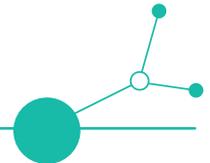


D1.3.5 Technical Solution upscaled thanks to the Pilot experience



Martina Lindorfer, ZSI





1. Executive summary

This report presents an innovative technical solution that was developed as part of the Health Labs 4 Value pilot project in the Czech Republic. This solution originated in the Living Lab at the Regional Hospital in Liberec with the aim of improving care for patients with spinal cord injuries (SCI). The pilot project addressed identified issues such as fragmented support following discharge from hospital, limited access to structured exercises and a lack of digital tools for coordinating rehabilitation both in hospital and at home. Thanks to international cooperation, a solution has been created and pilot-tested that addresses these specific healthcare needs.

The project demonstrated that this approach brings demonstrable improvements in key areas. From the perspective of patients and caregivers, it supports reducing and, hopefully in the future, completely minimising the information gap by providing patients, their caregivers and family members, as well as other healthcare professionals and the doctors working with them, with one reliable source of information on exercises, prevention and contacts. Involving patients and their families in developing the tool led to greater engagement and a willingness to participate in its future development, as well as spreading awareness of its existence. Qualitative evidence suggests that the solution increases patient confidence and facilitates staff work. In the future, the solution will simplify workflows for healthcare professionals by replacing fragmented paper leaflets with a unified multimedia tool. It also helps to address the prevention of secondary complications after discharge, a major concern for staff and families alike.

The collective impact of the pilot project goes beyond providing a single solution for patients with spinal cord injuries. A reusable 'Living-Lab plan' has been created that any hospital department can use to develop its own digital solutions. The project thus demonstrates an internationally replicable model of cooperation in the development of new healthcare technologies. The successful collaborative model involving all stakeholders (the Quadruple Helix Group) can be supported and replicated in each new region or department of the Liberec hospital. This ensures that every new feature is co-designed rather than imposed, and includes patients, clinical staff, a startup and the university.

The solution's upscaling potential is significant, and concrete plans for its further expansion have been made. In the short term (within 12 months), quantitative growth is planned in the Czech Republic by implementing the solution in the remaining three national spinal units and major rehabilitation centres. Medium-term goals (18-36 months) focus on institutional and functional expansion, with additional stakeholders such as dietitians, psychologists and community nurses joining the project. In the long term (more than three years), the goal is to expand geographically to neighbouring countries.

This report not only documents a single healthcare innovation but also serves as a roadmap for the future development of collaborative technical solutions. It provides tangible proof that internationally developed, patient-centred technologies can be highly successful and simultaneously demonstrate clear pathways for broader implementation and lasting impact on healthcare systems.



2. The technical solution based on the pilot experience

Brief overview on the background and context of the technical solution

Patients with spinal cord injuries (SCI) in the Czech Republic often leave hospital with paper leaflets, limited outpatient physiotherapy and little coordination between family carers (and relatives) and staff. Focus group work conducted in Liberec revealed four key issues: fragmented post-discharge support, limited access to structured exercises, low digital literacy, and a complete lack of tools to link ward routines with home-based rehabilitation.

To address these issues, the Liberec Health Living Lab has set out to co-create a new modular digital solution (working title: Rovinka) that will:

- enable systematic physiotherapy straight after surgery and throughout home care
- prevent pressure ulcers and other secondary complications via proactive education and tailored reminders
- give caregivers and clinicians and other specialists a shared channel for monitoring, advice, and rapid routine adjustment.

Pilot set-up and process:

- More than twenty patients, relatives and ward staff took part in an exploration-development-testing loop that was run entirely inside the spinal unit.
- Two Open Innovation Camps, monthly stakeholder calls and weekly meetings among hospital (KNL), SME (Mebster) and innovation hub (DEX), which was shared with the full HL4V partnership (AT, DE, HU, PL, SI and CZ) and fed straight back into the design process.
- Standard interviews and usability walk-throughs confirmed that the concept was understandable and practically helpful in both hospital and home settings, and feasible.

What the pilot delivered:

- A clinically reviewed content library
- A mind map and notion wiki capturing user stories, design decisions and Living Lab steps
- A clickable Figma prototype offering personalised plans, video guidance and reminder logic.

Together, these outputs form a validated technical solution package, ready for coding, further funding, and ultimately, scaling up to other Czech and Central European settings.

Detailed description of the technical solution and its uptake

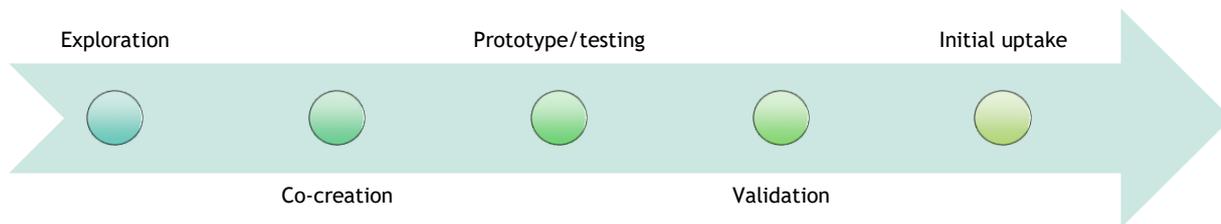


Our new technical solution is a modular technical solution (working title: Rovinka), which was developed within the Liberec Territorial Health Living Lab.

It has five objectives:

- (1) to provide systematic, evidence-based physiotherapy from the ward to the home.
- (2) to prevent secondary complications, especially pressure ulcers, through video instruction and smart reminders.
- (3) to give patients, caregivers, and clinicians one shared dashboard for progress and support.
- (4) to publish all content and process maps in an open bundle so that other organizations can build on them.
- (5) to stay true to Value-Based Health Care principles by tracking patient-reported experience and outcomes rather than service volume.

Implementation and uptake phases



Exploration (Q2 2023): Ward observations and over 30 interviews with patients, relatives and staff produced a ranked list of needs and initial sketches of the design.

Co-creation (Q3 2023): Mixed stakeholder workshops involving the Liberec team

Prototype/testing (Q4 2023-Q1 2024): Rapid prototype iterations were usability-tested with patients and their caregivers. The feedback received drove two major UI simplifications and the addition of a caregiver view.

Validation (January-February 2025): The Open Innovation Camp II involved 46 participants who stress-tested the near-final version, while clinical staff reviewed exercise and prevention routine.

Initial uptake (spring 2025): The spinal unit continues to use Rovinka in testing mode. Selected patients receive the tool and staff gather feedback. Minor content tweaks are then made.

The **key actors** were the clinicians from the Liberec spinal unit, the DEX Innovation Centre (which provided Living-Lab facilitation), Mebster (the industry lead and future owner), the Technical University of Liberec (which provided research support), and peer consultants from the Czech Paraplegic Association and from the hospital. The project followed the HL4V Living-Lab methodology and the mapping-needs guidance, combining



design thinking, rapid prototyping, the collection of patient-reported experience and structured interviews and continuous peer review.

Co-creation across countries

The solution was presented to partners and developed through a continuous process of co-creation across the HL4V consortium. This approach guaranteed that both the technical design and the Living Lab concept were truly international and transferable.

The key features of this co-creation process were:

- Active international involvement - Organisations from at least five countries (the Czech Republic, Slovakia, Poland, Hungary, Slovenia and Germany) contributed actively to the drafting, refining and validating of both the technical design and the Living Lab methodology.
- Structured and recurring collaboration - Four face-to-face transnational meetings were held to discuss design drafts and implementation concepts in detail.
- More than a dozen online co-creation sessions - which enabled partners to continuously exchange experiences and refine the technical solution.
- There were also regular monthly calls to present progress, gather feedback and integrate it directly into the development phase.
- Partners from Poland, Hungary, Slovenia and Germany provided targeted input on how to integrate lessons learnt.

Thanks to this process, the final solution reflects international experience and can be adapted to different healthcare environments across Central Europe. It is not a 'Czech-only' product, but rather the outcome of a structured transnational co-design approach.

Rovinka is no longer just an idea in the pilot stage – it has begun to become part of everyday practice. Inside the Liberec Spinal Unit, the team has started to work on how to integrate the Rovinka into their discharge routine. Meanwhile, Mebster and the hospital's innovation office are preparing grant applications for TAČR ÉTA and OP TAK. The momentum is not limited to Liberec: rehabilitation centres in the Czech Republic have expressed interest and are in close contact with the Liberec Spinal Unit, where they are shown the digital solution on a regular basis. They have asked for live demonstrations. Most encouragingly of all, the patients who helped design the prototype have volunteered to record further exercise videos and test new features – clear evidence that they already see Rovinka as 'their' tool and want to help it develop further.

These practical steps and unsolicited requests demonstrate that uptake is occurring organically and that a realistic pathway for wider implementation is already underway.

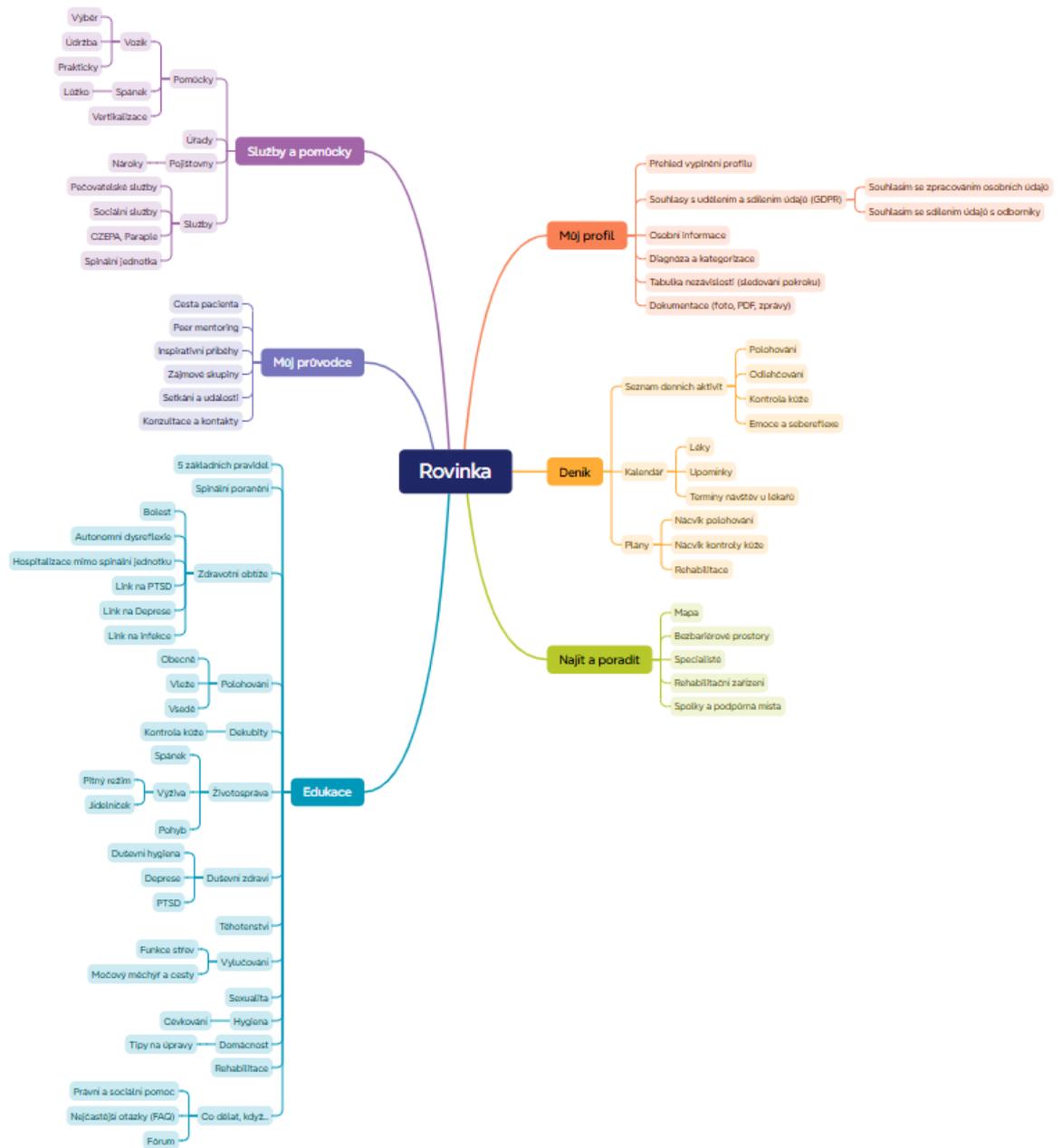
The pilot leaves behind two tangible assets:



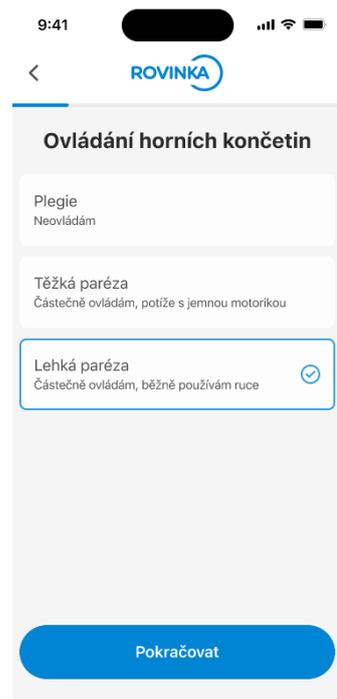
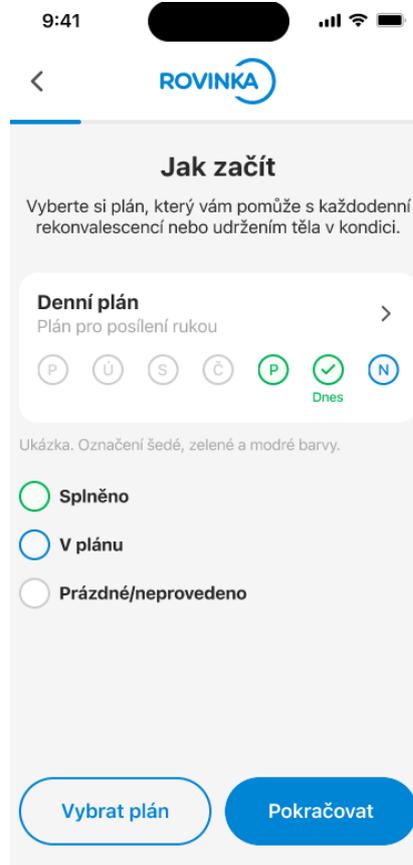
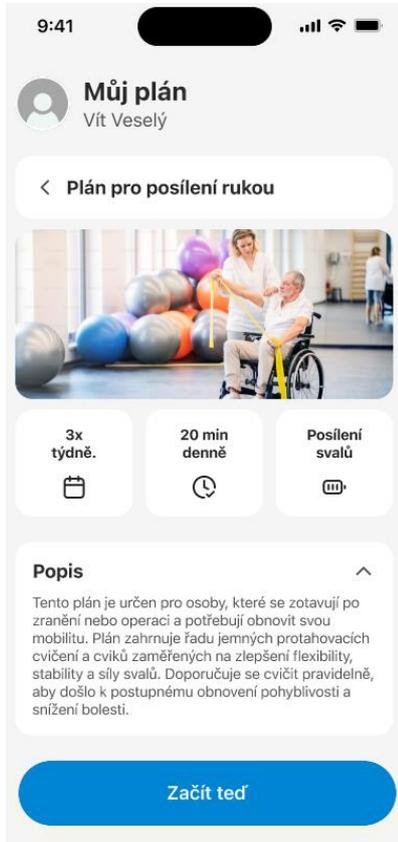
- A validated digital package (content library, wiki and Figma blueprint, checklist), which is ready for software development and further funding.
- A reusable Living-Lab/VBHC experience plan, enabling any hospital (or department) to follow the process and adapt this process



MIND MAP - structure of the digital solution



Examples from the application: daily plan, how to start, risks, physiotherapy plan, positioning, key habits, warnings.



1. The screenshots are the part of the application and were created directly at the spinal unit with local staff, peer workers and patients who agreed to the recording of video for these purposes.



The videos will be linked to the application. For now, they are stored in shared storage, and [here we offer you a few samples](#). There are more videos, but these have undergone post-production.

Under each image, you will find a brief description of what the video is about.



These demonstrations show methods of getting on and off the wheelchair, as well as a demonstration of the wheelchair itself. Choosing the right wheelchair is crucial for patients with spinal injuries, which is why patients and spinal unit staff suggested creating a separate video on this topic.



ODLEHČOVÁNÍ



ODLEHČOVÁNÍ



Ideální poloha
na odlehčování je vleže

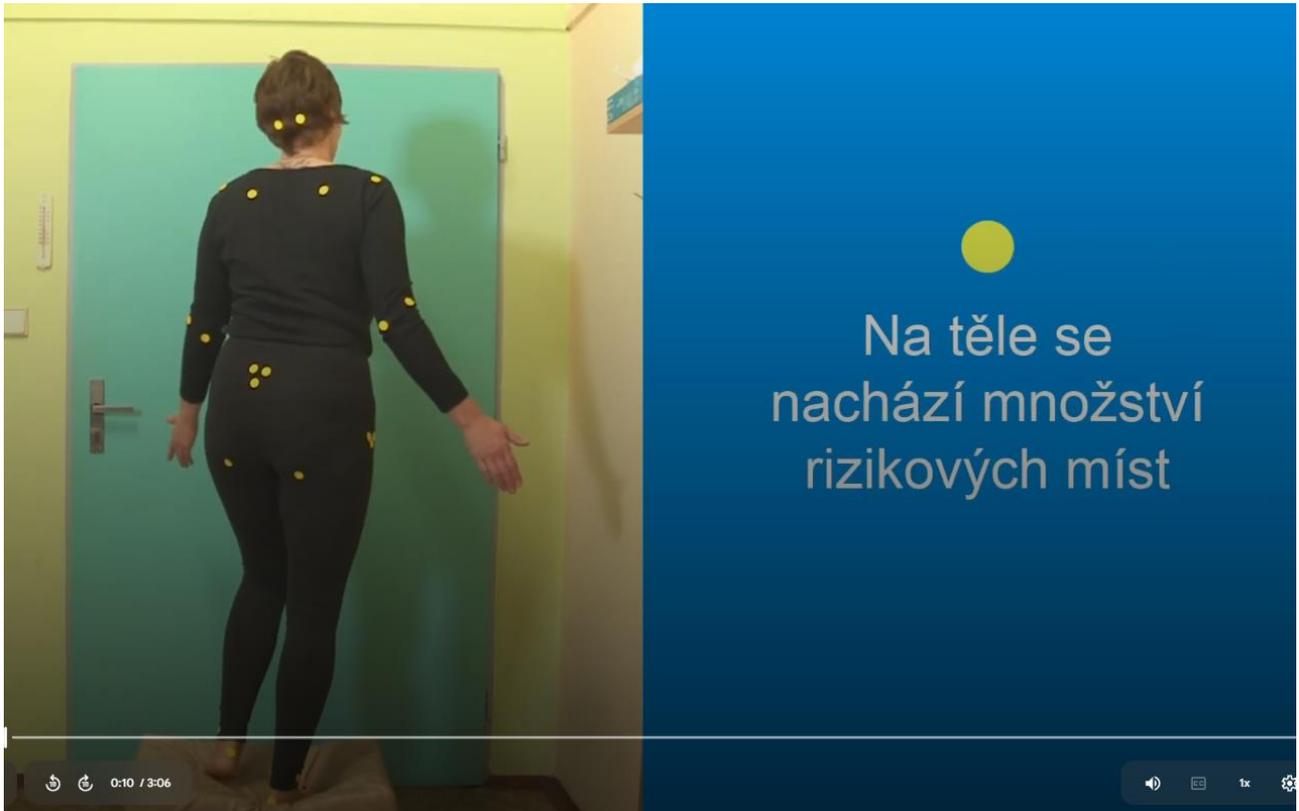
The following video excerpts deal with a very important topic related to rehabilitation: **“Offloading”**

Offloading reduces the load on the wheelchair user's body, improving their comfort and mobility.

The aim is to enhance user comfort and minimise the risk of health complications, such as pressure ulcers.

It also facilitates the manipulation of the wheelchair and improves its manoeuvrability.

It also allows the user to be more independent and participate more actively in everyday life.



Repositioning is an integral part of a spinal patient's daily life.

This is another preventive measure against pressure ulcers. The pictures show the areas of the body at risk of pressure ulcers, and an occupational therapist talks about this issue.

There are photos from interviews with patients, activities, and meetings of the entire team.



Testing the application directly with the patient. (January 2025)



Open Innovation Camp II - Validation of needs (February 2025)



Open Innovation Camp II - Validation of needs (February 2025)



Regular meeting with the staff of the spinal unit at the hospital (April 2025)



Measurable results

The Liberec pilot was not designed to produce concrete clinical data, but rather to facilitate learning. Therefore, the impact was tracked using **qualitative, real-life indicators** that were systematically gathered within the Living Lab routine. This approach enabled company representatives, hospital staff, patients, carers and researchers to collaborate on a single project and reflect on the outcomes together.

Data sources - To ensure robust evidence, several complementary methods were employed.

- **Interviews and focus groups:** During the exploration phase, more than 30 structured interviews were conducted with patients, family caregivers and ward staff, followed by focus groups after discharge and during two Open Innovation Camps.
- **Core-group debrief meetings:** These were held at least once every four weeks with spinal-unit clinicians, the DEX Innovation Centre and Mebster. Observations were logged and directly translated into design iterations.
- **Usability testing:** Multiple prototype versions were tested by patients and caregivers, whose feedback led to two significant interface simplifications and the addition of a caregiver view.

Main findings

The risk of pressure ulcers was a recurring theme in nearly every interview. Patients and families often underestimated how quickly skin damage could occur after leaving the ward. Rovinka addressed this risk directly by combining short instructional videos from nurses with personalised reminder prompts. During home trials, most users confirmed that the alerts 'kept the topic in my head' and helped them stick to physiotherapy and offloading routines.

Observation logs and group discussions also revealed three key findings:

1. Closing the information gap

- **Patients and carers** reported that the app provides a reliable, central source of information on exercises, prevention and contacts.
- *"The app looks great. It contains lots of useful information for both new and long-time wheelchair users, and it will help them to stay healthy,"* one patient explained.

2. Streamlining staff effort



- **Hospital staff** noted that the tool replaces fragmented paper leaflets with a unified multimedia script.
- As physiotherapist described it: *'It is the materialisation of all our accumulated experience, and a way to pass it on so we can help other patients as well.'*

3. High engagement potential:

- Patients, families, clinicians and even students were willing to co-create and test the tool.
- A student involved in testing and development stated: *'I mainly heard positive things; I didn't hear much criticism. They liked the application and suggested things that would be useful for beginners.'*

Why these findings matter

Even without quantitative KPIs, the combination of interviews, focus groups, debrief meetings and usability testing provides **verifiable evidence** of impact.

- Rovinka increases patient confidence and autonomy.
- It reduces staff workload by unifying educational content.
- It generates strong engagement, with stakeholders actively shaping its ongoing development.

In short, the pilot has demonstrated measurable improvements in patient empowerment and the prevention of secondary complications, as well as smoother workflows for staff. This shows that, when systematically collected and illustrated with real examples, qualitative data can provide strong evidence of impact.

3. Sustainability of the solution

Sustainability Strategy

The new technical solution, currently known as 'Rovinka', is legally owned by Mebster, who co-created it from day one. Mebster will be responsible for upgrades, regulatory compliance and user support. The Department for Research & Innovation at Liberec Regional Hospital and the spinal-unit Living-Lab team will maintain full clinical oversight on the hospital side and continue to host co-creation sessions with patients and carers. This three-way structure – comprising Mebster (owner), the hospital (clinical host) and the Living-Lab coordinators – proved effective throughout the pilot phase and will therefore remain unchanged for the post-project phase.



Mebster handles all source code, servers and security patches. The hospital's IT department simply applies its established GDPR routines and ensures that future software updates do not disrupt ward workflows. Educational content, such as videos, prevention checklists and caregiver tips, is stored in a shared repository. Clinicians can update this material without affecting the core software.

Further development is already planned within Mebster's grant and investment pipeline. The company has experience of securing Czech and EU innovation funds and has incorporated Rovinka into its strategic roadmap. Upcoming calls (e.g. TA ČR, OP TAK) are earmarked for feature expansion and broader system integration. The spinal unit Living Lab continues to serve as an active test bed, offering a ready-made user environment and patient cohort for each new funding bid.

Key lessons learned

1. Patient-centred care only works when patients are true partners. Once we involved SCI patients and their families in every design decision, they became much more engaged, and the content became much clearer. On the other hand, because every patient is different, we will never treat a single comment as dogma; instead, we will keep listening, crosschecking and refining until a change helps most users without overcomplicating the tool. Future releases will therefore maintain the principle of 'one patient, one vote' and include a bedside tutorial with the app to give users confidence from day one.
2. Less is more - Value-based thinking shifts the conversation from features to outcomes. Rather than asking, 'What else can we add?', the team started to ask, 'Does this reduce complications or confusion?' This approach led us to remove several nice-to-have screens and focus on pressure-ulcer prevention and simple exercise tracking. All future upgrades will undergo the same testing process: first, we establish whether there is a measurable benefit, and then we consider the bells and whistles.
3. Co-creation shortens the road – and the rework bill. Rapid, mixed-stakeholder sprints uncovered problems early on saving weeks of redevelopment work. We will stick to the same rhythm of exploring, testing and refining, because it maintains high momentum and minimises complications.

4. Upscaling of the Technical Solution

General goal and strategy for upscaling

Our solution has demonstrated that a patient-centred Living Lab approach can help spinal-cord-injury (SCI) patients maintain a systematic exercise physio routine, from hospital to home. Therefore, scaling up is about multiplying impact, not growing the number of organisations. Our objective is to bring the same preventive discipline and “voice of the



patient” mindset to many more people, embedding the Living Lab method in everyday hospital practice.

This is how we can / plan to achieve it

1. Follow the full SCI pathway, rather than just one facility - Upscaling starts inside the Czech care trajectory: acute spinal unit → rehabilitation clinic → home → annual check-ups. At each stage, we conducted brief, structured interviews to track progress and identify new barriers, feeding this information straight into our digital solution updates. This ensures the content remains in every real-world setting where patients need it.
2. Treat the Liberec Living Lab as an open hub - The spinal unit will remain the 'test kitchen' where new ideas are prototyped in short cycles. However, neighbouring hospitals and rehabilitation centres can also contribute without establishing full innovation departments. They will receive the process information and outputs through regular meetings and participation in joint activities and visits.
3. Make the most of the university bridge - Our partnership with the Technical University of Liberec increases capacity: students document patient journeys for their theses, while health management researchers evaluate outcomes. This academic loop deepens the evidence base and trains the next generation of motivated digital health students and researchers.

Concrete goals and measures for upscaling

Rovinka is a new digital solution containing field-tested content, workflows, and design files that were developed during the Czech Living Lab pilot. The next logical step in the Czech Republic is to increase access to the programme by rolling it out in the three remaining spinal units and major rehabilitation centres, thereby making it available to many more SCI patients.

Upscaling paths

Short term (12 months): quantitative

We will finalise the Czech content, provide training to ward teams in the other national spinal centres, and incorporate Rovinka into their discharge checklists. Mebster will use its existing peer network contacts to introduce the tool at patient meetings and through social media groups so that families and GPs hear about it.

Mid-term (18-36 months) - institutional and functional:

As the user base grows, new stakeholders will join in, such as dietitians, psychologists, and community nurses, who will contribute extra modules. The Living Lab template that we tested in Liberec will be offered to other hospital departments as a quick way to co-create digital aids for different conditions, turning the spinal unit's innovation corner into a small, multi-topic hospital hub.

Long term (3+ years) - geographic

Once the Czech rollout is running smoothly, the same bundle can be localised for neighbouring countries. As the interface is icon-led and the content sits in a separate layer, a translator can replace the Czech text with Slovak, German or Romanian text, for



example, without altering the core code. Mebster handles regulatory alignment, while local rehabilitation institutes pilot the tool under their own data protection rules.

Why is this feasible?

Funding routes have been mapped out, including national innovation calls (TA CR, OP TAK) for further development, small onboarding fees from clinics and in-kind staff time from partner hospitals.

The same Quadruple Helix setup that worked in Liberec – patients, clinicians, SMEs and the university – can be cloned in each new region, ensuring that every feature is co-designed rather than imposed.

Feature growth is modular: after physiotherapy and pressure-ulcer prevention come optional extras such as a peer-support chat room or GP-friendly progress reports, which are activated only where they are useful.

Resource Requirements for upscaling

This digital solution can be scaled up without the need for a large number of new specialists. It relies on implementing a proven 'tool-plus-method' package in each setting and providing local teams with just enough guidance to adapt it. In Czech spinal units, we are already familiar with the pathway and personnel, so the main issue is awareness rather than manpower. Nurses, physiotherapists and doctors only need a brief overview of the app and a one-page handout for patients. If we were to scale up to another country, we would recommend cloning the Liberec Living Lab model: gather a small Quadruple Helix group (clinicians, patients, a tech partner and perhaps a university) to localise the language and content.

Day-to-day changes are minimal. 'Introduce Rovinka' is added to the discharge checklist; each patient (plus caregiver) receives a five-minute bedside demonstration; and the ward books a quarterly check-in with the developer. Everything else fits existing quality improvement routines, so no extra bureaucracy is needed.

The financing mix is equally lean. Mebster will blend Czech innovation grants (TA CR, OP TAK, Horizon-aligned calls) with modest onboarding fees from new hospitals and, later, licence income from rehabilitation centres. Diversifying across grants, service contracts and royalties cushions the roadmap against funding gaps while keeping patient access affordable.

Partnerships complete the picture. Long-standing links to the national SCI peer-support network provide a direct route to end users, and collaboration with regional rehabilitation institutes and primary care bodies establishes a presence for Rovinka throughout the entire care pathway.

Finally, the example of Liberec shows that a ward can double as an innovation hub. When a hospital assigns a small cross-functional team comprising an innovation lead, physiotherapist, nurse educator and ICT liaison, it can conduct micro-studies, trial updates and provide feedback directly to Mebster. This in-house Living Lab capacity keeps iteration cycles short and ensures that every new feature solves a real clinical problem.



Next steps and commitments

Several concrete activities are already being prepared to ensure the continued expansion and upscaling of Rovinka.

- An action plan for integrating Rovinka into the discharge routine of more Czech spinal units and rehabilitation facilities is being drafted, with the first consultations scheduled for autumn 2025.
- Letters of commitment from two rehabilitation institutes and the Czech Paraplegic Association are being prepared to support grant applications for a wider rollout.

In parallel, discussions are underway in the hospital regarding an application for Horizon Europe funding (or other funding opportunities) to secure resources for international expansion.

These steps demonstrate that this new solution for SCI patients is not only sustained locally (in Liberec), but is also embedded in a structured roadmap for national and transnational scaling.

5. Conclusions

In the short term Rovinka will stay where it was born—on the Liberec spinal ward—while the project team and Mebster finish the first production build, film the remaining exercise videos and keep testing each update with the same patients and clinicians who shaped the prototype. By the middle of next year, we expect every Czech spinal unit and at least two rehabilitation institutes to have a “starter pack” (app, user guide, five-minute onboarding script).

That is our mid-term yard-stick: a nationwide roll-out that treats Rovinka as the standard discharge tool for spinal-cord-injury patients and proves that a small Living Lab team can spread good practice without heavy bureaucracy.

In the long term, we look beyond borders. As all patient texts are stored in a separate content layer, our clinical partners in neighbouring countries will be able to quickly translate and adapt the material. Further down the line, we plan to integrate community chat, tele-rehab check-ins, and plug-ins for electronic health records, enabling Rovinka to adapt to different regulatory frameworks.

Throughout the project, we will adhere to three principles that have served us well: keeping the patient voice at the forefront, scaling knowledge before software, and combining public grants with modest service fees to ensure the programme's financial resilience.