC_{ICT}$). The assessment could be limited to users of care or include carers.
- Calculation of the total public expenditure involved with the ICT initiative ($TC_{ICT}$).

\[
\frac{MB_{ICT} - TC_{ICT}}{TC_{ICT}}
\]

Assessment of the increased labour supply of carers (e.g. increase in the full-time equivalent employment rate, or average hours in employment) and associated wage earnings, so as to quantify the direct increased revenues thus generated.

### Conceptual or methodological limitations:
The RoI will allow for the evaluation of the cost-efficiency of a given ICT initiative per se. However, it should be compared with standard ways of delivering care, thus allowing for the assessment of the most cost-effective way of delivering care.

### Source:
1: Koopmanschap et al. 2008.
4: Maguire & Serra-Sastre 2009.
6. Acceptability

List of selected indicators for the dimension:

- **Micro-level:**
  - 6.MI.1 Satisfaction of users
  - 6.MI.2 Willingness to use the ICT tool
  - 6.MI.3 Drop-out rate

- **Meso-level:**
  - 6.ME.1 Market opportunities for ICT producers
  - 6.ME.2 Facilitating provision of care services

- **Macro-level:**
  - 6.MA.1 Public investments on ICT tools
**6.MI.1**  
**Satisfaction of users**

**Definition:**
Satisfaction is conceived as a reaction of the user to the ICT tool: if the level of satisfaction is low, this may lead to the abandonment by the user of the service. In this sense, satisfaction is defined as a person’s critical evaluation of several aspects of a device concerning its use. This evaluation is influenced by user expectations, perceptions, attitudes, and personal values.

**Role of ICT:**
The use of an ICT tool is influenced by the level of satisfaction of the users. However, in the assessment phase, it should be clear what kind of satisfaction is being measured: satisfaction with the ICT device itself or with the whole service (this latter includes, for instance, organisational issues). These differences can be investigated through the proposed assessing tool.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers and/or care recipients.

**Conceptual or methodological limitations:**
Devices can be very different: in some cases, the ICT service is just a software or website to use through the personal computer; in other cases, it is a widespread device well-known by users (television or phones); in other cases, it is a completely new device that the user should learn how to use or approaching to it. These three categories make evident that the evaluation of satisfaction should take into account this diversity.

**Source:**
| **6.MI.2**  
| **Willingness to use the ICT tool** |
| **Definition:**  
As a critical element of technology acceptance by users, the willingness to use concerns the evaluation by the user of the efficacy and efficiency of the ICT tool. This latter should be adequate in matching people needs and making them comfortable when using it. |
| **Role of ICT:**  
All devices should take into account the way they satisfy people needs. Even if a tool is efficient and provides a good support, it can be perceived as hard to use. Also social influence, in this sense, is important and can have effects on the willingness to use. |
| **Method of collection:**  
**Measure:** Direct question to ask before and after the initiative begins.  
**Administration:** Self-administered questionnaire to carers and/or care recipients. |
| **Conceptual or methodological limitations:**  
Devices can be very different: in some cases, the ICT service is just a software or website to use through the personal computer; in other cases, it is a widespread device well-known by users (television or phones); in other cases, it is a completely new device that the user should learn how to use or approaching to it. These three categories make evident that the evaluation of willingness to use should take into account this diversity. |
| **Source:**  
6.MI.3
Drop-out rate

**Definition:**
During the initiative, calculating the drop-out rate contributes to indicate user satisfaction or dissatisfaction towards the specific ICT device or the general service provided: if many people decide to give up during the initiative, it is a sign that something doesn’t work in the initiative organisation or in the ICT use – that is, the attrition problem. Of course, it is not possible to reduce the drop-out rate to zero because of unpredictable events or major external constrains (e.g. user removal), but still it could be minimised in order to adapt the characteristics of the service to the user’s needs.

**Role of ICT:**
Drop-out rate can be considered as an outcome indicator: it may be assumed that the more an ICT-supported initiative has a high drop-out rate, the less the initiative is effective. This issue is important to understand possible problems of ICT tools and improve the whole service, leading to new efficient strategies of organisation.

**Method of collection:**
To be calculated, the drop-out rate needs three measures:
- the total number of the users who have been involved in the initiative since the beginning to its end (UE);
- the total number of the participants who have been involved in the initiative at the beginning but then abandoned it due to major constrains (e.g. removal, hospitalisation or death of participants) (UC);
- the total number of the participants who have been involved in the initiative at the beginning but then abandoned it due to dissatisfaction or problems with the device or the service (UD).

Once that the three numbers above have been determined, we have two possibilities. We can calculate the value of the general drop-out rate considering both major constrains (UC) and dissatisfaction/problems (UD) through the following formula:

\[
\frac{UC + UD}{UE + UC + UD}
\]

Otherwise, we can calculate the specific dissatisfaction drop-out rate through the following formula:

\[
\frac{UD}{UE + UC + UD}
\]

Of course, the second formula is more useful for the purposes of ICT assessment. However, it may be interesting to compare the two drop-out rates.

For simplicity, both rates may be turned into a percentage by multiplying each rate by 100.

A final high drop-out rate can indicate that the ICT-supported initiative is not efficient in getting used by all the target people.

**Conceptual or methodological limitations:**
In calculating the drop-out rate we should take into consideration the different reasons that lead to abandon the service. Other than major constrains, dissatisfaction drop-out rate could be related to both ICT device’s characteristics and organisational problems – these latter not strictly related to the ICT tool itself (Wessels et al. 2003). Indeed, results should be read carefully and without trying to force the interpretation considering only the device problems, but also the whole service. In this sense, it may be useful to apply indicator 6.MI.1 also to dropped-out users in order to understand if the reasons of their dissatisfaction are related to the device or to the service program.

**Source:**
### Market opportunities for ICT producers

**Definition:**
ICT producer companies' behaviour can influence the adoption of a device by users and local care providers. In fact, such companies need to evaluate the market in order to understand if there are opportunities for or if barriers are too high. In this sense, market opportunities can be assessed through the Return On Investment (ROI) ratio, which is useful to analyse the convenience of an ICT device production on a large scale.

**Role of ICT:**
Even if an ICT is useful and efficient in relation to its functions, the production of such tools could be very expensive or not convenient at all. In fact, local care providers and initiative promoters can be directly involved in the production of contents, but not in the production of ICT devices. In some cases, prototypes are produced by research institutes like universities – but this cannot be applied to a large scale production. It is clear that the involvement of ICT producer companies is important to assure the know-how, the competences, and the technical processes aimed at ICT tool production. For that, an ICT producer company should have a minimum return on investment (ROI) as it still remains a for-profit organisation.

**Method of collection:**
Index to be calculated through the relation between:
- Assessment of the estimation of the net income (NI\textsubscript{ICT}), given by the difference between the total monetary income (TI\textsubscript{ICT}) (e.g. money gained by selling or renting a single device – IU – multiplied by the number of units to be produced – U) and the total costs of production (TC\textsubscript{ICT}) (e.g. cost per unit – CU – multiplied by the number of units to be produced – U). Also investments done by other organisations (e.g. in form of reimbursement or loans) should be taken into account both for income (OII\textsubscript{ICT}) and costs (OIC\textsubscript{ICT});
- Calculation of the total cost of production of ICT devices (TC\textsubscript{ICT}).

\[
\frac{TI_{ICT} - TC_{ICT}}{TC_{ICT}} = \frac{[(IU \times U) + OII_{ICT}] - [(CU \times U) + OIC_{ICT}]}{TC_{ICT}}
\]

The number of devices to be produced (U) should be assessed through the estimation of potential people who could adopt them (as target population of the initiative itself) at local or national level (it depends by the size of the company).

**Conceptual or methodological limitations:**
A limitation of such an index could be related to the availability of data concerning the economic costs and possible income of the device. Companies already involved in these initiatives can be prudent in providing such information. However, in case the device is produced as a prototype by a non-profit organisation (e.g. universities or research centres), it may be possible to make an estimation of costs and profits on the basis of the data collected: collaboration with such institutes can easily lead to possible scenarios on the production process.

**Source:**
### 6.ME.2

**Facilitating provision of care services**

**Definition:**
The acceptability of an ICT tool can be measured also from the point of view of local care providers as facilitating the provision of care services. This means that ICT-supported initiatives can help improving the target population covered by the local care providers’ services, as they can be activated in distance: standard care services may have a restricted range of action and cover a smaller area within the community served by the care provider.

**Role of ICT:**
Local care providers can have many benefits from using ICT tools in improving cost containment and quality of care provided. However, ICT can facilitate the provision of services also in allowing more people to use it and have related benefits. The main characteristics of ICT concern the possibility for a user to have access to a service even if it is not physically at his/her place. This means a revolution in terms of public health and social care services because ICT tools can enlarge the target population covered by a local care provider.

**Method of collection:**
The total number of users reached by a care service with and without the ICT tool are compared. The facilitating provision of care service can be calculated through the following formula, where \( U_G \) is the Users Gained through ICT, \( U_{std} \) the number of users covered by standard care service, and \( U_{ICT} \) the number of users covered by ICT tool:

\[
U_G = U_{ICT} - U_{std}
\]

The ICT measure will produce an improvement of the number of users if \( U_G \) is positive.

**Conceptual or methodological limitations:**
Limitations can concern the inclusion of the digital competences issue into calculating this indicator. In fact, even if a service can cover an high number of users, some of them may be not allowed to use the tool because of a digital divide (e.g. lack of skills and competences for using it). The availability of skilled carers in using the ICT tool should be incorporated (if possible) into this indicator, with the following formula, where \( U_{SICT} \) is the number of users covered by ICT tool without sufficient skills to use it:

\[
U_G = (U_{ICT} - U_{SICT}) - U_{std}
\]

**Source:**
### 6.MA.1

#### Public investments on ICT tools

**Definition:**
At a national level, the role played by governments in facilitating the acceptance of ICT tools is fundamental. The amount of public investments refers to all the different forms of financial support provided by national institutions to final users, ICT producers, and local care providers. Examples of public investments are reimbursements, grants, allowances, and loans for acquiring or producing/selling ICT devices.

**Role of ICT:**
As care systems are raising their financial needs in recent times (and the situation does not seem to change next years), ICT can represent an useful instrument in order to contain some public expenditure and debt. If some ICT tools are found to be efficient at micro- and meso-levels, national governments should take into account the possibility to invest more in these tools in order to save money on a short-, medium-, and long-term.

**Method of collection:**
In order to calculate the total public investment per each user of the target population (to which the ICT tools is potentially addressed to), there is need for the following information:
- the amount of public investments on ICT addressed to final users ($I_{ICT}$);
- the amount of public investments on ICT addressed to local care providers ($CP_{ICT}$);
- the amount of public investments on ICT addressed to ICT company producers ($P_{ICT}$);
- the total number of potential users of the specific ICT tool into the national territory ($U$).

The public investment index can be calculated through the following formula:

$$\frac{I_{ICT} + CP_{ICT} + P_{ICT}}{U}$$

The final index concerns the public investment in ICT per head. It is possible to differentiate indexes basing on the target of investments. For example, the following formula concerns only the public investments for final potential users (investments provided to individuals):

$$\frac{I_{ICT}}{U}$$

Also a calculation of the public investments for local care providers is possible (where $CP$ is the number of local care providers that can potentially adopt the ICT tool):

$$\frac{CP_{ICT}}{CP}$$

Finally, public investments for ICT company producers should be taken into account as well (where $P$ is the number of ICT company producers that can potentially produce the ICT tool):

$$\frac{P_{ICT}}{P}$$

**Conceptual or methodological limitations:**
It may be difficult to get all the related data due to fragmented sources and legislation. For what concerns the ICT company producers, it is important to consider them in case the ICT tool is a completely new device. In some cases, however, this segment is not so relevant because the ICT tool can deal with widespread technologies or only with a provision of contents.

**Source:**
7. Infrastructure & Accessibility

List of selected indicators for the dimension:

- **Micro-level:**
  - 7.MI.1 Level of digital skills and competencies required

- **Meso-level:**
  - 7.ME.1 Availability of ICT tools within local communities
  - 7.ME.2 Availability of skilled carers in ICT use within local communities

- **Macro-level:**
  - 7.MA.1 Availability of ICT tools at national level
  - 7.MA.2 Availability of skilled carers in ICT use at national level
### 7.MI.1

#### Level of digital skills and competences required

**Definition:**
The use of an ICT device requires a certain level of digital skills and competences. This means that target users should be familiar to the ICT tool (having a previous “digital literacy”) or the device itself should be very easy to use (minimising the requirements to users).

**Role of ICT:**
Digital divide can represent a possible barrier to let carers use in an efficient way the device. Problems can arise from both the hardware and software interfaces. In this sense, digital skills and competences include the ones concerning computer tools, as well as other technical devices.

**Method of collection:**
*Measure:* Direct question to ask before and after the initiative begins.

*Administration:* Self-administered questionnaire to carers and/or care recipients.

**Conceptual or methodological limitations:**
Above selected items refer to the perceived level of digital skills and competences: they do not assess the objective skills and competences. To do that, it is necessary an ad hoc assessment tool elaborated by the each initiative coordinator in order to be able to assess the specific skills: it is different if we are talking of computers or telealarm devices’ related competences. Each device requires a different assessment in order to the type of technology used and the functions provided.

**Source:**
1: California Emerging Technology Fund 2008.
2: Adult Literacy and Lifeskills Survey 2000.


<table>
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<tr>
<th>7.ME.1</th>
<th>Availability of ICT tools within local communities</th>
</tr>
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**Definition:**
In order to assess the potential impact of ICT tools at community level, it is important to define the availability of the required ICT devices or related prerequisites (e.g. Internet connection) within the target population. Indeed, the availability of ICT tools refers both to the availability of non-provided devices and to the availability of non-provided prerequisites.

**Role of ICT:**
An ICT-supported initiative can deal with devices with different availability within the target population: widespread technologies (e.g. televisions), long-established technologies but not completely familiar to certain users (e.g. digital divide for computers or mobile phones), completely new devices to be installed ad hoc (e.g. tele-alarms or surveillance systems). What is going to be assessed through this indicator is the accessibility of ICT to users in terms of main devices and of general infrastructure (prerequisites).

**Method of collection:**
To be calculated, the availability of non-provided ICT device rate needs two measures:
- the number of households considered into the local target population (TH);
- the number of households considered into the target population who has got the non-provided device (THD).

Once that the two numbers above have been determined, we can calculate the value of the availability of non-provided ICT device rate through the following formula:

\[
\frac{THD}{TH}
\]

To be calculated, the availability of non-provided ICT prerequisite rate needs two measures:
- the number of households considered into the local target population (TH);
- the number of households considered into the target population who has got the non-provided prerequisite (THP).

Once that the two numbers above have been determined, we can calculate the value of the availability of non-provided ICT prerequisite rate through the following formula:

\[
\frac{THP}{TH}
\]

For simplicity, both rates may be turned into a percentage by multiplying each rate per 100.

A final low availability of non-provided ICT device rate can indicate that the ICT-supported initiative cannot reach all the target population because the ICT device is not widespread.

A final low availability of non-provided ICT prerequisite rate can indicate that the ICT-supported initiative cannot reach all the target population because the ICT device (even if it is installed ad hoc) cannot work without certain technical prerequisites.

**Conceptual or methodological limitations:**
Please notice that the availability of non-provided ICT device rate can be applied only if the initiative does not provide the device itself: this is often the case of on-line websites, which provide contents but not the computer. In other cases, it cannot be applied as the initiative can deal with completely new devices provided (e.g. as prototypes) to users.

Concerning the availability of non-provided ICT prerequisite rate, it can be applied only if the initiative does require specific technical prerequisites (such as internet connection or electricity). In some cases, the prerequisites are guaranteed by the initiative, overcoming local or household problems and the rate is not applicable.

In case the initiative requires also software (or non-hardware) prerequisites, they can be calculated in the same way of the availability of non-provided ICT prerequisite rate, although it could be difficult to find data or make estimations at a community level.

**Source:**
1: Empirica 2008.
## 7.ME.2
### Availability of skilled carers in ICT use within local communities

**Definition:**
Target users should be familiar to the ICT tool (having a previous “digital literacy”) or the device itself should be very easy to use (minimising the requirements to users): this indicator concerns the possibility for an ICT tool to be adopted in a specific local context.

**Role of ICT:**
Digital divide can represent a possible barrier to let carers use in an efficient way the device. Problems can arise from both the hardware and software interfaces. In this sense, digital skills and competences include the ones concerning computer tools, as well as other technical devices.

**Method of collection:**
To be calculated, the availability of skilled carers in ICT use needs two measures:
- the number of cares considered into the local target population (C);
- the number of carers considered into the target population who are skilled in ICT use (SC).

Once that the two numbers above have been determined, we can calculate the value of the availability of non-provided ICT device rate through the following formula:

$$\frac{SC}{C}$$

The rate may be turned into a percentage by multiplying it by 100.

A final low availability of skilled carers rate can indicate that the ICT-supported initiative cannot reach all the target population because the knowledge of ICT tool is not widespread.

**Conceptual or methodological limitations:**
Please notice that the availability of skilled cares rate can be applied only if the initiative does not provide training for the use of the technology.

**Source:**
1: California Emerging Technology Fund 2008.
2: Adult Literacy and Lifeskills Survey 2000.
Availability of ICT tools at national level

Definition:
In order to assess the potential impact of ICT tools at national level, it is important to define the availability of the required ICT devices or related prerequisites (e.g. Internet connection) within the target population. Indeed, the availability of ICT tools refers both to the availability of non-provided devices and to the availability of non-provided prerequisites.

Role of ICT:
An ICT-supported initiative can deal with devices with different availability within the target population: widespread technologies (e.g. televisions), long-established technologies but not completely familiar to certain users (e.g. digital divide for computers or mobile phones), completely new devices to be installed ad hoc (e.g. tele-alarms or surveillance systems). What is going to be assessed through this indicator is the accessibility of ICT to users in terms of main devices and of general infrastructure (prerequisites).

Method of collection:
To be calculated, the availability of non-provided ICT device rate needs two measures:
- the number of households considered into the national target population (TH);
- the number of households considered into the national target population who has got the non-provided device (THD).

Once that the two numbers above have been determined, we can calculate the value of the availability of non-provided ICT device rate through the following formula:

$$\frac{THD}{TH}$$

To be calculated, the availability of non-provided ICT prerequisite rate needs two measures:
- the number of households considered into the national target population (TH);
- the number of households considered into the target population who has got the non-provided prerequisite (THP).

Once that the two numbers above have been determined, we can calculate the value of the availability of non-provided ICT prerequisite rate through the following formula:

$$\frac{THP}{TH}$$

For simplicity, both rates may be turned into a percentage by multiplying each rate per 100.

A final low availability of non-provided ICT device rate can indicate that the ICT-supported initiative cannot reach all the target population because the ICT device is not widespread.

A final low availability of non-provided ICT prerequisite rate can indicate that the ICT-supported initiative cannot reach all the target population because the ICT device (even if it is installed ad hoc) cannot work without certain technical prerequisites.

Conceptual or methodological limitations:
Please notice that the availability of non-provided ICT device rate can be applied only if the initiative does not provide the device itself: this is often the case of on-line websites, which provide contents but not the computer. In other cases, it cannot be applied as the initiative can deal with completely new devices provided (e.g. as prototypes) to users.

Concerning the availability of non-provided ICT prerequisite rate, it can be applied only if the initiative does require specific technical prerequisites (such as internet connection or electricity). In some cases, the prerequisites are guaranteed by the initiative, overcoming local or household problems and the rate is not applicable.

In case the initiative requires also software (or non-hardware) prerequisites, they can be calculated in the same way of the availability of non-provided ICT prerequisite rate, although it could be difficult to find data or make estimations at a community level.

Source:
1: Empirica 2008.
### 7.MA.2
#### Availability of skilled carers in ICT use at national level

**Definition:**
Target users should be familiar to the ICT tool (having a previous "digital literacy") or the device itself should be very easy to use (minimising the requirements to users): this indicator concerns the possibility for an ICT tool to be adopted at national level.

**Role of ICT:**
Digital divide can represent a possible barrier to let carers use in an efficient way the device. Problems can arise from both the hardware and software interfaces. In this sense, digital skills and competences include the ones concerning computer tools, as well as other technical devices.

**Method of collection:**
To be calculated, the availability of skilled carers in ICT use needs two measures:
- the number of cares considered into the local target population (C);
- the number of carers considered into the target population who are skilled in ICT use (SC).

Once that the two numbers above have been determined, we can calculate the value of the availability of non-provided ICT device rate through the following formula:

\[
\frac{SC}{C}
\]

The rate may be turned into a percentage by multiplying it by 100.

A final low availability of skilled carers rate can indicate that the ICT-supported initiative cannot reach all the target population because the knowledge of ICT tool is not widespread.

**Conceptual or methodological limitations:**
Please notice that the availability of skilled cares rate can be applied only if the initiative does not provide training for the use of the technology.

**Source:**
1: California Emerging Technology Fund 2008.
2: Adult Literacy and Lifeskills Survey 2000.
4. Applying the methodological framework: guidelines for practitioners

Introduction
These guidelines consider the impact assessment of ICT-supported initiatives in the field of home care. The aim is to provide guidance on the methodological issues to address in assessing direct or indirect impacts of such initiatives. The guidelines are designed to assist practitioners carrying on an ICT-supported service for carers to develop a methodological framework which is appropriate to the case.

They are thought to provide information for practitioners involved in planning, implementing or evaluating an ICT-supported initiative in order to be aware of possible assessment methods and tools. They give insights on how to develop a proper approach for the specific initiative and consider different kinds of impact.

The guidelines are based on three sources:

- **literature review**: research done on dimensions and measures rose important points to be considered;
- **recommendations from experts**: during the CARICT Experts’ Validation Workshop (Brussels, 21-22 June 2011) and the Policy Makers’ and Experts’ Validation Workshop (Brussels, 21-22 November 2011) some methodological issues have been pointed out by external experts, which made suggestions on this regard;
- **evidence from the case study analysis**: the analysis of 12 good practices has been helpful in order to better focus some problems from the field work.

The prototype of Impact Assessment Methodology (IAM) developed by the CARICT consortium (see chapter 3) has been considered as the basis for initiative assessments: the guidelines have been designed according to this IAM. In this way, they can be applied to a wide range of cases. Carrying out an impact assessment of ICT-based solutions for carers is a good practice in order to recognise the effects of the service, develop improvement strategies, share results with practitioners (supporting the replication or activation of similar initiatives) and research community (having more data on which work on) and help policy makers to better understand the positive outcomes.

1. Preliminary analysis: identification of possible dimensions of impact
When an ICT-supported initiative is implemented, there is need to identify the possible dimensions of its impact since the final primary users can be different. For example, some
services may be more focused on improvements of carer’s quality of life, some others on cost savings and care efficiency (compared with non-ICT-based solutions having the same functions), others on improvements of care recipients’ quality of life that allow a bigger relief to the carer. Not all the dimensions identified in the IAM are relevant in every case: a preliminary analysis is needed to understand what aspects are relevant and can be really assessed. In particular, we can distinguish the seven dimensions of impact (see chapter 1) in two categories:

- **User-oriented dimensions**: these are based on profiles of the main users of ICT-supported initiatives:
  1. Quality of life of informal carer
  2. Quality of life of paid assistant
  3. Quality of life of care recipient
  4. Quality of care provided by informal carer and paid assistant

- **Initiative-oriented dimensions**: these are based on technical and operative characteristics of ICT-based initiatives:
  5. Care efficiency & sustainability
  6. Acceptability
  7. Infrastructure & accessibility

The first group includes user-oriented dimensions where at least one of them can be considered a primary one. In fact, not every dimensions are influenced by the service: according to the main users, as well as to the type of support provided, the focus of the solution may be on one category of users but not on others, as well as on more.

The second group includes initiative-oriented dimensions which can be always assessed. Initiative coordinators can decide if these dimensions are important or not to be considered depending of several contextual factors (e.g. size of the service, amount of budget required, type of devices used), but in principle it is always possible to include them into an impact assessment.

Concerning the first group, there is need to build a preliminary analysis in order to understand which dimensions are more likely impacted by the intervention. Such analysis should be based on the understanding of the different technologies and support functions: domains and measures will be built and stratified according these basic rules. The following matrix summarises possible examples of initiatives according to such different factors (Table 1).
<table>
<thead>
<tr>
<th>Types of technologies</th>
<th>Support functions</th>
<th>User-oriented dimensions of impact</th>
<th>Examples of ICT-based initiatives (not an exhaustive list!)</th>
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</table>
| **Independent living** | - carer’s quality of life (direct or indirect)  
- carer’s social participation (direct or indirect)  
- dependent older person | 1. Quality of life of informal carer AND/OR  
2. Quality of life of paid assistant | - Social alarms  
- Video surveillance  
**These devices give some kind of relief to the carer who may benefit in terms of improved health-related quality of life or social activities.** |
|                        | 3. Quality of life of care recipient | - Smart homes designed for care recipients  
- Assisted Ambient Living (AAL) | |
|                        | 4. Quality of care provided | - Smart homes or devices designed to help carers in caregiving activities | |
| **Information & Learning** | - carer’s quality of life (direct or indirect)  
- migrant-related | 1. Quality of life of informal carer AND/OR  
2. Quality of life of paid assistant | - Health information on websites  
- E-learning courses  
- Training materials  
**In the case of a migrant-related support, these services are integrated with language/culture courses or translation facilities/settings.** |
|                        | 3. Quality of life of care recipient | | |
|                        | 4. Quality of care provided | | |
| **Personal Support & Social Integration** | - carer’s quality of life  
- carer’s social participation (migrant-related) | 1. Quality of life of informal carer AND/OR  
2. Quality of life of paid assistant | - Counselling  
- Call centres for psychological, personal, and emotional support  
- Support groups  
**In the case of a migrant-related support, above services (for personal support and/or social integration) are available in different languages and/or have a focus on migrant care workers’ context.** |
|                        | 3. Quality of life of care recipient | | |
|                        | 4. Quality of care provided | | |
| **Care Coordination** | - carer’s quality of life (direct or indirect)  
- migrant-related  
- dependent older person (migrant-related)  
- quality of care through carer (indirect) | 1. Quality of life of informal carer AND/OR  
2. Quality of life of paid assistant | - Coordination with formal care services (less stress)  
- Access to e-health records  
- Organisation of public care services  
**In the case of a migrant-related support, these services are available in different languages and/or have a focus on migrant care workers' context.** |

Table 1: A matrix for identifying user-oriented dimensions of impact.
Of course, any initiative can be based on more than one technology or support function: this means that every service should carry its own impact assessment being careful to take into consideration all aspects and possible effects. Indeed one single service can provide different functions and concern many dimensions of impact.

Concerning the migrant-related support function, it is important to keep in mind that such function has been developed in the methodology in order to deal with those migrant care workers that are not fully integrated into the destination countries (e.g. because they arrived few time before and/or they spend much of their time in assisting the dependent person). In these cases, there is certainly need for language services that can facilitate the interaction between the migrant care worker, the family and the dependent older person, as well as a support for the use of devices and care facilities. However, in some cases such migrants can be already integrated into the society, not requiring features other than the standard ones.

2. Defining audience and levels of analysis

Once defined the dimensions on which the impact assessment will focus, there is need to understand the context of analysis. Is the assessment going to be an internal evaluation of the initiative, underlining weaknesses and points of strength? Or is it meant to be an instrument for policy makers in order to understand possible impact of the service if applied on a large scale? These are only a couple of questions that can arise from the specific contexts.

In general, there is need to consider the following types of audience:

- **Practitioners and researchers**: initiative coordinators are the most involved and interested in understanding the real effects of the ICT-supported solution on individuals. Moreover, researchers can gather evidence of positive impact in order to acquire more general knowledge on what services work and what do not. These types of audience require primarily impact data at micro-level. Please note that, in some cases, initiatives can allow a widespread access and use of the service, so that the micro-level of analysis could deeply vary among the types of initiatives (it depends on technology, functions, accessibility, success factors, etc.);

- **Companies and civil society organisations**: in some cases, companies and organisations are interested in testing or adopting a service internally in order to improve the conditions of the working carers (specifically at work or in general). These stakeholders may want to know if ICT-supported initiatives are effective both at micro- and meso-levels: in fact, the impact should be assessed both at an individual level (improvements for single persons) and at company or organisation level (overall benefits for them);

- **Local care providers**: of course, care providers are important stakeholders that aim to improve care services provided to local communities. Impact assessment should be able to demonstrate benefits not only for the single persons (micro-level), but also for the communities that are served by a local care provider (meso-level) in
order to understand the various differences between ordinary solutions and ICT-supported services;

- Policy makers: more interested in large scale scenarios, policy makers are a possible audience of impact assessment mainly for what concerns the macro-level. Even if individual stories are important, large evidence of data is a powerful means that allows policy makers to plan and decide about the sustainability and replicability of these kind of initiatives.

All these actors play an important role in the definition and assessment of ICT solutions. However, a clear identification of the audience is needed in order to understand which kind of impact assessment is going to be carried out and to focus the analysis on the levels more interesting for each actor.

In this sense, every impact assessment should be built on data gathered at micro-level: this means that the first step is to (1) select a sample of users, (2) implement the ICT-supported service, and (3) assess the impact on individuals.

Once proper micro-level data will be collected, meso- and macro-level data can be built as aggregations or simulations/predictions on a large scale. In some cases, it is possible to have results at meso-level through individual data collected and cumulated within a single organisation (e.g. company) or a local community. If the aggregation is not possible, than a projection can be carried out on the basis of available data at micro-level and estimated overall target population at meso-level. The macro-level is usually based only on micro-level data from which simulations can be built calculating the potential overall target population (in some cases, we are supported by national surveys and censuses that provide useful information for such calculations).

Furthermore, some impact assessment at micro, meso, and macro-level (e.g. dimension 5: Care Efficiency & Sustainability) is obtained by the application of certain formulas. Information in this respect can be provided by: carers (for micro-level); initiative coordinators and project managers, through qualitative interviews (for micro- and meso-levels); policy makers and experts through qualitative interviews (for meso- and macro-levels); available national data (for meso- and macro-levels).

3. Materials and methods
The aim of these guidelines is not to recommend a single method for assessing the impact of ICT-supported initiatives, but to propose some approaches that can be adapted and developed by practitioners and researchers according to the specific context.

Research design
The research designs proposed below have been considered ones of the most appropriate to be applied in the field of ICT for home care; of course, no design is completely free of threats for internal and external validity. Research designs that can be applied are, among the others:
• **within-subjects design (repeated-measures design):** this is an experimental design in which the same subjects are treated with different interventions in different times: each user allows to see the control and experimental situations. Longitudinal differences along the time are considered. This is helpful where different kinds of the same service are available, and especially in conducting a study when few users are available and there is not much time to carry it out. However, some problems may arise concerning maturation and history threats;

• **interrupted time series design:** this is a quasi-experimental design in which data are collected at multiple instances over time before and after the ICT-supported initiative. This is a simple design which allows practitioners and researchers to assess an initiative with the same group of people. The selected impact dimensions are assessed in the group several times before the intervention and then after that. However, this research design has some weaknesses because the service is supposed to be short in time and able to have an immediate impact. Also, individual assessments and use of the service should be carried out in parallel among all the people in the sample. It is not recommended to long initiatives or to those that have no proper schedule (e.g. informative websites). It can work with scheduled interventions (e.g. scheduled e-learning courses) and with high-impact solutions;

• **randomised controlled trials (RCTs):** this is a pretest-posttest design with a randomised assignation of sample users to experimental or control groups (this latter receiving no intervention). If possible, the ICT variable can be isolated through multiple treatment groups: one group receiving the whole support (ICT + non-ICT features); one group only the non-ICT features; one group no intervention. Even if randomised controlled trials are a golden standard, they require a lot of justification and are very expensive: they can become impracticable for pilots or small initiatives.

**Sampling process and drop-out rates**
Samples for quantitative assessment, considered as subsets of the overall targeted population, should be statistically significant and big enough in order to make some kind of generalisation of final results. There is no suggested number of people for samples: it depends from contextual factors (e.g. research design) and expected heterogeneity of targeted population, as well as from the practical constrains (e.g. time, budget). Sampling process may be non-probabilistic (researchers choose the sample groups: users have not the same probability to be assigned to one of the groups) or probabilistic (it is a random sampling where everybody in the targeted population have the same probability to be selected). Probability sampling is more accurate when applied on large numbers, whereas non-probability sampling is a better choice when dealing with a few number of users. Concerning this latter type of sampling, it is important to consider the selection bias. Who accept to be involved in an ICT-supported initiative may have already a positive attitude towards technologies: in this case, the sample could be not representative of the target population. Technology could be positively accepted by the sample using the ICT tool, but there is no guaranty that it can be generalised to the whole targeted population. Such selection bias calls for attention on this issue during the sampling process.
Furthermore, there is need to consider also the drop-out rate during the initiative, which contributes to indicate user satisfaction or dissatisfaction: if many people decides to give up during the initiative, it is a sign that something does not work in the initiative organisation or in the ICT use: this latter can be identified as an attrition problem. In some cases, however, drop-out rates can tell a different story: the ICT-supported initiative could be so effective that users do not need the service anymore. Of course, this can happen to informal carers or paid assistants, but it is unlikely to happen to dependent older people. Anyway, it is important to ask and understand users’ motivations when they drop out an initiative.

**Measures**

The IAM proposed in this work is a prototype that will serve as basis for applications and further developments. Specific measures with related references are mentioned in the methodology as proposed ones, but there are other available measures in the literature for each one of the seven dimensions of impact. Indeed, each indicator can be further developed with new measures and tools. Chapter 2 may be helpful since it provides a good overview on the dimensions from a methodological point of view, discussing also standardised measures and tools in the field. Also chapter 6 provides some good suggestions, with recommendations from external experts concerning other possible measures to be used as well for impact assessment.

In general, it can be argued that selected dimensions and indicators cannot be considered as a closed number: new assessment needs can arise from evidence or practice and the methodological framework used should be adapted as consequence.

Furthermore, there is need to consider that some overlap may exist between the indicators in the quality of life of informal carers and in the one of paid assistants. In fact, some indicators that have been originally planned to be used in the first dimension can be easily adapted and applied also to the second dimension (for details, see chapter 5).

**Ethics**

Finally, ethical issues need to be mentioned. In general, there is need to find a balance between what are the ethical and privacy limits of users involved and the benefits occurring in use the ICT devices: the solution should be found every time because it depends on contextual factors. Usually this balance is guaranteed by Review or Ethics Boards of the promoter organisations, which analyse carefully contents and methodology of the project (either running initiatives or research projects). If not, practitioners and researchers should keep in mind the importance of such issues in carrying on an ICT-based service or a study, involving target users and stakeholders in order to be sure of not missing anything important.

Concerning the aims of an impact assessment, discussion of results should be carefully pondered according to the final audience (e.g. policy makers, population) we are addressing, because they may misunderstand evidence and then approach related health problems in a wrong way.

The choice of the target user of the ICT-supported initiative is crucial too. These people can be really in need of help, but this does not mean the proposed solution is good for their
situation. In some cases, such users do not have the chance to influence the study or the service: user involvement in shaping the project should be considered as a good practice. Moreover, sometimes older people and carers involved cannot negotiate or really decide to be part of the study or not: in these cases, there is an involuntary participation to the project, an involvement without consent or even a proper coercion. An additional risk is to misunderstand (in good or bad faith, from researchers’ point of view) nature of research or its purposes, making people create their own wrong expectations. Indeed, attention on users’ perspective is required.

During the assessment of the initiative, ethical violations may arise from a misuse of coordinators’ power in approaching users. These latter could be asked to do something they do not want to do or that is detrimental of their dignity or rights. Even users’ physical or psychological conditions may be affected by the project coordinators and researchers if they are asked to act differently from their ordinary behaviour. Such risks should be avoided.

Finally, the privacy issue is one of the most crucial ones. Sometimes ICT tools may allow a control over the older person who is deprived de facto of his/her privacy: there is risk for initiatives to completely overcome the rights and dignity of older people in favour of an improved and wide service. Also carers may be involuntary constrained in decision making during the duration of the initiative. It is recommended to make a clear agreement with users and explain to them the details of initiative and study, in order to make them aware of every possible privacy limitation in advance.
5. Recommendations for the methodological framework

Introduction
Recommendations presented in this chapter concern the methodological framework developed by the CARICT project consortium. They have been elaborated by external experts involved in two separate events and asked to validate the overall framework developed and propose directions for future research.

The 22 experts\(^4\) who attended the Expert Validation Workshop (Brussels, 21-22 June 2011) made recommendations to the project consortium concerning the methodological framework, including the conceptual framework and the Impact Assessment Methodology (IAM) developed so far, and made suggestions for further developments. Some recommendations concern also project phases and objectives in general and they are mainly based on the conclusions experts made on the project development and related issues.

The 19 experts\(^5\) who attended the Policy Makers’ and Experts’ Validation Workshop (Brussels, 21-22 November 2011) made additional recommendations concerning the methodological framework and suggested some future directions of development.

In the following paragraphs, recommendations are listed without mentioning if they have been elaborated in the first or in the second workshop: such division is available anyway in project deliverables 3.4, Minutes of the Expert’s Workshop with a set of “Expert’s Recommendations for the Methodological Framework”, and 5.2, Minutes of the Policy Makers’ and Experts’ Workshop identifying the Recommendations to be taken into account for WP3 and WP5 Final reports.

Conclusions concerning project development
The experts saw tremendous value in the work done so far and recognised the project consortium had carried out a lot of work in a short period of time. They also recognised that the project has been influenced by several major constraints (i.e. time and budget) that influenced negatively the workflow and limited the project’s capacity to achieve all planned objectives. The experts suggested that the project from this point should narrow its focus

\(^{4}\) List of participants is available in Annex 2A.
\(^{5}\) List of participants is available in Annex 2B.
to only one or two core objectives, to allow it to make the most of the results already achieved. Otherwise, in trying to achieve too much, the whole project could become unsustainable and the overall quality of the study's outputs adversely affected.

1. Recommendations concerning the IAM already developed and project objectives

- **To consider the IAM as a first attempt that will serve for future developments.** The IAM developed so far should be kept as it is and not developed anymore within the project: it has great value as a first attempt to build a new methodological framework for evaluating the multidimensional effects of ICTs in home care. It should be seen as a foundation for future work to further develop IAMs in the field, which could draw on the necessary resources. The final integration report (D 5.3) needs to be built on previous deliverables to show in a policymaker-friendly way that more resources are needed to develop a comprehensive tool to assess the impact of ICT-supported initiatives.

- **No need for further testing of the IAM, in-depth qualitative analysis is preferable.** The project consortium should not test the IAM anymore since the testing phase has been planned to deal with a very small sample (not representative and statistically not significant) and the first results would not be comparable with the ones coming from the second testing phase (with methodological differences). Instead of further IAM testing, the project consortium can gather in-depth qualitative data on the initiative in order to describe the impact of ICT tools.

- **No chance to do cost benefit and cost utility analyses within the project timeline.** Cost benefit and cost utility analyses can be kept within the IAM, but it is not feasible at all to carry out such analyses for the selected initiatives due to obvious project constraints.

- **Need for use standardised instruments of data collection.** It would be best if the IAM included already existing, standardised, and validated tools for data collection. Where feasible, a balance of subjective and objective indicators should be used. New questionnaires or indicators can be developed and incorporated, where there is clear need but no existing and suitable instrument available.

- **Guidelines can provide methodological issues to be considered in applying an IAM in this field.** The IAM can provide guidelines (mainly on methodological and ethical issues) for practitioners and researchers interested in developing and applying IAMs in this field.

- **A clearer definition of the aims and of the final audience of the IAM is needed.** The project deals with too many tasks and objectives to be pursued in parallel (i.e. to review existing IAMs, to develop a new IAM, to test the new IAM, to provide evidence of ICT
tools impact, to provide recommendations to policy makers, to provide a definitive IAM to be used by researchers and practitioners). There is a need to focus only on one/two primary objectives and to limit the work expended on the others. Also, the audience for the IAM should be better clarified, since some research results may be more interesting to policy makers, while others of more interest to researchers, and still others of greater relevance to practitioners.

2. Recommendations for further developments of the conceptual framework

- **Need for enlarging the framework and considering also other actors involved.** The conceptual framework currently considers the carer-care recipient dyad as the starting point of the representation. However, it might be too narrow to focus only on the dyad at the micro-level. Other actors may be included into the framework, such as secondary carers, other carers from the same family and formal carers from integrated care services.

- **The role of formal carers should be included in future developments of the framework.** Excluding the care workers affiliated to the formal sector could be not the best choice in order to try getting a comprehensive picture of home care contexts and caregiving networks. Future research should clarify how formal carers fit into the framework already drawn. This is important also because care assistants may be paid anyway with public money. Indeed, this should be included in the network of care as a crucial cost issue at macro-level. Adding the formal carer in the framework has some consequences on the whole methodological framework of course, like the inclusion of an eighth dimension of impact at least – the quality of life of formal carer. The update action can be based taking into account already developed frameworks for long-term care such as the one from the INTERLINKS project (available online: [http://interlinks.euro.centre.org/](http://interlinks.euro.centre.org/)).

- **The role of families and kinships should be further analysed and clarified.** In the conceptual framework, only the primary carer is included in the micro-level: families are assigned to the meso-level as a social network because the research assumption was to focus on the carer-care recipient dyad – i.e. considering only the primary carer. This fact was justified from the current lack of knowledge and research on the topic of secondary and multiple family carers: there is no enough evidence at this time to assess contexts in which many family members provide care to the dependent person. However, future developments of the framework can try to address the multiple carers issue, drawing a network that includes all of them, perhaps considering families themselves as at the boundary between micro- and meso-levels.
Other approaches to build conceptual frameworks in this field are possible. The relevant actors that should fall within the scope of the IAM might be determined by different methodological approaches. For example, social network analysis would help in determining the actors involved and their interrelationships, also provide an understanding of the links between the micro and meso levels. Another possible approach would be to use a range of scenarios based on different caregiving situations. These might include different types of carers and the care recipient’s level of dependency in terms of: (a) mental/physical health, and (b) service utilization/costs for care recipients and their households.

3. Recommendations for improving the overall methodology of data collection

- **Methodology of the impact assessment should be defined in a rigorous way.** When applied, an IAM needs to strictly define the following points: (a) sample (number of users and selection process), (b) study design, (c) data collection. In this regard some common errors concern: the failure in identifying the exact number of people to be assessed; the criteria for selection; the variables to be controlled (if carers already use a support service before the ICT-based one, etc.), as well as issues relating to repeated measurements (i.e., specification of time between measurements, etc.).

- **Randomised controlled trials are not the only solution for research designs.** While randomised controlled trials (RCTs) are a ‘gold standard’ method for determining the effect of an intervention, they require serious justification due to their cost and the many pragmatic difficulties inherent in realising them. Another possibility would be, as an alternative, to use quasi-experimental settings such as by geographical separation or by giving technologies to different groups at different timepoints.

- **Multiple measures over time should consider all individual and contextual factors that may influence service use.** Needs of dependent elderly people and consequently of the carers change with time and the impact of ICT can also change. In the definition of the assessment tools, it is recommended to assess the contextual characteristics of the sample and their situation - i.e., the demographic details, the dependency of the care recipient and so forth. This is important in order to allow for comparison/aggregation of samples. With regards to service use, a good example comes from the EUROFAMCARE project, which developed a comprehensive list of services for carers/care recipients (the carer was asked to indicate the services currently used). A simplified version of this process would give a good measure of service use.

- **To avoid the use of national data from external sources because of comparability problems.** It is recommended that, when considering macro level changes relating to telecare initiatives, it is not possible to determine any changes using data collected nationally. The two main reasons for this are: (a) the time delay before nationally collected data is published, and (b) it is not possible to establish that any changes seen
in the data are caused by the intervention as opposed to other activities locally or nationally.

- **A coherent development process should lead to define the domain of the interventions to be considered:** (1) literature review on the overall possible interventions for carers; (2) literature review on ICT-based interventions for carers; (3) identification of areas with major potentialities. As ICT strategies are a subset of broader intervention strategies used with carers, it is important to review the literature on carer interventions generally, in order to understand what types of interventions work and why. This first step can be carried out quite easily since several recent reviews and meta-analyses are available in this regard (Sörensen et al. 2006). The key question to answer here is where ICT strategies fall within the broader framework of caregiver interventions. Another important question to address would concern which elements of existing interventions would benefit from ICT approaches.

The second step would be to review the empirical scientific literature on ICT-based intervention strategies: this is a fairly small but growing literature. It will be important to integrate/reconcile the scientific literature with the evidence of case studies in available (even grey) literature. They each have different strengths and weaknesses which would be useful to point out in order to provide future direction in this area.

The practical and scientific work in this area is promising but still in early stages of development. The third step would be to identify areas with the most promising potential and emphasize that in order for applied community-based programmes to move forward they need to adhere to a higher standard in terms of improving the evidence base so that more informed decisions can be made about where and how to invest in future development. Developing methods, tools, and resources that would improve evaluation methods for community-based programs and help community-based providers implement these strategies could be one of the goals of future development of the IAM.

- **Need for a terminology coherent with the one used by European institutions.** ICT terminologies should developed with reference to those used in the documents of the European Commission. Concepts like ‘ambient assisted living’, ‘ageing well’ (at work, at home, in the community), ‘end-users’ (primary, secondary, tertiary) need to be integrated in order to allow a better understanding by the market, administrations and users (elderly people and carers).

- **To differentiate the IAM according to different scenarios dealing with types of technologies, categories of carers, and caregiving contexts.** The IAM ideally should be able to measure impact across all of the different scenarios and long term conditions of older people, across the European states and other interventions and/or study-specific contexts. There should be aggregation by categories:
  - technologies: e.g. remote monitoring, interactive and educational services;
  - categories of carers: e.g. caregiver characteristics (capacities, age, gender, employment status) and motivation/relationship with care recipient;
o care recipients’ level of disability: different kinds, related to levels of care required.

It is difficult that one single framework could include and deepen every important aspect concerning all different possible scenarios. The differentiation of the IAM would lead to many benefits and would facilitate the work of researchers and practitioners (who have to apply the methodology), as well as of policy makers (who can better understand differences in potentialities and impact of the initiatives). In this way, there would be also a better linkage and aggregation from one level to another (micro to meso to macro); overlaps might therefore be avoided. For example, the indicators on work could be used only for certain care groups (e.g. not for married spouse carers).

- **To give attention to ethical and privacy issues arising from the use of ICT tools.** There is need to find a balance between what are the ethical and privacy limits of users involved and the benefits occurring from the use of ICT devices: the solution should be found every time because it depends on contextual factors. Ethical issues mainly concern the relationship between initiative coordinators (and researchers) and users involved. In particular, adequately achieving informed consent is important: it is recommended that people are made aware of how the initiative works, what is required from them and what are the possible limitations of their rights. Concerning privacy, there is a need to clearly inform users of how the initiative is carried out, what kind of information ICT tools make available to project managers and how it will be treated.

- **Applications of the methodological framework should bear in mind that it is a flexible tool to be adapted to contextual situations.** Even if it is already mentioned in the “Guidelines for practitioners” (chapter 4), it is important to stress and further develop application strategies for the methodological framework. This means that the overall model could consider more in detail who is going to assess the ICT-based initiative, how and for what purpose.

4. **Recommendations for further developments of dimensions and indicators**

- **Possible other measures may be used for assessing Quality of Life.** A measure that balances comprehensiveness with brevity would be the WHOQoL-BREF (26 items, 4 subscales: physical health, psychological health, social relationships, physical environment); there is a version for older people, which could be used with the care-receiver, if required. Otherwise, many quality of life measures are actually health-related quality of life measures (SF-12, EQ-5D), so if one of these were to be used, one should also use a measure of psychological well-being (WHO-5), psychological morbidity (GHQ-12) or depression (CES-D), together with a measure of social relationships (Loneliness scale). If the care receiver cannot respond reliably, and some indication of their well-being is required, then the Apparent Emotion Rating Scale is a good proxy measure of expressed/observable positive and negative affect. Regarding the carer-care recipient relationship, the Kreisman Affection Rejection scale
is an excellent measure of relationship quality, but not of caregiving relationships. The Mutuality scale was developed for this area so it might be more appropriate. Quality of life is the main focus, but QUALYs may be used as supplemental data.

- **Possible other measures may be used for assessing burden and dependency.** Objective and consistent items/instruments could be used in the evaluation of aspects of quality of life for the informal carer and care recipient, that are directly related to the caregiving context. Reliable instruments have been developed and can be used for the evaluation: burden (Zarit Burden Interview), dependency (Katz, Lawton & Brody Index) etc. The Zarit Burden Interview also refers to questions related not only to a general evaluation of burden, but also to factors like negative consequences of caregiving (Factor 1), feelings of incompetence (Factor 2) and negative relationships (Factor 3) (Carretero et al., 2007). The Zarit Burden instrument is the most widely used, but it only measures the negative impact of care. The COPE Index is recommended in this respect, as it provides measures of negative impact, positive value, and quality of support in caregiving as perceived by the carer, and is available in several European languages.

- **Possible other measures may be used for assessing Acceptability.** A further development of the IAM should include whether all appropriate levels of acceptability have been identified, for example user attitudes to technology and rejection of technologies. A good instrument that looks at perceptions of technology/assistive devices, and links that to issues such as wellbeing, is the PIADS (Psychosocial Impact of Assistive Devices Scale). The IAM could also include a measure of ambivalence, as people often have both positive and negative attitudes towards technology.

- **Inclusion of the reconciliation between care and family as an important sub-dimension of impact.** Even if indicators concerning employment issues are important, there is a need to consider also the reconciliation between care and family, which is a priority for all the carers already retired and non-working spouses.

- **Inclusion and further development of measures concerning sleep quality/quantity.** Some of the quality of life measures deal with sleep quality/quantity. However a specific focus (i.e. indicator) may be needed for clearly assessing sleep quality/quantity, if the quality of life measure selected does not tap this important issue.

- **Inclusion and further development of measures concerning care service utilisation by carers.** Some measures dealing with care service utilisation are already included in the IAM. However it is recommended to further develop such indicators, in particular focusing on the utilisation of such services by carers.

- **To avoid mistakes in talking about ‘burden’, ‘stress’ and ‘burnout’ measures.** Confusion regarding the concepts of ‘burden’ and ‘stress’ may occur when dealing with such issues: it is strongly recommended to differentiate the use of these according to
the available literature. Burden is a stress process, according to the Pearlin Stress process model (Pearlin, Turner & Semple, 1989; Pearlin et al., 1990; Pearlin, 1991; Aneshensel et al., 1995; Pearlin & Skaff, 1995; Gaugler, Zarit & Pearlin, 1999), developed to explain the negative effects of informal care on the carer (based on the Transactional Theory on stress of Lazarus & Folkman, 1984, 1987; Lazarus, 1991). Moreover, burden is a term used to refer to the consequences of caring in an informal context (see Grad & Salinsbury, 1963; Zarit, Reever & Bach-Peterson, 1980; George & Gwyther, 1986; Pearlin et al., 1990; Gaugler, Kane & Langlois, 2000). For the formal context, the more accepted term is ‘burnout’.

- **Some indicators originally developed for informal carers can be used also for paid assistants.** Even if there are differences between the quality of life of informal carers and that of paid assistants, some indicators can be useful for both cases (i.e. 1.2.MI.1, 1.2.MI.3, 1.3.MI.3, 1.3.MI.6).

- **Improvement of the indicators included in the dimension Quality of Life of Informal Carer, sub-dimension Health-related Quality of Life.** Indicators at meso- and macro-levels should be supplemented by non-work related indicators of health and well-being for the carer, e.g. derived from self-assessed health status or number of medical or hospital visits.

**Further readings suggested by the experts**


Belle, S. et al. (2006). Enhancing the quality of life of dementia caregivers from different ethnic or racial groups. Annals of Internal Medicine, 145(10), 727-738.


6. Analysis of 12 case studies: implications for the methodological framework

Introduction
This chapter discusses evidence of the impact of information and communication technologies (ICT) on home care contexts and related implications for the methodological framework built in the previous sections. It is based on in-depth analyses of 12 initiatives which have been selected as good practices in the field. Implications are built on the basis of:

- an analysis of current methods used to assess impact in the 12 cases using the methodological framework proposed in earlier chapters (i.e. the seven dimensions of impact identified). This analysis is provided in sub-paragraph 3.2;
- an analysis of the Impact Assessment Methodology (IAM) using the new empirical material (i.e. based on practice in the field) in order to understand if it provides a solid framework for assessment, if there are things assessed in practice that are not included, and if there are issues that just do not seem to appear in practice. This analysis is provided in sub-paragraph 3.3;
- a review of the original classification of ICT-based initiatives (technology used and functional support to carers) in order to clarify if it provides an added value in understanding the empirical material. This review is provided in sub-paragraph 3.4.

Acknowledgements
This chapter is based on the data collected by the CARICT project partners which analysed the 12 selected ICT-based initiatives for carers. Data collection and analysis have been carried out in the period April-October 2011. All data included in this section have been collected by the following partners, who we would like to thank:

- Carlos Chiatti, Italian National Institute of Health and Science on Aging (INRCA): analysis of Cuidadoras en Red (Spain, in collaboration with Trinidad Carrión, University of Málaga);
- Gary Fry, Centre for International Research on Care, Labour and Equalities (CIRCLE), University of Leeds: analysis of Just Checking (UK, with contributions from Celia Price, Just Checking) and Telecare Scotland (UK);
- Elizabeth Hanson and Lennart Magnusson, Swedish National Family Care Competence Centre (SNFCCC): analysis of ACTION (Sweden);
• Marco Socci and Carlos Chiatti, Italian National Institute of Health and Science on Aging (INRCA): analysis of CAMPUS (Italy, with contributions from Licia Boccaletti, Anzianienonsolo) and E-CARE (Italy, with contributions from Carla Fiori, CUP 2000 SpA);
• Andreas Stückler, European Centre for Social Welfare Policy and Research: analysis of Platform for Caring Family Members (Austria), SOPHIA (Germany) and Resources for Enhancing Alzheimer’s Caregiver Health I/II (USA);
• Zsuzsa Széman, Institute of Sociology, Hungarian Academy of Sciences: analysis of Emergency Alarm (Hungary) and Caring for Others (Canada).
• Nadja Widéhn, Swedish National Family Care Competence Centre (SNFCCC): analysis of IPPI (Sweden).

All case studies are available in the project deliverable 4.3, Final report containing case-by-case detailed description and analysis of 12 good practices (Chiatti et al., 2011).

1. Selection criteria and in-depth analysis
Previous steps of the project identified 52 good ICT-supported initiatives for carers that represent the largest European data-set available in the field at this moment (data collection and analysis have been carried out in the period January-May 2011). All these initiatives are beyond the pilot status and are integrated with the care system. Information on these cases is available in the project deliverable 2.3, Analysis and mapping of 52 ICT-based initiatives for caregivers (Schmidt et al., 2011), which includes both an overall analysis of the selected solutions and a case-by-case presentation of them. In order to better understand the impact and the success factors of such services, a second stage was conducted. Among the available operational and successful European initiatives, 10 ICT-based services have been selected by IPTS and project consortium. The selection tried also to keep a balance among the different care regimes (Simonazzi, 2009) to show ICT application in different national backgrounds. Furthermore, these European cases have been complemented by cases of two initiatives from North America which are recognised examples of high quality impact assessment design and providing convincing evidence of positive outcomes.

The selected initiatives are:

• **Anglosaxon area:**
  o Just Checking (UK)
  o Telecare Scotland (UK)
• **Continental area:**
  o SOPHIA (Germany)
  o Platform for Caring Family Members (Austria)
• **Scandinavian area:**
  o ACTION (Sweden)
  o IPPI (Sweden)
• **Eastern European area:**
  - Emergency Alarm (Hungary)

• **Mediterranean area:**
  - CAMPUS (Italy)
  - E-CARE (Italy)
  - Cuidadoras en Red (Spain)

• **North America:**
  - Caring for Others (Canada)
  - Resources for Enhancing Alzheimer’s Caregiver Health I/II (REACH I/II) (USA)

A case study method was used to explore each initiative, using a common data collection framework (see Annex 1), and guidance on questions to ask of people and documents. Each researcher was asked to analyse and write the case study in a form appropriate to the particular initiative. The case study method was developed with a three-fold aim:

1. to collect all the impact assessment and evaluation data available from within the service or project, in order to show in the most comprehensive way the actual impact of the service as it had been measured. This included documenting the evaluation methods use, and providing references to the original studies;
2. to explore what sort of Impact Assessment and evaluation had been carried out along the lifetime of the service, the methods used, the limitations and gaps, and the conditions under which this evaluation had been made, and use this also to provide a test of the scope of the proposed Impact Assessment Methodology (IAM);
3. to provide an account of the development of the service over time in order to contextualise the impact assessment, and provide the information necessary to inform the analysis of potential for scaling transferability and development. This description identified key enabling factors, barriers to development and how they were overcome, the actors, the way the technology, financial and professional support was developed, the decision points, the way that evidence of impact was used to inform decisions.

Data collection and analysis for this second stage have been carried out in the period April-October 2011: data was gathered through a small number of in-depth interviews with initiative coordinators and project managers of the services, web-based research and secondary analysis of existing data. Information presented is updated to October 2011: nature and features of services, as well as the geographical context, may change after this date and the submission of this deliverable.

The methodology of data analysis for the 12 case studies was different from the Impact Assessment Methodology (IAM) developed. As mentioned in the Introduction of this deliverable, the analyses of the 12 selected initiatives was not aimed to test the IAM itself, due to major project constraints (i.e. time and budget available). Each case was presented in order to show the previously gained evidence of impact and to underline which
dimensions from the IAM were more related to the service peculiarities and if any additional areas could be identified.

2. Limitations

The selected cases are limited in two ways. On one hand, the 10 selected European initiatives are not a representative sample of all the operational ICT-based solutions carried on in the continent. The analysis carried out in this section have not the aim of generalising results, but to check if the methodological framework is adequate to describe the complexity of ICT-based initiatives or it needs further adjustments and improvements from a theoretical and conceptual point of view. Such goal is achieved through the discussion of evidence gathered from the selected case studies, that is however limited and cannot provide a comprehensive picture of every ICT-supported service.

As well, the two interventions from North America are not representative of United States of America and Canada contexts. They have been considered to be useful in this work because they can provide some insights on initiatives different from European ones and that may present different approaches for impact assessment.

On the other hand, the cases were based on a very small number of interviews, and existing documents, collected during a relatively short period of time in 2011, so do provide a comprehensive case, for example, giving alternative perspectives on the development and benefit of a service from that of the main person responsible, or exploring in depth the methods and motivation for the specific evaluation and impact assessment studies conducted. Some of the cases were written by those who were closely involved in setting up and running the services, and providing detailed insights, but with of course the methodological limitation of an inside voice which has been addressed by case study design and editorial review.

Moreover, some limitations concerning the analyses of collected material exist too. As mentioned and explained previously (see the introduction to this report), the project was negatively affected by practical constraints (i.e. time and budget) that limited consortium in fully achieving all planned objectives (see recommendations made by external experts in chapter 5). In particular, the following analyses were carried out in a very short period of time (end of October – mid November 2011), between the end of single case studies and the second Validation Workshop (held in Brussels on 21-22 November 2011); working time allocated to this task by the workplan was also very limited. Some more work could be done on the basis of collected information: it represents a rich source of interesting data that may allow more in-depth and detailed analyses than the ones presented here. However, for the purposes of the project, the following analyses have been recognised as valuable and validated by external experts who attended the Policy Makers’ and Experts’ Validation Workshop (see deliverable 5.2, Minutes of the Policy Makers’ and Experts’ Workshop identifying the Recommendations to be taken into account for WP3 and WP5 Final reports), and considered as the best result that was possible to achieve in such timeframe and constraints.
3. Analysis of evidence and related implications for the methodological framework

As repeated above, the main goal of this chapter is to discuss the methodological framework on the basis of evidence gained through the case study collection. Each initiative has been analysed in-depth, reporting data on previous impact assessments carried out by project managers and coordinators.

This report starts to cross-analyse the findings of the cases in relation to impact assessment conducted by the initiatives and described in the cases. The aims of this are to

1) test the methodological framework against practice in the field, to assess whether it provides the basis of a good theoretical and conceptual instrument for impact assessment, and
2) to discover how assessment is carried out in practice. In fact, evidence can show new crucial dimensions of impact or critical issues in ongoing practice in ICT-based initiative evaluation methods. Furthermore, the classification of such solution is currently problematic and needs to be anchored to a solid practice.

The analysis will be presented in the following 4 stages:

- a matrix (Table 1) that links types of technologies (based on the nature of the service provided) with supported functions (based on users’ needs), identifying which are the dimensions of impact to be considered for each type of initiative. This table has been already presented in chapter 4, since it provides a general framework for understanding the possible impacts and outcomes of the ICT tools in relation to functions and technologies;
- case-by-case descriptions of initiatives (Tables 2.1-2.12) that provides an analysis of the impact assessment available in each of the 12 initiatives based on the methodological framework developed in earlier chapters (including types of technology, support functions and their relation with the dimensions of impact);
- an analysis of the Impact Assessment Methodology (IAM) using the new empirical material (i.e. based on practice in the field) in order to understand if it provides a solid framework for assessment, if there are things assessed in practice that are not included, and if there are issues that just do not seem to appear in practice;
- a review of the original classification of ICT-based initiatives (types of technology and functional support to carers) in order to clarify if it provides an added value in understanding the empirical material or it requires further changes.

3.1. A general framework for identifying possible dimensions of impact for each initiative

The starting point of the analysis of the 12 case studies is Table 1, which has been already presented in chapter 4. This table is a general framework aimed to link the types of technology and the support functions inserted in the conceptual framework (chapter 1) with the possible user-oriented dimensions of impact to be considered in assessing an ICT-based initiative for carers. As mentioned before, Table 1 includes only user-oriented dimensions, namely: 1. Quality of Life of Informal Carer, 2. Quality of Life of Paid Assistant, 3. Quality of Life of Care Recipient, 4. Quality of Care Provided by Informal Carer and Paid Assistant. The other initiative-oriented dimensions can be applied in all cases without distinctions: that is the reason they have not been included in Table 1 but are considered for the discussion of the 12 cases and in related Tables 2.1-2.12. These additional initiative-
oriented dimensions of impact are, namely: 5. Care Efficiency & Sustainability, 6. Acceptability, 7. Infrastructure & Accessibility.

Table 1 uses a functional framework, where each type of service is classified according to types and target of support provide, based on previous work by IPTS. *Independent Living* addresses dependent older people’s needs as a primary support function, but in some way it can support also carers’ quality of life and social participation or the quality of care through the carer: in these latter cases, however, the impact can be indirect as the mediated effect of some other primary outcome (e.g. if the tool allows older person to be more independent - primary outcome - the carer could be impacted having more relief from caring activities and improving his/her quality of life or social participation - secondary outcome).

*Information & Learning services* support mainly the quality of care through carer, since it provides informative and training material on caregiving contexts - e.g. how to better care for the older person with a specific disease. Of course, secondary outcomes can be related both to the dependent older people (improvement of their quality of life) and the carers' quality of life (e.g. making them aware of available services and contributing decreasing their depression). A migrant-related function is still possible, since this kind of informative and training materials can be accessed in other languages, facilitating migrant care workers.

Personal Support & Social Integration services address all carers’ personal needs in terms of quality of life and social participation: the aim of such services is to support carers, decreasing their care-related diseases (e.g. burden or depression through counselling or self-help groups) and increasing their opportunities to keep in touch with social contacts (e.g. allowing them to improve social participation with relatives and friends, as well as to allow reconciliation between their situation and work). A migrant-related function is possible, like call centre or counselling services available in different languages.

Finally, *Care Coordination systems and services* support all the needs related to a better integration between home care and formal care system. An improvement in this area can lead to important (even if mainly indirect) outcomes concerning carers’ quality of life (e.g. feeling more supported by care services and being less depressed), quality of care through carer (e.g. allowing a better home care by relatives) and consequently dependent older people (e.g. increasing quality of care can lead to better health conditions). Even in this case, migrant-related function is possible in order to provide more opportunities for migrant care workers to be contacted and contact formal care services.
<table>
<thead>
<tr>
<th>Types of technology-enabled services</th>
<th>Support functions</th>
<th>User-oriented dimensions of impact</th>
<th>Examples of ICT-based initiatives (not an exhaustive list!)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Independent living</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| carer’s quality of life (direct or indirect) | 1. Quality of life of informal carer AND/OR 2. Quality of life of paid assistant | - Social alarms  
- Video surveillance  
*These devices give some kind of relief to the carer who may benefit in terms of improved health-related quality of life or social activities.* |                                                          |
| carer’s social participation (direct or indirect) | 3. Quality of life of care recipient | - Smart homes designed for care recipients  
- Assisted Ambient Living (AAL) |                                                          |
| dependent older person               | 4. Quality of care provided | - Smart homes or devices designed to help carers in caregiving activities |                                                          |
| quality of care through carer (direct or indirect) | | |                                                          |
| **Information & Learning**           |                   |                                  |                                                          |
| carer’s quality of life (direct or indirect) | 1. Quality of life of informal carer AND/OR 2. Quality of life of paid assistant | - Health information on websites  
- E-learning courses  
- Training materials  
*In the case of a migrant-related support, these services are integrated with language/culture courses or translation facilities/settings.* |                                                          |
| migrant-related                      | 3. Quality of life of care recipient | |                                                          |
| dependent older person (indirect)    | 4. Quality of care provided | |                                                          |
| quality of care through carer (direct or indirect) | | |                                                          |
| **Personal Support & Social Integration** |                   |                                  |                                                          |
| carer’s quality of life              | 1. Quality of life of informal carer AND/OR 2. Quality of life of paid assistant | - Counselling  
- Call centres for psychological, personal, and emotional support  
- Support groups |                                                          |
| carer’s social participation         | 1. Quality of life of informal carer AND/OR 2. Quality of life of paid assistant | - Telework [only for informal carers]  
- Facilities for e-commerce or e-government services  
- On-line communities of carers’ advocacy and protection of rights |                                                          |
| migrant-related                      | 2. Quality of life of paid assistant | |                                                          |
| **Care Coordination**                |                   |                                  |                                                          |
| carer’s quality of life (direct or indirect) | 1. Quality of life of informal carer AND/OR 2. Quality of life of paid assistant | - Coordination with formal care services (less stress)  
- Access to e-health records  
- Organisation of public care services  
*In the case of a migrant-related support, these services are available in different languages and/or have a focus on migrant care workers’ context.* |                                                          |
| migrant-related                      | 2. Quality of life of paid assistant | |                                                          |
| dependent older person (indirect)    | 3. Quality of life of care recipient | |                                                          |
| quality of care through carer (indirect) | 4. Quality of care provided | |                                                          |
| **Table 1: A matrix for identifying user-oriented dimensions of impact.** | | | |
3.2. Case-by-case descriptions of the 12 initiatives comparing possible dimensions of impact and assessed ones

In order to provide to the reader some basic information on the selected initiatives, below a brief description per each initiative is presented, supported by tables summarising the initiative in terms of service functions and particular technologies deployed possible dimensions of impact, and evidence from previous impact assessment.

Concerning the types of technology-enabled services already presented in chapter 1, a first issue has been raised in classifying such services. In fact, “Information & Learning” and “Personal Support & Social Integration” were both dealing with possible complementary functions. In some cases, however, ICT-based solutions could be clearly ascribed to a certain category without implying the other one. For instance, some informative material can be recognised to be an “Information”-based initiative without any “Learning” function, whereas the first one deals more with static materials without any other support. Moreover, “Personal Support” services can be provided without a specific “Social Integration” function because they can be stand-alone tools, the first ones dealing with interaction with care professionals (in order to improve carers’ health conditions), the second ones dealing with relatives, friends and social life in general (in order to improve social participation needs). For these reasons, in the cases in which it was possible and clear, these two types of service were split, separating “Information” and “Learning”, as well as “Personal Support” and “Social Integration”.

Moreover, each table present both types of dimensions identified in chapter 4, both user-oriented and initiative-oriented ones. Since these latter ones are not corresponding to a specific support function or a type of service, they have been included in all tables at their bottom: possible evidence from case studies is included in the last column (“Outcomes and notes”) with clarifications if that outcome concerns the ICT-supported solution in general, only a type of technology or a specific ICT tool.

Initiatives are listed in alphabetical order.
3.2.1. ACTION (Sweden)
http://www.actioncaring.se

The Assisting Carers using Telematics Interventions to meet Older people’s Needs (ACTION) initiative is an ICT-based mainstream support service designed together with frail older people and their family carers to help empower them in their daily lives by providing access to web-based educational programs and support from other ACTION families and dedicated care practitioners at a local call centre in the municipality via the use of an integrated videophone system.

<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Evidence of assessment</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Recipients and Informal Carers</td>
<td>Personal support &amp; Social integration: company with other carers through video-communication tool</td>
<td>carers' social support</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
<td></td>
<td>Carers’ subjective quality of life: reduction of social isolation and increased sense of security. The service represents a more environmentally friendly way of working for formal case staff as they use the video-system when contacting service users.</td>
</tr>
<tr>
<td></td>
<td>Information &amp; Learning: good practices for the management of the care recipient through on-line texts, videos and courses</td>
<td>carers' quality of life</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>quality of care through carer</td>
<td>Client application + website</td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
<td></td>
<td>Care recipients’ subjective quality of life: reduction of social isolation and increased sense of security. The impact is related to the use by the older person of the information &amp; learning and tools: it is not an indirect impact of the improved quality of care but a direct impact of using the service.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
<td></td>
<td>Concerning family carers, evaluation data revealed higher levels of preparedness on the care of their spouse/partner at home; they also expressed higher levels of self-esteem and mastery over their situation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5. Care Efficiency &amp; Sustainability</td>
<td>X</td>
<td></td>
<td>In 2004 the first cost calculation was made and revealed that ACTION service gave Borås municipality a saving of 10,000 Euros per year per family.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6. Acceptability</td>
<td>X</td>
<td></td>
<td>The ACTION service has undergone extensive usability and user acceptance work based on a user centred design model.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7. Infrastructure &amp; Accessibility</td>
<td>X</td>
<td></td>
<td>ACTION made several efforts in order to make his service easily accessible, even for those with low digital skills.</td>
</tr>
</tbody>
</table>

Tab. 2.1: Main features of the ACTION initiative with possible dimensions of impact and outcomes from previous assessments.
3.2.2. CAMPUS (Italy)  
http://www.anzianienonsolo.it/?page_id=21

This training system (based on e-learning, through the CAMPUS platform, or based on both e-learning and courses in presence) empowers/raises awareness on issues of long-term care and updates the knowledge and skills of caregivers and private care workers, in particular migrant care workers. CAMPUS is part of ASPASIA, an ICT-based initiative for social and professional inclusion of care workers; it aims to fill a gap in the provision of skilled training for caregivers of older people, using ICTs (i.e. the platform CAMPUS) in a flexible manner, promoting their use even by people without computer skills. Impact assessment has been carried out for this initiative, including assessment of quality of care provided by the carer, acceptability, infrastructure and accessibility. Information on assessments have been retrieved from the documentation available in the project coordinator website (www.anzianienonsolo.it), in the website of the project PIC Equal ASPASIA (www.equalaspasia.it). Direct information was gathered through both interviews with the project coordinator Licia Boccaletti, who is the director of the social cooperative Anziani e Non Solo, and questionnaires to users of the services.

<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paid Assistants - Migrant Care Workers</td>
<td>Information &amp; Learning: e-learning</td>
<td>carers' quality of life</td>
<td>Website &amp; DVD</td>
<td>2. QoL of Paid Assistant</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>courses through audio, video, text material</td>
<td>migrant-related</td>
<td></td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td>dependent older person</td>
<td>quality of care through carer</td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Training activities have improved job opportunities for MCWs: 60-70% of the people trained and enrolled in local professional registers, obtained a job within a year time frame. Testing the knowledge has been assimilated after training.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. Care Efficiency &amp; Sustainability</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. Acceptability</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Users expressed a high level of satisfaction for the e-learning activities. Overall drop-out rate was extremely low.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7. Infrastructure &amp; Accessibility</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Users have been provided with different material based on technical possibilities and time availability.</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 2.2: Main features of the CAMPUS initiative with possible dimensions of impact and outcomes from previous assessments.
Caring for Others (CFO) is an Internet-based program evolved from a series of research projects initiated in 2000. The aim was to design a user-friendly Internet-based intervention program for family caregivers of persons with chronic diseases/disabilities (Dementia, Parkinson, Stroke and Traumatic Brain Injury). It is able to replicate online, using group video conferencing, the same outcome results as face-to-face support groups for caregivers. The main improvements are in physical and mental health status and a reduction in stress associated with caring for a relative with a long-term disability. A lot of impact assessment has been carried out for this initiative, including assessment of quality of life of informal carer, quality of life of care recipient, care efficiency and sustainability. Evidence is publicly available and led to several publications, among the others: Marziali (2005, 2006, 2008), Marziali & Climans (2009), Marziali & Donahue (2006), Marziali & Garcia (2011), Marziali et al. (2005a, 2005b, 2006, 2010). Additional information was retrieved with the collaboration of initiative coordinator, Prof. Elsa Marziali (University of Toronto).

<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Evidence of assessment</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal Carers</td>
<td>Personal support &amp; Social integration: participation in interactive (video) therapy sessions AND Information: disease-specific handbooks</td>
<td>carers' social participation</td>
<td>Website</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
<td>The main improvement was in physical and mental health status and a reduction in stress associated with caring.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>carers' quality of life</td>
<td></td>
<td>2. QoL of Care Recipient</td>
<td>X</td>
<td>It reduces the time that patients are in a hospital or institution or delays admission into long-term care institutions as well.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dependent older person (indirect)</td>
<td>quality of care through carer</td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. Care Efficiency &amp; Sustainability</td>
<td>X</td>
<td>A cost-saving estimate was done with regard to keeping dementia patients out of institutions for one year. Reduction in the need for travel and costs of face-to-face support groups. No calculation given or actual saving in practice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. Acceptability</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7. Infrastructure &amp; Accessibility</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 2.3: Main features of the Caring for Others initiative with possible dimensions of impact and outcomes from previous assessments.
Cuidadoras en Red (English translation: “Woman Carers’ Network”) is an initiative led by the Institute of Innovation for Public Welfare (I2BC) in collaboration with the Nursing Department of the University of Malaga (UMA). This ICT-solution was set up in November 2008 in Malaga (Spain) and now it works through an online network. It basically consists in a social network aimed at both family carers of dependent elderly, social-care workers and private care workers (mostly immigrant women). The technical solution offers the targeted population a framework for communication, cooperation and training in giving care to the elderly and dependent. The users communicate between each others using online tools such as photo albums, personal blogs, community blog, community forum, group files, messages, and videos.

Impact assessment has been carried out for this initiative, including assessment of quality of life of informal carer, quality of care provided by the carer, acceptability, infrastructure and accessibility. All information has been retrieved from the documentation available in the web (e.g. www.cuidatel.es) and from direct information gathered through interviews with the project coordinator Trinidad Carrión (University of Malaga), as well as through publicly available assessments (Carrión & Armayones 2006).

<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Evidence of assessment</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal Carers</td>
<td>Personal support &amp; Social integration: online self-help groups and support from professionals</td>
<td>carers' social participation</td>
<td>Website</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
<td>Improvements of social activities; improvements of intergenerational relationships between carers and their children. ICT and information skills developed (proxy for QoL).</td>
</tr>
<tr>
<td></td>
<td>Information &amp; Learning: online courses on caregiving</td>
<td>carers' quality of life</td>
<td></td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>dependent older person (indirect)</td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
<td>Training assessment and higher motivation to learn.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>quality of care through carer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5. Care Efficiency &amp; Sustainability</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6. Acceptability</td>
<td>X</td>
<td>Willingness to use the website is built or improved. High retention rate (80%).</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>7. Infrastructure &amp; Accessibility</td>
<td>X</td>
<td>Digital skills and competences are built or improved through digital literacy sessions. Lack of access to computers.</td>
<td></td>
</tr>
</tbody>
</table>

Tab. 2.4: Main features of the Cuidadoras en Red initiative with possible dimensions of impact and outcomes from previous assessments.
3.2.5. E-CARE (Italy)
http://www.cup2000.it/reti-ecare/

The E-CARE system represents an innovative service which uses new technologies as an instrument to foster integration between the different health and social services; in particular, the initiative aims at creating an integrated service network for the care of older people using ICTs. The system is organised as a call-centre and, depending on the needs of the users, it offers a wide range of services (e.g. telecare, tele-alarm, video-phone and video-conference, telemonitoring, telemedicine and teleinformation) to support care recipients. By supporting the older person, the initiative reduces the burden of family caregivers.

Impact assessment has been carried out for this initiative, including assessment of quality of life of informal carer, quality of life of care recipient, care efficiency and sustainability, acceptability. Data have been retrieved from service provider website (http://www.cup2000.it/) and from an interview with initiative coordinator Carla Fiori. Furthermore, some material is publicly available: Cipolla & Guarino (Eds.) (2009), Fiori (2010), Lupi & Orsi (2007), Malvi et al. (2009), Moruzzi (2005).
<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Evidence of assessment</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Recipients</td>
<td>Independent Living: carers’ respite through social alarm tool</td>
<td>carers’ quality of life (direct or indirect)</td>
<td>Telealarm system</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
<td>Improved health-related quality of life of carers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>carers’ social participation (direct or indirect)</td>
<td></td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
<td>Improved health-related quality of life of care recipients.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dependent older person</td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>quality of care through carer (direct or indirect)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Care Recipients and Informal Carers</td>
<td>Personal Support &amp; Social Integration: support the interaction with other organisations for the provision of goods or services; telecompany and hotline services.</td>
<td>carers’ social participation AND</td>
<td>Call centre</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
<td>Improved health-related quality of life of carers.</td>
</tr>
<tr>
<td></td>
<td>Care Coordination: personal dossier update; support in accessing to formal care services; accompanying users to specialists; activation of nurses and care workers if needed.</td>
<td>carers’ quality of life</td>
<td></td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>dependent older person (indirect)</td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>quality of care through carer (indirect)</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. Care Efficiency &amp; Sustainability</td>
<td>X</td>
<td>Reduction of hospitalisation rate led to cost saving for the local care system. Internal indicators of effectiveness and efficiency. Attempts to measure costs of population in relation to savings.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. Acceptability</td>
<td>X</td>
<td>High level of carers’ satisfaction with the service.</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>7. Infrastructure &amp; Accessibility</td>
<td>X</td>
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</tr>
</tbody>
</table>

Tab. 2.5: Main features of the E-CARE initiative with possible dimensions of impact and outcomes from previous assessments.
3.2.6. Emergency Alarm (Hungary)
http://www.maltai.hu

It provides an emergency alarm for older persons, and family carers are able to replace institutional care. On the one hand emergency alarm ensures the independent living of older people. On the other hand family carers gain time to care for carrying out other family tasks, reconcile care and work or have leisure time. Impact assessment has been carried out for this initiative, including assessment of quality of life of informal carer, quality of life of care recipient, care efficiency and sustainability, infrastructure and accessibility. Data has been retrieved from interviews with the initiative coordinator from the Hungarian Maltese Charity Service (service provider) and internal assessments (carried out in 2010 and Autumn 2011). Furthermore, some information is still publicly available in organisational reports (among the others: Hungarian Maltese Charity Service 2008, 2009).

<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Recipients</td>
<td>Independent Living: carers’ respite through social alarm tools</td>
<td>carers’ quality of life (direct or indirect)</td>
<td>Telealarm system + call centre</td>
<td>1. QoL of Informal Carer</td>
<td>Survey assessed that psychological support provided by call centre improve carers’ health-related QoL and give relief for more leisure time and a better reconciliation with work.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>carers’ social participation (direct or indirect)</td>
<td></td>
<td>3. QoL of Care Recipient</td>
<td>Survey assessed that the social alarm tool reduces rates of care recipients’ admission to residential homes and hospitals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dependent older person</td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>quality of care through carer (direct or indirect)</td>
<td></td>
<td>5. Care Efficiency &amp; Sustainability</td>
<td>Estimations were made to assess cost savings, confirming the ICT-based service is cost effective if compared to hospital/residential services.</td>
</tr>
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<td></td>
<td>6. Acceptability</td>
<td></td>
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<td></td>
<td></td>
<td>7. Infrastructure &amp; Accessibility</td>
<td>Preliminary assessment was done in order to adapt the service to different geographical and social contexts.</td>
</tr>
</tbody>
</table>

Tab. 2.6: Main features of the Emergency Alarm initiative with possible dimensions of impact and outcomes from previous assessments.
Ippli opens up new channels of communication for people who currently remain outside the digital society. In addition to increased contact with family and friends, via ippi and their regular TV individuals can also easily communicate with health-care providers, medical care and service providers as the local cleaning company, pharmacy, grocery store, hairdresser, pedicure, etc. For the ippi-user this means that important information is readily available in one place. In addition, individuals can have a voice in their own daily lives and the support and the services which concerns them.


<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Evidence of assessment</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Recipients and Informal Carers</td>
<td>Personal Support &amp; Social Integration: improvement of social relationships through audio, video and text messages</td>
<td>carers' quality of life AND carers' social participation</td>
<td>Ippi device + connections with available TV set and mobile phone network AND web-based Ippi central system</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
<td>Improvement of social networks and contacts. Generational boundaries disappear. Better contact and planning between healthcare and relatives that lead to less stress for carers.</td>
</tr>
<tr>
<td>Informal Carers</td>
<td>Care coordination: facilitate the communication with formal care providers via email, voicemail and text messages. Carers often have a more direct communication with care providers if they use ippi.</td>
<td>dependent older person (direct and indirect)</td>
<td>Quality of care through carer (indirect)</td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
<td>People with functional impairment benefit with improvements in their health-related quality of life and social participation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
<td>5. Care Efficiency &amp; Sustainability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. Acceptability</td>
<td>X</td>
<td>Long-established user-driven development with designers and researchers.</td>
</tr>
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<td></td>
<td></td>
<td>7. Infrastructure &amp; Accessibility</td>
<td>X</td>
<td>It can be used with any kind of TV and phone.</td>
</tr>
</tbody>
</table>

Tab. 2.7: Main features of the IPPI initiative with possible dimensions of impact and outcomes from previous assessments.
3.2.8. Just Checking (UK)
http://www.justchecking.co.uk

Just Checking is an electronic monitoring system that requires no active input from the person being monitored, with small, wireless sensors in the key rooms of the house triggered as a person moves around their home; data from the sensors are gathered by the controller, a small box, and sent via an integral mobile phone to the Just Checking web-server, where carers and care workers can monitor the information. Where a service user is cognitively impaired and living alone, there is ample evidence that JC offers support for informal carers and can assist key workers in planning formal care inputs, leading to greater confidence and more sustainable care packages.

Impact assessment has been carried out for this initiative, including assessment of quality of life of informal carer, quality of life of care recipient, care efficiency and sustainability, acceptability. All information gathered is based on interviews with Celia Price, Director of Just Checking, or on information publicly available on the company’s website (www.justchecking.co.uk). Further evidence is publicly available: Department of Health (2008), Herefordshire County Council & PCT (2009), Leeds Partnerships NHS Trust (2009), Roworth-Gaunt et al. (2009), University of Nottingham & Nottinghamshire County Council (2010), Warwickshire County Council (2006).
<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Possible dimensions to assess</th>
<th>Evidence of assessment</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care Recipients and Informal Carers</td>
<td>Independent Living: carers' respite through social alarm tools AND Care Coordination: management of health data with the support of care workers from formal sector.</td>
<td>carers' quality of life (direct or indirect) carers' social participation (direct or indirect)</td>
<td>Telealarm system + website</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
<td></td>
<td>Carers gained a better insight into how the condition affected the cared for person. Communication and relationships with formal care workers are improved.</td>
</tr>
<tr>
<td></td>
<td>dependent older person</td>
<td></td>
<td></td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
<td></td>
<td>Residential admission rates were reduced (using JC in integration with another service). JC was evaluated as an assessment tool for people with dementia living alone, allowing them to manage better their lives.</td>
</tr>
<tr>
<td></td>
<td>quality of care through carer (direct or indirect)</td>
<td></td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. Care Efficiency &amp; Sustainability</td>
<td>X</td>
<td></td>
<td>Cost effectiveness in comparison to an admission to institutional settings has been verified.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. Acceptability</td>
<td>X</td>
<td></td>
<td>Possible wariness was largely overcome by the training, information and support provided with JC by the service provider. Carers felt that the system is very easy to install. Some third sector organisations wary about commercial service. Cost considered barrier, but no non-user study.</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>7. Infrastructure &amp; Accessibility</td>
<td>X</td>
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</tbody>
</table>

Tab. 2.8: Main features of the Just Checking initiative with possible dimensions of impact and outcomes from previous assessments.
The Platform for Caring Family Members (in German: "Plattform für pflegende Angehörige") is a website established by the Austrian Federal Ministry of Labour, Social Affairs and Consumer Protection, providing a diversity of information for caring relatives. Carers find valuable information on several care-related issues (e.g. care allowance etc.) on the website, also available in Slovakian language for migrant care workers.

No in-depth impact assessment has been previously carried out for this initiative, officially because of limited resources allocated by the organisation: only accesses to the web platform have been monitored (infrastructure and accessibility dimension). All information has been retrieved from the initiative webpage and through interviews by mail with contact persons at the Austrian Federal Ministry of Labour, Social Affairs and Consumer Protection (BMASK) in March and in August 2011. Moreover, additional information was gathered through questionnaires to users of the initiative: contacts with these users have been predominantly ensured by an Austrian self-help group for family caregivers caring for people with dementia (Alzheimer Angehörige Austria, www.alzheimer-selbsthilfe.at). Further data have been gathered from publicly available documents: BMASK (2008a, 2008b).

<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informal Carers and Paid Assistants</td>
<td>Information: good practices for the management of the care recipient through on-line texts</td>
<td>carers' quality of life (direct or indirect)</td>
<td>Website</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>migrant-related</td>
<td></td>
<td>2. QoL of Paid Assistant</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dependent older person (indirect)</td>
<td></td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td>quality of care through carer</td>
<td></td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5. Care Efficiency &amp; Sustainability</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6. Acceptability</td>
<td>X</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7. Infrastructure &amp; Accessibility</td>
<td>X</td>
</tr>
</tbody>
</table>

Tab. 2.9: Main features of the Platform for Caring Family Members initiative with possible dimensions of impact and outcomes from previous assessments.
Resources for Enhancing Alzheimer’s Caregiver Health (REACH) is an American research program sponsored by the National Institute on Aging and the National Institute on Nursing Research. Its primary purpose is the development and testing of interventions designed to enhance the quality of life and ease the burden of family members caring for people with Alzheimer’s disease and related disorders. REACH was performed in two phases:

- REACH I was designed as a multisite study implementing a variety of different interventions at six different sites. Two of these interventions concerned ICT-based solutions: an innovative Computer-Telephone Integrated System (CTIS), from now on “REACH I (1)”, and an automated telecare system based on an Interactive Voice System (IVS), from now on “REACH I (2)”;
- REACH II was targeted on assessing the efficacy of one specific intervention strategy with a multi-component approach. The research included a component based on a Computer-Telephone Integrated System (CTIS), from now on “REACH II (3)".

A lot of impact assessment has been carried out for both research programmes, mainly concerning assessment of quality of life of informal carer. Evidence has been retrieved from REACH I and REACH II programmes webpages, as well as from available publications: Belle et al. (2006), Eisdorfer et al. (2003), Mahoney et al. (2003), Schulz et al. (2003). Additional data have been retrieved from the National Registry of Evidence-based Programs and Practices (NREPP) (http://nrepp.samhsa.gov/ViewIntervention.aspx?id=129).
<table>
<thead>
<tr>
<th>Initiative</th>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Outcomes and notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>REACH I (1)</td>
<td>Informal Carers</td>
<td>Personal Support &amp; Social Integration: participation in interactive (video and text) therapy sessions</td>
<td>carers’ quality of life</td>
<td>Computer-Telephone Integration System (CTIS)</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
</tr>
<tr>
<td>REACH I (2)</td>
<td>Informal Carers</td>
<td>Personal Support &amp; Social Integration: stress monitoring and counselling through audio conversation; communication and support among carers through text messages</td>
<td>carers’ quality of life AND carers’ social participation</td>
<td>Interactive Voice Response (IVR) (including system narrator, bulletin board, mailbox, activity-respite-conversation system)</td>
<td>1. QoL of Informal Carer</td>
<td>X</td>
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<td>REACH II (3)</td>
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<td>Personal Support &amp; Social Integration: participation in interactive (video and text) therapy sessions</td>
<td>carers’ quality of life</td>
<td>Computer-Telephone Integration System (CTIS)</td>
<td>1. QoL of Informal Carer</td>
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<td>carers’ social participation</td>
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<td>Independent Living: care recipient distraction through audio conversation</td>
<td>dependent older person</td>
<td>3. QoL of Care Recipient</td>
<td>X</td>
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<td>quality of care through carer (direct or indirect)</td>
<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
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3.2.11. SOPHIA (Germany)
http://www.sophia-franken.de
http://www.sophia-hausnotruf.de

SOPHIA is an acronym standing for Soziale Personenbetreuung – Hilfen Im Alltag (English translation: “Social personal assistance and help in everyday life”). The emergency alarm services offered by SOPHIA are targeted towards dependent older persons, made possible by a team of professional and volunteer caregivers. SOPHIA combines social support with a modern security wristband to receive help in cases of emergency and/or the possibility of a videophone to get in contact with the SOPHIA team or relatives anytime.

Impact assessment has been carried out for this initiative, including assessment of quality of life of informal carer and quality of life of care recipient. Evidence has been retrieved from the SOPHIA websites and from an interview with Martina Saalmüller, head of the SOPHIA service centre in Bamberg (SOPHIA Franken). Further evidence is available in publicly available reports: Empirica, WRC & TUW (2010), Mollenkopf et al. (2010).

<table>
<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Evidence of assessment</th>
<th>Outcomes and notes</th>
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<tbody>
<tr>
<td>Care Recipients and Informal Carers</td>
<td>Independent living: carers' respite through social alarm tool AND Care coordination: health and personal data collected through an electronic tool</td>
<td>carers' quality of life (direct or indirect) carers' social participation (direct or indirect) dependent older people quality of care through carer (direct or indirect)</td>
<td>Safety wristband (emergency button + logfiles of care recipient’s activity) AND/OR GPS mobile phone with emergency button &amp; GSM emergency call device</td>
<td>1. QoL of Informal Carer 2. QoL of Care Recipient 3. Quality of Care Provided by Informal Carer and Paid Assistant 4. Care Efficiency &amp; Sustainability 5. Acceptability 6. Infrastructure &amp; Accessibility</td>
<td>Yes</td>
<td>The primary impact on family members consists in a certain relief of sorrows. The service can also contribute to the working life of relatives who would otherwise have to look after the older person more frequently. The personal assistance provided by voluntary godparents contributes to a considerable improvement of social life of the elderly.</td>
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Tab. 2.11: Main features of the SOPHIA initiative with possible dimensions of impact and outcomes from previous assessments.
The national Telecare Development Programme for Scotland was launched in August 2006 as a policy initiative to drive the adoption of telecare by local social and health care service providers. The telecare services developed in Scotland bring tailored ICT-based support packages to carers and the people they care for, supporting them in their various circumstances and providing flexibility for both (e.g. in terms of employment opportunities and ‘peace of mind’ for the carer, and increased independence for the cared for person).


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<thead>
<tr>
<th>Main target users</th>
<th>Types of technology</th>
<th>Support functions</th>
<th>Types of ICT tool provided</th>
<th>Dimensions of impact</th>
<th>Outcomes and notes</th>
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<tr>
<td>Care Recipients</td>
<td>Independent living: carers’ respite through telecare tools</td>
<td>carers’ quality of life <em>(direct or indirect)</em></td>
<td>different telecare services: telealarms, call centres, sensors, etc.</td>
<td>1. QoL of Informal Carer</td>
<td><strong>X</strong> Three-quarters of all carers reviewed felt ‘less stressed’. The beneficial impact of telecare most often cited was that it offered the carer ‘peace of mind’ about the well-being and safety of the person they cared for. Telecare helped some carers participate in paid employment. Most carers felt that telecare complemented their caring role rather than reducing or replacing caring tasks.</td>
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<td>carers’ social participation <em>(direct or indirect)</em></td>
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<td>3. QoL of Care Recipient</td>
<td><strong>X</strong> Preventing admissions to hospitals and rest homes was also found as a positive outcome.</td>
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<td>dependent older person</td>
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<td>4. Quality of Care Provided by Informal Carer and Paid Assistant</td>
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<td>quality of care through carer <em>(direct or indirect)</em></td>
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<td>5. Care Efficiency &amp; Sustainability</td>
<td><strong>X</strong> Estimations on local care providers’ cost savings were made.</td>
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<td>6. Acceptability</td>
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<td>7. Infrastructure &amp; Accessibility</td>
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Tab. 2.12: Main features of the Telecare Scotland initiative with possible dimensions of impact and outcomes from previous assessments.
3.3. Reviewing the Impact Assessment Methodology: gaps between theory and practice

The analysis of evidence collected underlined some important issues to be considered for the methodological framework. In particular, below the gaps between theory and practice in impact assessment are summarised:

- **Lack in theory - things that have been assessed in practice but not included in the methodological framework**: in general, the IAM was able to include within its framework the great majority of evidence collected from previous impact assessments. No further important dimensions or indicators were found in practice. Some points can be considered still:
  - impact assessment for the CAMPUS initiative used an indicator that is not included yet into the IAM, i.e. the “increased job opportunities for paid assistants”. As evidence shows, CAMPUS was effective in allowing migrant care workers to be enrolled in local professional registers and find quickly a job (CAMPUS allowed up to 70% of migrants to be hired in one year). This indicator is important because gives the opportunity to realise the effectiveness of a training programme through the impact on the specific home care “labour market”, that is the main distinction between a paid assistant (who cares for getting a wage) and an informal carer (who cares because of other personal motivations. It is recommended to include this indicator into new developments of the IAM;
  - impact assessment for the Caring for Others initiative provided evidence (supported by related literature) of an indirect impact of a Personal Support & Social Integration technology on dependent older people’s quality of life. At first, Table 1 did not recognise possible effects of that technology on care recipients, but actually available data make clearer that they should be considered as well. In fact, Personal Support & Social Integration technology supports carers’ needs, but in doing that it can lead to improve quality of home care and health condition of older people. It is recommended to include both dependent older person and quality of care through carer support functions into the matrix for identifying user-oriented dimensions of impact (i.e. Table 1);
  - finally, impact assessment for the ACTION and IPPI initiatives arises a point concerning the focus of service evaluations. In fact, these ICT-based solutions are provided to both care recipients and carers: however, since they both deal with Personal Support & Social Integration (in addition, Information & Learning for ACTION), the IAM addressed mainly the impact on carers without adequately considering the primary impact on care recipients. In particular, ACTION provides Personal Support & Social Integration and Information & Learning support to carers and dependent older people, which both are positively influenced: they receive information for improving independency and social participation tools for being in contact with other people. Such impacts have not the carer as a mediator: care recipients are initiative users as well as carers. For these reasons, there is need to better
qualify the focus of the IAM, in order to understand if such methodological framework should include instruments to assess only impact on carers (as it has been developed so far) or if it should include all possible instruments to assess impact on both carers and care recipients (in this case, an integration with available IAMs for older people would be needed). The first solution can be easily addressed through the prevision of an impact on dependent older person also in Information & Learning and Personal Support & Social Integration technologies. The latter one would need to further improve the IAM and build a more comprehensive framework able to take into account all effects from carers’ and care recipients’ sides;

- **impact on health professionals:** there are a whole range of other contextual factors that are considered important within some cases that do not appear in the IAM – these relate to policy frameworks and care services provided by the formal sector (e.g. Telecare Scotland and E-CARE). However, such dimension of impact was not considered in the whole project as a primary object of study (since the focus was on home care provided by informal carers and privately paid care assistants): future developments of the methodological framework should take into account this issue (see also related recommendations in chapter 5);

- **Lack in practice - things that are included in the methodological framework but not assessed in practice:** a lot of gaps in practice were found. No initiative was able to provide evidence on all the foreseen dimensions of impact. Lacks in practice are summarised below:
  - **lack of evidence on impact on paid assistants:** only one initiative is expressed built for paid assistants (CAMPUS), but still it does not include any in-depth assessment on Quality of Life of Paid Assistant. Moreover, even if most of other services could be adapted to paid assistants’ needs, no testing or proper evaluation seemed to be carried out. Informal carers remain the primary focus of the ICT-based initiatives. There is need to carry out more assessment on these services adapted to paid assistants’ needs;
  - **main focus on micro-level of analysis:** the initiatives generally provide good assessment at micro-level, investigating the effects on individuals (both carers and care recipients), but there is clearly a lack in evaluating effects at meso- and macro-levels. In some cases, meso-level was assessed through estimations of Care Efficiency & Sustainability for local care providers (Caring for Others, E-CARE, Emergency Alarm, Just Checking and Telecare Scotland), as well as calculations of hospitalisation or institutionalisation rates for the Quality of Life of Care Recipient dimension (E-CARE and Telecare Scotland). No clear assessments at meso-level were made concerning important issues like family and work reconciliation, and social life. No assessment at all was found for the macro-level: even if data at micro (or even at meso) level was available, no effort was made to do proper aggregations and estimations in order to find out possible effects on the overall national care and social protection systems. This lack of data clearly
precludes possibilities for these kind of initiatives to be taken more into considerations by national and EU policy makers, which need to understand possible effects if adopted on a large scale;

- **Quality of Care Provided by Informal Carer and Paid Assistant**: this dimension of impact is not adequately considered in previous impact assessments. Only few initiatives (ACTION, CAMPUS and Cuidadoras en Red) came up with some assessment of information material and training programmes provided, the same ones that are based on Information & Learning technology. This means that it makes very few sense to include this dimensions in the other types of technology. It can be argued that in practice there is no possibility to identify an impact on Quality of Care (that is provided by the carer itself and does not measure at all any quality of care by professionals affiliated to the formal sector) in technologies different from Information & Learning;

- **Information technology**: evidence from the selected cases, as well as from the 52 ones (Schmidt et al., 2011), raises a point concerning initiatives based only on Information technology. These kind of solutions usually provides static informative material to carers about home care, with no high-level interaction with health professionals. The carer accesses the material on his/her own. As literature generally recognises, level of impact of these initiatives is pretty low: the main reason is that they can only influence an intermediate factor (i.e. knowledge) in order to improve other cognitive (e.g. attitudes, beliefs, values) and behavioural factors (e.g. care activities), or health itself (e.g. stress, depression). The link among all these factors is not causal, indeed it is not possible to assume for sure that increasing knowledge we are able to influence quality of life of carers or any other dimension. The weakness of these initiatives is also affected by another practical problem, that is the lack of related impact assessment. In fact, informative service can be assessed anyway in order to understand if it leads to some kind of cognitive or real outcome. However, usually informative services are just carried out without in-depth assessment (in most cases by public organisations), like the case of Platform for Caring Family Members, in which only the data on user accesses are available and provided as an indicator of effectiveness. This situation calls for new practical efforts in assessing information provision for carers: in each ICT-based solution with informative service there is need to identify possible impact factors on a primary level (i.e. knowledge) and secondary one (i.e. cognitive or health-related);

- **Acceptability**: this dimension of impact clearly depends on the type of ICT tool used and the overall service provided. In some cases (E-CARE and Just Checking) Acceptability concerns the whole service, whereas in others it concerns the specific ICT tool (ACTION, CAMPUS, Cuidadoras en Red and IPPI). Obviously, the best way to assess the Acceptability of an ICT-based solution is to assess both types. Still, many tools that accomplished several functions (e.g. Caring for Others, REACH I/II and SOPHIA) do not provide any
adequate assessment of Acceptability, that would be a good practice to carry out to be sure users are comfortable with the services. This lack of evaluation requires a deeper consideration and investigation of the way users adopt ICT tools and services in practice.

Standing to the points summarised above, it seems quite clear that the IAM developed so far is a good and comprehensive methodological framework for assessing the impact of ICT-based solutions for carers. Some minor changes could improve the IAM through the addition of a new indicator (“increased job opportunities for paid assistants”) and empower the general framework for identifying user-oriented dimensions of impact (adapting support functions to each type of technology) available in Table 1. In general, however, nothing was found to be completely missed from the IAM.

On the opposite, a lot of work should be done in order to improve current practice in impact assessment. Even the 12 selected initiatives (which could be labelled as among the best ones in Europe and North America), are still not able to provide information concerning all the possible dimensions of impact (except for ACTION, the only ICT-based solution among the selected ones that evaluated to some degree all dimensions). Lacks in practice are evident and lead to few available data at meso- and macro-levels: nothing is known about eventual effects of adopting the initiatives on a large scale. Still, some micro-level data is available and could lead (if improved) to proper estimations at meso- and macro-levels.

Finally, two points deserve to be mentioned as issues to be considered for further developments of the IAM.

First, as already said, only one initiative out of twelve (ACTION) currently provides assessment on all the dimensions of impact: the widespread under-investigation in current impact assessment of many dimensions is clear. However, as stated here in the guidelines for practitioners (chapter 4), the IAM should be considered as a flexible tool that can adapt itself to the peculiarities of the single initiative. This means that the development of an adequate methodological framework depends on contextual factors that should be taken into account: this concerns not only time and available resources for carrying out the assessment (practical constrains), but also features of the service provided. In some cases, for example, there could be no need for proper assessing Acceptability or Infrastructure & Accessibility if the service deals with already well-established tools and target users are known to have an adequate level of skills for using it. Furthermore, if our initiative is focused on providing personal support and/or social integration only to carers, we could be more interested in assessing the outcomes for carers than the ones for care recipients which would be indirect in this case and require some more methodological efforts to be found out. It all depends on the assessment priorities of project managers and practitioners and on the aims (and audiences) of evaluation. The lack in practice (i.e. the fact that nobody is taking into consideration all seven dimensions of impact) is not necessarily a negative point because it means that impact assessment adapts to ICT-based solutions’ characteristics. However, possible negative consequences of this adaptation are (1) the missing of some important dimensions that, thought to be non-important, are crucial
instead, and (2) the limited focus on micro-level that prevent any kind of generalisation of results on a large scale and of estimations of positive impacts at meso- and macro-levels. The second point to be considered concerns the overall methodological framework and its autonomy. Since the CARICT project was carried out with the aim of focusing (for the first time in Europe) on the impact of ICT-based solutions for carers of dependent older people, the framework tried to include all possible aspects dealing with the carer and the carer-care recipient dyad (see the conceptual framework, chapter 1). However, evidence shows how the line between assessing impact on carers and assessing impact on care recipients is thin: for instance, some technologies can have both categories as target users and leading to a direct impact on care recipient where it was supposed only an indirect one (e.g. ACTION). The IAM considers the role of dependent older people; still, the development of types of technology, support functions and dimensions of impact was done according to the focus on carers. For these reasons, new discussion, proposals, and research could be needed in order to understand if ICT-based solutions in home care need different frameworks (according to the main users: an IAM for carers and another one for care recipients) or a single comprehensive, more general framework (able to integrate impact assessment for both carers and care recipients). This issue is mainly a policy-oriented topic, since practitioners and researchers still carry out research and impact assessment on the basis of their needs (e.g. focusing only on carers or care recipients, or on both): policy makers, as a possible audience of the IAM, could be interested however to understand at once all possible impact of ICT tools in home care, merging the two perspectives.

3.4. Reviewing the classification of ICT-based initiatives for carers

The conceptual framework (chapter 1) developed for the CARICT project provides, among the other things, also a possible classification of ICT-supported initiatives for carers, based on both the technology used and the function they offer. Such classification served as a starting point for the research carried out and for building a general framework linking technologies, functions, and dimensions of impact (Table 1). Since the focus of the project is on informal carers and privately paid assistants, there was need to overcome other classifications of ICT tools already used in the field of home care but addressing mainly frail older people’s needs, like ambient assisted living devices, domotics and smart homes: in fact, these are technology-based interventions designed for older people in which carers are only marginal actors. This point led to consider how to present a classification of home care technologies that address carers’ needs. The classification used in the CARICT project is explained in chapter 1, and was the basis for building Table 1. It distinguishes the following types of technology-enabled service:

- **Independent Living:** technology systems that allow elderly dependents to stay at home without continual formal or informal care support, thus relieving pressure on carer. It may allow caregiver to leave recipient alone, or help them in caregiving. Examples: social alarms; call centres; monitoring, wandering alarms, granny cams, ICT assisted living and ambient assisted living technologies; environmental controls (e-health can be included if relevant to support of carers);
- **Information & Learning**: tools that give access to information and training about caregiving, health and care issues for the dependent older persons, information and training about coping with caring; training for life - language, other work skills, accreditation of skills etc. Examples: on-line (or maybe standalone electronic form) information (websites); training materials (websites, video, games, interactive etc); learning support services – including telephone (and face to face);

- **Personal Support & Social Integration**: this provides social, emotional & peer support, leisure, relief of isolation and chances for participation in work, civil society etc. Examples: social networking systems for peer support; volunteer call networks (mobile, internet); call centres for counselling; access and support for internet access for ecommerce, e-government services, entertainment, family communication etc.

- **Care Coordination**: tools for coordinating formal sector and informal and family employed carers. Allows organisation of respite, sharing information on recipient’s and carers needs etc. Examples: organisational systems with carer access, or for use by networks of carers both formal and informal.

Evidence from the case studies provides useful information in order to evaluate the developed framework and to improve it. In general, it can be argued that the classification of technologies is helpful in better understanding potentialities of ICT-based services, identifying support functions and related dimensions of impact. However, some points can be discussed for further improving and strengthening the classification.

The first main aspect that arises from the case study analysis concerns the differences existing among the initiatives: even analogous ICT-based services with same main function may present a different level of complexity. In many cases, initiatives deal with more types of technology at the same time, such as: ACTION, Caring for Others and Cuidadoras en Red (Personal Support & Social Integration and Information & Learning), E-CARE and REACH I (2) (Independent Living, Personal Support & Social Integration, and Care Coordination), and IPPI, Just Checking and SOPHIA (Independent Living and Care Coordination). This evidence has not a direct impact on the service classification but it calls for a contextual integration of technology-enabled service types on the basis of the nature of the service provided (e.g. support functions, ICT tools, users’ needs): assuming the four categories as main ones, possible mixed categories can be built and new investigations on their validity carried out. The complexity of these initiatives should be kept in mind in developing an assessment framework.

A second point is to consider the overall service, the type of ICT tool and the quality of contents/services provided through them when building the contextual methodological framework for assessing an ICT-based initiative. On one hand, there is need to better understand and focus on users’ needs, which can be satisfied through different ways of communication (since ICT-enabled services are supposed to improve also this process among actors involved in home care). The main thing, here, is to concentrate on the users’ experience, evaluating both contents transmitted through the devices and features of the ICT service (e.g. graphic user interfaces): even if features are still considered in some cases (included in Acceptability assessment), no real assessment of quality of content is available.
in collected data. On the other hand, evidence shows that it is not possible to split contents, features and ICT tools: different tools can provide the same contents and features but with different users’ perception and patterns of use, as well as same tools can transmit different contents and features. For instance, video-communication tools or on-line fora were found to be useful and effective in some cases (e.g. ACTION and Cuidadoras en Red) but not in others (e.g. Platform for Caring Family Members and SOPHIA): in these cases, impact assessment does not demonstrate that ICT tool is effective or not, but that it is effective in a given context (influenced by providers, users, contents, cost, features etc.). There is need to elaborate a more complex assessment of ICT-based initiatives taking into account not only types of technology and support functions, but also different types of ICT tools (at hardware and software levels), including its features and contents. For example, even if self-help groups can be organised through different ICT tools like video-chat (e.g. ACTION, REACH I (1) and REACH II (3)) or on-line fora (e.g. Cuidadoras en Red) addressing the same type of technology and support functions (Table 1), users’ experience in each case is different and calls for different assessments: this means to validate features of the service and contents provided through proper evaluation and testing processes with desk (e.g. semiotic analysis) and field (e.g. usability and comprehension tests) work.

Finally, as mentioned before, some types of services (Information & Learning and Personal Support & Social Integration) concern quite broad intervention areas that may be divided. In fact, Information technology clearly refers to static material provided without any support or interaction with professionals, whereas Learning services deals with interactive training programmes. Clearly, some features of the selected initiatives (handbooks in Caring for Others and the overall Platform for Caring Family Members) fill into the Information category but not on the Learning one. On the other side, the line between Personal Support and Social Integration is thin: it can be argued that Personal Support deals more with support from professionals, whereas Social Integration more with increasing social life with relatives, peers and work (or other social activities). However, the fact itself to participate in a distant self-help group have an impact on carers’ quality of life (e.g. addressing depression) and on their social participation (e.g. feeling less alone, increasing contacts with others). For these reasons, it is more difficult to split the Personal Support & Social Integration technology if compared to the Information & Learning one. In any case, even this latter can be difficult to be split if it presents both static and dynamic features (like on-line fora or private communication with professionals): in some cases, also a combination with Personal Support & Social Integration is possible. Such considerations imply a contextual analysis of ICT-based initiatives for carers, understanding their characteristics in order to fill them into an adequate technology framework. A combinatory exercise able to take into account every possible variation and feature of these initiatives is not possible due to the potential complexity of services and the more and more frequent integration among different functions: the only practical way to overcome such difficulties is to have some main technology categories that serve as basis for building the analysis of the ICT-based solution, considering all contextual relevant factors.
Summary
The 12 initiatives reported as good practices in this work provide interesting material to discuss in order to understand which further improvements of the methodological framework are required or possible.

In general, the Impact Assessment Methodology demonstrated to be able to catch the vast majority of outcomes currently assessed by practitioners in the field. This means that the methodological framework is adequate to describe the possible dimensions of impact of such initiatives.

However, some issues arise from evidence collected. First, many gaps in practice of impact assessment were found. The main one concerns the lack of evidence at meso- and macro-levels: research focuses mainly on individual effects, in some cases dealing also with some Care Efficiency & Sustainability issues for local care providers, but macro-level is completely missing. Other issues are: the paid assistants are not adequately considered as a target user group of the initiatives; in many cases, the Acceptability dimension of impact is not assessed in complex initiatives that address many different support functions; in many cases informative services do not assess real outcomes on carers, limiting themselves to provide information for improving knowledge, without evidence for other cognitive or health-related outcomes.

Second, the methodological framework could be improved through minor changes: a new indicator can be included (“increased job opportunities for paid assistants”) in the Quality of Life of Paid Assistant dimension (retrieved from CAMPUS experience); some support functions can be added to the Personal Support & Social Integration technology in the framework for identifying dimensions of impact (Table 1); the Quality of Care Provided by Informal Carer and Paid Assistant dimension of impact can be limited only to Information & Learning technology. Moreover, some further developments could include the possible impact of ICT-based services on other actors and stakeholders (not yet in the conceptual framework) like professionals from the formal sectors (see also limitations of the study in the introduction and recommendations in chapter 5 in this regard).

Third, technology classification needs contextual adaptation in order to adequately report the complexity and richness of each initiative. Assessment frameworks need to be built on the ICT-based service peculiarities, including support functions, features and contents provided.

Finally, an overarching issue emerged concerning the focus of such Impact Assessment Methodology, its audience and purposes. Even if the focus of the methodological framework is the impact on carers, it is quite evident that some kind of impact on care recipient should be taken into account too. However, since some outcomes for care recipients were included in the framework and some other not because of project assumptions, there is risk to do not capture interesting and useful impact. Further research could clarify this point, underlining further requirements of an Impact Assessment Methodology in the field and understanding which direction is most useful to take. In other words, if it is better to improve the already developed methodological framework focusing only on carers or if it is better to integrate the framework with other available ones focused on dependent older people in order to build a unique, comprehensive and exhaustive framework in the field of ICT-based services in home care.
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Please note that all on-line resources are retrieved October 15, 2011, from indicated weblinks.


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## Annex 1  Template for reporting case-by-case information

<table>
<thead>
<tr>
<th><strong>Descriptive Information</strong></th>
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<tbody>
<tr>
<td>Website</td>
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<tr>
<td>Region(s)/Country</td>
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<tr>
<td>Rationale and motivation for the initiative</td>
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<td>Objective of the organisation</td>
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<td>Target user groups</td>
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<tr>
<td>Type of activities and services offered</td>
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<tr>
<td>Technologies and applications are used</td>
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<tr>
<td>Functions provided by ICT technologies and applications</td>
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<td>Development methodologies</td>
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<td>Categorization of stakeholders</td>
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<table>
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<tr>
<th><strong>Operational Information</strong></th>
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<tr>
<td>Starting operational (– ending) dates and operational status</td>
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<tr>
<td>Funding and budget</td>
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<tr>
<td>Other resources</td>
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<tr>
<td>Stakeholders’ involvement</td>
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<tr>
<td>Personnel involved in providing the service</td>
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<tr>
<td>Number of users reached</td>
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<tr>
<td>Requirements (e.g. skills, devices) to use the application / service</td>
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<tr>
<td>If needed, how did carers acquire the needed ICT skills</td>
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<tr>
<td>How do carers get knowledge about available ICT-supported services</td>
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<tr>
<td>Drivers and barriers for usage (from users and implementers’ perspective)</td>
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<tr>
<td>Reasons why they use an ICT-based service (and not only personal care)</td>
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<tr>
<td>Innovations introduced by ICT in connection to the context in which they are applied</td>
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</table>

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<tr>
<th><strong>Enabling conditions and success/failure factors</strong></th>
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<tbody>
<tr>
<td>Enabling conditions</td>
</tr>
<tr>
<td>Other local context conditions favouring / preventing a wider adoption of the ICT solution</td>
</tr>
</tbody>
</table>
### Success and failure factors

**Impact Assessment**

- Core dimensions of impact
- Major proved benefits for carers and care recipients
- Monetary outcomes
- Possible outcomes for stakeholders
- Possible unexpected outcomes
- New outcomes

**Future Perspectives**

- Sustainability model and perspectives
- Scalability capabilities and conditions
- Replicability elements
- Objective conditions for transferability to other local contexts across Europe

**Policy Implications**

- Digital inclusion
- Social inclusion
- Employment
- Social care
- Health care
- Immigration and integration
- Lifelong learning
- Any other lessons learned
Annex 2A  List of participants to the Expert Validation Workshop

The following experts attended the Expert Validation Workshop, held in Brussels on June 21-22. They validated the developed methodological framework and elaborated recommendations for further improving it (see chapter 5). Detailed minutes of the Workshop are available in deliverable 3.4, *Minutes of the Expert’s Workshop with a set of “Expert’s Recommendations for the Methodological Framework”*. 

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<th>N°</th>
<th>Abb.</th>
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</table>
Annex 2B  List of participants to the Policy Makers’ and Experts’ Validation Workshop

The following experts attended the Policy Makers’ and Experts’ Validation Workshop, held in Brussels on November 21-22. Among the other tasks, they elaborated additional recommendations for further improving the methodological framework (see chapter 5). Detailed minutes of the Workshop are available in deliverable 5.2, Minutes of the Policy Makers’ and Experts’ Workshop identifying the Recommendations to be taken into account for WP3 and WP5 Final reports.

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<th>No</th>
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