

# Result Report



## Ideation process

German-Danish network for  
innovation and  
cooperation in healthcare



**Interreg**  
Deutschland - Danmark



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# Imprint

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Project management  
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Kiel, March 2022

This result report presents a compilation on the key findings provided by the partners working in the work package:



Project management



Ideation process



Project communication & PR



Development process



German-Danish platform for  
innovations in the health sector



Market access

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## The Access & Acceleration project

The aim of the Access & Acceleration project is to provide an overview of the relevant players within the medical innovation sector in the German-Danish border region (*access*), and to signpost ways to speed up the cycle of medical innovation (*acceleration*). In the last three years, the Access & Acceleration project has examined both the fundamental barriers to market entry and the innovation process in the healthcare sector. The results were integrated into a digital platform where users from the clinical, academic and industrial sectors can find the skills to develop new ideas and to create new products for the healthcare markets in Denmark and Germany. The partners participated in pilot projects, pursuing the innovation process from the ideation stage to testing and evaluation, right through to the prototype phase. All of the stages were also documented on the platform. The platform also contains examples of good cooperation between research institutions, hospitals and companies. A database linking regional stakeholders offers the opportunity for future cooperation and the further use of the platform even after the end of the project.

### Project facts



March 2019 – March 2022



2.9 million Euros budget, thereof 1.7 million Euros funds



7 partner organisations from Denmark and Germany

### Project aims

- ✓ strengthen cooperation between medical providers, companies and universities in the German-Danish region
- ✓ promoting the involvement of patients and healthcare professionals in the user-centred development of innovative services and services and technologies in the health sector
- ✓ increasing the innovative capacity of companies in the and support them in accessing cross-border markets

## Project partners



## Introduction to the challenges addressed

Both German and Danish healthcare sectors are confronted with challenges such as the demographic change, shifting treatment requirements and rising costs. To meet these challenges and develop new innovative ideas, technologies and products in the healthcare sector, the continuous exchange between companies, hospitals and research institutions is of great importance. With its interdisciplinary approach, the Access & Acceleration project aims to establish a cross-border platform that will enable key players in the health sector to connect and cooperate with each other to initiate innovative processes. To effectively utilise the potential of the two different healthcare systems and to support projects that are already further advanced, the project partners consider the different stages of the innovation process:

### Ideation stage

This stage is about the genesis of new ideas within the healthcare sector and about fostering innovation activities by companies in the German-Danish border region. In this stage, the project will involve relevant stakeholders as health professions and experts from the regional healthcare sector as well.

### Development stage

The project partners create concepts for developing products as well as offers and test them into pilot projects.

### Market stage

The project partners identify possible market barriers that can arise during the introduction of new technical solutions and develop strategies that facilitate the market launch.

*Figure 1: Project goals in the different stages of the innovation process*

The *Chair of Technology Management at Kiel University* (CAU Kiel), Germany, focused on the ideation stage. In this regard, the CAU Kiel aimed, as lead for the project work package 4, on the following specific goals:

- 1) Application and development of an empirically validated approach and management system for collaborative idea generation for innovative products, processes, and services in the health sector. The purpose of this was to strengthen the competitiveness of regional technology companies and the integration of health service providers in the innovation process
- 2) Accelerating the uptake of innovation potentials and cross-sectoral cooperation between medical services providers, companies and universities by supporting innovation teams to accelerate the innovation processes and innovation activities in the programme region through various research and project activities as for instance:
  - The identification and evaluation of future market and technology trends (strategic foresight) in order to support regional companies and health professionals/hospitals in the strategic management planning
  - Identification and match of needs of health professionals and hospitals to emerging health trends and regional conditions and competencies
  - Identification and evaluation of driver and barriers in the acceptance and implementation of promising health technologies that possess the potential to achieve permanent improvements in the quality of treatment.
  - Identification of complementary competencies within and outside of the programme region and the consideration of the global market situation as a basis for future local R&D collaborations and research projects

## Empirically validated ideation process: Innovation Physio – A digital idea campaign with German physiotherapists

### Background

Innovations in ambulatory cross-sectoral patient care are gaining relevance. Coordination problems and a lack of patient adherence lead to efficiency and quality deficits. This downtrend is exacerbated by an increasing number of older people as well as by the significantly growing number of chronically diseased and multimorbid patients (Goodwin et al., 2017). In particular, the ambulatory care of multimorbid patients of advanced age (e.g., with osteoporosis) or patients with complex multiple traumas is very challenging (Marsh et al., 2011). To achieve sustainable innovations in the ambulatory care that meet the actual requirements, it is not only necessary to involve medical doctors, but also secondary healthcare providers as physiotherapists in the innovation process. Today, often only physicians are included as



possible innovators and in addition, there is no systematic approach to integrate all relevant stakeholders into the ideation process. Many classic approaches and models are not applicable due to the particularities of the health sector.

The CAU Kiel focused their study and digital idea campaign on the German ambulatory care, which is recognised for their mainly independent organised and autonomous health practices (Busse et al., 2014). More concretely, the CAU Kiel focused on the integration of ambulatory physiotherapists as further relevant innovators apart from ambulatory physicians. To create sustainable healthcare innovations that meet actual requirements, doctors and other relevant healthcare providers need to be involved in the innovation process. In an ideation drive across Germany, the CAU Kiel examined how the systematic involvement of physiotherapists in the ideation process helps to increase acceptance and willingness to innovate.

### Aim and activities

The objective of this research project was to apply and empirically validate an approach for strengthening the integration of physiotherapists as innovators in the collaborative ideation process in the ambulatory care of postoperative patients in Germany. The CAU Kiel conceived an idea campaign with a web-based ideation platform for this purpose. The content of the initiative was designed in collaboration with the *Deutsches Institut für Therapieforschung (DIT, German Institute for Therapy Research)* and the Kiel-based company *Buchner & Partner (B&P)*. In this context, the following research question has been examined:

- Under what conditions are physiotherapists able and motivated to determine concrete problem areas and to collaboratively develop ideas for new health solutions?

To reach the purposed research objective, the project partners conceived in cooperation with B&P and DIT a four-stage project plan:

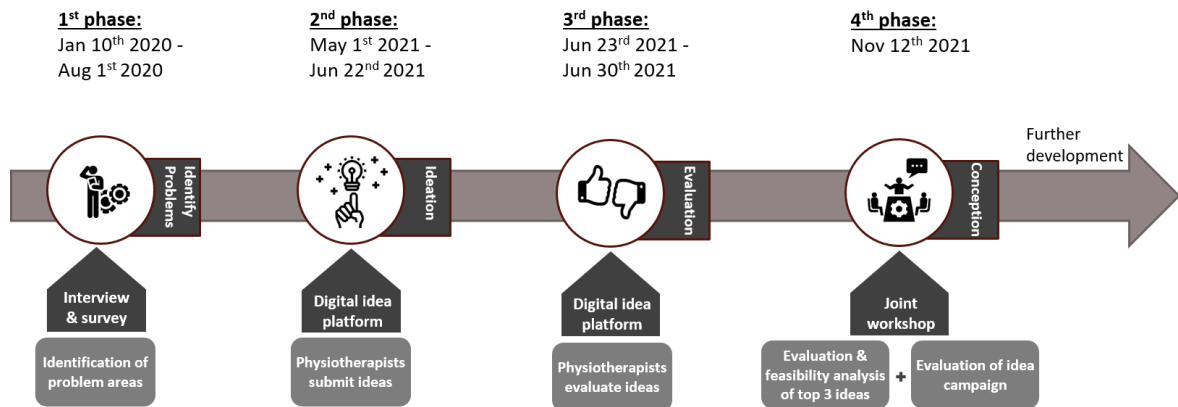


Figure 2: Project phases of the digital idea campaign in Germany conceived by B&P, DIT and the CAU Kiel

### First phase

In total, the CAU Kiel conducted qualitative interviews with 20 physiotherapists. Subsequent, an online survey was created to complement and further validate the interview findings and distributed throughout Germany. With both measures of this explorative research method the project partners were aiming on the determination of:

- 1) potential barriers that hinder the integration of physiotherapists in the ideation process,
- 2) potential effects of the integration of secondary health service providers as physiotherapists in the ideation process and adoption of user-driven innovations,
- 3) existing challenges in daily treatment of postoperative patients in Germany

The interviews and web survey and the following idea campaign were promoted by *B&P* with newsletters and two articles in the professional magazine *UP – Unternehmen Praxis*. In total, 4.320 German physiotherapists were contacted using the *B&P* and *DIT* networks.

### Second phase

The digital idea campaign addressed the following problem areas explored in the first phase:

- The planning and quality assurance of physiotherapeutic treatment,
- Lacking activation of patients through education, participation and co-decision-making,



- Lacking integration of physiotherapists in the holistic health value chain with insufficient intersectoral cooperation with further health service providers

All registered physiotherapists were asked to submit ideas based on the beforehand explored problems areas in the daily treatment of a postoperative patients. Despite of the above-mentioned research question, the purpose of the campaign was to collect innovative ideas in a larger scale as prospective solutions to improve in long-term the treatment quality of postoperative patients. For the idea collection, the CAU Kiel developed a digital ideation platform based on a professional platform toolbox provided by the Danish company *Nosco*. All participants were also able to comment, discuss and like submitted ideas of their colleagues on the idea platform (only accessible by previous registration). In order to make the idea submission process as easy as possible, the CAU Kiel created a customised standard form with different key questions about the idea.

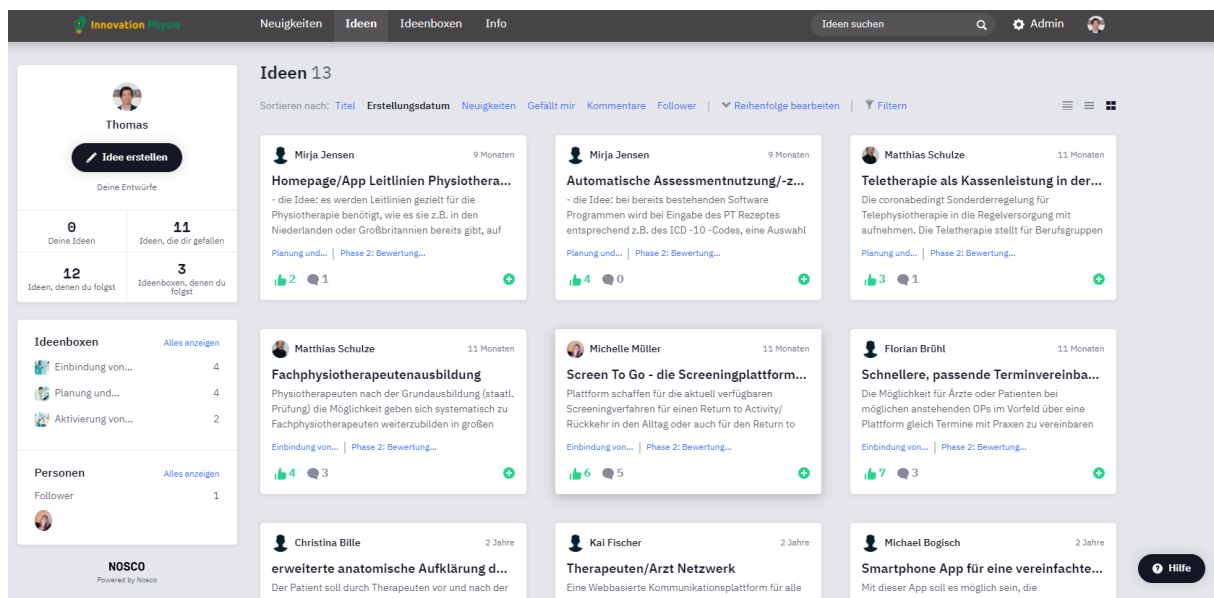


Figure 3: Idea platform for the idea submission and evaluation

### Third phase

The participants then condensed the ideas they had collected. On the platform, participants had the opportunity to evaluate each idea based on the following four criteria:

- 1) Innovativeness: How novel and innovative is the idea? Do you already know this solution?
- 2) Feasibility: How can the idea be realised in your opinion? What challenges to you see?

- 3) Benefit for patients: How high do you assess the potential of the idea to improve the quality of treatment for patients in the long term?
- 4) Benefit for the physiotherapists: Does the idea simplify or improve existing processes, relieve the daily workload, and thus save valuable time?

Subsequent, a jury of experts in the field of the physiotherapy and health innovations from B&P, DIT and from the CAU Kiel evaluated the ideas as well. In this manner, all submitted ideas were evaluated and the best 10 were elected.

#### Fourth phase

The participants validated and analysed the feasibility of the top three ideas in an online workshop. As an incentive, the participants who created the top three ideas were given the opportunity to further develop the concepts for their ideas, either as part of study projects or as part of another workshop with B&P and the CAU Kiel. The data from the participant surveys and their activities are available on the digital *Access & Acceleration* platform and provide a useful basis for the future integration of ideas into the innovation process. The online workshop was as well applied by the CAU Kiel for the validation of the integration of physiotherapists in scope of an idea campaign supported by a web-based idea platform.

#### Results

In the conducted idea campaign, a total of 80 registered German physiotherapists submitted, commented and evaluated ideas on the idea platform. After the duplication check, in total 13 usable ideas were submitted during the campaign on the idea platform. Apart from an internal jury (experts from B&P, CAU Kiel and DIT), 22 registered physiotherapists also evaluated the submitted ideas in the third phase of the campaign. Based on this, the project partners selected the top 10 ideas. And finally, five physiotherapists and three graduated physiotherapists with lecturer role at a university or research institution attended the online workshop for the deep discussion, feasibility analysis and further conception of the top three ideas.

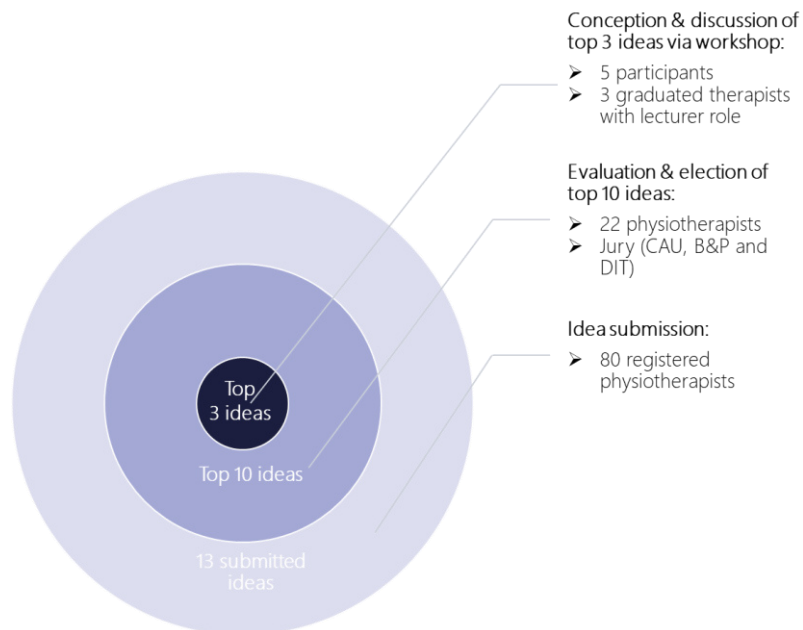


Figure 4: Output overview of the digital idea campaign with German physiotherapists

The scientific evaluation of the conducted research in the first phase and the workshop in the final phase of the idea campaign resulted in the following key findings, which are recommended to be investigated in further research:

- **Motivation of the integration in the innovation process:** A latent urge exists on the side of German physiotherapists to be involved in the ideation and thus, development process of novel tools, products, services and technologies in the ambulatory care. But for the motivation of physiotherapists to participate in innovation projects as the conducted digital idea campaign, intrinsic and extrinsic incentives are both essential. The involved physiotherapists all underlined the strenuous working conditions of physiotherapists that restrict the possibility and motivation to deal with digital health innovations and to be part of the development process. In this regard, the research findings highlight the key role of intrinsic motivation to take over tasks beyond their formal responsibilities, especially in absence of extrinsic drivers such as high monetary payoffs.
- **Perceived relevance of the integration in the innovation process:** In the perception of German physiotherapists, the lacking system integration of secondary health service providers as physiotherapists and the insufficient intersectoral collaboration with particularly physicians affect both the development of digital health innovations and daily business of patient treatment. On one hand, the overall missing system integration of physiotherapists and the lacking collaboration between the different involved health disciplines were described as main barrier in the German ambulatory care

that negatively affect the patient treatment, as the correct treatment planning relies on the knowledge and expertise of all involved professions. On the other hand, most of the asked physiotherapists underlined the missing integration of physiotherapists in the innovation development process as an important prerequisite for the emergence of new promising innovations in the ambulatory care. The rising complexity of the health system and particularly patients' needs make an efficient knowledge transfer between related health disciplines in the innovation process necessary to improve the full spectrum of care.

- **The personal innovation behaviour and academic education background of physiotherapists significantly affects the intention to participate in innovation projects:** All participants of the workshop consistently agreed that an idea campaign with an integrated idea platform was a promising and appropriate approach to encourage physiotherapists to participate in the ideation process. Thus, the underlying problem is not the selection of the approach itself, but rather the lacking awareness of the relevance of the topic "innovation" on the part of German physiotherapists. In this context, the workshop participants emphasised the relevance of
  - the revaluation and standardisation of the physiotherapy education throughout Germany, and
  - an early confrontation and sensibilisation with long-term oriented strategies such as the pro-active engagement with novel tools or the standardisation of quality assurance measures as well as the sensitisation of the use of evidence-based therapies.

In this regard, the workshop participants highly recommended to conduct further innovation projects such as idea campaigns in educational institutions and centres for physiotherapist students.

## Publications

Huynh, T. A case study of digital idea campaign with German physiotherapists - *scientific article (in progress)*.

## Accelerating innovation activities in the ideation and development process by integrating healthcare professionals

The objectives of this part of work package 4 were to improve the idea generation and acceleration of innovation activities in companies and organisations in the programme region through the intensive analyses of user requirements and market trends (as systematic technology forecasting). In order to achieve these overall goals, the CAU Kiel was collaborating with several companies in the programme region in scope of eight

different project initiatives. The objective within these project initiatives is to support companies in their innovation activities – particularly the ones with the most promising innovation potentials – through scientific investigation, while taking into account the needs and requirements of relevant stakeholders in the healthcare sector.

The following initiatives were carried out within the work package 4:

- **Initiative 1:** Identification of existing user needs and challenges in the German ambulatory care from the perspective of physiotherapists
- **Initiative 2:** Investigation of effects of interprofessional boundaries between ambulatory physicians and physiotherapists in adoption of user-driven health innovations
- **Initiative 3:** An empirical analysis of German hospitals' medical technology innovation behaviour
- **Initiative 4:** A digital idea campaign at the UKSH Kiel
- **Initiative 5:** Cochlear implants digital aftercare
- **Initiative 6:** “The New Normal” – A survey research about potential effects of COVID-19 on the shift and emergence of new healthcare trends
- **Initiative 7:** Online workshop with integrated survey about potential effects of CoVID-19 on the German healthcare system
- **Initiative 8:** Accompaniment and support during the project application process  
*BlueHealthTech*

A more detailed description of the eight project initiatives can be found at the Access & Acceleration project website: <https://accessinnovation.eu/ideation-stage.html>

## Case studies on innovation potential

The concrete objective was to examine, evaluate and thus to foster the development of two innovation potentials that have the potential to improve the patient situation in the programme region. In this regard, the CAU Kiel conducted two deep scientific studies of two different promising technology-related health innovations. They are presented as case studies in the following.

## First case study: Individual barriers to use of digital information systems in ambulatory care from the perspective of physiotherapists

### Background

In 2018, the Bertelsmann Stiftung's study *SmartHealthSystems - Digitization Strategies in International Comparison* measure the degree of digitisation of the healthcare system of selected EU and OECD countries. According to the results, Germany is on the second-to-last place, while even economically weaker countries such as Denmark and Estonia have the highest level of digitisation in healthcare (Thiel et al, 2018). According to further recent studies, the reasons are diverse, such as the high number of different stakeholders and the low appreciation for digitisation were stated by several surveyed healthcare institutions in Germany (Baierlein, 2016). Telemedicine, eHealth (electronic health) and mHealth (mobile health) are recognised as important digitisation drivers in the German healthcare system. The German Federal Ministry of Health defines these modern information and communication technologies as relevant applications that can provide decisive support in the care and support of patient treatment in the future (Zimmermann, 2021). This goes hand in hand with the findings from conducted interviews with German physiotherapists during the idea campaign (see chapter 1). For example, one interviewed physiotherapist stated:

*Digital applications or comparable novel digital health technologies will be the future, also for the German care and thus, also for us therapists. But colleagues are not dealing with this topic [...] either the practices have simply no time and resources to deal with the implementation of new tools or the [digitisation] topic is still for many not tangible yet.*

### Aim and activities

The objective of this research was to develop an empirical validated better understanding about individual drivers and barriers affecting the acceptance and thus, physiotherapists' adoption and use of digital health innovations. The research team was supported by a master student that conducted further interviews (personal and via phone) with German physiotherapists. Based on a previous literature analysis, a semi-structured interview guideline was created to examine potential barriers in the personal acceptance and use of digital health innovation in form of new health information systems.

### Results

The research findings show that the interviewed physiotherapist's use and acceptance of digital information systems are meaningfully affected by the following individual characteristics:

- **Perceived system security risks:** The risk barrier arises when the user (here the physiotherapists) cannot assess the risks and uncertainties associated with the

new technology e.g. by unauthorised third-party access of users' or patients private information (based on Wunderlich et al., 2015).

- **Perceived system complexity:** The system complexity is the degree to which a digital health information system is perceived by the user as relatively difficult to understand and use (based on Rogers, 2003).
- **Need of human interaction:** This personal barrier arises when new services or technologies poses a radical change in the human (patient) interaction and thus, physiotherapist's established working routine (based on Gelderman et al., 2011).

## Publications

Kisla, S. F. (2021). Innovativeness of healthcare providers: An analysis of the innovative capacity of German Physiotherapists– *Master thesis*.

## Second case study: Implementation and utilisation barriers of clinical decision systems

### Background

Despite the deficits in the quality of care and the consequently increasing pressure to improve the efficiency, the implementation of particularly technical innovations is often very challenging due to different characteristics of the healthcare system (Groß, 2017). A successful adoption of new medical technology products or services does not only comprise the adoption on the organisational level, but also requires the acceptance within the organisation, on the individual level of the employees (Schiavone, 2020).

The wide accessibility of sensor data, the thorough digital documentation of medical processes and intelligent evaluation and prediction procedures (machine learning) enable digital systems for clinical decision support and automated quality control (Wendt et al., 2000). Nevertheless, such clinical decision support systems (CDSS) often go hand in hand with a higher transparency of the hospital processes and outputs and, at least in partial, a transfer of competencies and responsibilities to technical systems (Buenestado et al., 2013). Regardless of the promising positive effects on the quality of care and efficiency, both aspects might have a negative influence on the acceptance of health professionals as for instance physicians (Chang et al., 2007).

### Aim and activities

In this study, the CAU Kiel focused on the investigation of individual barriers of health professionals (e.g., physicians, nurses) as end users with respect to the acceptance of new medical services and products in the German-Danish programme region. Furthermore, the aim was to use the findings and derived implications to gain insights how to systematically enhance the individual acceptance of physicians. The strengthened adoption rate of new medical products and services comprises the chance to improve the treatment quality and cost efficiency in healthcare. Based on the research results companies can also derive valuable impulses for optimising the

development and commercialisation of new medical innovations. The following research question will be answered in the course of this study:

- Which individual barriers, concerning the fear of a possible loss of control or higher transparency, reduce the acceptance of clinical decision support systems among physicians?

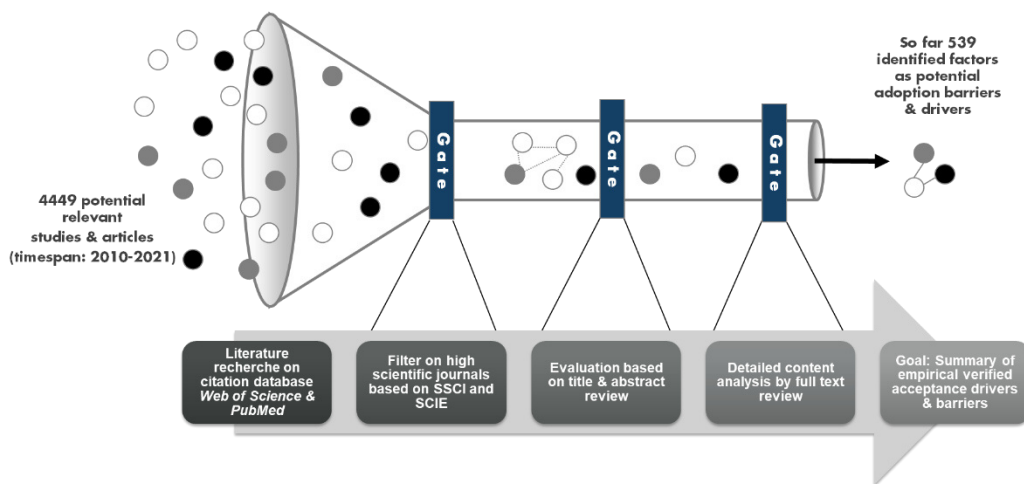


Figure 5: Procedure for the conducted systematic literature review on adoption barriers of CDSS



## Results

The findings emphasises that the focus in previous empirical studies lied on the investigation of technological and organisational CDSS adoption barriers. In contrast, a clear neglected research area is the scientific investigation of environmental, individual and social relational adoption factors of CDSS:

Technological factors	Frequency*	Organisational factors	Frequency*
Perceived usefulness (+)	43	IT knowledge & expertise (+)	28
System quality (+)	38	IT infrastructure & resources (+)	18
System ease of use (+)	20	Organisational structure/decision making (+)	18
System compatibility & workflow fit (+)	14	Related financial & time costs (-)	15
Perceived user benefits (+)	13	Organisational innovation culture (+)	12

Environmental factors	Frequency*	Individual and social relation factors	Frequency*
Training and education by supplier (+)	10	Social influence/pressure (-)	17
Competitive pressure (+)	5	Attitude towards new technologies (+/-)	15
Supplier IT/computing support (+)	5	Self-image (perceived image effect) (+)	9
Affiliation with network (+)	3	Personal innovativeness (+)	6
Government support (e.g. funds) (+)	3	Professional experience (-)	4

\* Frequency the factor was empirical investigated in the evaluated scientific articles

*Table 1: Scientific verified impact factors (top 5) on adoption behaviour and usage of CDSS categorised in technological, organisational, environmental, individual and social relation factors*

## Conclusions in a nutshell

The generated output in work package 4 serves on the one hand the concrete identification and investigation of innovation potentials considering the needs of the stakeholders in the healthcare sector in the programme region. On the other hand, the results of the project initiatives can be processed and published on the Access & Acceleration knowledge platform as valuable case studies for cross-sector innovation cooperation. The latter primarily serves as a positive signal for the success and benefits of the entire health innovation platform and thus, serves to attract new collaboration partners and the formation of the network in the programme region.

- **Value of cross-sectoral collaboration:** During the project initiatives, the advantages and added values of cross-sector collaborations have become apparent. The advantages are not only one-sided, but also valuable advantages arise on the side of the industry through the cooperation in the context of innovation (see [project initiatives](#)). The combination of cross-sector competencies and capacities yields essential synergies.

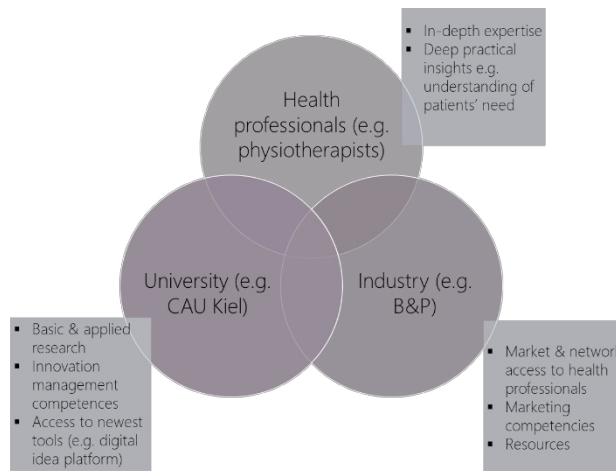


Figure 6: Reciprocal synergies through cross-sectoral collaboration

- Investigation of drivers and barriers of high innovation potentials in healthcare:** Clear evidence can be provided on the basis of the investigations carried out by the CAU Kiel. New health information systems or CDSS and thus, systems with high innovation potential and potential to improve the quality of treatment in the long-term face various barriers in implementation and user acceptance. The conducted scientific research of the CAU Kiel accelerates and provides a foundation in the development and broad diffusion of promising medical technologies as CDSS in the healthcare system. As illustration of the benefits of the conducted scientific research of the CAU Kiel (e.g., 2<sup>nd</sup> Case study on innovation potential) are summarised in the following figure:

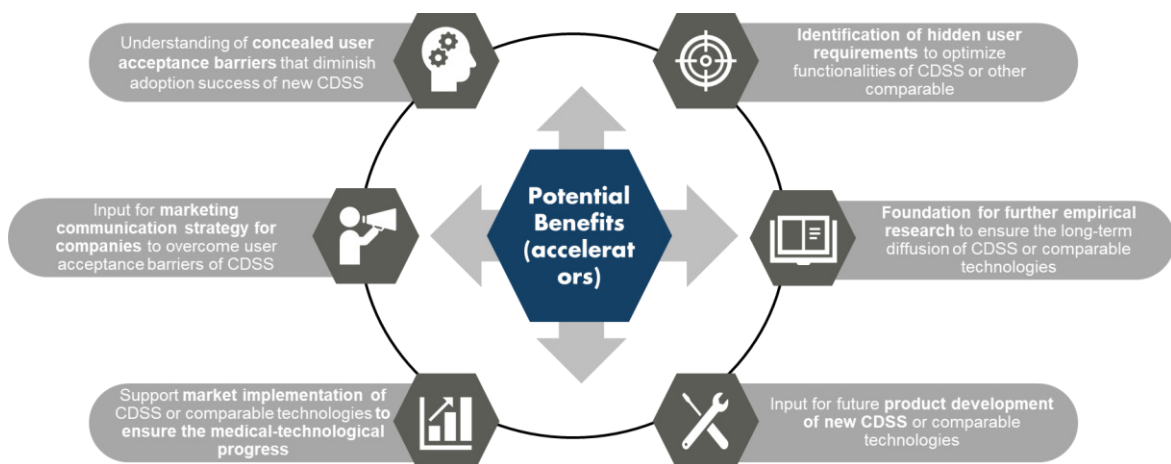


Figure 7: Benefits of research findings from systematic literature review for the acceleration of the diffusion and implementation of novel medical technologies as CDSS

- Drivers and barriers in the integration of health professionals in the ideation process:** The collected research data as for instance from the digital idea campaign highlights that the integration of secondary health service providers is evidently desired and perceived as mayor factor to ensure the emergence of promising new health innovations but are hindered through different challenges. The findings from the CAU Kiel provides a fundamental stepstone for future open innovation research and practical implications also for further innovation projects that aiming to strengthen the integration of health professional in the innovation process. Today, physicians are often involved and consulted by the industry that develop novel health tools and services. In contrast, non-doctors as nurses and physiotherapists are rarely or not at all considered as relevant development partners (Schiavone, 2020).

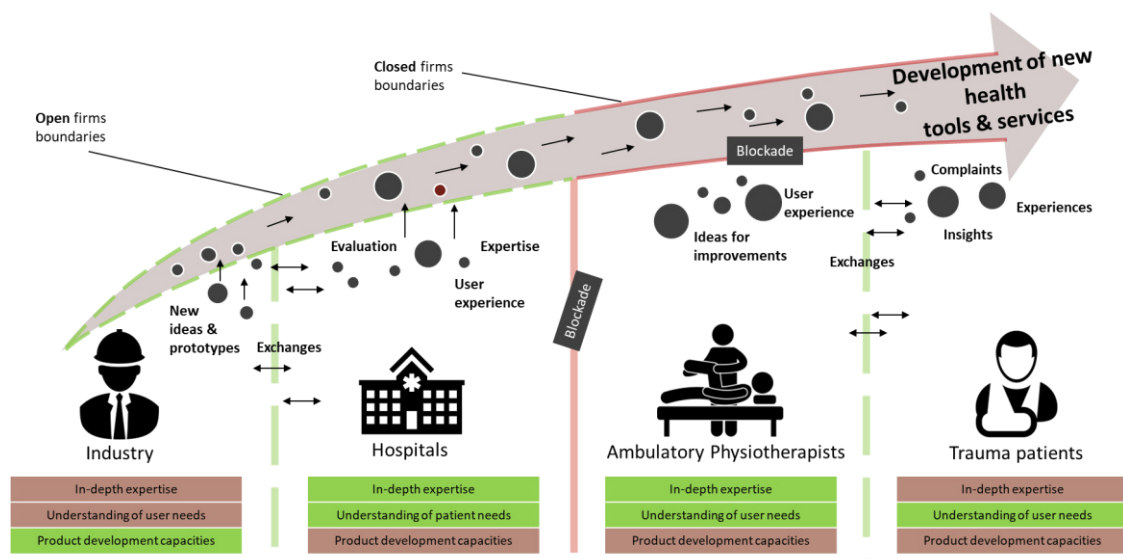


Figure 8: Lacking integration of non-medical health service providers and patients in the innovation process of new health tools and services

However, to create more sustainable innovations that meet the actual requirements of all system-relevant users, the existing user integration approaches need to be expanded. Health innovation needs to be an “interactive process” involving a broad set of relevant disciplines, with not only close relations emerging between the industry, clinicians, and academia but as well on the profounder level between the various health professionals (see results from [initiative 2](#)). To cope with individual requirements and resistances against digital health solutions, it is important to actively integrate not only physicians but as well physiotherapists in the ambulatory care. The integration of different knowledge bases fosters the innovation adoption by a higher number of innovation alternatives that covers the perspectives and needs of both professional groups to face efficiently existing multifaceted problems in healthcare.

The rising complexity of the health system and particularly patients' needs make an efficient collaboration between related health disciplines in the innovation process necessary to improve the full spectrum of care.

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