VitalLink

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EXECUTIVE SUMMARY

Mission

Our mission is to revolutionize Belgium's healthcare logistics by leveraging AI-driven digital twins technology to optimize medicine distribution, reduce waste, and ensure faster, more reliable access to critical treatments across hospital networks.

The Product	Our digital twins model of the Belgian healthcare ecosystem optimizes the supply chain of hospitals for medicine, making strategic and tactical decisions to solve problems in real time.
The Leadership	Josephine Buchta, Jesse Carmans, Henry Claesen, Jef De Samblanx, Stijn Raeymaekers
The Overall Industry	The Belgian hospital ecosystem consists of hospitals with limited collaboration in medicine distribution, which we aim to enhance through optimized logistics and AI-driven coordination to improve patient outcomes.
The Competitors	Though other companies have introduced digital twins in supply and logistics, this has not been implemented for hospital networks yet, presenting an oppertunity in the market.
Future Plans	Though we will initially connect the hospitals in Flanders, we aim to include all Belgian hospitals in network in the future.

THE TEAM

Josephine Buchta

Founder and CEO

Josephine is a student and passionate young entrepreneur with a background in biotechnology and biochemistry. While completing an Advanced master's in Biotech and Medtech ventures, she is dedicated to using technology and innovation to improve patient outcomes and drive meaningful change in healthcare.

Jef De Samblanx

Co-founder and COO

Jef is a student and engineer with a strong passion for innovation. While completing his studies, he joined VitalLink to apply his technical skills in developing cutting-edge solutions that optimize healthcare logistics and improve patient outcomes. His drive to create impactful, real-world solutions in healthcare made VitalLink the perfect fit for his expertise.

Jesse Carmans

Project manager

Jesse is a student and engineer known for his exceptional insight and problem-solving abilities. He joined VitalLink to optimize the development of our digital twins technology, using his expertise to streamline processes and enhance system efficiency. His innovative approach has been crucial in ensuring that our solutions deliver real-world impact in healthcare.

Henry Claesen

Senior Developer

Henry is a student and software enthusiast with a passion for coding and optimizing solutions. He joined VitalLink to apply his love for streamlining processes and developing efficient software, helping to enhance the functionality and scalability of our digital twins technology in healthcare. His expertise ensures that our systems are both innovative and highly effective.

Stijn Raeymaekers

Senior Developer

Stijn is a student and coding enthusiast with a strong focus on AI and machine learning. While completing his studies, he joined VitalLink to

apply his skills in developing advanced machine learning models, helping to drive the innovation behind our digital twins technology. His passion for AI allows him to continuously improve and optimize our solutions for better healthcare outcomes.

BUSINESS DESCRIPTION

About VitalLink

In Belgium's healthcare system, hospitals often function independently, leading to inefficiencies in resource utilization. Despite the government's efforts to enhance collaboration through locoregional networks - 13 of which exist in Flanders, challenges persist, such as hospitals dealing with shortages while others hold excess stock. This inefficiency not only leads to supply imbalances but also causes overordering and overproduction, resulting in significant waste of valuable medical resources.

These issues hinder the ability of hospitals to provide timely care and fully utilize their resources. Overproduction, particularly of medicines and medical supplies, exacerbates waste and increases costs, making the overall healthcare system less sustainable. Despite advances in cooperation and efforts to share resources and investments, the lack of optimized stock management continues to be a major barrier.

VitalLink aims to solve this obstacle by introducing a digital twins model for hospital inventory. This is a real-time virtual model that mirrors the stock levels of all connected hospitals. Using live data from hospital pharmacies and supply chains, it provides a dynamic overview of available medication across the network. This system enables hospitals to instantly detect shortages, predict future demand, and automate redistribution of critical drugs where they are needed most. By optimizing storage, reducing waste, and ensuring availability in emergencies, a digital twins transforms medication management, making healthcare more efficient and resilient.

Figure 1: model of VitalLink
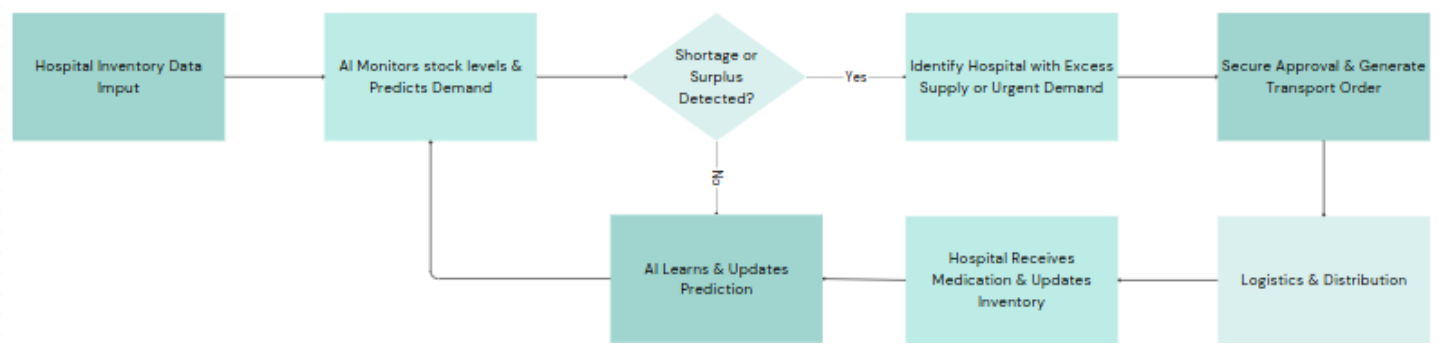
The benefits of this approach extend beyond just logistics. Similar AI-driven systems have already shown success in improving patient outcomes and reducing waste in other healthcare systems.

By adopting this innovative solution, Belgian hospitals can overcome current logistical constraints, leading to more efficient operations and improved patient care. This strategic move aligns with the ongoing efforts to modernize healthcare infrastructure and deliver high-quality, patient-centered services.

Another important advantage is the possibility to react, and operate on a small level, without the dependence on external distributors. Because of that, in situations where the transport of medicine is not a matter of life and death, treatments do not have to be prosponed because of a local shortage.

INDUSTRY BACKGROUND

The Belgian healthcare system has been evolving with the establishment of 24 locoregional hospital networks, designed to promote better collaboration and resource sharing among hospitals. However, despite these efforts, challenges in efficient resource management persist, including overproduction, excess stock and shortages of critical supplies. These inefficiencies lead to wasted resources and delays in care. With growing pressure on our healthcare system, AI-driven solutions such as a digital twins model, offers a promising opportunity to optimize logistics, streamline operations and improves patient outcomes. Additionally, there is increasing recognition of the role of advanced technologies like AI in transforming healthcare delivery and ensuring sustainable operations.

Figure 2: map showing distribution of locoregional hospital networks in Belgium
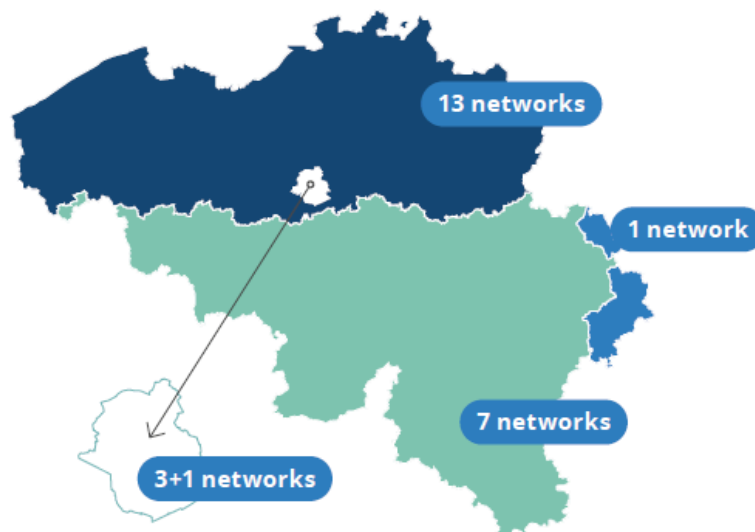
Challenges

The implementation of digital twins in the healthcare sector faces several significant challenges, particularly in data management. One major issue is protecting patient privacy; while encryption and access controls are essential, they require substantial time and resources to establish. Additionally, private hospitals may be hesitant to share sensitive data due to competitive concerns, fearing that collaboration with other institutions could compromise their proprietary strategies or patient base. These factors, alongside the complexities of data accuracy and availability, must be addressed to ensure the successful integration of AI-driven solutions in healthcare. A solution to this problem is keeping the inventory of all the hospitals in a central database, that way the hospitals can't see the specific inventory of other hospitals. However, when a specific medication needs to be transported from one hospital to an other, the AI just gives

instructions   on which, how many and from where the medication needs to be transported to a specific hospital.

The Future

The future applications of digital twins systems in healthcare are vast and transformative. Currently, we only aim to optimize resource management. However, these systems can also be used to optimize hospital operations by predicting the availability of staff, beds, and equipment, as well as simulating emergency scenarios to improve preparedness and response. They can also help optimize energy usage and streamline maintenance schedules. In the realm of medical devices, digital twins can monitor device performance in real-time, predict failures, and guide future design improvements. Additionally, digital twins can aid in population health management by forecasting disease spread, analyzing public health trends, and optimizing the distribution of resources based on predicted demand. These applications offer immense potential to enhance the efficiency, sustainability, and quality of healthcare services.

MARKET ANALYSIS

Target Market

Our primary end users are hospitals within the Belgian healthcare system, who will access the network to optimize resource sharing and logistics through our digital twins solution. These hospitals will benefit from improved coordination, faster response times, and better stock management. Additionally, the government will be a key user, leveraging the platform to mediate during crisis scenarios, such as disease outbreaks or supply shortages, by coordinating resource distribution across the network. This dual focus ensures that both healthcare providers and government agencies can respond swiftly and efficiently in times of need.

## Competitors in The Industry

In recent years, digital twin technology has started to make its way into healthcare, with applications aimed at predicting physiological and sociological behaviors. Some clinics are creating digital twins of patient organs to determine the most effective treatment options, while others build comprehensive models of patients' neighborhood environments to understand the impact of lifestyle on health. However, there are few solutions that apply the digital twin concept to optimize hospital networks. We have identified four main competitors in this emerging space.

- AnyLogic: AnyLogic is a simulation software company that has implemented digital twins technology in healthcare, specifically focusing on optimizing operations within individual hospitals. Their models are used to simulate various hospital scenarios, helping hospitals optimize processes such as staffing, resource management, and patient flow.
- GE Healthcare: GE Healthcare has been exploring the use of digital twins technology to enhance hospital operations. Their digital twins solutions focus on improving hospital efficiency, reducing equipment downtime, and enabling predictive maintenance of medical devices. They also use digital twins models to simulate patient journeys and optimize healthcare delivery.
- Siemens Healthineers : Siemens Healthineers has been integrating digital twins technologies into healthcare systems, focusing on the optimization of clinical workflows, medical device management, and the prediction of hospital demand. They leverage digital twins to model the performance of healthcare systems, improve patient outcomes, and streamline hospital operations.

- IBM Watson Health: IBM Watson Health is utilizing AI and data-driven solutions to optimize healthcare operations. Although IBM Watson doesn't directly implement digital twins, they are using advanced AI models to predict healthcare trends, optimize resource management, and improve decision-making processes within healthcare facilities, similar to what a digital twins could offer.

All competitors were scored for critical success factors of the market. As shown in figure 3, VitalLink differentiates itself by their core value of collaboration. Additionally, the VitalLink model allows strong for flexibility and scalability, giving us a competitive advantage.

Figure 3: competitive analysis grid
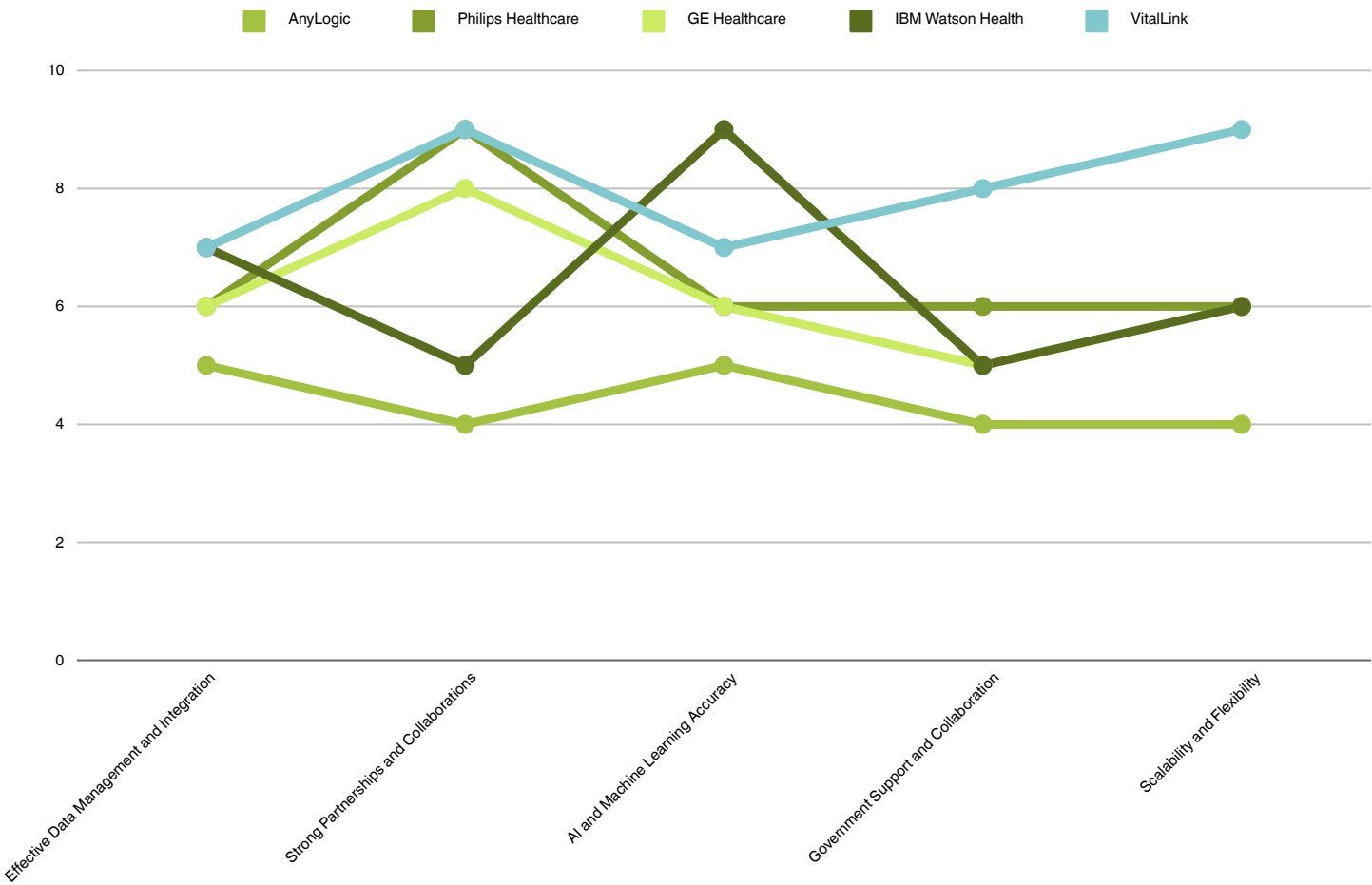
Our competitors models contrasts with our ecosystem approach, which aims to create a collaborative network

SWOT Analysis

Strengths

Innovative Technology: VitalLink leverages advanced digital twin technology to optimize resource management across multiple hospitals, providing real-time insights into inventory and improving logistics.

Focus on Healthcare Efficiency: The company addresses key inefficiencies in the Belgian healthcare system, such as stock imbalances, overproduction, and supply shortages, which can significantly improve patient care and reduce waste.

Government Collaboration: VitalLink's solution aligns with the Belgian government's efforts to modernize healthcare infrastructure, positioning it as a strategic partner for hospitals and public health initiatives.

Scalability: The digital twin model can be easily scaled to include more hospitals and government institutions, allowing it to grow in line with healthcare needs.

Weaknesses

Data Privacy Concerns: Hospitals, particularly private ones, may be hesitant to share data due to competitive concerns and patient privacy issues, which could slow adoption.

High Initial Investment: Development and implementation of the digital twin solution require substantial initial investment in technology, AI, and infrastructure.

Complex Integration: Integrating the digital twin model with existing hospital systems can be technically challenging and may require significant customization for each institution.

Opportunities

Expansion into Other Healthcare Markets: Beyond Belgium, there is potential for the digital twin model to be applied to other healthcare systems, both within Europe and internationally.

Integration with Other Healthcare Technologies: VitalLink can expand its solution by integrating with other hospital management tools, such as predictive analytics for patient care or AI-driven diagnostics, to further optimize hospital operations.

AI & Machine Learning Advancements: As AI and machine learning technologies evolve, VitalLink can enhance its models to predict not just resource shortages, but also broader healthcare trends and patient outcomes.

Regulatory Support: With increasing focus on digital transformation in healthcare, governments may provide support in terms of regulations or funding for innovative solutions like VitalLink.

Threats

Competition from Other Healthcare Solutions: Companies like AnyLogic are already exploring digital twin models for hospital networks. While their focus is on a single hospital, there's potential for competitors to pivot towards multi-hospital networks, intensifying competition.

Resistance to Change: Some hospitals may be reluctant to adopt new technologies, particularly if they require changes to existing workflows or upfront costs, delaying the adoption of VitalLink's solution.

Data Security and Legal Risks: The healthcare industry is heavily regulated, and any data breaches or mishandling of sensitive patient data could damage the company's reputation and expose it to legal challenges.

Technological Complexity: Continuous advancements in AI and digital twin technology may require ongoing updates to the solution, which could lead to high maintenance costs and development challenges.

MARKETING PLAN

Reaching The Right People

The used earning model is based on two possible plans: in the first an central organ, like the Flemisch governement, acquires the software and keeps on working with us to improve and maintain a smooth running operation. The second option is that that same central organ can license the software, still working together with us to insure keeping the operation running smoothly.

FINANCIAL PLAN

Capital Requirements

To launch VitalLink, the initial investment depends on several key factors, including technology development, infrastructure, regulatory compliance, and operational costs. The cost of development can be broken down into the development of the digital twins software, the machine learning models, integration with hospital databases, data security and secure servers. VitalLink will require a high level of regulatory and compliance, consisting of legal compliance such as GDPR, CE markings, etc. and cybersecurity. Additionally, operational costs, such as employee wages, need to be considered. Lastly, a marketing and sales strategy needs to be funded to deliver VitalLink to our end users.

	Value
Technology Development	$100K
Regulatory and Compliance	$200K
Marketing	$20K
Daily Operations	$150K
TOTAL	**$470K**

Financial Outlook

VitalLink pricing strategy consists of two aspects: an initial onboarding cost and a subscription model for the software licence. Additionally, government contracts will contribute to VitalLinks revenue. VitalLink holds significant growth potential, as this model can be scaled for expansion into the international hospital networks.

FUTURE PLANS & MILESTONES

VitalLink holds amazing growth and scaling potential. The solution can be applied nationally and even internationally to improve healthcare ecosystems globally. Additionally, it would be possible to introduce more parameters in the model that effect other parts of the supply chain.

2026 — Lauch pilot in Flanders

2027 — First profit generated

2030 — Expand to Belgium hospital ecosystem

2040 — International expansion