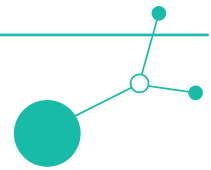# DIGICARE4CE

TRANSNATIONAL DIGICARE4CE MODEL |08.2024

O 1.1. Transnational DigiCare4CE model - LEARNING document

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INTRODUCTION

The Transnational DigiCare4CE Model creates a reference framework for the digital equipment level of long-term care facilities for older people and forms the basis for the strategic digital transformation in a short-, medium- and long-term development period.

It is a DIGITAL TRANSFORMATION model based on the desk research, review of good practices and understanding of different concrete situations of long-term care (LCT) facilities. Building on the realisation that each LTC facility has its own specifics it stands before implementation plan and online tool for LTC facilities.

Finally, it is DIGICARE4CE learning, living document that will be improved during the implementation of the pilots and for which wider impact and connectivity with local LTC and digital environment will be researched as state of the art and added during the next period.

DEFINITION OF TERMS

Long-term care facilities (LTC) provide both medical and personal support services to patients who are unable to live independently. The type of care that these facilities provide differs from short-term care to that administered for an extended period (typically 12 months or more) and does not have a defined outcome like treatment for an acute disease, illness, or injury. Long-term care facilities provide critical daily support to patients who might not have the resources or ability to care for themselves (Definitive Healthcare, 2024).

Terms digitization, digitalisation, and digital transformation have become increasingly prevalent. These concepts encompass the adoption and integration of digital technologies to enhance business processes, models, and operations. Understanding the distinctions between digitization, digitalisation, and digital transformation strategy is crucial for businesses or organizations aiming to leverage these approaches effectively (Dieffenbacher, 2024).

Digitalisation refers to the use of digital technologies in the context of the production and delivery of a product or service. Such digital technologies allow healthcare services to be organised, produced and delivered in new ways. Digitalisation is, therefore, less of a 'technical' process (like digitisation), it is also an organisational and cultural process (EXPH, 2018).

Digitalisation in long-term care facilities involves using digital technologies to enhance healthcare processes and operations. For example, it could mean implementing electronic medication administration records (eMARs) to ensure accurate medication administration, using wearable health monitoring devices to track patient vitals, and utilizing telehealth solutions to provide remote consultations. Digitalisation aims to improve the efficiency and quality of care delivery while maintaining or enhancing patient outcomes.

Digital transformation indicates that healthcare services and systems are in a transition in which more health services and processes will be digitalised. Digital transformation encompasses the instrumented effort to meaningfully introduce new digital information and communication technologies and corresponding new processes into the healthcare sector (EXPH, 2018).

Digital transformation in long-term care facilities encompasses a broader change in how care is provided and managed. It involves rethinking the entire care delivery model by leveraging digital technologies. This might include implementing advanced analytics to predict health deterioration, integrating smart sensors for fall detection and prevention, adopting AI-powered tools for early disease diagnosis, and optimizing staffing and resource allocation through data-driven insights. Digital transformation in this context aims to revolutionize patient care, enhance patient and staff experiences, and optimize facility operations.

Another common useful term is **Digital maturity** which describes the extent to which digital systems are leveraged for high-quality healthcare. Digital health maturity models are structured evaluations that allow healthcare organizations to document the current digital state and develop roadmaps for improving patient care, health outcomes and health equity. it can assist healthcare providers with their digital health strategy and monitor progress towards achieving organizational goals through digital change (Woods et al., 2022).

Digital maturity is connected to the digital literacy of organisation and its employees. Under **digital literacy** we understand the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital technologies for employment, decent jobs and entrepreneurship. It includes competences that are variously referred to as computer literacy, ICT literacy, information literacy and media literacy (Law, Woo and Wong, 2018).

A. IT STARTS WITH AN IDEA

Every transformation starts from an idea that something could be or should be different. But not all ideas have a same transformative power. For successful transformation it is important that idea comes from genuine need and desire to change. Furthermore, it is important that this need is understood and desire shared by all – decision makers, managers and other employees. Before you proceed, try to verify:

> What is your motivation for starting digital transformation? Does your idea answer a need of your LTC facility?
>
> Who proposed this idea (decision makers, managers or other employees)? Are other two groups also 'in favour' of change or at least not strongly opposed to it?
>
> What do you need to do to help everyone be 'on the same page' as much as possible: to understand the needs of LTC facility and to help them embrace the transformation?

If your idea answers the need of your LTC facility and all people are in favour of change, your main task will be to choose right ICT tools and services and ensure the quality of the process. But if you have some doubts about any of the above questions, there are steps that can help you prepare ground for digital transformation and ensure better ownership of the solution by all parties involved.

B. PREPARING THE GROUND FOR DIGITALISATION

1. ASSESSMENT

1.1. Analysis of the current situation in the long-term care facility

If you keep in mind that digital transformation happens in already existing environment, with its own organizational structure and pre-implementation digital maturity, everyone's understanding of the current situation in a LTC facility is vital for implementing new technology. It helps to identify specific needs, inefficiencies in workflows and ensures the chosen technology aligns with facility goals. This understanding is essential for integrating new technology seamlessly into the existing processes. It also helps to plan the training in a way that takes into account actual digital literacy of all the involved stakeholders. Describing the current state also highlights the benefits of technology adoption, supports better resource allocation and is a basis for informed decision-making. This comprehensive understanding is crucial as staff members can provide valuable insights into daily challenges and suggest practical solutions and it helps selecting features that directly address these challenges. Finally, understanding the current situation also helps in ensuring that the chosen technology complies with regulatory standards and guidelines in the healthcare sector and the LTC facility.

Areas and tasks you should consider:

1. **Common understanding of organizational structure of the LTC facility that plans to undertake digital transformation:** It is essential for all the stakeholders involved in the digital transformation process (from service providers, to developers, management etc.) to always keep in mind the whole organizational structure of the facility and its purpose since they represent a basis for understanding of specific workflows and people involved in the processes.

> Here are some examples of questions that can help you build that common understanding: *What kind of organisation is your LTC facility, what does it do? How is the management structured? How is the work structured? How many employees are there in the organisation? What profiles of people does your organization have or with other words which professionals work there? What kind of services does your LTC facility provide? How many older people does an organisation provide care for? And where? Which areas of care does it cover? Does your organization have units or some specialized facilities, groups? Is there a specialized ICT, research and/or educational unit?*

2. **Understanding of LTC facility needs and wishes in terms of digital transformation:**
   If you don't know yet, which digital solution you want to implement, needs assessment together with an understanding of the LTC facility is your starting point. And even if you have technology or digital solution already in mind, understanding of the LTC facility and needs assessment will help you better shape your decision.
   For successful digital transformation needs based approach is essential or to put it differently, only solution answering the needs of LTC facility can be successfully implemented.

> Here are some examples of questions that can help you with needs assessment (choose ones that are relevant for your situation):
>
> **What are the main challenges in your organization? And can any of them be addressed with digital transformation / technology?**
>
> **What digital solution do your employees propose regarding their everyday work?**

   While doing needs assessment it is important to include all stakeholders that will later be involved in use of digital solution: so, think about who are the stakeholders you have to include while introducing your digital solution?

3. **Understanding of a specific workflow / work processes LTC facility plans to digitalise:**
   Before starting digitalisation, it is important that all the crucial stakeholders involved in preparation and execution of digital transformation process (from service providers, to developers, management, other key employees etc.) have a common understanding of the work process LCT facility plans to digitalise.

After writing down the process LTC facility wishes to digitalize or support with new technology, we suggest that all the relevant stakeholders discuss their understanding of the process, think about why technology is needed in that process and what are perceived benefits and consequences if the technology is (not) implemented.

1.2 Understanding the long-term implication of the digital solution on long-term care facility

When implementing new digital solutions, it is essential to look beyond the current benefits and to also think about their long-term relevance and impact. Questions about the durability of the solution over 10-15 years, the need for updates or upgrades, the ability to adapt to changing infrastructure and quality standards, and the ability to identify potential future problems are essential. A complete picture ensures, that the chosen solution will not only be successful in the short term but will also be able to meet changing needs and challenges in the long term.

Think about the future situation and potential changes in your LTC facility. And don't forget to inquire about the durability of the solution and if / when updates and upgrades may be needed.

2. CO-CREATION

It is important to keep in mind that co-design capabilities are one of the facilitating factors for successful digitalisation. As described in the desk research results: Thinking beyond mere adoption of the digital solution, promotion of democratic participation and decision-making processes and the promotion of innovative capabilities of all actors (Digital Austria, 2020) – including employees with existing digital competencies, staff involvement as end users in the development so they are fit for purpose, and user engagement (staff or resident) – promotes a sense of ownership (Bail et al, 2022).

Here are some examples of questions that can help you with needs assessment (choose ones that are relevant for your situation):

Is there room for including more people (those most concerned with the digital solution) while choosing digital solution?

Is there room for co-design / co-creation process (including more people – especially those most concerned with the digital solution) while developing digital solution?

Is there room for co-design / co-creation process (including more people – especially those most concerned with the digital solution) while adapting digital solution?

As mentioned before, it is important to include all relevant stakeholders that will later be involved in use of digital solution in co-creation process: so, think about who are the stakeholders you have to include while introducing your digital solution?

C. HOW TO CHOOSE A TECHNICAL SOLUTION

> What kind of technology do you want to implement?
>
> Is technology answering the needs of LTC facility? *(look at section B 1.1.)*
>
> How was technology agreed upon? Were different stakeholder involved in the decision and development? *(look at section B 2.)*
>
> Which work process will technology influence and what changes will it cause? *(look at section B 1.2.)*

Before choosing technical solution, look again at these questions from previous chapter. To ensure sucessful implementation, this checklist will serve you as basis and check up point trougout the process of choosing technical solution.

For clear communication with all concerned (from organization selling the product to developers and people using the technical solution) **common terminology** is very important. Simple classification presented below can serve this purpose.

In order to choose the best solution for you, **market analysis** have to be performed. While some digital transformation models offer lists of possible solutions we reject such a model, since we believe, that the best solution for one LTC facility might not be the best solution for another facility. No matter what solution you choose though, you should keep in mind that soulution should be cost-effective and market analysis can help you with that.

Finally, **technoloy readiness level and reliability test** serve as safety points for you not to choose underdevelped, malfuntioning technolgy. And **intrastructure preparation** reminds you that not matter how good technical solution, if you don't have good coresponding infractructure, you can not carry out successful digital transformation. The same goes for **connectivity** of the sytem with existing systems and its openess for **integration**.

> Keep in mind that as humans we normally forgive animal mishaps, are more or less forgiving towards human mistakes and are the least forgiving towards technical errors. Furtermore, if trust toward technology in your facility is broken it is hard to mend it and can lead people to develop general mistrust toward technical solutions.

1. Classification

The digital health landscape involves various stakeholders, such as community/government representatives, technologists, the health workforce, project managers, network operators, researchers, individuals (clients, residents) etc. Despite their collaboration, a common and standardized language (digital health ontology) is vital to plan, conduct, and evaluate inventories of existing assets, identify gaps and duplications, conduct research, assess effectiveness, and

foster alignment across various digital health implementations. The World Health Organization provides a *"Classification of digital interventions, services and applications in health"*, which aims to create a shared language to describe the uses of digital technology for health (World Health Organization, 2023).

Overall, the classification is organized around 3 axes: (1) health system challenge, (2) digital health intervention, (3) digital services and application types. Additional information and examples for each category see here.

Health system challenge	Digital health intervention	Digital services and application types
☐ Information ☐ Availability ☐ Quality ☐ Acceptability ☐ Utilization ☐ Efficiency ☐ Cost ☐ Accountability ☐ Equity ☐ other:	☐ Intervention for persons ☐ Intervention for healthcare providers ☐ Interventions for health management and support personnel ☐ Interventions for data services ☐ other:	☐ Point of service ☐ health system, provider administration ☐ registries and directories ☐ data management services ☐ surveillance and response ☐ other:

2. Market research

After understanding what kind of technology, you want to implement, market research helps you scan the market for existing solutions. As described in introduction, **there is no one best solution for all LCT facilities** both due to unlike nature and needs of each facility and due to everchanging market. While choosing a solution keep in mind its cost-effectiveness. Below you can see one of the possible models for carrying out market analysis.

SIMILAR SOLUTION – TYPE A NAME	
Full name of the entity selling solution	
Status *(private entity/foundation/public entity etc)*	
Country	
Address *(city, full address)*	
Formal data *(ID number, etc)*	
Date of establishment of the entity	
Date of implementation of the solution/tool on the market	

Website	
Type of solution *(use BOLD font for chosen one or more options)*	Desktop app (can be open from the desktop)
	Mobile app
	Web app (can be accessed through browser)
	Includes sensors
	Other (please specify)
QUESTION	ANSWER
Brief description of the entity *(nature of activities, position of the analysed solution in the product portfolio, development until now. What resources are being used to finance the development of the entity (EU projects, investor funding, public collections, own resources).*	
Brief description of the solution *(general, brief description of the analysed tool)*	
DETAILED DESCRIPTION OF THE SOLUTION	
Functionality *(what does the tool offer - specifically)*	
Target group *(who is the tool aimed at – managers, care professionals, home residents? Please indicate and specify the functionality aimed at each group)*	
Coverage *(in which country the solution is available)*	
Language versions	
Cost of maintenance and hosting *(monthly or yearly)*	
Ability to communicate with health system (for example doctor)/ home environment (for example carer) or other systems *(yes/no – if yes, with what and how?)*	
Additional information relevant to the analysis	
Examples of usage (do you know of anybody who uses the solution and what do they see as an advantage of this solution)	

AN EXAMPLE OF DIGICARE4CE PROJECT:

Based on the list of proposed digital solutions of the 8 DigiCare4CE partners we drew up a list of good practices and competitive solutions in the field of digital solutions in formal care setting.

According to the content of the pilot proposal and chosen solutions partners wanted to implement, solutions were grouped into four thematic types of digital solutions - mainly to facilitate the search for different good solutions and to enable more concrete analyses. The four thematic groups of digital solutions are:

  A. DIGITALISATION OF NURSING DOCUMENTATION AND WORKFLOW
  B. REHABILITATION MONITORING
  C. FALLS PREVENTION AND MONITORING OF CRITICAL BEHAVIOURS
  D. VIRTUAL AND AUGMENTED REALITY in the field of support for the therapy of the older people

Based on the four types of digital solutions, all DigiCare4CE partners were asked to think about similar solutions in their own country (or other EU countries) and prepare market analysis. Questionnaire 2 (look at the D 1.2.2. Methodology for the elaboration of the Transnational Digi4Care Model) defined the criteria for partners to assess and prioritize the solutions.

The proposed solutions of the eight partners, which will implement new digital solutions as part of the project were placed in the four thematic groups of digital solutions:

  A. DIGITALISATION OF NURSING DOCUMENTATION AND WORKFLOW
  – Extension of the computer-aided nursing documentation DAN (DIT).
  – Expanding and optimizing an existing, mobile/digitized nursing documentation workflow (GZZ).
  – Detail analysis of processes conducted within the care facility followed by analysis of concrete possibilities for their digitalisation regarding concrete case studies and testing of proposed solutions within the care facility (TUKE).

  B. REHABILITATION MONITORING
  – Implementation of a tool to monitor the satisfaction of rehabilitated patients and the progress of rehabilitation itself (RRDA).

  C. FALLS PREVENTION AND MONITORING OF CRITICAL BEHAVIOURS
  – Intelligent 3D smart sensor, that can analyse movement in a room (NOELGA).
  – Device that will have to guarantee a response to the following critical care issues related to the health conditions of older residents in a protected nucleus dedicated to people with moderate-severe dementia (ISRAA).

- To design, implement and test in real settings reliable sensor-based systems with smart evaluation algorithms for supporting better and timely care of fragile persons (CVUT).

D. VIRTUAL AND AUGMENTED REALITY in the field of support for the therapy of the older people
   - Use of virtual and augmented reality in the field of support for the therapy of the elderly, SOS button (EGTC Via Carpatia).

List of solutions under the topic of digitalisation of nursing documentation and workflow

A. solution: DIGITALISATION OF NURSING DOCUMENTATION AND WORKFLOW		
	ORGANISATION (country)	PROPOSED DIGITAL SOLUTION + short description
1.	DIT (Germany)	**Extension of the computer-aided nursing documentation DAN** by the possibility to enable a secure data exchange via interfaces with general practitioners and specialists, hospitals and health care providers (physiotherapists and occupational therapists). Up-to-date: The DAN nursing software provides a central overview of all relevant data and information of all residents. Care documentation is standardised and unified. Data allocation for further processes (home inspection, billing with long-term care insurance) is possible directly in the system. Future: Communication with doctors, hospitals and therapists, from simple appointments to written information and data exchange, is to be simplified through digitalisation.
2.	GGZ (Austria)	**Expanding and optimizing an existing, mobile/digitized nursing documentation workflows in ilvi with further functionalities: (1) proof of execution and (2) digital wound documentation and measurement function via app.** We want to integrate an app in which professionals can easily perform the "proof of execution" of their completed steps in the care process at the point of patient care. The app should be able to measure the wound via photo/video as well as document and calculate the area/surface of the wound. Further ideas for the pilot action: Another possibility for the pilot actions would be to test a (3) skin cancer screening app on a mobile device. Furthermore, we are currently discussing on cooperating with an Austrian research project to test a (4) digital solution which measures nursing tasks via wearables and documents these automatically (NUDOCU). Side note: Option (1) and (2) are most likely to be implemented and are prioritized in the pilot action. Technologies (3) and (4) are only additional ideas for our pilot actions.
3.	TUKE (Slovakia)	**Detail analysis of processes conducted within the care facility followed by analysis of concrete possibilities for their digitalisation regarding concrete case studies and testing of proposed solutions within the care facility.**

The emphasis will be given on digitalisation of daily tasks with the aim to also support the communication of the main managing authority as well as among the senior care facilities enabling them to share data and knowledge.

With the proposed solution, we plan to develop the concrete map of common processes of care facility describing its possibility for digitalisation including concrete implementation plan as well as time and financial costs. Such a solution will bring the easy to understand and replicate not only within more senior care facilities but will serve also as the good practice for communication and cooperation of senior care facilities and self-governing regions as their managing authorities.

SIMMILAR SOLUTION (name and country of the entity)	Short description and main benefits of the proposed similar solution
1. eTTL – elektronski temperaturno-terapevtski list (Slovenia)	eTTL is an electronic temperature-therapy data sheet. It gives you all the important data for the patient's treatment and immediate and accurate data entry directly at the patient's bedside. This solution brings a major but positive change in hospital work processes, bringing a higher level of patient health and medical data protection. In particular the staff reported improved safety of patient treatment. Nurses can now see exactly what is prescribed for the patient. There are no more problems with illegible record. Employees also pointed out that the electronic system significantly reduces work time. Everything is more transparent; all patient data is immediately available in the system. Similar solution proposed by: IAT
2. Think!EHR Platform™ (Slovenia)	Think!EHR Platform™ is a big-data, high-performance solution for storing, managing, investigating and exchanging electronic health records. It is based on an open data model and enables universal recording of clinical data, portability between different applications, institutions and even countries. Marand was one of the first in the world to implement such an open model and the solution is highly sought after. Similar solution proposed by: IAT
3. Hipokrat (Slovenia)	Hipokrat is a programme aimed at digitising processes in healthcare. The software includes: support for the doctor's professional medical work (medical history, status, tests, therapy); use of the Health Insurance Card (HIC) on desktop and portable readers; billing of health services (for any payer); printing of forms, forms, labels, reports and examinations; monitoring of sick leave; selection of personal physicians and printouts of registered patients; scheduling of office hours; recording or transmission of laboratory and other tests; monitoring of financial management; production of prescribed statistics; interfacing with other information systems; computerised data exchange. Program is already used by many health centres, hospitals, general practices, specialist practices, etc. in Slovenia. Similar solution proposed by: IAT
4. BIRPIS (Slovenia)	BIRPIS is a hospital information system that keeps track of all patient-related events in different units and by specialty in hospitals and medical centres.

		The solution supports all hospital work processes. It is designed in a modular way, complemented by 130 different clinical modules that support specific business processes, and integrates with pharmacy, laboratory and radiology IT solutions, as well as more than 200 other tools, devices and solutions. Similar solution proposed by: IAT
5.	MEDDI app (Czech Republic)	With the MEDDI app, you always have a doctor at hand. We will put you in touch with your doctor or the appropriate emergency doctor on duty without any worries. The MEDDI app currently guarantees a connection to a doctor within 30 minutes, but the average response time is only 6 minutes. The app is completely free and works 24/7, and once a year you can take advantage of a free emergency room and doctor service. If needed, your doctor will send you an ePrescription across Europe. Using BioScan, you measure blood pressure, heart rate, heart rate variability, blood oxygen saturation, respiratory rate, sympathetic tension, parasympathetic activity and pulse-respiratory quotient. All analysis is performed directly on the device. Similar solution proposed by: APSS CR
6.	STAPRO (Czech Republic)	The STAPRO and CompuGroup companies represent more than 50% share on the Czech market of the health care information systems for various user types (hospitals, clinics, ambulances). The software is mostly targeted to administrative part of information and electronic health records, not enabling to save signals, images, etc. All of them are standard information systems that do not have any connectivity to external devices (e.g. wearables, medical devices for data import). The long-term care facilities can use that software for keeping medical information about the clients. However, the software does not support work with social status information and similar type of information and data. For that purpose, other software must be used. Similar solution proposed by: CVUT
7.	XotoSYSTEM (Germany)	XotoCAM allows to digitally document and structure the documentation and treatment process. The integrated software allows to document and manage all recorded data directly via the camera. The software also makes it possible to transfer the completed documentation directly to the resident's digital file.Mobile XotoCAM allows to take high-quality photos and videos, and measure and document them afterwards. Integrated interfaces make it possible to exchange data directly with many care software solutions or via common data formats. Wound documentation data is stored on XotoGATE as a case file. This complete documentation of a patient can be transferred as a PDF file to the in-house care software or external recipients (hospitals/general practitioners). Communication with an internal or external PACS is also possible. The wound management system enables to quickly and easily take images of wounds, reliably save data and thus completely document them. The system also offers a variety of analysis options that make work easier. A complete overview of all wound documentation data and treatment processes along with statistical analysis possibilities are available. The XotoSYSTEM guarantees documentation

		based on the expert standard of the ICW (Chronic Wounds Initiative) and the specifications of the MDK.
		Similar solution proposed by: ISRAA
8.	INTELLIGENT KNOWLEDGE SYSTEM (Italy)	The intelligent knowledge system allows through the 'Natural Language Understanding' and the semantic engine to analyse medical documents, interpret their meaning, and accurately extract the required information, as well as being easily integrated with other technological solutions already in use. The entire medical history of each individual patient is analysed, classified and sorted in a database: this data is immediately available for analysis, consultation or graphical representation in an immediate snapshot of the patient's clinical situation. All authorised healthcare professionals can access this information to plan and manage appropriate actions in a shared and organised way.
		Similar solution proposed by: ISRAA
9.	MEDchart medical software (Poland)	MEDchart medical software is a program for doctors of various specialties, nurses and midwives and medical registration. It is used by one-person businesses and larger establishments.
		The English word chart meaning, among other things, patient chart or diagram perfectly explains what the company does. It collects and processes medical data, makes it available in a simple and easy-to-understand form, and thanks to this it makes everyday tasks easier and faster. For partners, it is a guide in the world of modern technology. It helps you find your way through the maze of intricate regulations and get rid of unnecessary bureaucracy.
		MEDchart medical software gives you the ability to create and edit medical records electronically, features an appointment calendar and a powerful e-Registration module and offers Online consultations.
		Similar solution proposed by: RRDA
10.	Comarch HomeHealth 2.0 (Poland)	Comarch HomeHealth 2.0 is a tablet or phone application with integrated measurement devices that enables remote patient care outside a medical facility. It is designed for individual patients with chronic illnesses or post-hospital treatment, as well as for nursing homes or community nurses. The set of appropriate equipment can be modified according to the needs of the patient, such as for pulmonary patients or those diagnosed with diabetes.
		The product is available in two versions: single-user and multi-user. The single-user version allows individual patients to operate the solution. The multi-user version, on the other hand, is designed to be operated by medical personnel caring for patients or wards.
		Similar solution proposed by: RRDA
11.	Imito (Switzerland)	Imito offers four app solutions to simplify wound management, visual clinical documentation and communication for hospitals and clinics, ambulatory care services and research teams
		imitoCam is an app for photo documentation of wounds. Photos and videos of findings are immediately available in the electronic patient record and visible for other colleagues involved in the treatment. Opinions can be sought by colleagues through an "Instagram-like" team chat. User login is simplified via

		bardcode/RFID for impersonal devices and direct patient identification via barcode.
		imitoScan supports in digitizing relevant documents with the smartphone. The document can also be seamlessly transferred to the electronic patient record.
		imitoWound enables a standardized and intuitive wound documentation. All wound assessment parameters are visible at a glance. Non-visible characteristics of wounds can be easily documented. The parameters are based on national standards developed by wound experts, prepared to be exchanged among different care providers. The therapy and dressing material can be selected from a customisable catalogue. At the same time, the interval between dressing changes can be scheduled. For chronic wounds, additional parameters such as undermining, bags or fistulas can be documented. Scheduled assessments and therapies for a patient can be seen and worked on by everyone in the team. Receiving orders from an EMR is possible. An overview of all artefacts such as photos, documented parameters and assessments about the wound is also accessible via our universal web interface.
		imitoMeasure: Efficiently document, categorize and precisely measure acute and chronic wounds directly at the point of care (width, length, circumference, area). Length, width, area and circumference are automatically calculated.
		Similar solution proposed by: GGZ
12.	Voize (Germany)	voize is an app (used on smartphones) that allows healthcare workers to fill out forms via domain-specific speech recognition. Healthcare workers speak freely and our AI automatically generates the correct structured forms. voize automatically creates the correct care reports, vital signs entries and movement logs and transfers them to your documentation system via an interface.
		Similar solution proposed by: GGZ
13.	MEDIFOX DAN GmbH (Germany)	With MD Stationary, you can digitally map the entire administration process of your nursing and at the same time make it as efficient as possible. Via the intuitive master data management, all data is conveniently stored in the software, which, thanks to intelligent networking, is then automatically available in all other program areas. With the MD CarePad, mobile documentation succeeds with ease: Thanks to the app, your employees have access to the nursing documentation at any time - even when you are not currently connected to the WLAN.
		Similar solution proposed by: DIT
14.	DODS (Slovakia)	Company DODS system is the largest provider of the Information System for Social Services Facilities in Slovakia. Through the DODS information system, ensure: Complex solutions for your facility, Simplifying and streamlining work, A perfect overview of the establishment and internal processes, Professional and complex outputs in accordance with legislation and standards, Improving and increasing the level of services provided.
		Moduls: Attendance of staff members, Clients (overview of potential clients, new clients, overview of requests, guest book, overview of movements, client profile, clients' money), Nursing work (records, actions, competences, working with a client, medication), Social work (Autobiographical portrait, IP,

		risk plan, plan, record activities, various records, Folstei MMSE test), Economy – technical (maintenance, cleaning, laundry, ironing, record of trips, expense overview, overview of payments, business cash, client checkout), Catering (catering, warehouse). Similar solution proposed by: TUKE
15.	Software for social sphere (Slovakia)	Programs for the social sphere: They enable employees of social care facilities, such as facilities for the elderly, social service homes, social care centers, etc., to process the personal, financial and health agenda of recipients of social services, to keep records of various warehouses (e.g. warehouse of food, general materials, hygiene needs of clients, etc.), plan and calculate food. Moduls: Kitchen (Complete records of the catering operation's agenda (planning and food storage), SAZA (Comprehensive records of personal, social, health and financial data of recipients of social services in social care facilities), Warehouse (General material warehouse records). Similar solution proposed by: TUKE
16.	PowerCare (Czech Republic)	PowerCare is a modern computerized information system for residential facilities of social services. Functionality on social part (Register of applicants for social services, Point evaluation and waiting list, Complete agenda of clients, Individual care planning etc.), Health part (Patient records, Convenient health care billing, Documents for health insurance companies, NANDA nursing diagnoses, nursing interventions and nursing plans etc.), catering (Food orders, Choice of several types of food, Food standardization etc.), Warehouses (Receipts, disbursements, transfers, Calculation of inventory prices etc.) and Employees (Personal data, education etc.) Similar solution proposed by: TUKE
17.	Chytrá organizace (Czech Republic)	Smart organization represents the connection of 9 parts into 1 system. Within the framework of one system, you can get a Client part for keeping social and health documentation of clients, an Employee part together with an Organizational part for managing your organization, a Shifts and attendance part for simple recording of employees' working hours, Warehouses and supplies, and a Catering part. You can also add Data boxes to the system for safe storage of data messages, you will automatically get a Manager section for clear statistics, and we will be happy to create a new website for your organization within one system that meets the requirements of the Ministry of the Interior and the WCAG 2.1 standard. Similar solution proposed by: TUKE
18.	Vivendi (Austria/ Germany)	Digital medical- and nursing documentation - Recording of the nursing process based on the Health and Nursing act. Similar solution proposed by: NOELGA
19.	Edge computing (Slovakia)	Edge Computing solutions analyze large amounts of data. Sensitive digital patient files and associated diagnostic data are stored securely and reliably, but can be easily shared when needed to enable closer collaboration between healthcare professionals. Similar solution proposed by: EGTC Via Carpatia

20.	Siemens Healthineers (Slovakia)	This tool is a smart solution for hospitals and healthcare facilities. It analyses their procedures, operations and activities, looking at all these aspects from the patient's point of view. In the end, it proposes the optimization of the entire functioning system for the benefit of patients and clients.
		Similar solution proposed by: EGTC Via Carpatia

Digitalisation of nursing documentation and workflow was the best represented group of digital solutions, with partners finding 20 different good practices from their own or other European country. All the found digital solutions were connected to digital medical and nursing documentation and two of the described solutions were additionally focused on digital wound documentation and management.

The digital solutions described, which have been compiled by all ten partners, have identified some important common technical features. These all shared the importance of analysing large amounts of data, which is particularly relevant in the environment of nursing homes, hospitals, etc. and also the importance of digital solutions helping in summarizing and evaluating the entered data. One solution also described a specific technical feature: speech recognition with filling out forms via domain-specific speech recognition. One of the main perceived risks of new digital documentation solutions described is poor connectivity and communication with existing systems in long-term care facilities.

The target group of all the described solutions in the Digitalisation of nursing documentation group are mainly staff members (doctors, nurses, administrative workers etc.) and management of long-term care facilities and/or all segments of the healthcare systems. Indirectly, these solutions also have an impact on the users themselves, as digital solutions can improve work processes and thus the quality of the services provided.

List of solutions under the topic of digitalisation of rehabilitation monitoring

B. solution: REHABILITATION MONITORING		
	ORGANISATION (country)	PROPOSED DIGITAL SOLUTION + short description
4.	RRDA (Poland)	Presently, in cooperation with a care facility Donum Corde, we are considering the development and implementation of a tool to monitor the satisfaction of rehabilitated patients and the progress of rehabilitation itself (assessed by the patients and the rehabilitators). Web-based tool, made in PWA technology (possibility to "install" on a tablet / phone), which data will go straight to the server, will be available only to authorized persons. It is possible to integrate such a system within the existing DC system based on synchronization of employee data needed for authorization or linking completed surveys and patients. Perhaps also generating some kind of reports for "managers." In addition, the system would allow anonymized surveys to be made available externally for review by third parties or non-anonymized surveys for review by employees.

SIMMILAR SOLUTION (name and country)		Short description and main benefits of the proposed similar solution
1.	TERAPEVT 360 (Slovenia)	Terapevt 360 is comprehensive information system for physiotherapy that allows you to follow your patient from the first phone call to the last visit. The patient's progress is documented by clearly entering measurements and essential data. Developed in collaboration with physiotherapists, the Terapevt 360 information system offers: the complete solution for physiotherapy, input and output of all measurements, physiotherapy report, electronic messaging, waiting book, sms notification, self-pay management, invoice with header and signature. After each physiotherapy session, a physiotherapy report is generated, which includes patient information, a list of services provided and the physiotherapist's opinion on the patient's progress. The report can be emailed to the referring physician in PDF format directly from Therapist 360. Similar solution proposed by: IAT
2.	THE PHYSIO APP (France)	The Physio app is a mobile app made by physiotherapists for physiotherapists. It can enhance physiotherapeutic expertise on a daily basis with support for analysis, training and patient follow-up. With an emphasis on user-friendly and simple solutions, Kinvent enables patients to actively participate in their rehabilitation. The sensor devices they are developing enable accurate measurement of movement, position and posture and transfer data to connected applications. These apps then analyze the collected data and allow users to track rehabilitation progress, set goals, and access personalized workouts. Kinvent thus enables therapists and health professionals to monitor patients' progress remotely and adjust rehabilitation plans according to individual needs. At the same time, they enable patients to become more actively involved in their rehabilitation process, which can have a positive effect on motivation and achieved results. The physio app is connected with 7 Sensors connected to engage patients and enrich physiotherapeutic practice. Similar solution proposed by: IAT
3.	National Patient Satisfaction Assessment (Czech Republic)	The National Patient Satisfaction Assessment project was created as an initiative of the Ministry to provide providers of inpatient health care with a uniform and long-term sustainable analytical tool for meeting the requirements for mandatory standardization of the quality of care provided as part of the introduction of the so-called internal system of quality and safety of provided health services. The National Patient Satisfaction Assessment always lasts 4 weeks and, within one evaluation stage, begins and ends at all evaluated workplaces of the specific health service provider at the same time. It is carried out once per year in the specified time period from May 1 to May 31 of the given year. During this period, all patients who are discharged from hospital/health service unit are included in the evaluation. Similar solution proposed by: APSS CR

4.	HomeBalance (Czech Republic)	The primary product of the company is the Homebalance Care System, which is an information system and a number of related services including an integrated certified medical device. Homebalance Care System is an interactive system for the treatment of balance disorders. Movement coordination and usage of biological feedback allows patients to rehabilitate in the comfort of their home. It's suitable for use at home and in clinical settings. The principle of the therapy is based on the use of telemetry transmissions, audiovisual feedback, and monitoring of the patient's physical activity. Homebalance can be supplied in 3 different variants. Similar solution proposed by: CVUT
5.	REHABILITY (Italy)	REHABILITY is a motivational tool for gamified tele-rehabilitation and incorporates highly personalised therapy plans under specialist control and guidance. Available in twelve languages, REHABILITY is now working on six different versions, each one dedicated to very specific rehabilitation needs. Among these there are: Rehability neuro, Rehability cardio, Rehability cogni and Rehability lite. With REHABILITY, patients can carry out their rehabilitation exercises, from either the centre in which they are hospitalized or remotely, autonomously but with constant medical supervision. Physicians create tailored therapy plans. Progress is monitored constantly. Similar solution proposed by: ISRAA
6.	Rehametrics (Spain)	Rehametrics is a virtual care platform that enables healthcare professionals to deliver quantified physical and cognitive rehabilitation across care settings. Rehametrics uses gamification, session personalization and real-time motion analysis to deliver care to individuals suffering from chronic health conditions and for active ageing. The solution can be used on-premises (in hospitals and outpatient centers) or to prescribe to remote sites (homes or other health centers). As a result, Rehametrics can improve rehabilitation outcomes, track patient evolution objectively and generate clinical reports. The solution is designed for: Physical rehabilitation, Cognitive rehabilitation and Telerehabilitation. Rehametrics is a CE-certified medical device. Since 2017, the Rehametrics software has been present in more than 12 countries, improving the quality of life of patients with neurological or neurodegenerative conditions, musculoskeletal injuries and in active aging. Similar solution proposed by: ISRAA
7.	Finezjo (Poland)	Finezjo - medical records for physiotherapy practices and healthcare providers. Free, secure and compliant with the guidelines of the Ministry of Health and the National Chamber of Physiotherapists, a medical records management application. Individual practices (Physiotherapists): Interactive calendar, Intuitive and comprehensive examination card, Examination sheet divided into modules, List of patients and appointments, schedule of working hours, sms notifications, mobility, Interactive model for visualisation of ailments, Integration with other systems. Similar solution proposed by: RRDA

8.	PhysiApp (United Kingdom)	PhysiApp is part of the Physitrack system, which is dedicated to healthcare systems and hospitals, among others. Patients download the free PhysiApp patient app to follow perfect form exercise videos and report back on their progress, both online and offline. In-app reminders keep patients on track and motivated, while the instant messaging feature (if you've enabled this) allows you to stay in touch with your patients in real-time. Available for iOS, Apple Watch, Android and web, in more than 10 languages. Similar solution proposed by: RRDA
9.	EvoCare (Germany)	EvoCare is method of teletherapy that transports treatment content, instructions, and interventions from the therapist to the patient's home via eHealth. The care is socio-medical, psychological and training specific (physiotherapy etc.). Patients are not sent home in an insecure state, but are actively guided by the facility's team of professionals. With EvoCare, therapists and patients can work at staggered times. This offers enormous advantages, because therapists can care for several patients simultaneously around the clock. EvoCare already contains a comprehensive catalog of treatment content for unimodal and multimodal therapies in physical and occupational therapy, speech therapy, and more. The integration of new, treatment-specific content is possible at any time. Similar solution proposed by: GGZ

The thematic group **Rehabilitation monitoring** with 9 solutions found was the least represented group of the digital solutions. Good practices from this area include functionalities such as providing information system for physiotherapy, monitoring physiotherapy patients' progress remotely, possibility of tele rehabilitation, offering interactive system for the treatment of balance disorders and motivational tools for gamified tele-rehabilitation.

The solutions described especially encourage active participation of the people in the rehabilitation process. They are intended both at people in need of rehabilitation services and the professionals who provide them. Some of the solutions can be used on-premises (in long-term care facilities, hospitals and outpatient centres) or in the home setting as the solutions are offered in different formats (information systems, mobile apps, platforms, games etc.). Depending on the format, the functionalities offered by the solution also differ. For example, apps can offer exercise photos and videos connectivity to variety of sensors and other features that may also enable reporting of the rehabilitation progress and staying in contact with your provider of rehabilitation activities. Functionalities like that offer remote rehabilitation monitoring solutions that enable professionals to monitor patients' progress remotely and adjust rehabilitation plans according to individual needs.

List of solutions under the topic of falls prevention and monitoring of critical behaviours

C. solution: FALLS PREVETION AND MONITORING OF CRITICAL BEHAVIOURS		
	ORGANISATION (country)	PROPOSED DIGITAL SOLUTION + short description

5.	NOELGA (Austria)	The technology we would like to intend is **an intelligent 3D smart sensor, that can analyse movement in a room**. If the sensor detects a critical situation, it alerts a nursing assistant. The sensor will be placed in the centre of a room to scan and analyse the whole room using infrared. The sensor can be equipped with different modules. The purposes of the major modules are to prevent and detect falls. If a fall happens anyway, the collected data from the sensor can be analysed to reconstruct critical situation and to eliminate repetitive causes of falls. The sensor can also act as a virtual bed rail or can be used to detect suspicious absence or aggressiveness. With the installation of the sensor, we want to prevent and reduce falls as well as to respond quickly in the case of an accident inside the resident's rooms. The purpose is to protect the elderly and to reduce the costs of a medical treatment and care as a result of a fall. The importance to prevent falls is not only for the elderly's health, the nursing staff can also benefit, because they can set a better focus on their patients.
6.	ISRAA (Italy)	**The solution will have to guarantee a response to the following critical care issues related to the health conditions of older residents in a protected nucleus dedicated to people with moderate-severe dementia.** The expected functionalities for users are: Monitoring and detection of critical behaviours of older people, movement, presence, entering/exit of older people from the safety perimeter defined by the protected nucleus, falls and near-falls, slips on the floor, health parameters: temperature, blood pressure, heartbeat, oxygen saturation. With regard to the care staff, it should benefit from a reduced workload to the advantage of the quality of the social-health interventions and their timely customisation given by the inclusion of technological solutions. In particular, it is expected: a dashboard for the staff presenting trends about parameters remotely monitored, the reporting of critical or adverse events in real time on mobile devices, the suggestion of the most appropriate actions, identified by the system, starting from the clinical and behavioural status of the subject. We will use **devices that are related with the chosen solution**. Evidence shows wearables are not well accepted by people with dementia, therefore they will not be used. We are considering using smart patches, but it will depend on the solution we will choose. Currently, we are internally evaluating different solutions on the market that could be purchased for pilot implementation.
7.	CVUT (Czechia)	**The aim of the presented project is to design, implement and test in real settings reliable sensor-based systems with smart evaluation algorithms for supporting better and timely care of fragile persons.** We do not plan to design and develop new sensors, but our intention is to use commercially available hardware systems having good balance between price and functional properties. The main aim is to develop a fully functional system satisfying requirements formulated by potential users. Specific problems: information fragmentation (health and social information about a client are usually kept in different information systems, data transfer to/from a hospital on paper. Aim: to design a methodology that can be used for future implementation of an integrated solution.

		Expected results: reduction of repeated insertion of the same information to different information systems.
SIMMILAR SOLUTION (name and country)		*Short description and main benefits of the proposed similar solution*
1.	E-OSKRBA (Slovenia)	E-oskrba is a social service it enables all-day connection via a personal telephone alarm - remote protection. The main objective is to increase access to social telecare or tele-guarding services with a 24-hour connection via a telephone alarm. The primary aim is to provide older, chronically ill, and disabled people with a higher quality of life and the longest possible independent stay in their home environment, to relieve families from the constant care of their relatives and, therefore, to relieve chronically overcrowded and understaffed institutional care facilities. An added value of the service is the 24-hour assistance centre, which responds to calls for help and provides appropriate action (first aid or family call). The basic E-oskrba package includes: a security phone with a call-for-help button, a bracelet with a call for help button, SIM card with direct connection to the assistance centre and assistance services 24 hours a day. Additional equipment: mobile motion detector on a pendant to call for help, smoke detector, switch with the string to call for help, carbon monoxide detector and water leak detector. Similar solution proposed by: IAT
2.	ElderOn (Slovenia)	ElderOn was developed to optimise care in care homes. Their vision is to create added value for the homes and their residents. They use advanced self-learning algorithms to turn ordinary data into a service. To do this, they created ElderOn - a scalable security system for nursing homes. Their aim is to improve the safety of residents and support staff in their daily routine. The ElderOn system includes 2 devices that make your employees' work easier and provide better safety for your residents: bed sensor and SOS device. Easily upgrade your nurse call, improve staff reaction time and optimise night-time working with ElderOn system. Similar solution proposed by: IAT
3.	ŽIVOT PLUS (Czech Republic)	ŽIVOT PLUS brings together elderly and people with disabilities, their relatives and friends, professional experts and all people sympathetic to our mission. They have been providing social services since 1994. With the help of technology, the company helps elderly in crisis situations at home and outdoors, especially when they fall and are unable to get up, dealing with any crisis situations in the home environment and beyond, fire, gas leak, power failure, sudden deterioration of health, attack of the user in the apartment (forced entry into the apartment, assault, fraud and others). Similar solution proposed by: APSS CR
4.	HelpLivi (Czech Republic)	HelpLivi is an emergency alarm system suitable for care homes, retirement homes, lone workers in the field, etc. Increase the safety of residents and improve the work of personnel.

		Each resident is given a panic button (various types are available) that they can press if they find themselves in an emergency situation. This information is displayed on the mobile application of designated staff who are on duty. Staff can accept the alarm wherever they are and can go to help the resident. The web application offers simple administration of the complete system and clear reports of everything that has occurred. A further component of HelpLivi is the recording of specific activities of personnel using NFC chips.
		The special functions of the HelpLivi application allow easier passing on of information and communication among staff ensuring better planning of the day. The mobile application serves as an aid to staff so that they have all important information at their disposal, wherever they are. Via the application, they can see, for specific clients, what activities are planned, what tasks are to be performed or look back at the history of activities. If someone wants to add important information for other staff, they can save comments or write to the chat. The web application has got the same functions offering an even clearer data summary of specific clients and staff.
		Similar solution proposed by: APSS CR
5.	BLESS (Czech Republic)	BLESS, or Bluetooth Low energy Surveillance System, is a system for collecting data from Bluetooth 5 sensors and evaluating it. It contains several parts and integrates dozens of different sensors. The system is primarily built on PHP 7.4 technology using the Symfony 5.6 framework. In particular, however, the platform API 1.6. The system includes its backend part for data computation, as well as REST APIs for communication with sensors and gateways. The user part is implemented using a web browser and contains modern features including responsive design and JavaScript and AJAX functionalities. The system also has an admin interface for managing users, housing units and other primary data.
		Similar solution proposed by: CVUT
6.	ANCELIA (Italy)	The solution is made up of a smart optical sensor integrated with AI system and a carers app. Ancelia automatically collects and analyses a continuous flow of data about the quality of care. Ancelia solutions can read the environment, by acquiring images and sounds autonomously 7 days a week, 24 hours a day; it processes information immediately, managing the analysis of a large number of data; it communicates via smartphone or tablet notifications with operators; it provides reports on the caregiving and the conditions of residents to enable managers to better manage the facility with data-driven decisions.
		Ancelia's functionalities are: Fall reduction and prevention of accidents, Improving the quality of overnight assistance, Reducing the use of restraints, Improving postural care programme, Remote monitoring for staff, Improving decision-making process with objective data and analysis.
		Similar solution proposed by: ISRAA
7.	diPAS 2.0 (Italy)	DiPas 2.0 was developed together with professionals of the health sector and has the goal to improve the security of weak people and the professionality of those who work in the health sector. It uses sensors without cameras to monitor patient's status, in a room or inside the facility, with the goal to avoid potentially dangerous situations.

		DiPas 2.0 platform allows to manage room sensors and quality of care for older people in residential care facilities. The system permits to monitor people, displaying person's state of health, detecting the exact location of the person and detecting emergency situations with a special alarm system that notifies a mobile and fixed (monitor) devices allowing to intervene. Sensors are pressure and humidity sensor for bed, contact sensor for doors and windows, Bluetooth Low Energy Beacons and BLE scanner for the detection of nearby BLE Beacons for geolocalization, and bracelet with pulse detection and pedometer integrated. Thus, sensors can detect entering/leaving the room, movements in bed, falls, geolocalization, and pulse. Also, they allow to monitor temperature, humidity, and air quality. Iot Platform is used to manage, monitor and control devices. It allows to access information, user profile, send notifications and alarms to mobile devices. Similar solution proposed by: ISRAA
8.	Comarch e-Health (Poland)	The Lifeband is a digital caregiver always available at hand. Together with the mobile application and telecare service provided by the paramedics of the Comarch Group's Remote Care Center, it is the answer to the problem of elderly, dependent and chronically ill people. The possibility of immediate contact, sending an SOS signal, reading the location with the GPS module, detecting a fall or noting a pulse disturbance are just a few of the possibilities provided by Comarch's Life Band. Similar solution proposed by: RRDA
9.	cogvisAI (Austria)	By using 3D smartsensors, cogvisAI can detect and analyze movements in a room & trigger an alarm in critical situations. cogvisAI covers the following functionalities: Effectively prevents falls by timely alerting when people at risk of falling raise-up, sit-up or stand-up, an immediate alarm is triggered via the nurse call system (enabling rapid assistance), the virtual bed rail replaces physical containment devices and thus increases the perceived freedom of the inhabitant / patient, etc. Similar solution proposed by: GGZ
10.	QUMEA (Switzerland)	QUMEA offers a discreet and non-contact patient monitoring, enabling early intervention and effective (fall) prevention in hospitals and care facilities. The solution consists of intelligent sensors and a software and automatically calls for assistance based on patient's individual needs. QUMEA detects human motion. The 3D radar captures 100 million points of motion per second and determines their exact position in space. Using this motion data, artificial intelligence recognizes a person's position, posture and state. Each motion point contains information about both macro and micro motions. Macro motions provide information regarding posture and position of a person. Micro motions originate from minuscule body vibrations such as breathing, heartbeat, digestion, or trembling. All this information forms a source of insights for assessing the condition of a person in need of care. The solution consists of a sensor, cloud and apps. Similar solution proposed by: GGZ

11.	MOIO.CARE SYSTEM (Germany)	moio.care systems includes a movement sensor, a cloud service and an information plattform (application). The sensor, which is attached to a person's back, analyses movements (and movement behaviour) and recognizes critical situations. The sensor is connected to a cloud service which informs care takers about events per app on a mobile device. The device is still in development but can be tested. Similar solution proposed by: DIT
12.	livy care (Germany)	Livy care is a intelligent sensor that detect dangers in a patient's room and informs caregivers. Detection includes falls, getting out of bed or out of room, calls for help, air quality or inactivity. It also provides an communication service (talking through device with caregivers) and a night light function. Tool detects movements, e.g., falls, and informs the caregiver per app. Caregivers can talk through the service with patients. Caregivers can also interact with each other through the app ("I can/can't go there"). Similar solution proposed by: DIT
13.	MONSE (Slovakia)	Remote care solution intended for family members of independently living seniors and disabled persons. It will send you a notification in the form of an SMS or email if a crisis situation occurs in the monitored senior's household and you can react quickly. In the senior's apartment, wireless sensors are installed in every room, which collect information about his behaviour. If the behaviour deviates from the normal state, the system notifies the family member or caregiver by SMS message or e-mail. The system also includes SOS emergency buttons that immediately send a request for help: request for immediate help at home, a warning about not moving much during the day, warning of frequent movement at night, request for immediate help outside the home, warning of long open doors during the day, alert for open doors at night. Similar solution proposed by: TUKE
14.	Santea (Slovakia)	Monitoring and signaling the need for help - 24 hours a day / 7 days a week. The technology (Santea Watch, SanteaBox) contains a number of sensors and buttons that automatically connect you to the Santea dispatching system after pressing them. Trained dispatch workers immediately solve the current situation by calling directly through the watch or through the communication box.The technology (watch) also includes a fall sensor, thanks to which, in the event of a fall and subsequent loss of consciousness, a message with your location will be sent to dispatch, where trained personnel will immediately resolve the situation. The components work throughout the country, no matter where you are, calls are free (included in the service). Similar solution proposed by: TUKE
15.	Monitoring bracelet SOS button (Slovakia)	The SOS button service is intended for elderly or disabled people who live in a separate household, and its purpose is to trigger an emergency call by simply pressing a button for people who are in need or in situations that threaten their life and safety (e.g. falling in the shower, sudden heart attack, nausea,...). After pressing the button, the base will automatically call the Samaritans Association dispatch center, where medically trained personnel will then

		evaluate the situation and coordinate the next procedure, including calling for help or contacting a relative. The dispatch center works 24/7.
		Similar solution proposed by: EGTC Via Carpatia
16.	JimiWatch (Slovakia)	JimiWatch combines several devices, a mobile phone with Smart watch function, an emergency button with a fall sensor and an oximeter. By wearing the JimiWatch watch, seniors get interactive passive surveillance, a higher sense of security and more effective reaction time in case of an emergency. JimiWatch is a suitable alternative for seniors. The SENIIO service provides relatives via the application with basic health parameters (pulse, blood pressure), blood oxygen saturation (SpO2), monitoring of daily activities, SOS messages in case of emergency or fall, and the possibility of two-way calling.
		Similar solution proposed by: EGTC Via Carpatia

The thematic group **Falls prevention and monitoring of critical behaviours** consists of 16 good practices collected by the DigiCare4CE partners. All the solutions described include solutions connected with patient monitoring specified in fall prevention and/ or detection and some of the solutions describe monitoring of other critical behaviours, such as possibility of a heart attack, nausea etc.

All the solutions described include different kind of sensors that recognise critical situations. Different parameters are observed – some solutions analyse movements or inactivity, some detect basic health parameters (pulse, blood pressure, blood oxygen saturation etc.), some detect air quality, temperature, humidity, open doors and other parameters in the room, some detect other possible dangers in the room. Most of the digital solutions described offer remote monitoring and/or communication (contacting informal carers, nurse call systems and/or dispatch centres) as sensors are connected to cloud services and/or other devices. The described solutions combine sensors with several other devices, such as mobile phones, tablets, smart watches, SOS emergency buttons, sensor patches, SOS bracelets etc.

The remote monitoring of critical behaviours mainly contributes to higher sense of security and more effective reaction time in case of an emergency. The presented solutions describe positive effects on the residents in long-term facilities or in home setting (in particular with increased safety, independence and quality of life), on their relatives and/or informal caregivers (especially with feeling calm and reassured and receiving help with providing home care) and a lot of benefits for the long-term facility staff (better overview of the people they care for, fall reduction and prevention of accidents, improving the quality of overnight assistance, reducing the use of restraints, easier passing on of information, better communication among staff, better planning of the work in a day, improving decision-making process with objective data and analysis).

List of solutions under the topic of virtual and augmented reality in the field of support for the therapy of the elderly

D. solution: VIRTUAL AND AUGMENTED REALITY in the field of support for the therapy of the elderly	
ORGANISATION (country)	PROPOSED DIGITAL SOLUTION + short description

8.	EGTC Via Carpatia (Slovakia)	**This solution** (developed in the Košice region by Deutsche Telekom IT Solutions Slovakia) **is based on the use of virtual and augmented reality, among other things, in the field of support for the therapy of the elderly**. As part of the pilot, we would like to test this solution directly in facilities for the elderly and to promote and support the introduction of such solutions in facilities throughout the Košice region. We also want to identify new digital solutions for the elderly. The pilot will also include training for senior facility staff in working with new technologies that can be used in senior facilities. At the same time, we want to help developers improve and adapt this solution to best meet the needs of seniors and institutions that work with seniors. As part of the I-CARE SMART project, which was also aimed at seniors, we also identified an innovative solution for monitoring seniors. It is an **SOS button, which is used to call for help in case of need**. We plan to purchase and implement this solution in a facility for seniors. The pilot will be implemented in 2 facilities for seniors in the Košice Region.
SIMMILAR SOLUTION (name and country)		Short description and main benefits of the proposed similar solution
1.	SYNCSENSE® VR exercise (Denmark)	SYNCSENSE® is a digital training technology (also called the VR solution), which transforms traditional training equipment (e.g., for balance training, gait, elliptical trainers and bicycles) into sensory-stimulating and socially engaging training experiences - and promotes physical, cognitive and social activity. It is a complete all-in-one VR solution that does not require internet / WiFi. The VR solution is a new tool that therapists and nursing staff can use to make exercise fun and motivating - and promotes physical, cognitive and social activity. A VR solution consists of VR glasses, a motion sensor, a tablet and access to all our specially designed VR experiences / game library (which is regularly expanded). Access to a data compliance module, where the use of VR solutions can be continuously monitored based on data reports. In addition, a VR solution consists of ongoing updates, support and FULL implementation support. Similar solution proposed by: IAT
2.	MojaSlovenija.si (Slovenia)	The MojaSlovenija.si website is a 30-year-long online project to showcase natural and cultural heritage. The project is based on interactive 360° spatial images (360° spatial photographs). The aim of the project is the field documentation and visualisation of geographical locations for the visual experience of people with mobility problems and distance learning. The documented locations contribute to the spatial representation of the user. Users of the portal (intended for people with mobility problems and distance learning) can take a 360° tour of Slovenian cities, towns, mountains, waterfalls, caves, churches, castles, museums, cultural and other events etc. There are also 360° images of some World Heritage Sites and a few cities of the foreign countries. Similar solution proposed by: IAT
3.	Virtual reality (Czech Republic)	Virtual reality – dementia is unique vocational training for employees in social services developed by Educational Dementia Immersive Experience (EDIE) from

		Australia. The aim of this training is to better understand dementia from the perspective of the user. The benefit for the target group is that they will better and first-hand understand the feelings and fears of people suffering from dementia ASSP CR bought licence for this training and start offer Czech version since 2019.
		After the introduction story, the trainees use the VR headset and can see how difficult is for person suffered from dementia to use bathroom during the night. It is very awkward and depressed experience. And thereafter the participants analyse with the trainer what they saw and how they felt. This is followed by the second part of the story, which shows how much easier the situation could be if the flat is adapted to the needs of people with dementia. Similar solution proposed by: APSS CR
4.	VIREAS (Czech Republic)	The purpose of the VIREAS project is to provide a comprehensive solution for the use of virtual reality as means of keeping older adults active, both in residential and home care. The project has produced two main outcomes- the Virtual Experience Kit software and the Conceptual Manual. Virtual Experience Kit VIREAS has been developed based on several tests and studies among care home residents. The Set contains three virtual experiences: "Walk through a Forest," "Walk through the City Center," and "Travel." The interactive design combines computer graphics and 360° pictures. The Set is designed to positively influence older adults' self-expression and self-confidence, motivate them and stimulate their curiosity. The Set allows older users, especially those in care homes, to see places they cannot visit in the real world and brings them new stimuli they can share with others. The software VIREAS is beneficial mainly in care homes as tool for keeping residents active. The conceptual manual, certified by the Czech Ministry of Labour and Social Affairs, enhances the benefits of virtual reality even in the older person´s everyday life. Similar solution proposed by: CVUT
5.	ViroteaVR (Sweden)	ViroteaVR targets older people living in residential facilities. It offers care recipients to travel digitally without having to leave the safe corner of the home. The company provides users with 2 pieces of VR glasses and tablet to access the media library and easily choose experiences and activities that can be run over VR glasses. They have a large selection of over 1000 images and videos that include from Christmas markets, tropical destinations, guided tours, concerts, bustling cities, harmonious forests and much more. They can also tailor contents upon request. The solution does not require technical skills or training. ViroteaVR aims at offering exiting activities in the form of digital travel to improve the quality of life of care recipients, stimulate everyday life individually or in group. Similar solution proposed by: ISRAA
6.	SeniorVR (Italy)	SeniorVR is designed to provide recreational and therapeutic activities, capable of contributing positively to the well-being and quality of life of older people in residential care facilities, based on several studies that have highlighted its positive impact in everyday life. The service includes a kit

		composed of 3 headsets and 3 Android tablets, and a content download service that offers three kinds of experiences (relaxing, travelling, engaging) that are regularly updated.
		Similar solution proposed by: ISRAA
7.	GRYDSEN (Poland)	The GRYDSEN therapeutic tool helps slow down cognitive (memory) and motor (movement) dysfunctions characteristic of people over 60. By training these functions, the therapeutic tool can extend the period of independence and good quality of life for the elderly. The solution is used in diagnosis, therapy, prevention, medical rehabilitation and education of sick and healthy people. Therapy with the GRYDSEN kit means keeping the elderly in good physical and cognitive condition for longer, thus extending their period of independence and maintaining a high level of their well-being (physical and mental). The therapy kit includes: GRYDSEN's innovative proprietary therapy software, training of the Purchaser's staff in the use of the equipment and the implementation of the therapy, updates to the software installed at the Purchaser's site, if the exercise package is developed, once a year, participation (free of charge) of the Purchaser's representatives in a training conference, a set of wireless virtual reality goggles from HTC VIVE, a 32" or 40" monitor for the therapist, a swivel chair for the patient. Similar solution proposed by: RRDA
8.	VR TierOne (Poland)	VR TierOne is a non-pharmacological therapeutic method to support mental conditioning. Treating depression and anxiety with Virtual Reality. The TierOne VR solution consists of two parts: a medical device and a therapeutic cycle. Medical device - allows you to enter the Virtual Garden of Rebirth created by us, fully immersed in Virtual Reality and carry out effective therapy under these optimal conditions. Therapy - consists of a two-week cycle of 8 sessions of up to 20 minutes in length. Virtual therapy abounds with relevant metaphors, messages and tasks to improve the patient's mental condition. Similar solution proposed by: RRDA
9.	VitaBlick (Austria)	VitaBlick offers people with restricted mobility the opportunity to travel to special possibility to travel to special places from their past and to discover them anew. The technology includes VR glasses, with which seniors can 360° videos. The virtual excursions can be controlled with the glasses or a tablet. The videos include different categories: nature, relaxation, culture, religion and animals. Seniors receive a travel brochure and can choose in advance which virtual excursion they would like to experience. Similar solution proposed by: GGZ and NOELGA
10.	Magic horizons (Germany)	Magic Horizons offers a combination of elaborately produced 360-degree environments in 3D, calming music, the Virtual Reality technology and relaxing virtual worlds. The Magic Horizons VR applications intent to calm before and during medical treatments, for a short relaxation after mentally demanding activities and for mental regeneration. The VR software of Magic Horizons is a CE certified medical device class 1 for anxiety and pain reduction during and/or after unpleasant medical treatments, surgical interventions and/or in situations with high stress levels.

		Magic Horizons is an effective, holistic platform for the following fields of application: Activation (Virtual Journeys, Biographical Work), Cognitive training, dementia therapy (calming of agitation), Anxiety and pain reduction, Stress reduction (age depression, stress reduction of employees).
		Similar solution proposed by: GGZ
11.	Granny Vision GmbH (Germany)	The Munich-based startup Granny Vision offers a virtual world suitable for seniors with its VR glasses. In addition to entertainment through games and informative 3D films and motivation to exercise through age-appropriate sports sessions, travel and participation in the life of the family should be possible without leaving the house.
		Granny Vision enables older people to have experiences in virtual reality that they can no longer experience in real life due to their physical or mental condition. For example, walking through the forest, enjoying the sunset on the beach, exploring cities or accompanying artists at work. In care facilities, VR glasses can be used both individually by residents and as part of group care. Using a smart TV or laptop, the content can also be mirrored from the glasses to the screen.
		Similar solution proposed by: DIT
12.	Anio GmbH (Germany)	The Anio Care+ smartwatch for seniors helps your family to live life more safely together. Our smartwatch is a full-fledged cell phone for the wrist, specially designed for the needs of older people, as it can be activated and deactivated to perfectly adapt to the requirements of the wearer. It can store up to 3 SOS contacts, which are called one after the other when pressing the SOS button until someone answers.
		Similar solution proposed by: DIT
13.	Virtual Lab (Czech Republic)	The purpose of our work on the Senior Pack is to bring modern technology to an area that is not its traditional recipient. We respond to the needs of practice and focus on the comprehensive digitization of social services, which includes applications for clients, applications for staff and digitization of processes. We collaborate on the development with the Faculty of Health and Social Sciences of the University of South Bohemia and selected Homes for the elderly.
		Similar solution proposed by: TUKE
14.	VIRTUO (Slovakia)	Special treatment programme using VR to deal with the psychological problems.
		Similar solution proposed by: TUKE
15.	Opium Systems VR platform (Slovakia)	The VR platform for senior citizens is a technological innovation aimed at enhancing the quality of life and well-being of older individuals. It provides a virtual environment where seniors can engage in various cultural and social activities, despite potential mobility issues or geographical constraints. The solution offers: Virtual Museum and Gallery Visits, Virtual Nature Experiences, Virtual Concerts and Music Performances and Virtual Family Gatherings with very user-friendly interface. The VR platform for seniors is primarily aimed at the facility's seniors themselves.
		Similar solution proposed by: EGTC Via Carpatia

Virtual and augmented reality in the field of support for the therapy of the elderly thematic group was represented with 15 different good practices collected by DigiCare4CE partners. Virtual reality solutions in the field of long-term care offer a variety of interesting and useful benefits in the field of support for the therapy of the elderly. These solutions may be used for diagnostics, therapy, prevention, medical rehabilitation, education, socialisation, relaxation and other important areas. An important target group of these solutions are people with restricted mobility, elders as technologies like that may help with keeping the elderly in good physical and cognitive condition for longer and with that extending their period of independence and maintaining a high level of their physical and mental well-being. Virtual and augmented reality solutions usally combine the use of VR glasses, headsets, tablets, motion sensors etc.

Fife of the solutions described mentioned gamification as a tool engage care recipients, caregivers and LTC employees to collaborate, share and interact while using virtual and augmented reality solutions. More than half of the solutions presented described the use of VR and augmented reality for excersise purpose. Four of them were focused on physical exercise that can add new elements to normal exercise, such as sensory-stimulating and socially engaging training experiences. Three of them focused on mental excercise, such as virtual reality as a non-pharmacological therapeutic method to support mental conditioning. Many of the described solutions focus on mental health as they are all aimed at enhancing the quality of life, reducing loneliness etc. Some solutions also help with anxiety and pain reduction during situations with high stress levels (unpleasant medical treatments etc).

Many (7) solutions offer interesting virtual visits or travel. Solutions like that can showcase natural and cultural heritage of diffenent world countries and/or provide other pleasant virtual experiences for the user (e.g. walk through a forest, visit a christmas market, concert, virtual family gatherings etc.). Solutions like that allow users, especially those in care homes, to see places and do things they ususally can no longer experience or visit in real life due to their physical or mental condition. One interesting solution also mentioned training purpose of the virtual and augmented reality solutions with, with an example of a vocational training for employees in social that help to better understand dementia from the perspective of the user. Other described solutions also mentioned socialysing and safety features.

3. Technology readiness level

The Technology Readiness Level (TRL) scale was originally defined by NASA in the 1990's to indicate the maturity of a given technology. In 2014, the scale was introduced to EU funded projects in the Horizon 2020 program (APRE & CDTI, 2022).

Usually, new technologies undergo different stages of the TRL scale throughout their life cycle. Throughout the research and development stages, there can be iterations among the various TRL levels. In this context, the TRL scale helps to evaluate and better understand the current state and project progress.

To avoid complications due to malfunctioning of technology it is important to choose technology that is well developed and tested before you start desired digital transformation; in practice we suggest you choose technology with readiness level above 7 (signifying its readiness for deployment).

This is especially important because malfunction of technology both slows down the digitalisation process and even more importantly decreases a trust of technology users, who become reluctant towards working with technology in the future. The only exception is, if LTC facility decides to partake in research project and undertakes the development of technology itself; in that case it is important to communicate to all who will come in contact with the solution that they are part of research and development process and to train them in what that means.

TRL 1 – basic principles observed (case of key enabling technologies)	scientific research has just started, and the first results are used to be translated into future research and development
TRL 2 – technology concept formulated	basic principles have been studied and first experiments/tests are designed based on the initial findings (still speculative)
TRL 3 – experimental proof of concept	analytical and laboratory studies conducted, results from experiments/tests support the initial idea (proof-of-concept model)
When TRL 3 is reached, one can conclude that the new technology is **feasible from a scientific point of view.**	
TRL 4 – technology validated in lab	Validation of technology has been performed at laboratory level; a laboratory prototype is available.
TRL 5 – technology validated in relevant environment	Technology is tested in a more realistic, but still under control mode environment.
When TRL 5 is reached, one can conclude that the new technology is **feasible from a technological point of view.**	

TRL 6 – technology demonstrated in relevant environment	To confirm that engineering is feasible, the prototype is demonstrated in (industrially) relevant environment.
TRL 7 – system prototype demonstration in operational environment	The prototype/working model is demonstrated in an operational environment under 'normal' conditions and timings.
When TRL 7 is reached, one can conclude that the new technology is **reliable from the technological point of view.**	
TRL 8 – system complete and qualified	The technology is ready for implementation into an already existing technology or technology system.
TRL 9 – actual system proven in operational environment	The technology system has been proven during operations, competitive technology.
When RL 9 is reached, one can speak of a **commercial technology**.	

4. Reliability test

Conducting a **reliability test or pre-test** before implementing new technologies in LTC facility is a crucial step to ensure the effectiveness and usability of the solution. Develop realistic scenarios that reflect the daily tasks and challenges faced by employees in the LTC facility. Include a variety of situations to thoroughly test different aspects of the technology. Observe how users interact with the technology and address any issues that arise during this phase. Then obtain feedback regarding user-friendliness, efficiency, reliability, and overall user satisfaction. Use surveys, interviews, or focus groups to gather feedback from participants. Encourage users to provide detailed feedback on their experiences, including any difficulties they encountered and suggestions for improvement. Use this information to make necessary adjustments to the technology and its implementation. Document the results of the reliability test, including both positive outcomes and areas that need improvement. This documentation will be valuable when making decisions about whether to proceed with the full implementation. Consult with experts in the field, including technology specialists, nursing professionals, and usability experts, to gain additional insights and recommendations.

5. Infrastructure preparation

Clarify with your IT department and the manufacturer the technical requirements and necessary measures for the deployment of the technology.

The following questions may need to be clarified (Würdig et al., 2022):
- *Is WLAN required? SIM card capability? Is offline processing possible? Is the installation of, for example, signal boosters necessary?*
- *Is data transmission required, and what about the completeness of the data?*
- *Are analog or digital interfaces with the technology available in the facility, and are they compatible?*
- *Are there any technical requirements for the facility that go beyond the manufacturer's safety instructions, such as involving the construction department, data protection, occupational safety, etc.?*
- *What support does the manufacturer provide for implementation and ongoing operation?*
- *What warranty services are offered?*
- *Are possible product adjustments after implementation chargeable or provided as a service? Is there a replacement in case of hardware damage or loss?*

Consider that the acquisition of works, suppliers or services from economic operators by means of a public contract is subject to **rules on public procurement**. This secures transparent and fair conditions for competing on the common market and shall be followed when procuring services, works or supplies.

Rules differ depending on the kind of goods or services to be procured, the value of the purchase and the legal status of the awarding institution. Rules are set at the following levels:
- EU rules as set by the applicable directives on the matter
- National rules
- Project program rules (if implemented within the project)

It is strongly recommended to become familiar with the applicable procurement rules and, if necessary, to seek advice of procurement experts or national controllers early enough before launching a public procurement procedure.

So, what would be 'gold solution' for your LTC facility:
- ☑ Technical solution that answers the needs of LTC facility.
- ☑ Technical solution that is cost-effective, tested and has high enough readiness level.
- ☑ Technical solution that is sustainable.
- ☑ Technical solution that can be integrated in the system of organization and wider.

D. EVALUATION AND MONITORING OF DIGITALISATION AND DIGITAL TRANSFORMATION

When carrying out digital transformation process and introducing new technical solution (so carrying out digitalisation) it is important to understand the impact it has on the LTC facility and digital culture of LTC facility. For that data collection is crucial.

Furthermore, understanding of digital maturity of the LTC facility and digital literacy of the employees who will be included in the digital transformation process, before and after the implementation, can help you in developing and introducing appropriate training.

Finally, assessing and evaluating digital maturity before and after will give you a measure of progress and help you plan for the future, by developing or updating digital transformation strategy for your organisation.

While regular monitoring of the concrete digitalisation process will help you troubleshoot the issues and exploit the results to increase the motivation as soon as they emerge.

1. Assess and evaluate digital literacy of the employees (including the management)

There are numerous instruments that have been developed by national, regional, international and commercial agencies for assessing digital literacy or digital competence.

While assessing digital literacy in LTC facility you will probably use a tool that best fits your purpose, still we suggest you look beforehand if the tool you are planning to use is validated; UNESCO's Global Framework of Reference on Digital Literacy Skills for Indicator 4.4.2 can serve as your reference point.

> While doing an assessment we advise you to pay special attention to:
>
> *Are there differences in the level of digital literacy among people in your organisation? Which areas, or dimensions of digital literacy should be improved in your opinion? How do you think the level of digital literacy of managers and other employees could be improved? Is there any training course for employees' digital skills in your organization? Are employees encouraged to attend courses about digitalisation? Are these courses appreciated by professionals? How does your organization keep informed about digital innovations (e.g., new digital solutions or new software, etc.)?*

2. Assess the attitudes and standpoints of the employees towards the technology and digitalisation (including management)

There are different methodologies and tools available to assess those attitudes, as with digital literacy try to use validated tools as much as possible.

While doing an assessment ask managers and other employees about their attitude towards digitalisation and digital transformation. Ask them how do they fill about specific solutions? Given them an opportunity to tell you in what way they think technical solution can be implemented successfully? Where do they see barriers?

3. Assess the expectations

When planning an innovation majority of people have a certain idea, image how the innovation will look like and what changes it will bring. Those expectations can be realistic or not, but knowing, considering and addressing them is part of successful digital transformation process.

Here are some questions that can help with an understanding of expectations:
What are the expectations of the employees and management towards digitalisation (or towards specific digital solution you have in mind)? In your opinion, which are the key factors that must be considered for the digitalisation process? You can ask people to rank them based on their relevance for an effective implementation. In your opinion, which are the most important activities and processes of digital transformation that create value for the user and the organisation?

4. Assess digital maturity

The digital maturity assessment helps LTC decision makers, managers and providers to understand their level of digital maturity by identifying key strengths and gaps in the provision of digital services.

When done prior to digital transformation, digital maturity assessment can help organizations by providing a framework to identify opportunities for improvement and further development. At the same you can use it to measure a progress done during the transformation.

There are more than one digital maturity assessment tools, but most of them are not specifically tailored to LTC. You are free to use any of them, but one of the furthest in development for LTC facilities is probably What Good Looks Like Framework (WGLL) tool developed by NHS, UK. Put into practice in 2023, a tool baseline are 50 questions assessing digital maturity against 7 dimensions: Well led, Smart Foundations, Safe practice, Support people, Empower citizens, Improve care, Healthy populations. The framework draws on local learning to build on established good practice to provide clear guidance for health and care leaders to digitise, connect and transform services safely and securely as part of the Long-Term Plan's strategic aims for digital transformation.

As part of DigiCare4CE project we developed assessment tool that can be used by LTC facilities to self-assess digital maturity:

In the perimeter of the D.1.3.1 "Toolbox for benchmarking" is possible to know the logical path that the Consortia has adopted to build a new tool, that is the **LOTECADIM LO.ng TE.rm CA.re DI.gital Maturity self-assessment questionnaire**. The questionnaire has been built throughout a collaborative multiple codesign process, among Project Partners, supported by a large Europe wide on-line survey used to set up and validate it by a Factorial analysis.

Starting from 112 items the tool is finally based on 48 items, 11 factors that represents the main dimension of self-assessment and LTC comparison on the Digital Maturity level.

In the next project phase, the self-assessment tool and digitalisation training for LTC facilities, based on the Transnational DigiCare4CE model, will be available as an online tool called "DigiCare4CE Online Check" (D 1.4.1.).

5. Monitoring

Regular monitoring during the introduction of a new digital solution in a long-term care facility involves several key steps. Each step is designed to ensure the successful adoption of the technology while addressing challenges as they arise. Below are the steps with examples:

1. **Establish Clear Benchmarks and KPIs**

Example: Define specific goals such as reducing medication errors by 20% within the first three months of implementing an electronic medication administration record (eMAR) system. Establish key performance indicators (KPIs) to track progress, such as the number of errors reported, time spent on medication rounds, and staff satisfaction with the new system.

2. **Conduct Regular Feedback Sessions**

Example: Schedule weekly meetings with staff to gather feedback on their experiences with the new system. This could include ease of use, any technical issues, and suggestions for improvement. For instance, if staff find that the eMAR system is slowing down their workflow, this feedback can be used to adjust training or tweak system settings.

3. **Monitor System Performance and Usage**

Example: Use analytics tools to track how frequently the new system is being used and how well it is performing. For example, monitor login frequency, time spent on different modules, and any system errors or downtime. If you notice that certain features are underused, it may indicate a need for additional training or system adjustments.

4. **Troubleshoot Issues Immediately**

Example: If a caregiver reports that the system crashes during peak hours, prioritize investigating and resolving this issue. This might involve working with the IT team to increase server capacity or optimizing the software configuration.

5. Regularly Review Progress Against Benchmarks

Example: Compare actual performance data against your initial benchmarks every month. If the goal was to reduce medication errors by 20% and the reduction is only 10%, analyze the data to understand why and adjust your approach, such as providing additional training or revising workflows.

6. Adjust Training and Support Based on Feedback

Example: If monitoring reveals that certain staff members are struggling with the new system, offer additional training sessions focused on the areas where they are facing difficulties. For example, if many staff members struggle with entering data into the eMAR system, a focused training session can be organized to address this specific issue.

7. Communicate Successes and Improvements

Example: Regularly update the team on the positive outcomes of the new system, such as a significant reduction in errors or improved patient care efficiency. For example, if the system has reduced medication administration time by 30%, share this success to boost morale and reinforce the value of the new technology.

8. Adapt the Monitoring Process Over Time

Example: As the digital solution becomes more integrated into daily operations, adjust the frequency and focus of monitoring. For instance, in the early stages, daily checks might be necessary, but over time, you might shift to weekly or monthly reviews, focusing on long-term outcomes rather than initial implementation challenges.

9. Engage Stakeholders in Continuous Improvement

Example: Involve caregivers, IT staff, and management in regular review sessions to discuss the digital solution's performance and identify areas for improvement. For instance, after six months, hold a review meeting to assess whether the eMAR system is meeting the long-term care facility's needs and to discuss potential upgrades or additional features.

10. Document and Report Findings

Example: Create regular reports that document the monitoring process, issues encountered, solutions implemented, and the outcomes achieved. For example, produce a quarterly report that summarizes system performance, user feedback, and improvements made, which can be shared with stakeholders to ensure transparency and continuous support.

By following these steps, you can ensure that the digital solution is effectively integrated into the long-term care facility, with issues being resolved quickly and staff being continuously motivated by the positive impact of the new technology.

E. OTHER THINGS TO CONSIDER

1. ETHICAL AND LEGAL QUESTIONS

The legal and ethical questions refer to elements, principles, behaviours, and considerations that relate to both legal requirements and ethical standards. This category encompasses aspects related to ensuring that actions and decisions align with the law, such as enabling safety, security, privacy, and with morally acceptable conduct.

a. Ethical

Technologies with higher maturity levels (near to level 9) usually do not need ethical approvals since they have already been through a research phase in which ethical aspects have been tested. However, if necessary, establish ethical guidelines for the use of technology with your employees and seek care-related ethical expertise in case of uncertainties. Pay attention to transparency, information, and adherence to agreed-upon ethical values, especially when new employees are being integrated and regularly assess whether new ethical questions have arisen (Würdig et al., 2022). Ethical rules might be country specific. Therefore, we recommend checking **ethical guidelines and standards of your country**. Depending on the technical solution you want to implement you may also involve the following councils such as the Residents' Council or the Bioethics Commission of your country.

These practical questions might support in adhering ethical standards:
- *What ethical issues may arise from the use of technology in your LCT facility?*
- *What approaches could you develop to address these issues?*
- *Does the use of technology hinder or support social participation, the right to self-determination, and the privacy of your clients?*
- *Is the dignity and health of your clients preserved through the use of technology?*
- *Does the use of technology harm the reputation of your LCT facility?*
- *Does the deployment of technology contradict the guiding principles of your establishment?*
- *Which stakeholders need to be informed about and involved in the implementation of technology? Think beyond your clients, for example, consider relatives, caregivers, employee representatives, nursing home authorities, health departments, health insurance companies, medical practices, political committees, etc.*

b. Legal

Adherence to data protection rules is also important throughout the whole digital transformation, encompassing the implementation and testing phases of a new technology within your LCT facility. Ensure strict compliance with both internal organizational and national data protection rules and,

on a broader scale, adhere to EU data protection requirements. More information on data protection in the EU can be found here: [Data protection EU](#).

> Here are some questions that can help you look at legal requirements:
> - *Does the pilot action follow data protection rules? How to adhere to data privacy rules?*
> - *Which consents are needed?*
> - *How will the contracting between LTC & vendor be organized?*
> - *How to optimize surveillance?*
> - *How is data flow managed?*

2. COMMUNICATION AND CULTURE

a. EARLY INVOLVEMENT OF KEY STAKEHOLDERS AND MANAGEMENT

Early involvement of key stakeholders: It is important to identify key stakeholders for your pilot context as an important factor for the success of a product implementation is the early involvement of all stakeholders. These can be internal and external stakeholders. A list of project members and stakeholders will help you to further coordinate communication and involvement in your pilot.

> Think of the following questions:
> - *Who in your organization is needed and should be involved to introduce new technology? (include all levels, decision making)*
> - *Who are the opinion leaders?*
> - *Who needs to be informed about the change?*

Management Power: Appoint a project manager, digital transformation responsible for the implementation and as a central contact person for the LTC facility. Especially for complex product launches, the team typically needs an experienced guide who is flexible, residents, competent, and able to support new users confidently until they are proficient in independent product use and the changed processes (Würdig et al., 2022). If applicable, appoint a wider digital transformation management team (e.g., establish a dedicated help desk to assist users with technical issues.). Clarify in detail the roles and responsibilities in advance and communicate them transparently.

b. EFFECTIVE COMMUNICATION

Effective communication and a supportive organizational culture are critical for overcoming resistance, fostering collaboration, and ensuring the successful adoption of new technology in a LTC setting. It creates an environment where employees feel empowered, valued, and well-prepared to leverage technology to enhance their work and improve resident care. External communication is also essential for introducing the new technology to external stakeholders such as residents, their families, and regulatory bodies. Transparent and informative communication

with these external parties helps manage expectations, build trust, and demonstrate the nursing home's commitment to providing enhanced care through technological advancements.

Communicating acceptance from stakeholders, works best when it focuses on the people who are affected by the change (Maguire et al., 2018), but also recognises differences between professional cultures, facilitating dialogue and translation between professional cultures (network, task-teams) (Dugstad et al., 2019). Team communication and collaboration is also important in bottom-up engagement in digital strategy (Trenerry et al., 2021). A good strategy should conceptualise and communicate technologies as tools that complement rather than replace staff and introduce a variety of incentives for adopting the new model, which should reflect the diversity of interests in the workforce (Chan et al., 2022).

> Communication measures for successful digital transformation are needed during the following phases:
> 1. Communication in the preparatory phase (information for stakeholders & employees)
> 2. Communication during implementation (information on where to get information and support, feedback, motivation & trouble shooting)
> 3. Communication after implementation (communicating results & final feedback)

3. GOAL SETTING AND DEVELOPMENT OF INTERNAL DIGITAL TRANSFORMATION STARTEGY

Concrete, realistic, and shared goals are motivators and provide a clear guideline. They should be regularly reviewed and adjusted as needed throughout the process. Develop the objectives associated with product implementation and make them transparent. Goal setting can be part of monitoring and evaluation process (to see an example look at the section D 5.).

> It is useful to document goals and evaluate their achievement regularly: Has the intended result been achieved? What supportive factors and barriers have you identified within your organization throughout the process? Involve employees and digital transformation team members in the goal setting process to increase their motivation.

Based on the needs analysis, unerstanding of current ICT solutions and monitoring and evalution while implementing specific solutions, LTC facility can benefit by developing more holistinc and long-term internal digital transformation strategy.

An internal digital transformation strategy is crucial for a LTC facility as it ensures that the adoption of new technologies aligns with organizational goals, optimizes resource allocation, and enhances resident outcomes. It facilitates change management, engages staff through proper training, and supports scalable, secure, and flexible implementation of digital solutions. Additionally, such a strategy enables data-driven decision-making, mitigates risks, and helps the facility stay competitive and future-proof in a rapidly evolving healthcare landscape. If possible, internal digital transformation strategies should be aligned with regional or national digitalisation strategies, sometimes giving opportunities for additional funding.

4. TRAINING AND EDUCATION

Digital change is as much about people as it is about technology and training of employees proved to be one of the most important factors to facilitate the digitalisation process (Bail et al., 2022; Boyle et al., 2022; De Leeuw et al., 2020; Trenerry et al., 2021). Management needs to provide investments and opportunities in professional development, tailored training, and peer-to-peer learning (De Leeuw et al., 2020); skills upgrading or retraining, understanding that in the healthcare sector users possess varying degrees of technological expertise and access, so everyone should receive mandatory training in technology use (Iyanna et al., 2022). Organizations should negotiate with firms providing e-health and e-care products/services to secure onsite personnel support and chat-based online support to address any challenges end-users (healthcare providers and residents) might face (Iyanna et al., 2022).

TRAINING PLAN

Systematic and well-prepared training is crucial for successful implementation of technical solution. It helps people implementing technical solution to understand this solution, it includes them into co-shaping the goals of digital transformation of your LTC facility and when properly structured it gives them a sense of security while using technology – building their trust for future introduction of digital solutions.

In preparation for the training shortly answer the following questions:
- Shortly describe technical solution you are implementing.
- Why did you decide for this digitalisation and what are your goals?
- Is there non-technical knowledge that is also important for your implementation?
- What will happen during the pilot / Which milestones do you predict? When?
- Where will solution be implemented? And who will be involved?
- Where and how can people implementing technology receive support if they have technical or non-technical issue? Think about the time before, during and after the implementation.

These questions can serve you as a basis for training preparation. While preparing the training try to think about the training as a continuum.

Taking into account the questions above, now think about people involved in your digital transformation. While thinking about whom you should include into the training think about different levels: from managers to people who will be using technology. Think about what kind of knowledge and information they will need.

Who in your organization is needed for implementation of new technology and should be included in the training? (include all levels, decision making)	What kind of training and information do they need? - Before the pilot - During the pilot - After the pilot	When and in what form do you plan to provide this training and/or information? Who will be providing this training and/or information?

Finally, think about methodlogy you will use for specific parts of the training.

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5. WIDER IMPLICATION OF TRANSNATIONAL DIGICARE4CE MODEL

a. HEALTHCARE CHALLENGES WHILE INTRODUCING NEW DIGITAL SOLUTIONS IN LONG-TERM CARE FACILITIES

The digitalisation of long-term care facilities faces several systemic challenges within the broader healthcare system:

1. Lack of Standardization

Challenge: The absence of standardized digital practices and protocols across healthcare systems makes it difficult for long-term care facilities to implement digital solutions consistently. Different facilities may use varying electronic health records (EHR) systems, data formats, and communication protocols, leading to interoperability issues.

Impact: This lack of standardization hampers seamless information exchange between long-term care facilities and other healthcare providers, creating gaps in resident care and complicating coordinated efforts across the healthcare continuum.

2. Need for Modular Systems

Challenge: Long-term care facilities require modular digital systems that can easily adapt to new models, technologies, and regulatory changes. However, many existing systems are rigid and unable to integrate new functionalities without requiring major changes.

Impact: Without modularity, facilities face challenges in keeping up with evolving best practices, incorporating new care models, and meeting changing resident needs. This lack of flexibility can lead to outdated systems that are costly and difficult to upgrade, ultimately affecting the quality of care.

3. Connectivity Issues

Challenge: Ensuring consistent and reliable connectivity is a significant challenge, particularly in rural or underserved areas where internet infrastructure may be lacking. Long-term care facilities rely on robust connectivity for real-time data exchange, telemedicine, and digital monitoring tools.

Impact: Connectivity issues can disrupt the delivery of care, limit the effectiveness of digital tools, and isolate long-term care facilities from the broader healthcare system. This can lead to delays in care, reduced access to specialized services, and an overall lower quality of life for residents.

4. Fragmented Healthcare Ecosystem

Challenge: The healthcare ecosystem is often fragmented, with multiple stakeholders, including care facilities, hospitals, primary care providers, specialists, and insurance companies, each using different systems. This fragmentation complicates the integration of long-term care facilities into the broader digital health network.

Impact: Fragmentation leads to inefficiencies, such as duplicated efforts, gaps in communication, and difficulties in coordinating care across different levels of the healthcare system. Residents may experience inconsistent care due to these disjointed systems.

5. Regulatory and Compliance Barriers

Challenge: Navigating the complex regulatory environment is another significant hurdle. Long-term care facilities must comply with a range of data protection, privacy, and healthcare regulations, which can vary by region and are often slow to adapt to new digital technologies (further descirbed in section E 1.).

Impact: Compliance challenges can slow down the adoption of digital solutions, as facilities may be wary of inadvertently violating regulations. This can lead to delays in implementing potentially beneficial technologies, further complicating the digitalisation process.

6. Resource Constraints

Challenge: Many long-term care facilities operate with limited financial and human resources, making it difficult to invest in and maintain advanced digital systems. Budget constraints often force facilities to prioritize immediate operational needs over long-term digital investments.

Impact: Resource limitations can result in a slower pace of digital transformation, reduced access to cutting-edge technologies, and an over-reliance on outdated systems, all of which can negatively affect the quality of care provided to residents.

These systemic challenges highlight the need for a coordinated, comprehensive approach to digitalizing long-term care facilities, ensuring they can fully integrate into the broader healthcare system and provide high-quality care to their residents.

b. RELATION BETWEEN DIGITAL TRANSFORMATION OF LONG-TERM CARE FACILITY AND LOCAL ENVIRONMENT

Digital transformation in long-term care facilities can significantly enhance how older adults interact with their local environment, supporting the concept of an age-friendly environments.

For example, still active older people encouraged to learn digital skills and equipped with needed tools (as part of internal digital transformation strategy) can use mobile applications designed to provide information about local activities, such as exercise classes or social events, tailored to their interests and mobility levels. These apps can also include features like maps showing the location of benches, public restrooms, and accessible routes, making it easier for older adults to navigate their communities safely and independently.

For older adults who cannot leave a long-term care facility, digital transformation can still significantly enhance their connection to the local environment and community. For instance, simple video calls can help residents to connect with family and friends. Virtual reality (VR) experiences can allow residents to explore local parks, attend community events, or visit familiar landmarks virtually, providing a sense of connection to the outside world. Additionally, apps can offer virtual participation in local activities, such as joining a live-streamed community concert or a virtual book club hosted by the local library. Residents can also use digital platforms to engage in social interactions with local volunteers or school groups through

video calls, helping them stay socially connected even when they can't physically leave the facility.

To conclude: while the DigiCare4CE model provides a framework for digital transformation within long-term care facilities, its impact extends beyond the confines of these facilities. The shift in mentality that accompanies digital transformation not only enhances operations within LTC settings but also creates opportunities for broader connections with the wider healthcare system and the local community.

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