Transform safety-critical Cyber Physical Systems into distributed solutions for end-users and partners

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New business models enabled by edge and cloud services.

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Contents

1. Current Business Models for Cloud and Edge Services

This chapter contains a theoretical review of the state of art regarding current business models used by the industry for Cloud and Edge services. As for this document, we consider a business model as a combination of strategies regarding environment analysis, product or service definition and commercial, strategic and financial planning.

This may be considered as a starting point from which all new business models will be based on, in order to showcase the differentiation aspects of the business models developed through the TRANSACT framework.

1.1. Current business models

1.1.1. Subscription model:

In the subscription model, customers pay a recurring fee, typically on a monthly or annual basis, to access a service. This model offers customers continuous access to the service without the need for upfront investment or long-term commitments.

Advantages:

- **Predictable Revenue:** The subscription model offers a steady and predictable stream of revenue for service providers. This predictable cash flow can help with financial planning and investment in further product development.
- **Customer Retention:** Subscribers often commit to long-term contracts, resulting in higher customer retention rates compared to one-time purchases. This fosters a loyal customer base and reduces churn.
- **Upselling Opportunities:** Service providers can upsell premium features or additional services to subscribers over time, increasing the lifetime value of each customer.
- **Ease of Budgeting**: For customers, subscription-based pricing facilitates budgeting, as they know exactly how much they will be charged each billing cycle, leading to better cost management

The subscription model is well-suited for businesses offering software-as-a-service (SaaS), digital content streaming, and ongoing services where customers benefit from continuous access to resources or updates.

1.1.2. Pay-as-you-go model:

The pay-as-you-go model charges customers based on their usage of the service. Customers are billed for the resources they consume, such as computing power, storage, or data transfer. This model provides flexibility, as customers only pay for what they use, making it suitable for fluctuating workloads.

Advantages:

- **Cost Efficiency**: The pay-as-you-go model allows customers to optimize costs by paying only for the resources they use. This can be particularly beneficial for organizations with fluctuating workloads or seasonal demands.
- **Scalability**: Customers can easily scale their usage up or down based on demand without the need for upfront investment in infrastructure. This flexibility enables businesses to respond quickly to changing market conditions.
- **No Wastage**: Customers avoid over-provisioning resources and paying for unused capacity, leading to cost savings and improved resource utilization.

- **Transparency**: Pay-as-you-go pricing offers transparency, as customers can monitor their usage in real-time and adjust resources accordingly. This transparency builds trust and fosters strong customer-provider relationships.

This model is ideal for businesses providing cloud computing resources, such as infrastructure-as-a-service (IaaS), platform-as-a-service (PaaS), and other on-demand services where usage varies over time.

1.1.3. Freemium model:

The freemium model offers a basic version of the service for free, with optional premium features available for purchase. This allows customers to try out the service before deciding to upgrade to a paid plan for additional functionality. The goal is to attract a large user base with the free offering and convert a portion of them into paying customers.

Advantages:

- **User Acquisition**: Offering a free version of the service attracts a large user base, allowing service providers to gain widespread adoption and market visibility.
- **Product Differentiation**: The freemium model allows customers to experience the basic features of the service firsthand, showcasing its value proposition and distinguishing it from competitors.
- **Upsell Potential**: By providing a taste of the service for free, service providers can entice users to upgrade to premium plans for access to advanced features or enhanced functionality.
- **Viral Growth**: Satisfied free users may become advocates for the service, driving word-of-mouth referrals and organic growth through social sharing and recommendations.

The freemium model suits businesses offering software, mobile apps, or digital platforms seeking rapid user acquisition and market penetration. It's effective for attracting a large user base and fostering user engagement.

1.1.4. Marketplace model:

In the marketplace model, a platform provider hosts a marketplace where third-party developers and service providers can offer their services to customers. The platform provider typically takes a commission or transaction fee on the revenue generated by these services. This model allows customers to access a wide range of services from different providers within a single platform.

Advantages:

- **Diverse Offerings:** Marketplaces offer customers a wide range of services and solutions from various providers, providing choice and flexibility to meet their specific needs.
- **Increased Visibility:** Third-party developers and service providers can leverage the platform's existing customer base and marketing channels to gain visibility and reach new audiences.
- **Revenue Sharing:** Platform providers earn revenue through commissions or transaction fees on sales made through the marketplace, creating a mutually beneficial ecosystem for both providers and the platform.
- **Scalability:** Marketplaces can scale rapidly by onboarding new providers and expanding their catalog of offerings, catering to evolving customer demands and market trends.

Marketplaces are suitable for businesses hosting third-party products, services, or applications, facilitating transactions between buyers and sellers. They're common in e-commerce, software distribution, and service aggregation industries.

1.1.5. Hybrid model:

The hybrid model combines elements of multiple business models to meet the specific needs of customers or organizations. This could involve offering a combination of subscription-based services, pay-as-you-go pricing for additional resources, and premium features available for purchase. The hybrid model provides flexibility and customization options to cater to diverse customer requirements.

Advantages:

- **Flexibility**: The hybrid model offers flexibility by combining multiple pricing and monetization strategies to meet the diverse needs of customers. This versatility allows service providers to cater to different market segments and use cases.
- **Customization**: Customers can tailor their subscription plans or usage-based pricing to align with their specific requirements and budget constraints, maximizing value and minimizing costs.
- **Revenue Diversification**: By offering a mix of subscription-based, usage-based, and premium services, service providers can diversify their revenue streams and reduce dependency on any single source of income.
- **Adaptability**: The hybrid model can adapt to changing market conditions, allowing service providers to experiment with different pricing models and adjust their strategies based on customer feedback and market dynamics.

The hybrid model is versatile and adaptable, making it suitable for businesses with diverse customer needs and preferences. It's often used by businesses offering complex or customizable solutions that require flexibility in pricing and monetization.

2. Competition analysis

This chapter provides an overview of all commercial partner's main competition as a way of contextualizing their business needs and challenges.

2.1. VINOTION BV (VIN)

ViNotion BV competes in the advanced urban traffic management field using computer vision and artificial intelligence technologies. An analysis of some of ViNotion's main competitors in this environment can be found below.

Siemens Mobility

Siemens Mobility, a division of Siemens AG, is a giant in the transport and intelligent mobility solutions sector. The company offers an impressive range of solutions, including advanced traffic management systems, railway signaling, and urban traffic control. Its ability to address multiple aspects of traffic management stems from its extensive experience and a solid reputation built over years in the industry.

One of Siemens Mobility's greatest strengths is its ability to provide comprehensive and highly optimized solutions for transport and urban mobility. However, this large scale can also be a disadvantage, as its solutions tend to be less flexible and adaptable to specific local needs compared to smaller, more agile competitors. Additionally, the cost of implementing their solutions can be a significant barrier for smaller cities or those with limited budgets.

Siemens Mobility's business model is based on selling technology and consulting services, with a strong focus on long-term service contracts and turnkey projects. The combination of its ability to offer comprehensive solutions and its strong presence in the transportation industry gives it a significant competitive advantage.

SWARCO

SWARCO, an Austrian company, specializes in signaling and traffic management solutions. With a clear focus on improving traffic safety and efficiency, SWARCO has distinguished itself with highly focused and efficient products.

SWARCO's specialization in signaling and traffic management allows it to offer innovative products that significantly enhance road safety. However, its global reach is more limited compared to competitors like Siemens, and its focus on signaling may restrict its ability to offer broader urban mobility management solutions.

SWARCO's business model focuses on selling signaling equipment and traffic management services, with additional revenue from maintenance and continuous update contracts. Its dedication to road safety and constant innovation are the pillars of its competitive advantage.

FLIR Systems

FLIR Systems is globally recognized for its thermal imaging solutions and advanced sensors. In the traffic management field, FLIR offers detection and monitoring solutions based on thermal sensors, standing out for their accuracy and ability to operate in adverse weather conditions.

FLIR's advanced sensor technology allows for impressively accurate traffic detection and monitoring. However, this highly specialized technology may be less applicable to comprehensive traffic management solutions, and the high implementation costs can be a barrier for some markets.

FLIR Systems' business model is based on selling detection and monitoring equipment, complemented by revenue from maintenance and update services. FLIR's ability to offer solutions that operate in extreme conditions and its advanced sensor technology are its main competitive advantages.

ViNotion faces robust competition from major players like Siemens Mobility, SWARCO, and FLIR Systems, each with unique strengths and challenges. ViNotion's competitive advantage lies in its ability to integrate advanced computer vision and artificial intelligence technologies into urban traffic management, offering highly precise and efficient solutions.

2.2. NAVTOR (NVT)

NAVTOR, a global leader in maritime e-Navigation, faces significant competition within its environment. Below is offered an insight into this competitive sphere.

Siemens Digital Logistics

Siemens Digital Logistics offers a seamless integration of supply chain and logistics management solutions, extending its expertise to the maritime sector with cutting-edge navigation and monitoring tools. With a wealth of experience and a strong global presence, Siemens stands out in the logistics industry. Their comprehensive solutions cover all facets of logistics and navigation, providing a holistic approach to supply chain management.

However, Siemens' broad focus on land logistics might dilute their specialization in maritime solutions. Their extensive scope of operations can sometimes lead to less flexibility and adaptability to specific maritime needs. Additionally, the high implementation and maintenance costs of their solutions may be a barrier for some cities.

Their business model is built around subscriptions for software platforms and long-term contracts for consulting and implementation services, ensuring a steady revenue stream and highlighting their dominance in the industry.

Wärtsilä Voyage

Wärtsilä Voyage is at the forefront of digital transformation in the maritime industry, offering intelligent navigation solutions, real-time monitoring, and predictive analysis. Their extensive range of digital products and services for navigation and fleet management showcases their strong innovation capabilities.

While Wärtsilä Voyage excels in providing advanced, customized solutions, integrating their multiple systems can be challenging. The complexity and high costs associated with implementation and maintenance might be daunting for some operators.

Wärtsilä's business model revolves around subscription services and contracts for both software and hardware solutions, including maintenance and technical support. Their ability to deliver tailored solutions for fleet management and navigation gives them a competitive edge.

Kongsberg Maritime

Kongsberg Maritime is renowned for its integrated technological solutions in ship navigation and monitoring, with a significant emphasis on automation and operational efficiency. Their advanced technology and strong reputation in the maritime industry make them a reliable choice for maritime solutions.

Kongsberg's focus on high-end solutions might limit accessibility for smaller operators. The integration of their complex technologies can be costly and may require specialized training, posing additional challenges

Their business model includes customized solutions offered through sales contracts and subscription services for maintenance and support. The highly advanced and automated solutions provided by Kongsberg enhance operational efficiency and safety, reinforcing their market position.

Transas (acquired by Wärtsilä)

Transas, now a part of Wärtsilä, is celebrated for its advanced simulation and training solutions, alongside its maritime traffic monitoring and control systems. Their expertise in maritime simulation and training complements their advanced monitoring capabilities.

The integration of Transas solutions with Wärtsilä's systems can present challenges, potentially complicating the merger process. Additionally, their broadened focus post-merger might reduce their emphasis on specific navigation solutions.

Transas operates on a subscription model for software and simulation services, along with long-term contracts for monitoring and control systems. Their ability to offer comprehensive training and simulation services alongside navigation solutions positions them well in the market.

NAVTOR faces substantial competition from industry giants like Siemens Digital Logistics, Wärtsilä Voyage, Kongsberg Maritime, and Transas. Each competitor brings unique strengths to the table, from comprehensive logistics integration and innovative digital products to advanced automation and simulation training. However, these strengths come with challenges such as high implementation costs, complexity in system integration, and a broader focus that might dilute specialization in maritime solutions.

2.3. POLITECHNIKA GDANSKA (GUT)

Politechnika Gdanska (Gdansk University of Technology) participates in the TRANSACT project aiming to develop a software focused on developing advanced technological solutions for urban infrastructure management, especially in intelligent mobility and transportation. While they do not seek to sell their product, were they to change their mind, some of the competition they could find is listed below.

Siemens Mobility

Siemens Mobility is a major player in the transport and intelligent mobility solutions sector. Siemens offers a wide range of solutions, including advanced traffic management systems, railway signaling, and urban traffic control. Their extensive experience and solid reputation have been built over decades, allowing them to address multiple aspects of traffic management with unparalleled effectiveness.

Similar to the ViNotion analysis, Siemens Mobility's ability to provide comprehensive and highly optimized solutions is noted as a major strength. However, their large scale and higher costs can be a disadvantage, particularly in terms of flexibility and adaptability to specific local needs.

SWARCO

SWARCO, an Austrian company specializing in traffic signaling and management solutions, is recognized for its clear focus on improving traffic safety and efficiency. Their products are highly focused and efficient, making significant improvements in road safety.

In the ViNotion analysis, SWARCO's strength in traffic signaling and their innovative products are also acknowledged. Both analyses note that SWARCO's global reach is more limited compared to larger competitors like Siemens, and their specialization may restrict their ability to offer broader urban mobility management solutions.

Kapsch TrafficCom

Kapsch TrafficCom, another Austrian player, excels in traffic management and electronic toll collection. Specializing in intelligent transportation systems (ITS) and mobility solutions, Kapsch provides technologies designed to enhance traffic efficiency and reduce congestion.

The strength of Kapsch TrafficCom lies in their advanced ITS solutions and their leadership in electronic toll collection technology. However, their primary focus on toll collection and ITS systems can sometimes limit their competitiveness in other areas of urban infrastructure management. Additionally, their advanced solutions can be costly to implement and maintain, posing another challenge.

Kapsch TrafficCom's business model is built around selling technology and associated services, with a significant focus on long-term implementation and maintenance contracts. Their ability to offer advanced technological solutions secures their solid position in the smart mobility market.

Cubic Transportation Systems

Cubic Transportation Systems offers integrated transportation and ticketing solutions that enhance urban mobility. Their solutions range from traffic management to public transportation payment, providing an integrated and efficient user experience.

The ViNotion analysis also highlights Cubic's integrated solutions and leadership in ticketing, noting their ability to improve both efficiency and user experience in urban transportation. However, both analyses recognize that Cubic's primary focus on ticketing and transportation management may limit their broader applicability in urban infrastructure solutions.

Politechnika Gdanska faces significant competition in the intelligent mobility and transportation field, much like ViNotion. Competitors such as Siemens Mobility, SWARCO, Kapsch TrafficCom, and Cubic Transportation Systems each have unique strengths and weaknesses. The analyses for both Politechnika Gdanska and ViNotion consistently identify these competitors' strengths in providing comprehensive, specialized, and advanced technological solutions, as well as their limitations in flexibility and cost.

2.4. AVL SOFTWARE AND FUNCTIONS GMBH (AVL)

AVL Software and Functions GmbH faces several key competitors who are also seeking to innovate in the realm of cloud-based Battery Management Systems (BMS). Here is a detailed analysis of these competitors:

Siemens Digital Industries

Siemens Digital Industries stands out as a giant in the integration of automation and digitalization solutions for industry. Their focus on the electric mobility industry includes the provision of advanced Battery Management Systems that seamlessly integrate with their vast ecosystem of digital solutions.

With extensive experience and a global presence across various industries, Siemens offers a comprehensive suite of tools ranging from process automation to advanced data management. Their ability to provide holistic and customized solutions positions them as a formidable competitor. However, Siemens' broad focus across multiple sectors can limit their specialization in specific solutions for electric mobility.

Siemens' business model is based on long-term contracts and subscription services for their software, ensuring a stable and recurring revenue stream. This strategy allows them to maintain long-lasting relationships with their customers and provide continuous product updates.

Bosch Automotive

Bosch Automotive is a well-known name in the automotive industry, recognized for its innovation in battery management systems and electric mobility solutions. Their focus is on developing advanced BMS that incorporate real-time data analysis and battery health monitoring capabilities.

Bosch has the advantage of deep expertise in the automotive sector and the ability to integrate their BMS solutions with other automotive systems. This integration provides significant added value to their customers, who can benefit from a more cohesive and efficient solution. However, integrating complex technologies can be costly and require specialized training, which could be a barrier for some customers.

Bosch's business model combines direct hardware sales with service and maintenance contracts, allowing them to offer continuous support and ensure the optimal performance of their systems.

LG Chem

LG Chem is a leader in the production of lithium-ion batteries and battery management systems. Their focus on innovation and energy efficiency has made them a key supplier of energy storage solutions for both automotive and stationary applications.

With strong production capabilities and a focus on sustainability, LG Chem offers BMS that optimize battery performance and extend their lifespan. Their ability to combine mass production with technological innovation places them in a strong market position. However, as a battery manufacturer, they may lack the flexibility and adaptability offered by companies more focused on software and services solutions.

LG Chem's business model is based on direct sales of batteries and energy management systems, complemented by maintenance and technical support services, ensuring a diversified revenue base.

Panasonic

Panasonic is another formidable competitor in the field of battery management systems. With a long history in battery manufacturing and a strong presence in the automotive market, Panasonic offers highly efficient and reliable BMS solutions.

Panasonic's main strength lies in its large-scale production capabilities and focus on technological innovation. Their BMS are designed to maximize battery performance and ensure safe and efficient operation. However, integrating their systems can be challenging due to technological complexity and high implementation costs.

Panasonic's business model includes hardware sales and service contracts for the maintenance and technical support of their systems, allowing them to offer a comprehensive solution and ensure customer satisfaction.

As a summary, AVL faces intense competition from companies such as Siemens Digital Industries, Bosch Automotive, LG Chem, and Panasonic. Each of these competitors offers advanced and specialized battery management systems, with business models that include subscriptions, service contracts, and direct hardware sales.

2.5. DAC SPOLKA AKCYJNA (DAC)

DAC Spolka Akcyjna (DAC) faces significant competition from various companies that are also innovating in the field of intelligent transportation systems and advanced data management. Its most important competition comes from these companies:

Siemens Mobility

Siemens Mobility stands out as a global leader in intelligent mobility solutions. They offer a wide range of services, from traffic management to urban and railway transport systems. Their extensive experience and global presence enable them to provide exceptional value to their customers by efficiently integrating advanced digital solutions.

Despite their impressive reach and capabilities, Siemens faces the challenge of maintaining a specialized focus on edge and cloud technologies due to their broad range of services. Their business model, based on long-term contracts and subscription services, ensures a stable income stream and allows for continuous updates, although the complexity and cost of integration can be a barrier for some customers.

IBM Watson IoT

IBM Watson IoT is renowned for its powerful platform that utilizes artificial intelligence and advanced data analytics to optimize infrastructure and asset management. IBM's capability to process large volumes of real-time data and provide actionable insights is one of its main strengths.

However, its specialization in AI and data analytics may overlook specific aspects of transportation management that other competitors address more precisely. IBM uses a subscription model, allowing them to maintain continuous relationships with their customers and provide regular improvements. Nonetheless, reliance on this model can be challenging if customers do not perceive continuous and significant value.

Cisco Systems

Cisco Systems is recognized for its leadership in networking and communications. In the realm of intelligent mobility, they offer robust IoT and connectivity solutions that facilitate efficient traffic and infrastructure management.

Despite their strength in networking infrastructure, Cisco may lack the deep specialization in transportation and mobility that other more focused competitors offer. Their business model combines direct hardware sales with subscription services for software and support, diversifying their revenue streams and providing comprehensive solutions. However, the need for significant hardware investments can be a barrier for some customers.

Kapsch TrafficCom

Kapsch TrafficCom specializes in intelligent transportation systems, including electronic toll collection, traffic management, and urban mobility solutions. Their expertise and specialized focus allow them to offer highly optimized and effective solutions.

Nonetheless, their specific focus on transportation solutions might limit their ability to offer broader integration with other advanced digital services. Kapsch TrafficCom operates with a business model based on long-term contracts and turnkey projects, ensuring substantial income and fully integrated, customized solutions. Dependence on large projects can make their income less stable and subject to the variability of won contracts.

In summary, DAC Spolka Akcyjna faces strong competition from companies such as Siemens Mobility, IBM Watson IoT, Cisco Systems, and Kapsch TrafficCom. Each of these competitors offers advanced and specialized solutions in transportation management and data analytics, with business models that include subscriptions, long-term contracts, and direct hardware sales.

2.6. CISC SEMICONDUCTOR GMBH (CISC)

Currently, COYERO holds a small market share due to limited resources and brand recognition. However, with the recent hiring of marketing and sales personnel, CISC is actively entering new markets. Competitors include Feratel Personal Interests Assistant (PIA), MindPower.com (4tix), Xamoom, and Cities. COYERO's advantage lies in being an all-in-one solution that covers ticket management, digital card usage, public transport, electric vehicle charging, and access management.

Feratel Personal Interests Assistant (PIA)

Feratel Personal Interests Assistant (PIA) specializes in the tourism sector, offering applications designed to manage personal interests and provide tourist information. With extensive experience in this field, Feratel has built a solid customer base that relies on its services.

Feratel's business model is subscription-based, where tourist regions and various entities pay an annual fee to access the platform and services offered. This strategy provides Feratel with recurring revenue and significant financial stability. Additionally, customers receive continuous value through regular updates and ongoing support.

However, this model also presents challenges. The reliance on a subscription scheme can limit customer flexibility, especially if their needs change rapidly. Furthermore, compared to COYERO, Feratel may be at a disadvantage due to the lack of complete integration of multiple services into a single platform. This could be a decisive factor for many users seeking a more holistic, all-in-one solution.

MindPower.com (4tix)

MindPower.com (4tix) is a remarkable platform specializing in ticket sales and event management, renowned for its dedicated focus and user-friendly interface. This tool has significantly simplified the process for both event organizers and attendees, becoming an indispensable resource in the industry.

From the very beginning, the platform impresses with its simplicity and effectiveness. Event organizers can effortlessly manage everything from ticket sales to event administration, ensuring a smooth and hassle-free experience.

One of the key strengths of MindPower.com (4tix) is its specialized focus. By concentrating exclusively on ticket sales and event management, it ensures highly optimized services in these areas. The intuitive interface is another strong point, designed with ease of use in mind, allowing users to navigate and manage events with minimal effort.

However, the platform has its limitations. Its capabilities are restricted to ticket sales and event management, lacking integration with other services such as public transport or electric vehicle charging. This limitation could reduce its appeal to users looking for a more comprehensive solution.

The business model of MindPower.com is based on a pay-per-use system. Event organizers pay according to the number of tickets sold or services utilized, offering flexibility to adjust costs based on the specific needs of each event.

This pay-per-use model provides significant advantages, particularly in terms of flexibility and scalability. It allows organizers to pay only for what they use, making it especially beneficial for events that vary in size and frequency. This approach offers an economical and scalable solution.

However, there are also disadvantages. One of the main challenges is that revenue can be less predictable and may fluctuate with the season and demand for events. This variability can present challenges in long-term financial planning, making it more difficult to forecast income accurately.

In summary, while MindPower.com (4tix) excels in its core functions of ticket sales and event management, its limited scope and variable income can pose challenges. Nevertheless, its flexibility and user-friendly interface make it a valuable tool for event organizers.

Xamoom

Xamoom is a provider specializing in mobile marketing solutions and content platforms, known for its ability to deliver mobile content and digital marketing strategies focused on enhancing the user experience.

One of Xamoom's greatest strengths is its capacity to create intuitive and engaging platforms that meet the needs of both consumers and businesses. Their focus on user experience has allowed them to stand out in a competitive market, providing solutions that are not only effective but also easy to use.

However, Xamoom faces some challenges. One of its weaknesses is the lack of focus on integrating multiple services, something COYERO does offer. This gap can limit its appeal to customers looking for a more comprehensive solution that encompasses various functionalities.

Xamoom's business model is freemium. They offer a basic version of their service for free, allowing users to try the main features at no cost. However, to access premium features and additional capabilities, users must subscribe to paid plans.

This freemium approach has several advantages. Initially, it allows them to attract a wide user base with the free version. As these users experience the platform's value and their needs evolve, some choose to become paying customers, generating additional revenue for the company.

However, transitioning users from free to paid plans can be challenging. It requires a compelling offer of additional value to persuade users to invest in the premium versions. This implies continuous investment in improvements and new features to keep the platform attractive and competitive.

Cities

Cities is a platform offering smart city management applications designed to provide information and services to both residents and visitors. Its focus on integrating multiple urban services makes it a valuable tool for efficient city administration.

One of Cities' major strengths is its ability to integrate various urban services, enhancing user experience in areas such as transportation, security, and waste management. This comprehensive approach allows it to stand out in the smart city domain, providing solutions that facilitate daily life for citizens and optimize municipal management.

However, Cities faces some limitations. Compared to COYERO, it may not offer the same depth of services in specific areas like tourism and access management. This difference can affect its appeal to those seeking specialized solutions in these fields.

Cities' business model is market-based. It allows third-party developers and service providers to offer their solutions through its platform, charging a commission for each transaction made. This model has several advantages, such as expanding the service ecosystem without the need to develop them internally. By attracting a wide range of services and providers, Cities can offer a rich and diverse variety of options to its users.

Nevertheless, this model also presents challenges. Its success largely depends on the ability to attract and retain high-quality developers and providers. Additionally, competition in this space can be intense, requiring constant effort to stay ahead and offer attractive and reliable services.

In summary, Cities positions itself as an innovative and flexible platform for smart city management, though it must face and overcome certain challenges to maximize its impact and reach in the market.

Indirect Competitors

In the competitive landscape of COYERO, there are several forms of indirect competition, each with its own strengths and weaknesses.

One area of competition comes from access management applications specifically designed for institutions and businesses. These applications excel in access management and security, offering robust and precise solutions tailored to the specific needs of their clients. However, despite their effectiveness in these areas, they often lack the ability to provide an integrated and holistic solution like COYERO.

The business model employed by these applications varies between subscription and pay-per-use, allowing institutions and businesses to choose the option that best suits their needs. The main advantage of this approach is its high specialization, which allows them to efficiently meet specific access management and security needs. However, the lack of integration of multiple services limits their applicability in broader sectors, an area where COYERO has a clear advantage.

On the other hand, providers of electric vehicle (EV) charging stations also constitute significant indirect competition. These providers focus on EV charging infrastructure, a rapidly growing sector with high demand. Although they have a strong focus on this specific area, they lack the additional capabilities of service management and tourism that COYERO offers.

The business model of these providers generally includes subscriptions for maintenance and monitoring services, as well as pay-per-use models for vehicle charging. This approach allows them to capitalize on the growing demand for EV charging infrastructure, providing a steady stream of revenue. However, their offering is limited by the lack of a comprehensive solution that combines tourism services and access management, a niche where COYERO excels.

In summary, while these forms of indirect competition have their own strengths and meet specific needs, they lack the integration and versatility that COYERO provides to its users, thus standing out in an increasingly competitive market.

2.7. PHILIPS MEDICAL SYSTEMS NEDERLAND BV (PMS)

Philips faces several significant competitors in the sector of Edge-Cloud based clinical applications for image-guided therapy and diagnostic imaging systems. Below is a detailed analysis of some of these competitors and their offerings. Some of its most relevant competitors are listed below.

Siemens Healthineers

Siemens Healthineers is an undisputed leader in the medical technology market, known for its wide range of products and services spanning imaging, diagnostics, and advanced therapies. The company stands out for its commitment to technological innovation and the integration of artificial intelligence in its solutions, enabling more precise and efficient diagnostics. Additionally, Siemens boasts an extensive global distribution and service network, strengthening its market presence.

However, Siemens' equipment often comes with high acquisition and maintenance costs, which can be a barrier for some institutions. Furthermore, its significant reliance on proprietary technology can limit interoperability with third-party systems, a crucial aspect in the digital health environment.

Siemens primarily uses direct sales and subscription models for its cloud-based solutions, complemented by maintenance packages and continuous update services. Its advanced integration of AI in diagnostics and its strong global presence are the main competitive advantages that differentiate Siemens in the market.

GE Healthcare

GE Healthcare is another giant in the medical technology sector, known for its imaging solutions, patient monitoring systems, and healthcare information technologies. The diversity of its portfolio allows GE to address multiple needs in the healthcare sector, from diagnostic imaging to clinical data management.

GE stands out for its capacity for innovation and technological development, supported by a technical support and training network that ensures effective adoption of its technologies. However, the complexity of integrating its systems due to the breadth of its portfolio can be a challenge. Additionally, the high initial implementation costs of its advanced systems can be an obstacle for some institutions.

GE Healthcare’s business model combines subscription and pay-per-use, offering flexible solutions for different sizes of healthcare facilities. Its comprehensive solutions that combine advanced imaging with data management and patient monitoring are a significant competitive advantage.

Canon Medical Systems

Canon Medical Systems offers a complete range of imaging products, including CT, MRI, and ultrasound, with a strong focus on image quality and diagnostic precision. The company continuously invests in research and development to keep its technologies at the forefront of the sector.

One of Canon's main strengths is its high image quality and diagnostic precision, aspects that are fundamental for healthcare professionals. However, Canon has a smaller global presence compared to competitors like Siemens and GE, and its reliance on proprietary technologies can limit interoperability with other systems.

Canon uses direct sales and subscription models, focusing on continuous updates and technical support. Its ability to innovate in image quality and diagnostic precision is one of its main competitive advantages.

Medtronic

Medtronic, although better known for its medical devices, also participates in the market for image-guided systems for minimally invasive interventions. The company is a leader in intervention technology, offering innovative solutions that improve the outcomes of medical procedures.

Medtronic stands out for its constant innovation in image-guided solutions and intervention technologies, supported by a wide distribution and technical support network. However, its main focus is not on imaging systems, which can be a limitation compared to other competitors more specialized in this area.

Medtronic’s business model includes subscription and direct sales, especially in the area of medical devices and image-guided interventions. Its strong presence in minimally invasive interventions and advanced medical devices is a key competitive advantage.

Philips competes in a highly competitive market with significant players like Siemens Healthineers, GE Healthcare, Canon Medical Systems, and Medtronic. Each of these competitors has its own strengths and weaknesses, but they all share a focus on technological innovation and the quality of their products and services. Philips' competitive advantage lies in its ability to integrate multiple services into a holistic solution, providing not only advanced imaging systems but also support and training services, along with flexible and scalable business models.

2.8. FEOPS NV (FEOPS)

FEops competes in the niche market of advanced cloud-based preoperative planning solutions for structural heart disease interventions. Below is a detailed analysis of some of FEops' main competitors in this environment.

3mensio from Pie Medical

3mensio, a division of Pie Medical, is well-known for its preoperative planning software for cardiovascular interventions, including TAVI (Transcatheter Aortic Valve Implantation). 3mensio's long-standing presence in the medical software market has allowed them to build a solid user base and gain industry recognition for the quality of their products.

However, 3mensio's software requires installation on specific workstations, limiting flexibility and accessibility compared to a cloud-based solution like FEops HEARTguide. Additionally, while the software is precise, it relies heavily on manual measurements, which can be slower and more error-prone.

3mensio's business model is based on software licenses with significant upfront payments and annual maintenance fees. Their experience and well-established product quality are major competitive advantages in the cardiovascular market.

Mimics Enlight from Materialise

Mimics Enlight, developed by Materialise, offers a software platform for planning complex cardiovascular procedures. This software integrates seamlessly with other imaging systems and planning software, providing a comprehensive solution for healthcare professionals. Additionally, it allows for high customization and adaptation to specific patient needs.

However, the implementation and maintenance of Mimics Enlight can be costly, posing a barrier for some institutions. Like 3mensio, it requires installation on specific workstations, limiting accessibility compared to cloud-based solutions.

Materialise offers software licenses with customization options and technical support, usually through annual contracts. Advanced integration and software customization are their main competitive advantages.

Circle Cardiovascular Imaging

Circle Cardiovascular Imaging develops advanced software for the evaluation and planning of cardiac interventions, excelling in diagnostic accuracy and ease of use. They use advanced algorithms and AI techniques to improve diagnostic precision, and their software is designed to be intuitive and user-friendly, facilitating adoption by healthcare professionals.

However, although highly specialized, Circle Cardiovascular Imaging's focus may be limited to certain areas of cardiovascular diagnostics, not offering as comprehensive a solution as FEops. Additionally, integrating with other systems and training personnel can involve significant additional costs.

Circle Cardiovascular Imaging uses a subscription model, with fees based on the number of users and usage volume. The use of cutting-edge technology and a user-friendly interface are their main competitive advantages.

In conclusion, FEops competes in an environment with several significant players like 3mensio, Mimics Enlight, and Circle Cardiovascular Imaging, each with their own strengths and weaknesses. FEops primarily differentiates itself with its cloud-based platform, FEops HEARTguide, which offers a comprehensive solution for preoperative planning of structural heart disease interventions, utilizing predictive modeling and AI-based anatomical analysis.

2.9. NUNSYS S.A. (NUN)

Nunsys S.A. competes in the realm of advanced water cycle management, process digitalization, and the implementation of cloud and edge computing technologies. Among its main competitors we can find the following:

IBM

IBM is a global technology and consulting company known for its ability to provide comprehensive and customized technological solutions across various sectors, including water management. Its extensive experience and vast financial and human resources enable it to develop and offer cutting-edge solutions that stay at the forefront of technology.

IBM stands out for its constant investment in research and development, ensuring that its products and services are always up-to-date. However, its global focus can be a disadvantage when it comes to quickly adapting to specific local needs, compared to more agile companies in local markets.

IBM's business model is based on selling technological solutions and consulting services through long-term contracts and subscriptions, in addition to offering cloud services and consumption-based artificial intelligence solutions. The combination of comprehensive technological solutions and a strong investment in innovation are IBM's main competitive advantages.

Siemens

Siemens, a German multinational, offers a wide range of technological solutions in sectors such as energy, industry, infrastructure, and healthcare. In the water management field, Siemens provides advanced solutions for automation, digitalization, and data analysis.

Siemens is distinguished by offering comprehensive solutions that cover everything from process automation and control to digitalization and data analysis. Its long history and strong presence in global markets reinforce its competitive position.

Despite its success, Siemens' solutions can be costly to implement, which can be a barrier for some organizations. Its business model is based on selling technology and consulting services, with a strong focus on long-term service contracts and turnkey projects. The ability to offer comprehensive solutions and its strong presence in the industry are its main competitive advantages.

Schneider Electric

Schneider Electric is a leader in energy management and automation, offering advanced technological solutions for managing critical infrastructures, including water management. The company stands out for its focus on sustainability and energy efficiency, providing solutions that help reduce energy consumption and improve operational efficiency.

Schneider Electric is distinguished by its commitment to sustainability innovation, offering products and services that cover everything from energy management to process automation and control. However, despite its global presence, it may rely heavily on certain specific markets.

Schneider Electric's business model is based on selling technological solutions and consulting services, with a strong focus on sustainability and energy efficiency. The ability to offer sustainable solutions and its focus on energy efficiency are its main competitive advantages.

Nunsys competes in an environment with significant players like IBM, Siemens, and Schneider Electric, each with its own strengths and weaknesses. Nunsys' competitive advantage lies in its ability to integrate advanced technologies such as big data, artificial intelligence, and predictive analytics in the management of the entire water cycle and other services.

2.10. DEPURACION DE AGUAS DE MEDITERRANEO S.L. (DAM)

Depuración de Aguas de Mediterráneo S.L. (DAM) competes in the advanced water cycle management sector, leveraging cloud and edge computing technologies. Its main competitors in thie field are:

Acciona Agua

Acciona Agua is a well-known company in the water sector, offering comprehensive solutions that span from water capture and treatment to distribution and sanitation. This company stands out for its significant investment in research and development, enabling it to develop advanced technologies in areas such as desalination and water reuse. Acciona Agua's global presence provides a considerable advantage, allowing it to leverage economies of scale and share best practices across different regions of the world.

However, Acciona Agua's reliance on public contracts can limit its flexibility and ability to quickly adapt to market changes. Its business model is based on long-term contracts with public and private entities, ensuring stable and recurring income. The ability to offer comprehensive solutions and continuous investment in technological innovation are Acciona Agua's main competitive advantages.

Veolia Water Technologies

Veolia Water Technologies is one of the world's leading companies in water treatment, known for offering a wide range of technological solutions for water and wastewater management. Its focus on sustainability and energy efficiency allows it to align with global trends towards sustainability, providing solutions that range from industrial wastewater treatment to the management of drinking water distribution networks.

Despite its success, managing a wide range of services and technologies can be complex and costly, potentially affecting its operational efficiency. Veolia uses a diversified business model that includes operation and maintenance contracts, consulting services, and the sale of technological solutions. Its focus on sustainability and ability to offer a broad range of solutions are its main competitive advantages.

Suez Water Technologies & Solutions

Suez is a global provider of water management solutions, focusing on drinking water treatment, wastewater, and water reuse. The company is distinguished by its substantial investment in advanced technologies, including digitalization and the use of big data to optimize water management. With a significant presence in key markets, Suez can leverage synergies and economies of scale to provide efficient and high-quality services.

However, its strong presence in developed markets can limit its growth in emerging markets, where there is greater expansion potential. Suez's business model is based on long-term service contracts, turnkey projects, and the sale of technology and equipment. Innovation capacity and a strong presence in key markets are Suez's main competitive advantages.

DAM competes in an environment with significant players like Acciona Agua, Veolia Water Technologies, and Suez Water Technologies & Solutions. Each of these competitors has its own strengths and weaknesses, but DAM differentiates itself through its ability to integrate advanced technologies such as big data, artificial intelligence, and predictive analytics in the management of the entire water cycle.

3. Commercial Partners' Current or Expected Business Models

This chapter's objective is to understand the partner's current strategic vision regarding their business models and how they foresee the TRANSACT framework may affect their exploitation plans.

Partner's input was required for the realization of this section.

3.1. UC1

3.1.1. VINOTION BV (VIN)

Market and Competition Analysis

Traditional ways of monitoring urban traffic data and managing the information are no longer adequate, as the landscape is altered by cutting-edge technologies (computer vision and artificial intelligence), new societal values (environmental awareness) and changing urban mobility modes (self-driven vehicles, bicycles, e-scooters, *etc*.). In line with the growing urban population, there is an urgency to develop advanced Traffic Management Systems (TMS) to achieve a safer, cleaner, and more sustainable urban mobility. We foresee Cyber Physical Systems (CPS) that use real-time traffic information from sensors and that control traffic lights and remote controlled or autonomous vehicles to manage the traffic. ViNotion is developing a smart camera (ViSense) to collect and process traffic data in real-time (24/7 measurements) within a CPS for traffic management. By means of artificial intelligence algorithms, ViSense can analyse the behaviour of all traffic participants, including cyclists and pedestrians. Our distinctive technology provides a high amount of valuable traffic information with high accuracy (>98%). ViSense can supply densities, trajectories, heatmaps, queue length, near-incidents, *etc*. Furthermore, the privacy-by-design assures the highest level of protection in compliance with the most stringent GDPR regulations.

Mobility is a primary concern for large cities that strive to become smarter and more sustainable. Traffic congestion, pollution, urban population growth and outmoded transportation systems are some of the reasons why today's cities are notoriously difficult to move around. Many cities have already started solving their transportation problems by embracing a new era of data-based commuting, such as integrated mobility platforms, limited traffic zones (ZTL), redesigned traffic lights, *etc*. In this context, the need to integrate smart city technologies and infrastructures (management and communication) paves the way towards the ViSense implementation.

Market size in units sold and revenue

With the advances in communication technologies, TMS now help users in a wider array of applications by building a whole traffic applications ecosystem. The global TMS market was valued at $13,779 million in 2022 and is expected to grow at a CAGR of 11.23% between 2022 and 2027.

TMS market size is primarily driven by the global rise in city populations, oncoming self-driving vehicles and the rising awareness regarding the social and economic losses that economies incur due to urban traffic jams. Additionally, there is an increasing need for more robust data for bicycle, e-scooters and pedestrian transportation modes through expert algorithms that complete the urban mobility view and prioritize the safety of vulnerable users. Europe is estimated to be the leading region in TMS deployment owing to supportive government initiatives for developing smart cities and smart transportation projects. Furthermore, high adoption of cutting-edge technologies, such as route guidance software and smart signalling, are also estimated to foster the growth of the TMS market. However, the lack of standards and uniform technology and security-related issues are projected to be the major constraints.

Market demand is focusing on developing new products that comply with standards and ensure interoperability. Likewise, the growing relevance of soft transportation modes (cycling and walking) has

created an urgent need to integrate them into current mobility management solutions. In this sense, ViSense is likely to gain traction in the foreseeable future, underpinned by growing concerns regarding vulnerable road user's safety, air quality and costly traffic jams.

It is estimated that there are around 4,000 cities in the world that have over 100,000 inhabitants, of which 325 are in Europe. Taking into account these figures and considering a ViSense's targeted market share for permanent projects with 5 to 10 cross-sections (over 40 sensors) of 15%, we forecast a total of around 48 European cities fitted-out with our technology after the first 3 years of commercialization.

Customer definition and profile

Our primary application market is Municipalities & Traffic Authorities. Traffic management remains a challenge in densely populated cities. A more efficient use of existing urban roads to harmonize traffic flows and focus on pedestrian and cyclist safety are key assets towards a better management of urban mobility. The challenge in managing mobility in cities entails the interoperability of all traffic control subsystems, public and private, analysing and combining all data in real time. Our solution is able to communicate with any cloud-based TMS via a standardized broker. Hence, the ViSense system enables dynamic control and optimization of the traffic flows, with the consequent public savings.
Our main customers are system integrators and service providers that combine our ViSense system with a cloud-based traffic management system to offer a total solution. In the aftersales market we also sell our ViSense sensor directly to municipalities and road authorities to enhance their traffic management with more advanced traffic data.

Market share and competition

There are limited solutions in the market offering a smart integrated solution that can communicate with a cloud-based traffic control systems and can simultaneously monitor and manage traffic data of motorized vehicles, cyclers and pedestrians, as *ViSense* does. Indirect competition may come from "Traffic Control Integration Providers" offering integrated mobility services and related control systems. This market is dominated by a few big companies such as *Siemens, Indra* and *Swarco*. Compared to them, we offer a more specific solution and with a much more competitive price. Applied TMS are distinctly diverse, offering highly customizable solutions on a project-by-project basis. The table below shows main market players operating in EU that may compete with *ViSense* and compares some of their operational features.

Company Product	Real time	accuracy	Integration with TMS	Data analysis			Deep-Machine-learning
				Counting, Classification, Velocity, Direction	Traffic behaviours	Peak times Near-miss	
Scapeye (NL)	Yes	98%	NO	Yes	NO	NO	NO
DataFromSky(CZ)	NO	>95%	NO	Yes	Yes	Yes	Yes
Citylog (FR)	Yes	>95%	NO	Yes	NO	NO	NO
Eco-counter (FR)	NO	-	NO	Yes	NO	NO	NO
FLIR (USA)	Yes	-	Yes	Yes	Yes	NO	Yes
MioVision (CAN)	NO	95%	Yes	Yes	NO	NO	Yes
ViNotion (NL) ***ViSense***	Yes	98%		Yes	Yes	Yes	Yes

Table 1: Vinotion's Competition

Product or Service Definition

Brief product/service description

ViSense is an AI-based traffic sensor for traffic management to detect the presence and movement of vehicles, pedestrians and cyclists in real-time (24/7 measurements) and using edge-computing, ensuring high-privacy protection. Deep learning and machine learning algorithms require a large data set in order to properly train AI.

Product/service's differentiation features or functionalities

Within the TMS market we can distinguish several technologies that collect data through different methods. Each traffic measurement system has its own limitations and individual capabilities. Their successful application largely depends on the selection of the proper device for each situation; type of data required, data accuracy, ease of installation, cost, reliability, *etc*. For example, road sensors like inductive loops are invasive during the installation, cannot detect all traffic participants and cannot classify the traffic. Crossover buttons are only useful for pedestrians. Radar has an accurate detection performance, but the spatial resolution is very limited causing inaccurate classification and bad object separation capabilities. Floating Car Data (FCD) methods collect information from navigation devices and mobile phones. They can deliver data such as travel time, speed and position, but are not used by all traffic participants. Only a small fraction of the traffic is visible.

We offer a smart camera, because it provides the most detailed and realistic data, since they offer real-time information from all traffic participants. Camera solutions are cost-effective, being able to count in many directions at once (only one camera may cover several lanes or exits). Their parameters (even recording areas) are easy to modify from a remote PC. The product, called ViSense, offers traffic data to a cloud application via a standardized ITS protocol.

We believe the ViSense sensor is the most versatile solution that collects and manages traffic data providing the widest range of real-time data analysis with the highest accuracy of all urban participants. We plan to sell ViSense as an integrated and customizable service, offering enhanced robustness and presenting a remarkably higher versatility than any competitor. ViSense is the only option that is capable of improving the traffic flow and improving the safety by integrating with traffic control systems in the cloud.

Summarized roadmap of the product/service's evolution

In order to reach TRL8 and bring ViSense to the next stage, *ViNotion* schedules to develop the following TRL6 technical and pre-commercial activities in the coming year. In parallel we will deploy the ViSense sensor in several cities as pilots to validate the value and to receive feedback for further improvement and new future functionalities. Started in latter half year of 2023 we received approval from 6 cities in the Netherlands to test the solutions. As of January 2024, the prototype ViSense sensors have been installed in 5 cities on a small scale. Validation will follow in the coming months.

We plan to use these temporary projects as a launch platform to penetrate new markets (flagship projects), bringing visibility and then switching to permanent deployments. In this line, we also plan to commercialize low-priced demo systems with a support service to engage potential customers by validating our product and generating credibility. Our go-to-market planned roadmap is based onto the following criteria: **(i)** Countries/regions receptive to adopting innovative TMS, **(ii)** EU cities with a significant share of bicycles as urban transportation mode, **(iii)** our existing network of customers and partners.

The first five years of commercialization have been divided into 4 stages, considering market research studies and our commercial prospects.

- **Year 1 – Expansion into our home market: The BENELUX Region.** As a company established in Eindhoven, the BENELUX region is our natural market, where we have already created a strong and close network of

partners. We have executed temporary projects with Dutch municipalities (Hengelo, Helmond, Delft, Amersfoort, Utrecht), which have shown interest in turning those temporary campaigns into permanent ones. The precise knowledge of industry standards and regulations will ease the rapid expansion of our solution.

- **Year 2 – Scandinavian countries, Germany and Austria.** We will expand into leading regions investing in sustainable mobility. Cities like Copenhagen, Stockholm, Vienna and Berlin are among the most bicycle-friendly cities in Europe. Thereby, we can maximise our unique competitive advantage of being the first company offering a holistic approach that includes the monitoring of bicycles and pedestrians.
- **Year 3 – France, Spain and European Eastern countries.** In the 3rd stage we will target European regions where authorities have already launched campaigns to promote the use of bicycles in urban areas. With the aim of halving injury and fatality rates for cyclists by 2030, these countries plan important investments in cycling transport infrastructure.
- **Year 4 and 5 - Expansion outside the EU.** We will initiate our expansion overseas in North America, a region that holds 21% of the total TMS market, and the south-east Asian region which anticipates a smart mobility applications market as large as ≈70 billion$. We will focus on the largest cities where mobility is a big issue and where TMS are well-accepted.

Strategy

Business Model CANVAS:

1. ***Value proposition:***

ViNotion offers a single-sensor solution for all traffic participants including pedestrians and cyclists with the most versatile information to enable advanced traffic control from cloud application. This approach is scalable and sustainable, ready for changes towards future transportation.

2. ***Key activities:***

ViNotion focuses on R&D for embedded software and the support toward systems integrators, service providers of traffic management systems and OEMs.

3. ***Key partnerships:***

For sales towards the end users, we rely on partnerships with system integrators and service providers. For hardware design and manufacturing we have existing partnership with a supplier. For our technical personnel we maintain an established relationship with the technical university.

4. ***Key resources:***

Our key resources are the R&D and support engineers. Over the past 16 years we build a solid codebase and knowledge base that is being exploited for development of our products.

5. ***Customer relationships***

Our main customers are system integrators and resellers. Hence, direct communication and a service portal for technical support is most important.

6. ***Distribution channels***

We started building our network with end users in The Netherlands, but we foresee the distribution via reseller partners and international system integrators.

7. ***Customer segmentation***

To have sufficient international reach, we target our sales to system integrators of traffic management solutions.

8. Revenue streams

We sell our sensors as hardware devices but also generate revenue from recurring fees for data access, support, maintenance and performance monitoring to guarantee high availability and data quality.

9. Cost structure

The costs involve upfront investment for development of the product. In addition, marketing and sales costs will be involved to prepare for market introduction. After that, hardware procurement, services for connectivity and our service desk are continues costs to generate the revenue.

Sales model and pricing strategy

We will sell the ViSense sensor hardware at a sufficiently low price to minimize financial risks and have a low threshold for onboarding of new customers. Recurring prices for high availability of data, support, system monitoring, and maintenance will contribute to the revenue for profitability.

We continue developing new features for upselling to our install base customers to further improve the profitability.

3.2. UC2

3.2.1. NAVTOR (NVT)

Market and Competition Analysis

Market size in units sold and revenue

The main market for NAVTOR's services is commercial vessels in international trade ("SOLAS vessels"), estimated at about 55.000 commercial vessels. The total revenue in 2022 was 570 million NOK (about 50M€), having a yearly increase of about 20% last years

Customer definition and profile

The main customers are the Ship owners or Operators of the vessels, depending on type of contract.

Market share and competition

NAVTOR has, during the TRANSACT project, grown the number of vessels organically from about 7000 vessels to 9000 vessels, giving us a market share of 21%. In addition, NAVTOR announced a merge with a large competitor on Nov. 9th 2023, giving us a Marketshare of 33%. Through this merge NAVTOR is almost twice as big as our next competitor and has a significant impact on sustainability within Commercial Shipping.

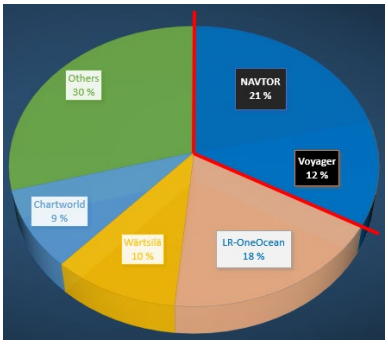


Figure 1: Main market players for e-Navigation services within international shipping.

Product or Service Definition

Brief product/service description

NAVTOR is a specialized, maritime service provider providing digital information and SW (e.g. planning station NavStation) for Safe navigation to the Bridge team and particular to the navigators onboard. With a steep increase in interest for sustainable shipping, NAVTOR experiences an increased demand for Web-based Fleet management systems for shore-based user as vessel Owners and Operators, for more detailed insight in the daily operation of the vessel related to safe and efficient navigation and operation of the vessel. This is where our value proposition, enabled by the TRANSAS Device-edge-Cloud architecture, has developed into a value proposition for cloud-based services for monitoring and notifications for situations defined by the Owner/Operator as "unnormal", and where a notification or warning is wanted.

As many of these digital services have, more or less, fixed costs (development, maintenance, operational costs, etc.), a potential scaling of earnings is possible when the number of vessels subscribing is above a certain threshold on a subscription model.

Product/service's differentiation features or functionalities

In the TRANSACT project, NAVTOR has further developed and improved our Device-Edge-Cloud solution by adding new advisory services in the Cloud for supporting safe and efficient navigation. We have few competiors on safe navigation, but an increasing number of efficient navigation working on fuel consumption. However, NAVTOR's advantage is our "ONE integrated solution" with an Onboard platform (NavStation) and a shore based platform (NavFleet). With this architecture we have a more mature and cyber secure service than our competitors.

Summarized roadmap of the product/service's evolution

NAVTOR has made serveral demos using the new device-Edge-Cloud architecture, e.g. downloading AIS information from device via Edge to Cloud to find frequently sailed routes, but also to identify congestions areas and detect abnormal behaviour of vessel causing an alarm or notification to shore and vessel side.

Strategy

Business Model CANVAS:

1. ***Value proposition:*** NAVTOR will continue to utilize the TRANSACT architecture for new services, partly AI enhanced, supporting safe and efficient navigation for "NAVTOR-vessels"

2. ***Key activities:*** Working closely with customer in demonstrating benefits with the TRANACT activities.
3. ***Key partnerships:*** We will continue to work with our key partners in UC2 to further utilize the potential in the Device-Edge-Cloud continuum.
4. ***Key resources:*** NVT will utilize our internal IT and Product departments, as well as continue to work with key partners in new R&D projects
5. ***Customer relationships:*** We work close with our customers in customer meeting and events
6. ***Distribution channels:*** Sales is out of NAVTOR sales department in different maritime Hubs (Norway, Greece, Singapore, China, Japan, etc)
7. ***Customer segmentation***: Mainly for Safe (e-navigation) and Efficient (fuel performance) in small, medium and big vessel owners and operators
8. ***Revenue streams:*** It is a short way from R&D to market, NAVTOR has a steady revenue growth year by year
9. ***Cost structure***: All costs are Personnel costs, either by internal budgets or by R&D projects

Sales model and pricing strategy

Sales are starting with basic information needed by regulation, and then other layers and products are added as time goes. Pricing is fixed, but discounts will apply for larger customers.

3.2.2. POLITECHNIKA GDANSKA (GUT)

Gdansk University of Technology (Gdansk Tech/GUT) is one of the key research universities. Apart from educational activities, Gdansk Tech conducts high-quality research activities in low (TRL<=5) and high (TRL<=8) TRL levels. Complete and mature technologies are registered in Gdansk Tech Technology Transfer Centre and companies interested in licensing can get access to the developed technologies. Within the project TRANSACT timeframe, Gdansk Tech focused on development of a 7-metre long modular Unmanned Surface Vehicle (USV) “HORNET” together with dependable wireless communication payload that can operate in edge-cloud continuum based on TRANSACT architecture. HORNET was designed as a completely modular platform based on use of redundant components (e.g. engines, batteries, etc.) agreed with Polish maritime authorities and standardization bodies and TRANSACT architecture focused on safety and reliability. Due to its modularity, the following technologies will be registered in Gdansk Tech Technology Transfer Centre: a) the complete Modular USV HORNET platform, b) dependable wireless communication system; and c) situational awareness payload.

Market and Competition Analysis

Market and competition analysis presented below has been prepared using data available in “Unmanned Surface Vehicle Market by Type (Remotely Operated, Autonomous), System (Propulsion, Payload, Component, Software, Chassis Material, Communication), Application, Hull Type, Endurance, Size, Cruising Speed, and Region - Global Forecast to 2026” report prepared by MarketsandMarkets™ INC – named “the M&M report” or “the report” in further descriptions below.

Market size in units sold and revenue

An unmanned surface vehicle (USV) is a marine vessel that operates on the water surface without a crew. It has a complex system, which includes several types of technology, such as system integration technology, environment perception technology, navigation and wireless communication systems, and autonomous decision & control technology. Based on the M&M report, the overall unmanned surface vehicle market is projected to grow from USD 616 million in 2021 to USD 1,038 million by 2026, at a CAGR of 11.0% from 2021 to 2026. In this market, medium USV (3-7 Meters) are projected to grow from USD 108 million to USD 188 million (CAGR 11.7%) while large USV (7-14 Meters) are projected to grow from USD 270 million to USD 447 million (CAGR 10.6%). HORNET USV is 7m long USV, so it falls within these two scopes.

Customer definition and profile

The main USV market drivers considered are: increased demand for water quality monitoring and ocean data mapping and increasing capital expenditure of companies in offshore oil, gas, infrastructure, and wind turbines. It means, that customers can be: a) end-users from the above segments directly; b) USV production companies; c) USV integrators; and d) companies providing services based on USV platform. Additionally, 3rd parties providing components that can be integrated with modular USV "Hornet" (e.g. NAVTOR, video-based recognition, control systems, mission-control systems, etc.) will participate in the whole value chain.

Market share and competition

Market size, by commercial application, in the period 2021–2026 is (in USD Million, three biggest markets are considered): Hydrographic Survey (139-229; CAGR 2021–2026: 10.4%), Infrastructure Inspection (23-39; CAGR 2021–2026: 11.3%), Environment Monitoring (79-133; CAGR 2021–2026: 11.1%). Additionally, estimated USV market size, by commercial application, in the period 2021–2026 is (in USD Million, three biggest markets are considered): the payload segment is estimated to be USD 229 million in 2021 and is projected to reach USD 404 million by 2026, at a CAGR of 11.68% from 2021 to 2026, the propulsion segment is estimated to be USD 135 million in 2021 and is projected to reach USD 232 million by 2026, at a CAGR of 11.46% from 2021 to 2026, the communication segment is estimated to be USD 84 million in 2021 and is projected to reach USD 146 million by 2026., at a CAGR of 11.68% during the forecast period. Main competitors are USV producers: L3Harris Technologies, Teledyne Technologies, Textron, ECA Group, Elbit Systems, SeaRobotics, Rafael Advance Defense Systems, 5G International, Liquid Robotics, Maritime Tactical Systems, Thales, Atlas Elektronik GmbH, Clearpath Robotics, Ocean Aero, Deep Ocean Engineering, Marine Advance Research, Saildrone, Seafloor Systems, Zhuhai Yunzhou Intelligence Technology, Maritime Robotics, QinetiQ, Ocius Technologies, Kongsberg and Saab AB. Although, the pool of competitors is big, one should remind that HORNET is a modular USV platform that is build on commercially available components (e.g. RIB), which makes the whole platform price competitive. Taking into account that HORNET USV is 7m long USV, so it falls within medium USV (3-7 Meters; average market price USD 1,500,000) and large USV (7-14 Meters; average market price USD 5,000,000) scopes it is safe to estimate that its acceptable market price can be between USD 1,500,000 and USD 3,000,000, while it can be proceed 5-10 times less.

Product or Service Definition

Within the project TRANSACT timeframe, Gdansk University of Technology (Gdansk Tech/GUT) focused on development of 7m long modular Unmanned Surface Vehicle (USV) "HORNET" together with dependable wireless communication payload that can operate in edge-cloud continuum based on TRANSACT architecture. HORNET was designed as a completely modular platform based on use of redundant

components (e.g. engines, batteries, etc.) agreed with Polish maritime authorities and standardization bodies and TRANSACT architecture focused on safety and reliability. One of the key USVs features is dependable wireless communications systems that enable real-time data transmission, ensuring seamless communication and efficient remote operation. Robust wireless technologies maintain continuous connectivity, allowing operators to monitor and control USVs, receive live data feeds, and make prompt decisions. The integration of dependable wireless communications enhances the effectiveness and reliability of USV operations in monitoring marine infrastructure or offshore wind power plants

Brief product/service description

HORNET modular architecture allows to address many possible exploitation ways - the platform can used: 1) in fully autonomous missions (e.g. bathimetric measurement, perimeter protection, critical infrastructure monitoring, etc.) as an end-to-end product; 2) as a naval vehicle for USV testing purposes (e.g. verification of algorithms used for autonomous USV algorithms, testing of different payloads that can be used on USV); 3) for development of third party original and innovative payload to be used in fully autonomous missions (e.g. lidar-based payload for situational awareness, high resolution cameras with computer vision algorithms, post-quantum cryptography for unmanned vehicles, etc.). At the platform is modular, HORNET can be licensed and sold as a complete product, HORNET subcomponents or subsystems (e.g. dependable wireless communication system or scalable situational awareness payload) can be sold as product in the USV market or more innovative business models can be used (e.g. the complete platform can be produced by a 3rd party to provide and sell services to end-users). First companies, that approached Gdansk Tech, are boat and ships producers and they expressed strong interest in the scalable situational awareness payload, so it can be integrated with their products.

Product/service's differentiation features or functionalities

The main HORNET differentiators are affordable price and its modularity. Modular USV systems are being considered by many end-users a way of delivering capabilities, so there is an increasing need for multi-mission modular USVs where new technology can be implemented fast without requiring significant changes to the host platform to adapt it to particular end-user needs. In fact, HORNET has already gained interests of 2 big end-users (LoIs linking these companies with GUT and TRANSACT has been signed already): MEWO S.A. (the biggest company for offshore measurements in the Baltic Sea) and LOTOS Petrobaltic S.A. (the biggest Polish offshore oil company having rich portfolio of offshore infrastructure). First contracts for autonomous USV inspection and measurement missions are negotiated. Additionally, HORNET is one of the highlights of Unmanned Vehicles Task Group (UVTG) in Poland that is run by INTERIZON – the biggest ICT Cluster in Poland (HQ in Gdansk) and one of the Polish Key Clusters. INTERIZON together with GUT organizes UVTG activities to facilitate development of international USV value chain that include: NAVTOR, GUT, INTERIZON cluster companies (e.g. NAVINORD, WiRAN, INERO) and NATO DIANA companies developing prospectful deep tech technologies (e.g. ANZEN, GOLDILOCK, GIM ROBOTICS, LOBSTER, REVOBEAM). The latter UVTG companies already expressed their interest in dependable wireless communication system and scalable situational awareness payload as separate products that can be integrated with their products.

Summarized roadmap of the product/service's evolution

After the TRANSACT project end, Gdansk Tech will further develop HORNET USV platform so it can be demonstrated and further used by MEWO S.A. and LOTOS PETROBALTIC S.A. in real missions. MEWO S.A. formed a dedicated internal team to generate full requirements specifications for Gdansk Tech. It is expected that by the end of November 2024 Gdansk Tech will accomplish a number of tests that will be used to

commercialize the solution. At the same time, Gdansk Tech will make an attempt to organize dedicated funding schemes to cove futer increase of the HORNET USV platform TRL level. It is expected, that during the next 2 years the platform will be used to provide services by Gdank Tech to the above companies and new end-users and in 2-4 years 1-3 licenses will be sold. Moreover, Gdansk Tech will further develop dependable wireless communication system and scalable situational awareness payload as separate produts that can be integrated with 3rd party products.

Strategy

Business Model CANVAS:

1. ***Value proposition:*** Gdansk Tech provides cost-efficient, reliable and modular AI-enhanced USV platform that can be used in long 24/7 inspection/guarding/perimeter protection missions, supporting safe and efficient operations in maritime domain.
2. ***Key activities:*** Direct and close collaboration with potential end-users as well as with maritime systems integrators and boat/ship producers to demonstrate benefits during real missions.
3. ***Key partnerships:*** Collaboration with Polish maritime authorities, standardization and certification agencies and prominent end-users to increase the modular USV platform visibility. Active cooperation with Unmanned Vehicles Task Group run by INTERIZON – the biggest ICT Cluster in Poland (HQ in Gdansk) – to build the complete international value chain around the platform.
4. ***Key resources:*** Gdansk Tech Technology Transfer Centre and Centre for Digital Technologies will be the key resources to commercialize the modular USV platform. Moreover, key R&D partners (e.g. NAVTOR, AVL, TTTECH) will be ignited in new R&D projects.
5. ***Customer relationships:*** Gdansk Tech will work close with end-users, which are the main driving force to commercialize the modular USV platform. Additionally, the international value chain companies will be involved to build a comprehensive market offer to satisfy the end-user needs.
6. ***Distribution channels:*** In the initial stage, Gdansk Tech will directly contact end-users. In the later stage, a dedicated start-up company will most probably be created. It is also planned to create sales channels via direct collaboration with the international value chain companies that will be involved to build a comprehensive market offer (e.g. NAVTOR, Polish ship/boat producers) having sales departments worldwide.
7. ***Customer segmentation***: Companies performing many DDD (dull, difficult, dirty) missions (e.g. bathymetric measurement, perimeter protection, critical infrastructure monitoring, etc.) operated by manned vessels/boats as well as small, medium and big vessel owners operators or producers.
8. ***Revenue streams:*** It is expected, that during the first 2 years the platform will be used to provide (paid) services by Gdansk Tech to the existing and new end-users. It is estimated that after 2 years, additional revenue streams from licenses and consulting will be started.
9. ***Cost structure***: Planned costs during the first 2 years will be mostly personnel cost from paid services, internal budget or by R&D projects.

Sales model and pricing strategy

In the first 2 years, costs will be mostly personnel cost and potential end-users will buy services from Gdansk Tech. It is planned that Gdansk Tech will charge ~5000 EUR for 1 PM of such services. If the modular platform will be rented, it is planned hat Gdansk Tech will charge ~1000 EUR for a single day of trials or measurements (that includes involvement of two persons – the USV HORNET operators). Pricing is fixed, but discounts will apply for the key customers and for bigger contracts.

3.3. UC3

3.3.1. AVL SOFTWARE AND FUNCTIONS GMBH (AVL)

The challenges of tomorrow require complex, resource-intensive and contemporary solutions. As top-rated engineering service, AVL Software and Functions GmbH commits to the implementation of innovative achievements; our vision: the realization of world-class products. The following model is the anchor point of our thinking and acting and builds the columns of our success. The optimal exploitation of our ability potentials remains our pioneering maxima. Thus, we continuously perfect our range of products and never forget to reverse to the self-conception of the company. As a steady partner we stand for sustainable values and an honest business policy. We break new ground and always ask ourselves “Why not?”. Our simple answer: “Move different.”

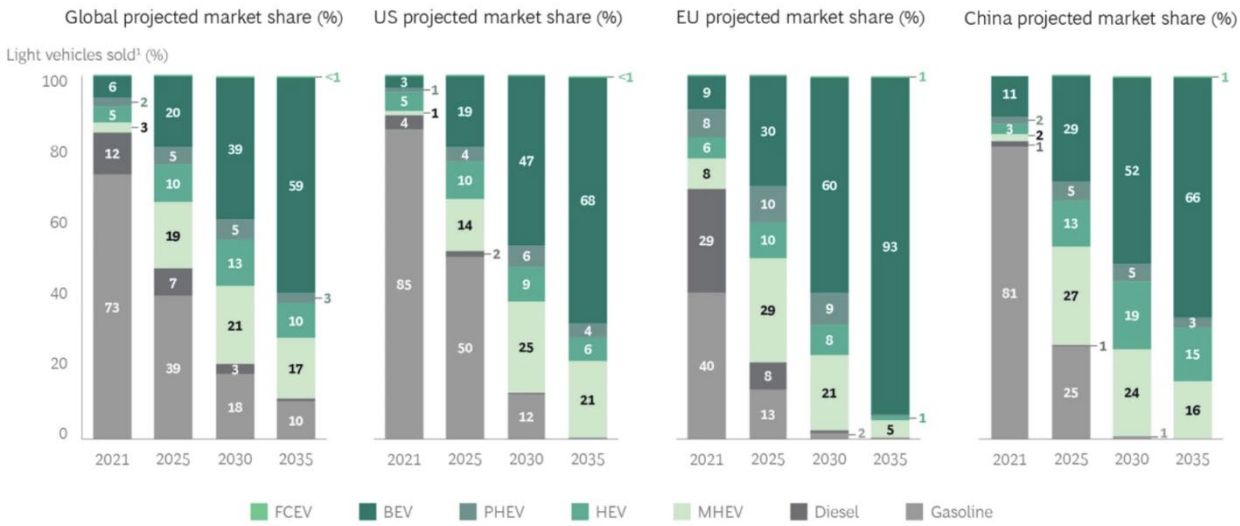
AVL is a pioneer for the development of Battery Management Systems (BMS). In the context of TRANSACT, the existing isolated solution will be expanded to a distributed and connected one.

Market and Competition Analysis

Market size in units sold and revenue

The amount of sold and required BMS scales with the amount of Battery Electrical Vehicles (BEVs). The Figure 2 depicts the current status and the sales forecast for BEVs until 2035.

Exhibit 1 - Battery Electric Vehicles Are Projected to Make Up 20% of Global Sales in 2025



Source: BCG analysis.

Note: FCEV = fuel cell electric; BEV = battery electric; PHEV = plug-in hybrid electric; HEV = full hybrid electric; MHEV = mild hybrid electric. Because of rounding, the percentage total for a particular year may not equal 100%.

¹Forecast includes cars, SUVs, and all other light vehicles except heavy vans.

Figure 2: Sales forecast for Battery Electrical Vehicles. Taken from https://www.bcg.com/publications/2022/electric-cars-finding-next-gear.

Accordingly, the need increases by a factor of between two and three until 2035. As AVL acts globally, there is no limitation to the market region.

Customer definition and profile

Car manufacturers are also referred to as OEMs. In principle, one can distinguish between **big OEMs** and **small/niche OEMs**. Beside the car manufacturer, there are also three more stakeholders which are interested in knowing their batteries in details: The **Driver (Owner)** of the vehicle. In the B2C market, the Driver, who is also the owner of the vehicle is interested in having a good estimation of the health of the battery. As the price of the battery is a huge share of the total sales price, the health also has an important role when it comes to re-selling the vehicle. In the B2B market, the vehicles are not owned by a single person, but by an organisation. The amount of vehicles ranges from 10 to several thousands. The **Fleet Owners**, those who operate the vehicles, e.g. public transportation or logistics, are mainly interested in the total costs of ownership.

Beside of the automotive market, there is also a share of application in the **Industry.** Batteries can be operated in a non-automotive context, e.g. stationary energy storage or electrified trains, but also hydrogen infrastructure can play a role, as still short-term buffers are required which are currently realized by batteries.

Product or Service Definition

Brief product/service description

AVL SFR is an engineering service. That means, AVL SFR develops products, solutions or components engaged by customers. On the one hand, AVL SFR must demonstrate to possess the capability to realize the requirements, ideally with existing demonstrators or recent projects as references. On the other hand, the costs for development shrink when there is a reuse or a basis of existing solutions, leading to a better position in a peer comparison in terms of price and time-to-market. That means, AVL SFR must anticipate the current and upcoming needs of existing or new customers. The frequent exchange with (potential) customers identified the need for a cloud-connected BMS for monitoring purpose. Data can also be used for further research but also to adapt current software version which is then remotely installed over-the-air.

Product/service's differentiation features or functionalities

The product vision as a BMS which is connected to the cloud is to enable data analytics and health monitoring. For this use case, there are several competitors. Most of them focus on data driven analytics. The key difference is that AVL also develops BMS and performs simulations on battery cells and packs. Accordingly, AVL has a much deeper understanding of the overall system has the capability to also directly interact with the BMS in a closed and fully integrated solution.

Summarized roadmap of the product/service's evolution

With the end of TRANSACT, AVL wants to have at least established the uni-directional connection from the BMS/vehicle to the cloud and offering a GUI for displaying live, session and analyzed data. In upcoming projects, the reverse channel shall be established. Also advanced and distributed battery models shall be investigated.

Strategy

Business Model CANVAS:

1. ***Value proposition***

   AVL aims to develop a flexible and easily adaptable solution. It will be a need oriented approach instead of providing a "take-it-as-it-is"-solution.

2. ***Key activities***

   Understanding the dynamics of the market and finding new niches.

3. ***Key partnerships***

   As Use Case leaders, AVL partners with all UC3 participants and integrates their solutions. This gives a good basis to understand possible customer requests and to already pre-build solutions for the connection to third parties.

4. ***Key resources***

   The project is driven by the Digitalization department at AVL. Also involved are Battery Management System (HW+SW), E-Drive Innovation, WebTools and DevOps team.

5. ***Customer relationships***

   AVL's RnD is mainly customer driven. Interests and Requirements originate from customers. However, there is no key customer relationship right now.

6. ***Distribution channels***

   AVL uses the classical sales distribution channel, but also online presence like LinkedIn. Besides this, several research and journal articles have been published or are currently in progress. Furthermore, on AVL's YouTube Channel one can also find the presentation of TRANSACT related results.

7. ***Customer segmentation***

   The following customer segmentation are in scope: big OEM, small/niche OEM, and emerging markets in the Industry**.**

8. ***Revenue streams***

   As engineering service, main revenue stream is project business.

9. ***Cost structure***

   Costs include personnel costs for RnD but also HW costs.

Sales model and pricing strategy

As AVL is an engineering service, the sales model is based on customer acquisition via proposals and direct contact. The fix-price offers are based on estimating the time and material costs.

3.3.2. DAC SPOLKA AKCYJNA (DAC)

Market and Competition Analysis

Market size in units sold and revenue

We provide services for 50% of the dairy companies in Poland with an estimated revenue of around 150,000 euros.

Customer definition and profile

With D_Box we have already begun streamlining operations in several key areas, such as the dairy industry, logistics, mapping, lean manufacturing, automotive, and construction sectors.

Market share and competition

D_Box unequivocally underscores the deficiency in hardware expertise within software firms. This indicates that D_Box confidently fills this void and firmly establishes itself as a distinctive solution in the market. Although competition may arise from other IoT hardware providers, D_Box's distinguishing features, including its trusted hardware layer and advanced connectivity options, are poised to differentiate it effectively.

Product or Service Definition

Brief product/service description

D_Box is a hardware device developed by DAC.digital to address the limitations of existing prototypes in industrial applications, particularly in the dairy industry. It features a trusted hardware layer designed for safety, reliability, and scalability, with advanced connectivity options and edge computing capabilities. D_Box serves as a centralized solution for managing and analyzing data from various sources, making it suitable for industries such as manufacturing, smart city solutions, and agriculture.

Product/service's differentiation features or functionalities

D_Box's differentiation features include its trusted hardware layer, which ensures safety, reliability, and scalability. It offers advanced connectivity options such as Bluetooth 5.0, WiFi, CAN, RS232, I2C, USB, Ethernet, GPS, and GSM in LTE-M version, enabling seamless data transmission and connectivity even in areas with poor internet connection. Additionally, its edge computing capability allows for efficient local data processing, enhancing operational flexibility and control.

Summarized roadmap of the product/service's evolution

The roadmap of D_Box's evolution includes several critical phases: conceptualization, design and prototyping, testing and iteration. Initially, DAC.digital identified flaws in existing prototypes and outlines a new device to overcome these challenges. Then DAC.digital crafts a new device design, eliminating inefficient components and incorporating scalable technology suitable for industrial use. Subsequently, rigorous testing is conducted to ensure safety, reliability, and effectiveness in real-world industrial environments, leading to iterative improvements based on user feedback. Overall, the evolution of D_Box demonstrates a commitment to addressing industry challenges and continuously innovating to meet the evolving needs of customers across various sectors.

Strategy

Business Model CANVAS:

1. ***Value proposition***

    a. Integrated modules of GPS and GSM
    b. High performance in a compact form
    c. Durability and reliability in industrial environments
    d. Easy impelentation thanks Linux OS

2. ***Key activities***

    a. Research and development of new features and capabilities
    b. Production and assembly of new devices
    c. Testing
    d. Developing relationships with partners and customers

3. ***Key partnerships***

    a. Electronic component and subsystem suppliers
    b. PCB assembly company
    c. PCB production company
    d. Industrial and logistics clients

4. ***Key resources***

    a. Team of engineers and product development specialists
    b. Partnerships with component suppliers
    c. Laboratory and assembly space

5. ***Customer relationships***

a. Long-term relationships based on technical support
b. Close collaboration in customization for customer needs
c. Prompt response to reported issues and inquiries

6. Distribution channels

a. Direct B2B sales

7. Customer segmentation

a. Logistics Companies
b. Manufacturing solutions Companies
c. Automation and agriculture Industies.
d. Research and Development Institutions:

8. Revenue streams

a. Sale of hardware devices
b. Technical support
c. Collaboration on custom projects

9. Cost structure

a. Production and component procurement costs
b. Employee salaries
c. Marketing and sales costs

Sales model and pricing strategy

The sales process entails direct marketing, participation in industry conferences, and upselling for current clients. Each client is evaluated based on multiple factors, such as the size of their order. All discounts are negotiated directly with the prospective client.

3.3.3. CISC SEMICONDUCTOR GMBH (CISC)

Market and Competition Analysis

Market size in units sold and revenue

Currently, COYERO is successfully implemented in three Austrian regions/municipalities as well as in a Vienna-based organization with approximately 6500 members, which results, so far, in a generated revenue of around 100000 Euros. However, several new projects within the energy and touristic sector and also in other areas, such as access management for semi-public institutions, are expected to be performed throughout the year 2024.

Customer definition and profile

In general, COYERO customers can be separated into three different groups. The first groups involves tourist regions, municipalities as well as other guest-oriented stakeholders (e.g. hotels) - their intention is to

implement COYERO in the existing infrastructure (charging / parking / transport) is mainly to offer a marketplace for regional service providers next to providing a holistic information and travel management tool for guests. In addition, the digitalisation of existing guest card offers is a central feature in touristic applications. Secondly, there are the clubs and other organizations (e.g. clusters), who profit from COYERO by enabling more efficient membership management and communication. Last, but not least, companies and other institutions, such as residential developers and governmental organisations, who are encouraged to implement smart access and EV charging systems with COYERO.

Market share and competition

At the moment, COYERO holds a neglectible market share within all three target groups, which is mostly due to limited ressources as well as insufficient brand awareness. However, due to the recent recruitment of new Marketing and Sales staff, COYERO is constantly evolving and entering new markets. There is relevant competition, especially within the touristic sector – therefore, CISC pays close attention to the market development and carefully analyses shifts and evolution.

To name a few of the most relevant competitors:

- Feratel Personal Interests Assistant (in short PIA)
- MindPower.com (4tix)
- Xamoom
- Cities

Product or Service Definition

Brief product/service description

COYERO is the platform for individually branded and modularly configurated iOS/Android apps that are managed by so-called tenants (i.e. the customer of CISC). The main focus of COYERO is to provide a map view, where service providers within a specific region are shown. Furthermore, these service providers can offer their products and services to a broad audience in the form of digital tickets, which can be obtained by users via various secure payment options and redeemed thanks to technologies like BLE, NFC or QR codes – think of it as a digital marketplace. In addition, direct communication from the tenant and service provider to the user is made possible thanks to integrated push messages. Other features include EV charging station compatibility, public transport integration, interfaces to touristic databases as well as profound backend statistics.

Product/service's differentiation features or functionalities

When comparing COYERO to the aforementioned competition, it becomes clear that none of the other solutions can summarize ticketing, digital card usage, public transport, EV charging and access management in a holistic solution. Therefore, COYERO, unlike other products, can be considered as the "all-in-one" solution for many different needs and use cases. In addition, many competitors provide their product as a Progressive Web App, whereas COYERO is a native app, which is downloaded from the App/Play Store. CISC believes that this intentional decision brings fundamental advantages when it comes to security, usability and trustworthiness.

Summarized roadmap of the product/service's evolution

The touristic approach origined in 2019 in the form of a collaboration with the tourist region Klagenfurt am Wörthersee. Back then, the main focus of COYERO was to provide a digital marketplace for regional service

providers, interfaces and other features were not yet implemented. As the time went by, the partnership grew and further customers implemented COYERO, additional features were gradually developed in alignment with the market and its desires. Mentionable milestones in this ongoing evolution process are:

- 2022: EV charging integration (COYERO OCPP server, compatibility with WALLBOX and go-e chargers)
- 2023: Implementation of the dashboard landing page(s)
- 2024: Reservation function

Strategy

Business Model CANVAS:

1. **Value proposition:** "All in one" solution for various use cases, digital marketplace for regional service providers, holistic information with high usability and comfortable redeeming of benefits
2. **Key activities:** App development, Customer support, Up- and Cross-selling, Maintenance, Market research, Advertising, Customer Relationship Management, Lead generation, Quotation writing
3. **Key partnerships:** Economical networks, Clusters, Partner businesses (IT, design agencies, interfaces), Landlords, Governmental institutions, Suppliers
4. **Key resources**: Knowledge and competences, staff, hardware, partners, infrastructure, licenses, market insights, monetary resources.
5. **Customer relationships:** Defined customer journey with four phases throughout all customer groups: Development --> Presale --> Setup --> Operation (The philosophy is to develop a partnership rather than a business relationship – ongoing contact between the parties is desired, realisation e.g. via regular follow-ups during Operation phase (personal visit once a year, online alignment twice per year)
6. **Distribution channels:** Company website, Social Media (LinkedIn, Instagram), Local media houses, customer media (Social Media, Website, newspapers), tradeshows, webinars, WoM
7. **Customer segmentation:** Tourist regions, municipalities, hotels, clubs, clusters, residential developers, governmental organisations
8. **Revenue streams:** Funding, License fees, Setup fees
9. **Cost structure:** Staff, rent, Operating costs, business travel, Interface fees, Hardware equipment, Marketing material, training

Sales model and pricing strategy

Generally speaking, sales are generated via direct acquisition – this takes place in the form of personal contacting (lead generation and processing), trade shows as well as out of economical and touristic networks (e.g. KWF, CTA).

CISC offers two different payment models for the COYERO platform, they both consist of two individual cost centers. The first part (which is the same for both payment models) covers the setup costs, i.e. the app development, branding and procurement. For this service, CISC charges a specific amount in the form of a one-time payment.

For the second part, the following two options are available:

- Fixed yearly costs: CISC charges a yearly license fee, where a discount can be granted if customers sign for a two or three year license in advance
- Variable yearly costs (Pay-per-use): In this case, CISC charges a specific amount for each active user on the platform (usually on a quartly basis)

3.4. UC4

3.4.1. PHILIPS MEDICAL SYSTEMS NEDERLAND BV (PMS)

Market and Competition Analysis

Market size in units sold and revenue

Philips is a leading health technology company focused on improving people's health and well-being through meaningful innovation. Philips' patient and people-centric innovation leverages advanced technology and deep clinical and consumer insights to deliver personal health solutions for consumers and professional health solutions for healthcare providers and their patients in the hospital and the home. Headquartered in the Netherlands, the company is a leader in diagnostic imaging, ultrasound, image-guided therapy, monitoring and enterprise informatics, as well as in personal health. Philips generated 2022 sales of EUR 17.8 billion and employs approximately 70,700 employees with sales and services in more than 100 countries.

At Philips, our purpose is to improve people's health and well-being through meaningful innovation. Philips has a heritage of ground-breaking innovation that stretches back almost 130 years. In 2022, Philips invested 10,5% of its sales in Research and Development. Royal Philips' IP portfolio currently consists of 56,000 patent rights, 33,000 trademarks, 114,000 design rights and 3,200 domain names. Philips filed 920 new patents in 2022, with a strong focus on the growth areas in health technology services and solutions.

Customer definition and profile

Philips IGT (Image-Guided Therapy) generally targets healthcare professionals and hospitals. This includes interventional radiologists, cardiologists, surgeons, and other specialists who perform minimally invasive procedures using medical imaging technology. These professionals use Philips IGT solutions for high-quality imaging, precision guidance, and real-time monitoring during procedures to improve patient outcomes. Additionally, the company caters to healthcare institutions that invest in advanced technologies for clinical excellence, safety, and economic value.

Market share and competition

Philips IGT has a significant market share in the image-guided therapy systems market. According to a report by Research & Markets, the image-guided therapy systems market was valued at USD 2.82 billion in 2019 and is expected to reach USD 4.27 billion by 2027, growing at a CAGR of 5.2% from 2020 to 2027. Philips IGT's main competitors are Siemens Healthineers, GE Healthcare, Toshiba, Shimadzu, Canon and Medtronic.

Product or Service Definition

Brief product/service description

Philips IGT offers a wide range of products and services that support image-guided therapy procedures in hospitals and clinics. These products and services include:

1. Imaging Systems: Philips IGT provides advanced imaging systems such as X-ray, angiography, CT, and MRI machines that enable healthcare professionals to obtain high-quality images of the human body during procedures.

2. Navigation Systems: The company's navigation systems use real-time imaging to help guide surgical instruments and devices to specific targets within the body.

3. Therapeutic Devices: Philips IGT provides therapeutic devices that can be used during minimally invasive procedures to perform tasks such as cutting, coagulating, and ablating tissue.

4. Software and Services: The company offers a suite of software tools to help healthcare professionals plan and execute procedures, interpret images, and monitor patients. Philips IGT also provides training, consulting, and maintenance services to customers.

Philips IGT's products and services are designed to help healthcare professionals perform minimally invasive procedures safely and effectively, while improving patient outcomes and reducing costs.

Product/service's differentiation features or functionalities

Philips IGT has several unique selling points, including:

1. Innovation: Philips IGT is a leader in innovation in the image-guided therapy market and has been at the forefront of developing new technologies that improve patient outcomes, safety, and efficiency.

2. Integration: The company's products are designed to work seamlessly with other medical and surgical equipment, allowing healthcare professionals to perform procedures more efficiently and with greater precision.

3. Real-time imaging: Philips IGT's systems offer real-time imaging capabilities, enabling healthcare professionals to guide surgical instruments and devices to specific targets within the body with greater accuracy and ease.

4. Clinical performance: Philips IGT's products have been shown to provide excellent clinical performance and outcomes, which can lead to better patient satisfaction and reduced costs.

5. Training and support: Philips IGT offers comprehensive training and support to healthcare professionals, ensuring they have the knowledge and skills needed to use its products effectively and confidently.

Summarized roadmap of the product/service's evolution

The Philips IGT roadmap is targeting personalized, connected and integrated care, delivering healthcare "anytime, anywhere" through a distributed, highly accessible network. Cloud-based digital platform solutions will unlock data from different systems and devices, in- and outside the hospital.

Strategy

Business Model CANVAS:

1. ***Value proposition***

Philips IGT offers innovative and integrated image-guided therapy systems that provide real-time imaging and exceptional clinical performance.

2. ***Key activities***

Philips IGT's key activities include designing, manufacturing, and marketing image-guided therapy systems, as well as providing training, support, and maintenance services to customers.

3. ***Key partnerships***

The company partners with suppliers, distributors, and healthcare organizations to ensure that it can provide high-quality products and services to its customers.

4. ***Key resources***

Philips IGT's key resources include its research and development team, manufacturing facilities, and its strong and experienced workforce.

5. *Customer relationships*

Philips IGT builds strong relationships with its customers through ongoing joint clinical research, support, training, and maintenance services

6. *Distribution channels*

The company uses a variety of channels to reach its customers, including direct sales, marketing campaigns, trade shows, and conferences

7. *Customer segmentation*

The company targets hospitals, clinics, and healthcare professionals who perform minimally invasive procedures.

8. *Revenue streams*

The company generates revenue by selling its image-guided therapy systems and providing ongoing support and maintenance services to customers.

9. *Cost structure*

Philips IGT's costs include research and development, manufacturing, marketing and sales, and ongoing support and maintenance services for its customers.

Sales model and pricing strategy

In the existing IGT solution offerings the sales model is mainly based on Capital Expenditures (CAPEX), e.g. linked to purchasing a new imaging system. Associated maintenance contracts typically are operational expenditures (OPEX).

For novel cloud-based solutions, OPEX will be considered. The pay-per-use or subscription-based payment model would fit best with cloud-based clinical solutions. The pay-per-use model typically involves paying for the resources used by healthcare providers, such as storage and computing power, on a per-usage or per-month basis. This model would be well-suited for healthcare providers who have unpredictable usage patterns or who may not need a large amount of storage or computing resources on a consistent basis.

On the other hand, a subscription-based model would involve paying a fixed fee on a monthly or yearly basis for access to the cloud-based clinical solutions. This model would be well-suited for healthcare providers who have consistent usage patterns and who require a more predictable pricing structure.

Both payment models would enable healthcare providers to control their costs, as they would only pay for the resources they use or access to the clinical solutions they need. Additionally, these payment models would allow for scalability, as providers could increase or decrease their usage or subscriptions based on their changing needs. Initial discussions with target customers indicate a preference to subscription based models, since it is more predictable, and does not add a financial barrier to use functionality during a clinical procedure.

3.4.2. FEOPS NV (FEOPS)

Market and Competition Analysis

Market size in units sold and revenue

FEops is active in the market of Structural Heart Disease. This market includes interventions such as Transcatheter Aortic Valve Implantation (TAVI) and Left Atrial Appendage Occlusion (LAAO). FEops offers pre-operative planning solutions for these interventions.

This is a significant growth market, as the number of TAVI procedures will increase from 420.000 in 2023 to 580.000 in 2027, and the number of LAAO procedures will increase from 144.000 in 2023 to 353.000 by 2027. For TAVR, this translates in an implant market size of 6.4B USD in 2023, which grows to 8.7B by 2027. For LAAO, the implant market in 2023 is 1.4B USD, growing to 2.9B USD by 2027.

FEops is not selling implants, but provides solutions for planning these complex cardiac interventions. The total addressable pre-op planning market in the structural heart domain is estimated at 400M USD. In 2023, FEops supported 2000 interventions.

Customer definition and profile

FEops offers its pre-operative planning solutions to physicians involved in TAVI and LAAO. This includes interventional cardiologists and electrophysiologists. Besides convincing the physicians performing TAVI and LAAO, there is also a need to convince the hospital administration of the economical benefit of adopting the FEops HEARTguide solution.

Market share and competition

There are several companies providing software for the pre-operative planning of structural heart interventions (e.g. 3mensio from Pie Medical, Mimics Enlight from Materialise, Circle Cardiovascular Imaging).

The market leader in this domain is the 3mensio software from Pie Medical. This is a traditional software that has to be installed on a specific workstation. The market share of FEops is at this moment still limited, but thanks to the recent clinical evidence and platform improvements, a significant growth is expected in the coming years.

Product or Service Definition

Brief product/service description

FEops HEARTguide is a unique cloud-based pre-operative planning solution that uses predictive modelling to simulate how a specific implant will interact with a patient's anatomy using medical CT images. In addition, an AI-based anatomical analysis is provided. Based on the provided insights, physicians can pre-operatively assess the impact of device sizing and positioning for each patient individually, allowing them to make a better-informed decision before entering the operating room. This results in increased procedural efficiency and improved clinical outcomes as demonstrated by the randomized PREDICT-LAA trial.

Product/service's differentiation features or functionalities

FEops' offering differs from the competitive solutions in several ways:

- Our unique differentiating factor is the predictive modelling of device-patient interaction.
- Our solution is cloud-based (access anywhere, anytime), while the competitive products are traditional software packages installed on a specific workstation.

- FEops provides an AI-based anatomical analysis, while other solutions require manual measurements which can be time-consuming.

Summarized roadmap of the product/service's evolution

FEops HEARTguide is a platform which currently supports the pre-operative planning of two interventions, TAVI and LAAO. In future, we would like to extend this with additional interventions, such as transcatheter mitral and tricuspid valve replacement. Also, the pre-operative planning services will be further automated by embedding more and more AI models, and eventually, the goal is that physicians can independently use FEops HEARTguide, without the involvement of trained FEops case analysts (who currently check and correct the AI output if and where needed).

Strategy

Business Model CANVAS:

1. ***Value proposition***

FEops HEARTguide allows physicians to obtain unique pre-operative insights that allow them to increase procedural efficiency and outcome.

2. ***Key activities***

FEops' key activities are the design and development of medical device software, as well as the provision of pre-operative planning services using this medical device software. In addition, customer support is a crucial activity to help our customer maximizing the value of using FEops HEARTguide.

3. ***Key partnerships***

FEops has several important partnerships:

- Clinical organizations / hospitals: FEops is collaborating with several renowned hospitals, to define the product roadmap and to generate clinical evidence and visibility.
- Implant manufacturers: FEops works closely together with the leading implant manufacturers. On the one hand, input regarding their implants is critical for keeping our predictive models in sync with the implants available on the market. On the other hand, the implant manufacturers also act as a distribution channel (see below).

4. ***Key resources***

The number 1 resource within FEops is the human capital (R&D team, quality and regulatory team, operations team, therapy and business development team, etc.)

5. ***Customer relationships***

The therapy development team within FEops is responsible for establishing relationships with its customers through training and support. Also, we support several key opinion leaders with clinical projects, resulting in visibility for our FEops HEARTguide solution.

6. ***Distribution channels***

FEops recently entered a distribution agreement with Terarecon, a well-known player in the medical imaging domain with an install base of more than 1500 hospitals. In addition, implant manufacturers bundle FEops HEARTguide with their implants as a differentiating factor.

7. Customer segmentation

The most important segmentation for FEops is the geographical segmentation. Regulatory clearance is required for our software, and so far, clearance has been obtained in EU, Canada, UK, Australia and US. As well as this, there are two types of cardiologists that we are targeting: interventional cardiologists and electrophysiologists.

8. Revenue streams

There are two important revenue streams for FEops:

- FEops HEARTguide: Hospital and implant manufacturers pay for the pre-operative planning services provided through our FEops HEARTguide platform.
- Engineering consulting: We also help implant manufacturers during the design and development of novel implants using advanced computer modelling.

9. Cost structure

Providing FEops HEARTguide services involves computational modelling and manual steps. Although we have already incorporated a significant amount of automation (e.g AI-based anatomical analysis), there are still some manual steps that are performed by trained and qualified case analysts (e.g. checking and correcting the AI output where needed). This human effort is the most important cost in the process.

Sales model and pricing strategy

We typically sell FEops HEARTguide through an annual subscription model, which is linked to a certain volume of cases (e.g. 100 LAAO cases). If hospital exceed their yearly volume, an additional cost is charged per case. As part of the sales process, we typically offer a few cases for free (i.e. free trial).

3.5. UC5

3.5.1. NUNSYS S.A. (NUN)

Market and Competition Analysis

Market size in units sold and revenue

The technological sector in Spain demonstrated formidable resilience throughout 2022, as evidenced by insights gleaned from the AMETIC Digital Economy Barometer. Despite a challenging macroeconomic backdrop, the sector exhibited robustness, achieving a noteworthy 5.1% growth in total turnover, reaching 122.066 billion euros compared to the previous year. A striking 18.8% year-on-year growth from July 2022 to July 2023 further emphasizes the sector's sustained momentum.

The sector's strength lies in its diversification across four pivotal domains: Information Technologies (IT), Communications, Digital Contents, and Telecom-Electronics.

In the realm of Information Technologies, comprising nearly half (48.9%) of the total turnover, 2022 witnessed a remarkable revenue of 59.633 billion euros, showcasing an impressive year-on-year growth of +8.3%. This domain encompasses a spectrum of IT services, playing a pivotal role in propelling the sector's overall growth.

Communications, constituting nearly a quarter (24.4%) of the total turnover, achieved a record revenue of 16.915 million euros in 2022. This sector, focusing on connectivity and communication technologies, remains integral to the sector's economic landscape.

Digital Contents, representing 13.9% of the total turnover, attained a record revenue of 16.915 million euros in 2022. Covering digital media, entertainment, and content creation, this sector significantly contributes to the market's diversity.

The Telecom-Electronics domain, constituting 12.9% of the total turnover, experienced notable growth. Encompassing telecommunications and electronic technologies, this category contributes to the sector's diversity and economic impact.

Beyond these individual sectors, the overall Digital Technology Sector comprised 38,209 companies in 2022, achieving a 4.6% increase of 1,668 companies compared to the previous year. This surge underscores the sector's vitality and adaptability to evolving market dynamics. Notably, NUNSYS Group has solidified its position among the top 50 ICT companies with the highest revenue in Spain for 2023, underscoring its continued success in this dynamic and evolving market landscape.

Customer definition and profile

NUNSYS caters primarily to medium to large-scale enterprises seeking comprehensive and tailored IT solutions. Their typical customer profile includes businesses across diverse sectors such as finance, healthcare, education, and manufacturing, indicating their versatility in addressing varied industry needs. These clients often prioritize efficiency, scalability, and security in their IT infrastructure, aligning closely with NUNSYS' core offerings.

In terms of demographics, NUNSYS' clients are often established organizations with a solid foundation in their respective markets. They may have complex IT requirements stemming from the need to manage large volumes of data, comply with industry regulations, or adapt to rapidly evolving technological landscapes. These clients value not only technical expertise but also a collaborative partnership approach, where NUNSYS acts as a trusted advisor guiding them through digital transformation initiatives.

Moreover, NUNSYS' customer base typically comprises forward-thinking businesses that recognize the strategic importance of technology in achieving their long-term objectives. These clients are often looking to innovate and stay ahead of the curve in their industries, leveraging NUNSYS' expertise to implement cutting-edge solutions such as cloud computing, data analytics, and cybersecurity

Market share and competition

The Information Technology (IT) services market is undergoing significant growth, projected at a compound annual growth rate (CAGR) of 8.38% between 2022 and 2027. Valued at USD 1,045.15 billion in 2022, it is anticipated to reach USD 1,665.76 billion in the next five years.

North America stands out as the largest market, with the United States playing a crucial role, driven by the increasing adoption of intelligent technologies and higher investments in security. Digital transformation has been accelerated, particularly with the rapid popularity of remote work post-pandemic.

Asia Pacific emerges as the fastest-growing market, showcasing a significantly high CAGR. This ascent is supported by increased IT spending, widespread adoption of software as a service, and a focus on cloud-based solutions. The region experiences a growing demand for cloud-based solutions, especially in the IT and telecommunications industry.

Technological trends such as 5G, Blockchain, AR, and AI are making a considerable impact on IT services, not only driving digital transformation but also influencing security and operational efficiency. The rapid adoption

of 5G technology is poised to establish agile networks, enabling the automation and autonomy of complex systems.

Data-driven analysis, backed by technology, is assuming a central role in global strategic decision-making. The global data volume is expected to reach 163 zettabytes by 2025, underscoring the need for intelligent IT services to analyze and extract valuable information from these massive data reserves.

The cloud services market is growing substantially due to massive implementations across end-user industries. However, this growth faces challenges such as privacy concerns, identity theft risks, and an increase in data breaches, as evidenced by notable incidents like the T-Mobile breach in 2022.

The pandemic has exposed the vulnerability of supply chains, emphasizing the importance of IT service providers in ensuring the speed, security, and overall effectiveness of services, especially in remote work environments. Substantial post-pandemic investment in the IT services market indicates an active pursuit of meeting future needs and capabilities amid growing digital transformation.

The potential of these technological innovations has also led to an increased risk of cyberattacks, prompting businesses to reinforce the cybersecurity of their systems and processes. According to Gartner, 80% of CIOs plan to increase spending on cybersecurity in 2024. This landscape directly impacts consumers, with a projected global expenditure of USD 215 billion on end-user security and risk prevention next year, according to Gartner. This commitment will require continuous attention and review to avoid exposure to evolving threats.

In this scenario, market leaders such as IBM Corporation, Hewlett Packard Enterprise Company, Fujitsu Ltd., Toshiba Corporation, and Microsoft Corporation play a crucial role, leading the IT services industry with a consolidated presence.

In the context of the TIC Sector Market Share in Spain, it is crucial to highlight the outstanding performance of Grupo Nunsys, positioning itself among the top 50 revenue-generating companies in the country. Analyzing the figures from the Ranking, it is evident that the first 10 companies experience a growth rate of 5.7%, while those positioned between ranks 11 and 50 show a significant increase of 7.2% in their revenue for the year 2022. In this distinguished group, featuring prominent telecom operators such as Telefónica, Orange, Vodafone, MÁSMÓVIL, and Indra in the TOP 5, Grupo Nunsys stands out as a key player in the business landscape. Its position among the leading companies attests to its solid performance and contribution to the economic dynamism of the sector, establishing itself as a benchmark in the information and communication technology field in Spain.

Product or Service Definition

Brief product/service description

NUNSYS provides a comprehensive suite of IT products and services tailored to meet the diverse needs of businesses across various industries. Their offerings span IT consulting, software development, cybersecurity, cloud computing, and digital transformation solutions. Through strategic consulting services, NUNSYS assists clients in identifying and implementing technology strategies aligned with their business objectives, optimizing efficiency and maximizing ROI.

In software development, NUNSYS delivers custom solutions ranging from enterprise resource planning (ERP) systems to customer relationship management (CRM) platforms, tailored to streamline operations and enhance customer engagement. Their cybersecurity services encompass risk assessment, threat detection,

and incident response, safeguarding clients' digital assets and ensuring regulatory compliance in an increasingly complex threat landscape.

Additionally, even though NUNSYS has been a company historically focused on service provision, as of late they have started investing in product development in the fields of Artificial Intelligence, organizational efficiency and component circularity.

Product/service's differentiation features or functionalities

NUNSYS sets itself apart in the competitive IT service landscape through several distinctive features. Firstly, the company excels in offering tailored solutions, prioritizing a deep understanding of each client's unique needs and challenges. This ensures that clients receive customized IT strategies and implementations, optimizing efficiency and effectiveness. Secondly, NUNSYS boasts a comprehensive service spectrum covering consulting, software development, cybersecurity, cloud computing, and digital transformation. By providing end-to-end solutions, they simplify clients' IT management, ensuring seamless integration and consistency across their technology infrastructure. Additionally, NUNSYS focuses on innovation, integrating emerging technologies such as AI and IoT into their solutions to empower clients with the latest advancements and drive growth. Finally, the company emphasizes exceptional customer support and collaboration, fostering long-term relationships built on trust, transparency, and proactive assistance.

Summarized roadmap of the product/service's evolution

NUNSYS' plan is to focus on AI development as a catalyst of their expansion towards the product-centred market. The company is investing heavily in innovation and R&D, participating in investigation projects to enhance their knowledge and expertise in the subject.

With regards to their services, NUNSYS plans to remain at the forefront of any technological advancement to integrate them into their solutions so that customers can safely rely on the company's consultancy services.

Strategy

Business Model CANVAS:

1. ***Value proposition***

Comprehensive digital solution spectrum including industry-specific automation and data measurement, robust cybersecurity and dedicated IT governance, artificial intelligence algorithms, extended and virtual reality applications, and business operations enhancing systems, among others.

2. ***Key activities***

NUNSYS boast of a solid expertise in the implementation of integrated technology solutions, as well as in the development of digital transformation projects, cybersecurity, industry 4.0, communications, systems, software, audiovisuals and training, aimed at both private companies and public entities that are strongly committed to innovation.

As for key internal activities, NUNSYS invests heavily in R&D and participates in public funding projects in order to develop innovative products.

3. ***Key partnerships***

NUNSYS heavily relies on the relationships it establishes with both its suppliers and its key customers, both from the private sector and the public administration. The company is a strategic partner of the world's leading technology sector leaders, including but not limited to: Avaya, A3 Software, Bitdefender, Cisco, Citrix,

DellEmc, Epson, F5, Fortinet, HP Enterprise, Huawei, IBM, Microsoft, Mcafee, Paessler, Plantronics, Polycom, Samsung, Siemens, SonicWall, Sony, Sophos, Veeam, VmWare, Xerox, Nozomi, Kaspersky, etc.

4. ***Key resources***

Advanced technology platforms and machinery, high-capacity Tier 3 Data Centre, skilled professionals, and a wide range of digital services. Besides, NUNSYS also has certifications in the ISO/IEC 9001 (Quality Management System), ISO/IEC 14001 (Environmental Management System), ISO/IEC 20000-1 (IT Service Management System), and ISO/IEC 27001 (Information Security Management System) standards.

5. ***Customer relationships***

Building long-term partnerships with businesses seeking digital upgrades through continuous support and training. NUNSYS also offers existing customers their own expertise and consultancy regarding public funding and even involving them in consortium projects.

6. ***Distribution channels***

Online platforms, direct sales, partnerships, and industry events.

7. ***Customer segmentation***

Diverse industries including finance, marketing, sales, public administration and more specialized sectors.

8. ***Revenue streams***

Sales from software and hardware solutions, consultancy fees, managed services, ongoing client support and own products.

9. ***Cost structure***

Investment in development and maintenance of technology solutions, employee training, marketing, and operational costs.

Sales model and pricing strategy

NUNSYS adopts a flexible and customized pricing strategy tailored to the specific needs and requirements of each client. Rather than offering fixed pricing packages, the company engages in thorough consultations with clients to understand their IT challenges, goals, and budget constraints. This personalized approach allows NUNSYS to provide pricing structures that align closely with the value delivered and the scope of services required by each individual client.

Detailed breakdowns of pricing components and clear explanations of the value proposition are provided to foster trust and transparency in the client-provider relationship. Additionally, NUNSYS offers flexibility in pricing models, allowing clients to choose from options such as fixed-price contracts, hourly rates, or retainer agreements based on their preferences and budgetary considerations as well as a combination of multiple options.

The company aims to deliver tangible business outcomes and ROI to clients through its IT solutions and services. As such, pricing discussions often revolve around the value generated for the client's business, ensuring that the investment in NUNSYS' services translates into tangible benefits such as increased efficiency, productivity, and competitiveness.

3.5.2. DEPURACION DE AGUAS DE MEDITERRANEO S.L. (DAM)

Market and Competition Analysis

Market size in units sold and revenue

The target market is the Wastewater Treatment Plant (WWTP) market in Spain. As of the end of 2020, there were over 4,700 operational WWTPs in the country. The aggregate turnover of companies providing wastewater treatment services was approximately 1,330 million euros by the end of 2021, indicating a 2.3% increase from the previous year. The industry is adopting big data technology for enhanced data storage, centralized management, and improved control of water quality, as well as efficient utilization of waste generated by WWTPs. Following a 3.5% increase in 2022, the aggregated revenues of companies dedicated to water cycle in Spain are projected to experience an additional growth of around 3% by the close of 2023. This growth occurs amidst moderated consumption and an upward trend in tariffs. In 2022, the business reached 3,800 million euros, revealing a notable degree of market concentration.

Customer definition and profile

DAM caters to a diverse customer base, comprising both public entities and private businesses in the water and environmental engineering sector. In the public sector, our primary clients are municipal and regional administrations seeking comprehensive water cycle management solutions. On the private side, DAM collaborates with industrial and commercial businesses, particularly in areas related to waste valorization, construction projects, and other specialized services.

Market share and competition

The WWTP market in Spain exhibits a unique business structure with major construction groups holding a significant position through their water and environmental services divisions. Large private conglomerates managing the integral water cycle also play a key role, often operating numerous concessions, sometimes in collaboration with temporary joint ventures. Additionally, publicly owned entities and mixed companies with both public and private capital contribute to the diverse landscape.

In 2022, the top five operators jointly concentrated 63% of the total revenues, emphasizing the strong position of specific players in the water supply market. Market concentration is expected to remain a distinctive feature of the industry in 2023.

The sector displays a notable degree of concentration, with the top five operators representing 47% of the sector's turnover in 2020. This concentration increases when considering the top ten operators, accounting for 59% of the turnover. In 2020, the aggregate turnover of companies dedicated to the operation of water treatment plants grew by 2.4%, reaching 1,300 million euros. Public works tenders for water treatment and desalination facilities amounted to 806 million euros in 2020, a notable increase of 26.7% from the previous year.

The increase in consumption, influenced by a favourable economic environment and dynamic tourism, contributed to business growth in 2022. The estimated volume of water consumed was approximately 3,260 cubic hectometers, a 1.9% increase from 2021. However, a short to medium-term moderation in

consumption is anticipated due to economic slowdown and drought-related restrictions. Despite this, rising tariffs are expected to drive sector revenues in 2023, with an additional increase of around 3%.

The market tends to concentrate among a limited number of large, privately-operated entities with geographic diversification. Major conglomerates engaged in comprehensive water management and entities integrated within leading construction groups stand out among the key market players. In 2022, 3,197 companies were identified in water capture, distribution, and purification, reflecting a slight increase compared to the previous year.

DAM holds a significant position in the Spanish WWTP market, managing around 7% of the WWTPs managed by private companies in the country and treating around 20% of the volume of the national wastewater. The company's market share and involvement in wastewater treatment highlight its substantial role in the industry.

The WWTP market is expected to witness continued growth, driven by technological advancements and a focus on efficient water management. The integration of big data technology is likely to play a pivotal role in shaping the industry's future landscape. Public and private partnerships, as well as collaborations between construction groups and conglomerates, will continue to influence market dynamics. The market remains characterized by a concentrated competitive landscape, technological advancements, and the prominent role of key players like DAM. Continued growth is anticipated, presenting opportunities for companies to leverage emerging technologies and collaborative partnerships for sustainable wastewater management.

The moderation in consumption, stemming from economic factors and drought-related restrictions, is counteracted by the upward trend in tariffs, suggesting a scenario of continued growth in 2023. Market concentration is expected to persist, led by major, diversified operators. This updated analysis reflects the dynamics of the water supply market in Spain, emphasizing market concentration, the evolution of consumption, and the influence of tariffs on the sector's direction in 2023.

Product or Service Definition

Brief product/service description

Depuración de Aguas del Mediterráneo, S.L. (DAM) is a leading environmental engineering services company that excels in comprehensive water cycle management, operational proficiency, global presence, technological leadership, construction expertise, waste valorization, and innovation. Looking ahead, DAM envisions advancing treatment technologies, diversifying service offerings, enhancing environmental impact initiatives, forming collaborative partnerships, and maintaining a client-centric approach to ensure sustainable and efficient water management practices.

Product/service's differentiation features or functionalities

Services Offered:

- Comprehensive Water Cycle Management: DAM specializes in the entire water cycle, encompassing water capture, treatment, sanitation network management, and purification.
- Operational proficiency: With over 25 years of experience, DAM efficiently operates and maintains over 250 facilities, including urban wastewater treatment plants, showcasing a strong operational footprint.

- Construction and engineering expertise: DAM's construction department specializes in planning and executing sanitation and purification installations, demonstrating technological expertise in hydraulic works.
- Waste valorization: DAM's Waste Valorization and Management Department centralizes waste services and ensures responsible handling of wastewater sludge, integrating composting plants, biogas and waste treatment facilities.
- Innovation: DAM invests in research, development, and innovation studies, focusing on organic matter and nutrient removal, energy optimization, advanced disinfection systems, digitisation and resource recovery from industrial discharges.

Summarized roadmap of the product/service's evolution

As a leading environmental engineering services provider DAM, envisions a dynamic evolution in its services to meet the challenges of the future. Building on its current strengths in water cycle management, operational proficiency, technological leadership, construction expertise, waste valorization, and innovation, DAM is committed to advancing its offerings. The future trajectory includes digitalizing the water cycle facilities, embracing a green transition, enhancing energy efficiency, and addressing Sustainable Development Goal 6: Clean Water and Sanitation.

Digitalization of Water Cycle:

- Integrate cutting-edge technologies for real-time monitoring and control of the entire water cycle, enhancing efficiency in water capture, treatment, and sanitation network management.
- Develop digital platforms for streamlined data collection and analysis, optimizing decision-making processes and operational performance.
- Explore innovative IoT solutions to further improve the precision and effectiveness of water treatment processes.

Green Transition:

- Expand sustainable practices and technologies to minimize the environmental impact of operations, aligning with eco-friendly principles.
- Develop eco-efficient facilities with a focus on renewable energy sources, contributing to a greener and more sustainable water treatment approach.
- Investigate nature-based solutions for water treatment to enhance biodiversity and ecological balance.

Energy Efficiency:

- Implement energy-efficient technologies within water treatment processes and facility operations.
- Investigate renewable energy sources like solar and wind to power water treatment facilities, fostering energy sustainability.
- Deploy smart grid technologies for optimized energy consumption, reducing overall environmental footprint.

Sustainable Development Goals (SDGs), Particularly Goal 6: Clean Water and Sanitation:

- Commit to addressing SDG 6 by leveraging innovation to improve water quality, ensure accessibility, and promote sustainable water management.
- Utilize advanced technologies to expand access to clean water and sanitation facilities, particularly in underserved communities.
- Collaborate with stakeholders, governments, and NGOs to actively contribute to global initiatives aimed at achieving the targets outlined in SDG 6.

Strategy

Business Model CANVAS:

1. ***Value Proposition:***

DAM stands at the forefront of innovation in water and environmental engineering, delivering comprehensive solutions powered by cutting-edge technologies. With a track record of over 25 years in operational excellence, DAM leads the industry in sustainable water management practices. From our global presence and expert construction services to sustainable waste management, DAM is dedicated to continuous innovation. We invest in research and development to create advanced solutions that redefine environmental stewardship, enhance energy efficiency, and drive digital transformation.

In the context of the Transact project, we have developed three innovative solutions aligned with the ongoing digital transformation in the water sector. These tools, developed in collaboration with key technological partners, aim to minimize the impact of illegal industrial discharges on wastewater treatment processes, predict failures in critical equipment at facilities, and establish a decision support system at the organizational management level. This system integrates data from multiple wastewater treatment plants to facilitate informed decision-making.

2. ***Key Activities:***

DAM focuses on essential activities to lead in water and environmental engineering. Our commitment to Research and Development (R&D) drives innovation, ensuring we stay at the forefront of industry solutions. With a proven track record of operational excellence, we efficiently manage and maintain over 250 facilities, particularly urban wastewater treatment plants. Our Construction and Engineering Expertise team specializes in planning and executing sanitation and purification installations, showcasing our technological proficiency. The Waste Valorization and Management Department ensures responsible waste handling, integrating composting plants, biogas, and waste treatment facilities. Ongoing collaboration with key technological partners reflects our dedication to innovation, addressing challenges like illegal discharges and predictive maintenance. These efforts align with our commitment to excellence and sustainability in water management.

3. ***Key Partnerships:***

DAM collaborates strategically with key partners to enhance expertise and address areas beyond our core competencies. Technological partnerships form a cornerstone, specifically in digitalization, data science, artificial intelligence (AI), and cybersecurity. These alliances empower DAM to integrate cutting-edge solutions and stay at the forefront of technological advancements. By leveraging the specialized knowledge of our technology partners, we ensure a comprehensive and state-of-the-art approach to challenges in the digital realm, reinforcing our commitment to innovation and excellence in water and environmental engineering.

4. ***Key resources***

DAM leverages its extensive industry expertise in water management, a track record of securing public tenders, and adeptness in obtaining public funding for innovative projects. These resources serve as the cornerstone of our capabilities, empowering us to lead initiatives like Transact and actively contribute to the digitalization landscape. With a commitment to ongoing learning and collaboration, we manage around 250 wastewater treatment plants, providing valuable insights and fostering a shared success environment.

5. ***Customer relationships***

In our sales model, DAM maintains a flexible and tailored customer relationship, catering to the distinct needs of both public entities and private enterprises. For public administrations, we actively engage in tendering processes, securing long-term service contracts spanning 2 to 10 years, covering activities from construction to facility operation. This strategic approach allows us to establish enduring partnerships with public entities.

Conversely, with private clients, our customer relationship revolves around individualized service contracts designed for service execution. These contracts are adaptable and personalized, aligning with the specific requirements and preferences of our private clients. This customer-centric strategy ensures our services precisely meet the goals and expectations of each private partner, fostering a collaborative and mutually beneficial relationship.

6. ***Distribution Channels:***

DAM adopts a pragmatic approach to reach both public entities and private businesses. In the public sector, we actively participate in tendering processes, emphasizing reliability and practical solutions. Simultaneously, we build collaborations with private companies, especially in waste valorization.

7. ***Customer Segmentation:***

DAM's primary customer segments include municipalities, industrial facilities, and public or private entities requiring water treatment and environmental engineering services. The company serves municipalities by operating and maintaining urban wastewater treatment plants, ensuring compliance with environmental regulations. DAM's services cater to clients both nationally, especially in Spain.

8. ***Revenue streams***

Focusing on the Transact project, DAM's revenue streams primarily come from offering the innovative solutions developed within the project to our clients. For public administrations, especially in the case of public water treatment plants, these tools are presented as part of DAM's comprehensive management package. Instead of merely selling the Transact-developed services individually, DAM positions them as a competitive advantage, significantly enhancing our overall value proposition. Furthermore, there's the potential to secure public funding for the broader implementation of digitization technologies through initiatives like public procurement of innovation or other programs focused on water cycle digitization.

In tracking the success and performance of DAM's business model, key metrics include monitoring the adoption rate of Transact-developed tools, client satisfaction, the number and success of tender applications, and the acquisition of public funding for digitization projects. These metrics help gauge the effectiveness of DAM's strategy in the evolving landscape of water management.

9. ***Cost structure***

Our key expenses related to introducing the Transact project's collaborative solution involve personnel costs, technological investments for digitalization, research and development efforts, and ongoing operational maintenance. Collaborations with our essential technological partners include strategic investments to enhance capabilities in areas like data science, artificial intelligence, and cybersecurity. We also prioritize continuous training programs to keep our team updated on industry trends. These measured investments underscore our commitment to delivering advanced solutions while maintaining financial prudence.

Sales model and pricing strategy

Most of DAM’s clients are public companies that own wastewater treatment plants (WWTP). The operation and maintenance of these plants are tendered in a public tender through technical and economic proposal. Their requirements vary depending on the company who own them. As a gen eral overview, these proposals

consits of technical improvements for management and operation, both of equipment and processes, through specific actions. Preferably, these actions are one-time executions, most of the time with limited budgets and short execution periods, not exceeding 18 months. Additionally, they may include research and development (R&D) actions that involve technologies from different scientific areas and TRL levels.

Considering the characteristics of the wastewater sector, the current most effective cost strategy and sales model is through the implementation of tests within the R&D lines and charging for installation or unique development. Likewise, as the market evolves, Saas solutions may become predominant or exclusive models, leading companies to ultimately adopt this version.

3.6. Commonalities of the Current or Expected Business Models

3.6.1. UC2:

1. **Value Proposition**:
    - Both NAVTOR and Gdansk Tech offer solutions that contribute to safe and efficient maritime operations. NAVTOR provides digital information and software services for safe and efficient navigation, while Gdansk Tech offers a modular Unmanned Surface Vehicle (USV) platform with dependable wireless communication systems, both of which can enhance decision-making in critical maritime situations.
2. **Key Activities**:
    - Both companies engage in direct collaboration with customers and end-users to demonstrate the benefits of their solutions. In the context of critical maritime decision support, this collaboration can involve understanding specific operational challenges and tailoring solutions to address them effectively.
3. **Key Partnerships**:
    - NAVTOR and Gdansk Tech both collaborate with key partners to leverage technology advancements and enhance their solutions. This can include partnerships with technology providers, maritime authorities, standardization agencies, and other relevant stakeholders to ensure that their solutions meet industry standards and regulatory requirements.
4. **Key Resources**:
    - Both companies rely on key resources such as internal R&D capabilities and partnerships with external organizations to drive innovation and develop cutting-edge solutions. These resources can be leveraged to integrate AI-enhanced edge and cloud solutions into their offerings for enhanced decision support in critical maritime scenarios.
5. **Customer Relationships**:
    - NAVTOR and Gdansk Tech prioritize close relationships with customers and end-users, which is essential for understanding their needs and requirements in critical maritime decision-making situations. This close collaboration enables them to tailor their solutions to address specific challenges and deliver maximum value to their customers.
6. **Distribution Channels**:

- Both companies utilize distribution channels to reach their target markets and customers. NAVTOR sells its solutions through own maritime sales departments located in different hubs globally, while Gdansk Tech plans to directly contact end-users initially and later establish sales channels through collaboration with international value chain companies. These distribution channels can be utilized to deploy AI-enhanced edge and cloud solutions to critical maritime operations worldwide.

7. **Customer Segmentation**:
    - Both NAVTOR and Gdansk Tech target a diverse range of customers in the maritime industry, including vessel owners, operators, producers, and companies involved in various maritime activities such as offshore oil, gas, infrastructure, and wind turbines. This broad customer segmentation ensures that their solutions can address the diverse needs of the maritime sector, including critical decision support scenarios.
8. **Revenue Streams**:
    - NAVTOR generates revenue through the recurring sale of its digital information and software services, while Gdansk Tech plans to generate revenue initially through paid services and later through licenses and consulting. These revenue streams can be expanded by offering AI-enhanced edge and cloud solutions for critical maritime decision support as additional services or features.
9. **Cost structure:**
    - Both NAVTOR and Gdansk Tech initially incur costs primarily related to personnel, covering research, development, and service provision. They allocate resources from internal budgets or secure funding for further initiatives. As projects progress, expenses may extend to infrastructure, technology maintenance, and ongoing research efforts to enhance solutions for critical maritime decision support.

By leveraging these commonalities, NAVTOR and Gdansk Tech can collaborate to integrate distributed, AI-enhanced edge and cloud solutions into their offerings for critical maritime decision support. This collaboration can lead to the development of innovative solutions that enhance safety, efficiency, and reliability in maritime operations, ultimately benefiting the entire maritime industry.

3.6.2. UC3:

1. **Value Proposition:**
    - AVL Software and Functions GmbH (AVL), DAC Spolka Akcyjna (DAC), and CISC Semiconductor GmbH (CISC) offer cloud-featured battery management system (BMS) solutions, enabling remote monitoring, real-time data analysis, and efficiency optimization for batteries in various applications, from electric vehicles to tourist and energy infrastructures.
2. **Key Activities:**
    - These companies focus on the continuous development of hardware and software for battery management systems, research and development to improve efficiency and safety, as well as the implementation and maintenance of solutions for clients in different industrial sectors.

3. **Key Partnerships:**
    - They collaborate with electric vehicle manufacturers, electronic component suppliers, industrial clients, tourist businesses, municipalities, and governmental organizations to provide customized solutions tailored to the specific needs of each customer.
4. **Key Resources:**
    - The key resources for these companies include the team of engineers and technology experts, development and assembly laboratories, industry connections, and market experience in creating and maintaining cloud-featured battery management solutions.
5. **Customer Relationships:**
    - They focus on establishing strong, long-term relationships with customers, offering personalized technical support, collaboration on specific projects, and developing solutions that meet the changing needs of the market.
6. **Distribution Channels:**
    - They use direct sales through specialized teams, online presence via websites and social media, as well as participation in trade fairs and industry events to reach a wide audience and promote their products and services.
7. **Customer Segments:**
    - Their customers include electric vehicle manufacturers, industrial companies, tourist operators, municipalities, and governmental organizations interested in improving energy efficiency, reducing operational costs, and promoting sustainability through cloud-featured battery management solutions.
8. **Revenue Streams:**
    - They generate revenue through the sale of hardware and software for battery management systems, license fees and maintenance, as well as consulting and customization services for specific clients.
9. **Cost Structure:**
    - Costs include software and hardware development, operational expenses such as facility rental and marketing, personnel costs, and maintenance of the infrastructure required to operate and maintain the solutions offered.

The companies share a value proposition focused on cloud-based battery management systems, offering remote monitoring, real-time analysis, and efficiency optimization. They share key activities such as hardware and software development, research and development, as well as collaboration with the same key partners, allowing them to reach a broader customer base. This results in increased operational efficiency and competitiveness in the market.

3.6.3. UC4:

1. **Value Proposition:**

- Both Philips and FEops offer solutions aimed at improving healthcare outcomes through innovation. Philips provides image-guided therapy systems and related services, focusing on high-quality imaging and real-time monitoring during procedures. FEops offers pre-operative planning solutions for structural heart interventions, leveraging predictive modelling and AI to optimize procedural outcomes.

2. **Customer Segments:**
    - Philips targets healthcare professionals and hospitals, including interventional radiologists, cardiologists, and surgeons who perform minimally invasive procedures. FEops caters to physicians involved in TAVI and LAAO procedures, specifically interventional cardiologists and electrophysiologists.
3. **Customer Relationships:**
    - Both companies prioritize building strong relationships with their customers. Philips offers comprehensive training and support to healthcare professionals to ensure effective use of its products. FEops focuses on convincing physicians and hospital administrations of the benefits of adopting its pre-operative planning solution.
4. **Channels:**
    - Both companies utilize various channels to reach their target customers. Philips employs direct sales, marketing campaigns, and participation in industry events. FEops leverages partnerships with hospitals, distribution agreements, and engagement with key opinion leaders.
5. **Key Activities:**
    - Philips engages in designing, manufacturing, and marketing image-guided therapy systems, as well as providing training and support services. FEops focuses on developing and improving its pre-operative planning platform, integrating predictive modelling and AI-based analysis.
6. **Key Resources:**
    - Both companies rely on human capital for their operations. Philips has a strong research and development team driving innovation, while FEops invests in developing AI models and improving its platform for pre-operative planning.
7. **Revenue Streams:**
    - Philips generates revenue from the sale of imaging systems, therapeutic devices, software, and services. FEops earns revenue from its pre-operative planning solutions and may also offer consulting services.
8. **Partnerships:**
    - Both companies engage in partnerships to enhance their offerings. Philips collaborates with suppliers, distributors, and healthcare organizations. FEops partners with hospitals, implant manufacturers, and other stakeholders in the structural heart intervention domain.
9. **Cost Structure:**
    - Both companies incur costs related to research and development, manufacturing, marketing, and customer support. Additionally, FEops invests in AI development and maintaining its cloud-based platform.

These commonalities highlight the shared commitment of Philips and FEops to innovation, customer-centricity, and continuous improvement in delivering healthcare solutions. Both companies play essential roles in advancing medical technology and improving patient care within the context of image-guided therapy and diagnostic imaging systems.

3.6.4. UC5:

1. **Customer Segments**:
    - Both NUNSYS and DAM target municipalities, industrial facilities, and public or private entities requiring water treatment and environmental engineering services. In the use case, their joint solution caters to the needs of wastewater treatment plant operators seeking advanced technologies for spill detection and prevention.
2. **Value Proposition**:
    - NUNSYS and DAM offer comprehensive solutions powered by cutting-edge technologies. In the use case, their shared value proposition emphasizes the ability to detect and prevent spills in wastewater treatment plants using AI-driven cloud and edge services, ensuring environmental protection and operational efficiency.
3. **Channels**:
    - Both companies utilize online platforms, direct sales, partnerships, and industry events to reach their target customers. In the use case, they leverage these channels to promote their spill detection and prevention solution to wastewater treatment plant operators and other relevant stakeholders.
4. **Customer Relationships**:
    - NUNSYS and DAM focus on building long-term partnerships with their customers through continuous support, training, and tailored services. In the use case, they collaborate closely with wastewater treatment plant operators to understand their specific needs and provide ongoing support for the implemented solution.
5. **Revenue Streams**:
    - Both companies generate revenue from sales of software and hardware solutions, consultancy fees, managed services, and ongoing client support. In the use case, they monetize their spill detection and prevention solution through service contracts, consultancy fees, and potentially through the sale of proprietary AI algorithms or data analytics tools.
6. **Key Resources**:
    - NUNSYS and DAM rely on advanced technology platforms, skilled professionals, and a wide range of digital services to deliver their solutions. In the use case, their key resources include AI algorithms, cloud and edge computing infrastructure, sensor technologies, and expertise in water treatment and environmental engineering.
7. **Key Activities**:

- Both companies focus on essential activities such as research and development, operational excellence, and collaboration with key technological partners. In the use case, they collaborate to develop and deploy the spill detection and prevention solution, leveraging their combined expertise in technology and environmental engineering.

8. **Key Partnerships**:
    - NUNSYS and DAM establish strategic partnerships with key technological partners to enhance their capabilities and address industry challenges. In the use case, they collaborate with technology partners to integrate cutting-edge AI algorithms and cloud-edge services into their solution for spill detection and prevention.
9. **Cost Structure**:
    - Both companies invest in development and maintenance of technology solutions, employee training, marketing, and operational costs. In the use case, their joint investment includes costs associated with research and development, infrastructure deployment, training, and ongoing support for the implemented solution.

By aligning their activities, resources, partnerships, and revenue streams, NUNSYS and DAM can effectively address the needs of their target customers in the wastewater treatment industry while maximizing the value delivered by their joint solution for spill detection and prevention.

4. Application of Commonalities for the Design of New Business Models

In this chapter, after identifying the commonalities of the expected or current business models employed by partners, a methodology for the design of new business models will be explored. These commonalities will be grouped into five different business models, one per Use Case.

4.1. UC1

Leveraging the capabilities of Vinotion's ViSense technology and the growing demand for advanced traffic management solutions, we can develop an innovative business model that integrates cloud and edge services to deliver value-added services to municipalities, traffic authorities, and autonomous vehicle manufacturers. Let's outline the components of this business model:

Business Model Name: Cloud-Enabled Traffic Management Solutions

Value Proposition:

Offering comprehensive, real-time traffic management solutions powered by Vinotion's ViSense technology, leveraging cloud and edge services to optimize urban mobility, enhance safety, and reduce congestion.

Key Components:

1. **ViSense Edge Devices:** Vinotion's ViSense smart camera systems installed at key intersections and traffic hotspots to capture real-time traffic data.
2. **Edge Computing:** Edge devices equipped with processing capabilities to analyze traffic data locally, enabling rapid decision-making and minimizing latency.
3. **Cloud Infrastructure:** Utilizing cloud computing infrastructure to store and process large volumes of traffic data collected by ViSense devices, enabling advanced analytics and insights generation.
4. **AI Algorithms:** Deploying artificial intelligence algorithms on both edge devices and cloud infrastructure to analyze traffic patterns, predict congestion, and optimize traffic flow in real-time.
5. **Integration with Autonomous Vehicles:** Partnering with autonomous vehicle manufacturers to integrate ViSense data feeds into their navigation systems, enabling autonomous vehicles to make informed decisions based on real-time traffic conditions.
6. **Traffic Management Applications:** Developing cloud-based traffic management applications that provide municipalities and traffic authorities with actionable insights, customizable dashboards, and predictive analytics to optimize traffic flow and enhance safety.

Business Needs Addressed:

1. **Innovative Technology:** Vinotion needs to leverage innovative technology, such as ViSense, to stay competitive in the rapidly evolving traffic management industry. Developing advanced traffic sensing

solutions that utilize computer vision, artificial intelligence, and edge computing capabilities is crucial to meet market demands for smarter and more efficient traffic management systems. Moreover, cloud-enables traffic management requires standardization and adoption of these standards. It is essential that ViNotion follows the standardization developments and complies for early adoption.

2. **Market Demand:** There is a growing demand for advanced traffic management solutions driven by factors such as urbanization, increasing traffic congestion, and the rise of autonomous vehicles. Vinotion needs to capitalize on this market demand by offering cutting-edge solutions that address the evolving needs of municipalities, traffic authorities, and autonomous vehicle manufacturers.
3. **Differentiation:** To stand out in a competitive market landscape dominated by large companies, Vinotion needs to differentiate its offerings. The ViSense technology, with its high accuracy, real-time data collection, and privacy-by-design features, provides Vinotion with a unique selling proposition that sets it apart from competitors.
4. **Scalability:** Vinotion's business model needs to be scalable to accommodate growth opportunities both domestically and internationally. As the market for traffic management solutions expands, Vinotion must be able to scale its operations, product offerings, and customer base effectively to capitalize on emerging opportunities.
5. **Partnerships:** Collaborating with strategic partners, such as cloud service providers, and system integrators, is essential for Vinotion to enhance its market reach, leverage complementary technologies, and deliver comprehensive solutions to customers.
6. **Revenue Diversification:** Vinotion needs to diversify its revenue streams beyond hardware sales to ensure long-term sustainability and profitability. This includes offering subscription-based services, data monetization opportunities, consulting services, and value-added solutions that provide ongoing value to customers.

Key Benefits:

1. **Market Leadership:** By leveraging cloud and edge services to deliver comprehensive traffic management solutions, Vinotion can establish itself as a market leader in the rapidly evolving transportation industry.
2. **Competitive Advantage:** Vinotion's ViSense technology, combined with cloud-based analytics and edge computing capabilities, provides a unique competitive advantage, enabling the company to differentiate its offerings and outperform competitors.
3. **Revenue Diversification:** The business model offers multiple revenue streams, including hardware sales, subscription services, data monetization, and consulting, ensuring long-term revenue stability and profitability for Vinotion.
4. **Scalability:** With a scalable business model, Vinotion can effectively expand its operations domestically and internationally, capitalizing on emerging market opportunities and accommodating future growth.
5. **Partnership Opportunities:** Collaborating with strategic partners, such as providers of traffic control application, traffic control manufactures as OEM customer, and system integrators, enhances Vinotion's market reach, technology capabilities, and customer value proposition.

6. **Innovation and Differentiation:** Vinotion's focus on innovative technologies, such as computer vision, artificial intelligence, and edge computing, enables the company to deliver cutting-edge solutions that address the evolving needs of urban mobility and traffic management.
7. **Customer Value:** The business model emphasizes delivering value-added services, actionable insights, and customizable solutions to municipalities, traffic authorities, and autonomous vehicle manufacturers, enhancing overall customer satisfaction and loyalty.

Key Activities:

- Research & Development for ViSense hardware and software.
- Manufactoring and assembly of ViSense edge devices.
- Integration with cloud-based traffic management applications.
- Consultancy on traffic data generation to implement traffic policies of local authorities
- Data analysis and insights generation.

Key Resources:

- ViSense hardware and software.
- Edge computing capabilities.
- Cloud infrastructure and services.
- AI algorithms for traffic analysis.
- Skilled R&D and technical personnel.

Key Partnerships:

1. **Traffic control application providers:** Policies to reduce emissions, stimulate sustainable transportation modes, improve traffic throughput or to increase safety, requires alignment of the traffic data to be measured and the traffic control application that can exploit the traffic data to implement the policies.
2. **Cloud Service Providers:** Partnering with cloud service providers to leverage their infrastructure and services for storing, processing, and analyzing traffic data collected by ViSense devices.
3. **System Integrators:** Partnering with system integrators to deploy end-to-end traffic management solutions, combining ViSense hardware with cloud-based applications and integration services.

Customer Segmentation:

1. **Municipalities & Traffic Authorities:** Targeting municipalities and traffic authorities as primary customers for ViSense hardware and cloud-based traffic management applications.
2. **System integrators & traffic equipment manufacturers (OEM)**: The ViSense edge device is part of the solution that is typically offered by construction companies or system integrators. Hence, as tier 1 or tier 2 supplier, ViNotion offers the ViSense product to a main contractor.

Sales Channels:

1. **Direct Sales:** Selling ViSense hardware and subscription services directly to municipalities, traffic authorities, and autonomous vehicle manufacturers through a dedicated sales team.
2. **Channel Partners:** Collaborating with channel partners, such as system integrators and resellers, to extend market reach and offer comprehensive traffic management solutions to customers.

Pricing Strategy:

Overall Pricing Strategy:

- Value-Based Pricing: Setting prices based on the value delivered to customers in terms of improved traffic management, safety, and efficiency.
- Competitive Pricing: Ensuring that prices remain competitive compared to alternative solutions in the market.
- Transparent Pricing: Clearly communicating pricing structures and value propositions to customers to build trust and confidence in Vinotion's offerings

Revenue is generated through various streams:

Hardware Sales:

- ViSense Edge Devices: Priced competitively based on hardware specifications and features.
- Pricing may include installation and setup fees, depending on customer requirements.

Subscription Services:

- Tiered Pricing: Offering different subscription tiers based on the level of access and features required.
- Monthly or Annual Billing: Flexible billing options to suit customer preferences.
- Volume Discounts: Providing discounts for customers with larger deployments or longer contract terms.

Data Monetization:

- Pay-per-Use: Charging third-party organizations based on the volume of traffic data accessed or analyzed.
- Licensing Fees: Charging licensing fees for the use of ViSense data in commercial applications or research projects.

Consulting Services:

- Hourly or Project-Based Pricing: Charging customers for consulting services based on the duration or scope of the engagement.
- Value-Based Pricing: Pricing consulting services based on the value delivered to the customer, such as cost savings or efficiency improvements.

4.2. UC2

Business Model Name: Maritime Decision Support Alliance

Value Proposition:

The Maritime Decision Support Alliance offers an integrated platform that empowers maritime operators with advanced decision support capabilities. By combining NAVTOR's expertise in digital navigation services with Gdansk Tech's modular USV platform (HORNET) and AI-enhanced analytics, the alliance provides a comprehensive solution to enhance safety, efficiency, and reliability in maritime operations. The platform enables real-time data collection, analysis, and actionable insights, empowering operators to make informed decisions and optimize their operations.

Key Components:

1. **Cloud Infrastructure**: Robust cloud infrastructure provides the backbone for hosting the centralized platform, ensuring scalability, reliability, and security.
2. **Edge Devices** (including modular USV): Deployed edge devices, including sensors, cameras, and IoT devices, collect real-time data at the source, enabling immediate insights and responses.
3. **AI-enhanced Analytics**: Advanced AI algorithms analyze data streams from edge devices, offering predictive maintenance, anomaly detection, and route optimization capabilities.
4. **Digital Navigation Services**: NAVTOR's digital navigation services provide accurate and up-to-date navigational information, enhancing situational awareness and route planning for vessels.

Business Needs Addressed:

- Increasing demand for advanced decision support solutions in the maritime industry.
- Growing emphasis on safety, efficiency, and sustainability in maritime operations.
- Need for real-time data collection, analysis, and insights to optimize maritime activities.

Key Benefits:

- **Enhanced Safety**: Real-time monitoring and predictive analytics mitigate risks and enhance safety in maritime operations.
- **Improved Efficiency**: Optimized route planning and fuel consumption lead to cost savings and operational efficiency.
- **Increased Reliability**: AI-enhanced decision support capabilities improve reliability and performance in maritime operations.
- **Tailored Solutions**: Comprehensive decision support solutions tailored to the unique needs of maritime operators ensure maximum effectiveness and value.

Channels:

- **Direct Sales**: NAVTOR and Gdansk Tech sales departments directly engage with customers to promote and sell the platform.
- **Partnerships**: Collaborations with maritime authorities, vessel operators, and technology providers expand the platform's reach and capabilities.
- **Online Platforms**: Digital marketing channels and online platforms facilitate awareness and lead generation.

Customer Segments:

- **Vessel Owners and Operators**: Operators of commercial vessels, including cargo ships, tankers, and passenger vessels.
- **Maritime Authorities and Regulatory Bodies**: Organizations responsible for regulating maritime activities and ensuring compliance with industry standards.
- **Port Authorities and Terminal Operators**: Entities managing port operations and terminal facilities.
- **Offshore Oil and Gas Companies**: Companies involved in offshore exploration, production, and transportation of oil and gas.
- **Wind Energy Companies**: Operators of offshore wind farms and related infrastructure.

Customer Relationships:

- **Close Collaboration**: Proactive engagement with customers to understand their needs and provide tailored solutions.
- **Ongoing Support**: Continuous support and training programs ensure effective utilization of the platform and address customer needs.
- **Feedback Collection**: Regular communication and feedback collection processes drive continuous improvement and innovation.

Key Resources:

- **Cloud Infrastructure**: Investment in scalable and secure cloud infrastructure to host the platform.
- **Skilled Professionals**: A team of skilled professionals across software development, data analytics, and customer support domains.
- **Strategic Partnerships**: Collaborations with maritime industry players, technology providers, and research institutions to access expertise and resources.

Key Activities:

- **Platform Development**: Continuous development and enhancement of the platform to incorporate new technologies and features.

- **Customer Engagement**: Proactive engagement with customers to understand their needs and preferences.
- **Partnership Management**: Cultivation and management of strategic partnerships to drive ecosystem growth and collaboration.

Key Partnerships:

- **Collaboration with Maritime Authorities**: Partnerships with maritime authorities and regulatory bodies ensure compliance and standards adherence.
- **Industry Partnerships**: Collaborations with vessel operators and technology providers enhance platform capabilities and market reach.
- **Research Partnerships**: Partnerships with academic institutions drive innovation and technology advancements in the maritime industry.

Cost Structure:

- **Personnel Costs**: Investment in skilled professionals across various domains, including software development, data analytics, and customer support.
- **Technology Investments**: Allocation of funds for cloud infrastructure, edge devices, AI algorithms, and software development tools.
- **Partnership Investments**: Funding for partnership development, collaboration initiatives, and revenue sharing agreements with ecosystem partners.

Key Metrics:

- Monthly Recurring Revenue (MRR): Measurement of revenue generated from subscription-based models.
- Customer Acquisition and Retention Rates: Assessment of customer acquisition efforts and retention strategies.
- Platform Usage Metrics: Tracking of active users, data processed, and other platform usage metrics.
- Customer Satisfaction Scores: Collection of feedback and assessment of customer satisfaction levels.

Pricing Strategy:

- Subscription-Based Model: Tiered pricing based on usage and features, offering flexibility and scalability to customers.
- Pay-per-Use Pricing: Charging customers based on actual usage of specific services, such as AI analytics and digital navigation.
- Customized Pricing: Tailoring pricing for consulting services based on project scope, complexity, and customer requirements.

4.3. UC3

Taking into account the provided business models of AVL, DAC and CISC and the focus on cloud-featured battery management systems (BMS), this business model introduces an innovative approach to battery management systems, emphasizing the integration of cutting-edge technology to optimize battery performance and efficiency. By seamlessly combining BMS software with reliable hardware components and robust cloud platforms, this solution enables monitoring, predictive maintenance, and performance optimization across diverse applications with a focus on sustainability and innovation.

Business Model Name: Integrated Cloud-Edge Battery Management Solution

Value Proposition:

The value proposition of this integrated solution lies in its commitment to delivering cutting-edge battery management systems (BMS) with advanced cloud-edge hybrid architecture. By seamlessly integrating trusted hardware components, the solution ensures safety, reliability, and scalability in BMS implementation, addressing the critical need for dependable hardware in battery management. Additionally, the provision of a versatile cloud platform enables monitoring, predictive maintenance, and performance optimization for batteries across diverse applications, offering a comprehensive solution to meet the evolving needs of industries reliant on battery technology. This value proposition underscores the solution's capacity to enhance operational efficiency, maximize battery performance, and drive innovation in various sectors, from automotive to energy storage.

Key Components:

- BMS Hardware & Software: Advanced battery management software developed to monitor, analyze, and optimize battery performance.
- Telematic Control Unit: Trusted gateway integrated with battery management systems to enable communication between vehicle and cloud.
- Cloud Platform: Robust cloud platform utilized for data storage, analytics, and visualization, enabling remote monitoring and predictive maintenance.
- Integration Framework: Seamless integration framework to connect BMS software with hardware components and cloud platform, facilitating data flow and system interoperability.

Business Needs Addressed:

- Efficiency: The solution addresses the need for efficient battery management, allowing businesses to optimize battery performance and prolong lifespan.
- Safety: By integrating reliable hardware components and implementing monitoring, the solution enhances battery safety, reducing the risk of malfunctions or failures.
- Scalability: Businesses require scalable battery management solutions that can accommodate growth and adapt to evolving needs, which this integrated solution provides.

- Remote Monitoring: The ability to remotely monitor battery performance and conduct predictive maintenance addresses the need for insights and proactive maintenance strategies.

Key Benefits:

1. Enhanced Performance: Monitoring and predictive maintenance capabilities optimize battery performance, ensuring maximum efficiency and reliability.
2. Improved Safety: Integration of predictive maintenance capabilities enhances battery safety, reducing the risk of accidents or system failures.
3. Cost Savings: Proactive maintenance and optimization strategies reduce downtime and extend battery lifespan, leading to cost savings for businesses.
4. Scalability: The solution is scalable to accommodate the needs of businesses of all sizes and can be tailored to various applications and industries.
5. Remote Accessibility: Cloud-based infrastructure enables remote monitoring and management, providing flexibility and convenience for businesses to access battery data from anywhere, at any time.

Key Activities:

- Research and Development: Continuously researching and developing cloud-edge hybrid architecture to optimize battery performance and efficiency.
- Integration: Ensuring seamless integration between BMS software and hardware components to maximize compatibility and functionality.
- Customization: Tailoring the solution to meet the specific needs of different industries and applications, ensuring flexibility and adaptability.
- Testing and Validation: Rigorous testing and validation of the integrated solution in real-world scenarios to ensure reliability and effectiveness.

Key Partnerships:

- Collaboration with Hardware Providers: Partnering closely with hardware providers to access reliable hardware components for BMS implementation.
- Integration with Cloud Providers: Collaborating with cloud service providers to integrate BMS software with cloud platforms, enabling seamless data management and analysis.

Key Resources:

- Engineering Expertise: Leveraging expertise in BMS software development, battery simulation, and system integration.
- Reliable Hardware Components: Accessing trusted hardware components for BMS implementation, ensuring safety and durability.

- Robust Cloud Platform: Utilizing a robust cloud platform for data storage, analytics, and visualization, enabling real-time monitoring and analysis of battery performance.

Customer Relationships:

- Long-Term Partnerships: Building long-term partnerships with automotive manufacturers, energy companies, and industrial clients to provide ongoing support.
- Technical Support: Offering continuous technical support and maintenance services to ensure smooth operation of the integrated solution.
- Customization Options: Providing customization options based on specific client requirements to meet unique needs and challenges.

Distribution Channels:

- Direct Sales: Selling the integrated solution directly to OEMs and industrial clients through direct sales channels.
- Industry Events: Showcasing the solution at industry conferences, trade shows, and exhibitions to reach a wider audience and generate leads.
- Online Platforms: Utilizing online platforms, industry publications, and social media channels for marketing and promotion, raising awareness of the integrated solution.

Customer Segmentation:

- Automotive Manufacturers: Targeting automotive manufacturers seeking advanced BMS solutions for electric vehicles to improve battery performance, efficiency, and safety.
- Energy Companies: Addressing the needs of energy companies requiring BMS solutions for stationary energy storage systems to optimize energy usage and storage capacity.
- Industrial Clients: Serving industrial clients in sectors such as logistics, manufacturing, and infrastructure, providing BMS solutions tailored to their specific applications and requirements.

Revenue Streams:

- Product Sales: Generating revenue through the sale of integrated BMS solutions to OEMs and industrial clients.
- Subscription-Based Revenue: Earning subscription-based revenue through cloud services provided by partners, including data storage, analytics, and visualization.
- Consulting and Customization Fees: Offering consulting and customization services for tailored solutions, generating additional revenue through customization fees and project-based consulting services.

Cost Structure:

- Research and Development Costs: Investing in research and development activities to continuously improve the integrated solution and develop new features and capabilities.
- Production and Assembly Costs: Incurring costs for the production and assembly of BMS hardware components, including procurement, manufacturing, and quality assurance.
- Operational Costs: Covering operational costs for cloud infrastructure, maintenance services, technical support, and marketing and sales activities.

Key metrics:

- Battery Health Index (BHI): A composite metric assessing battery health and performance, crucial for ensuring optimal battery operation and longevity.
- Predictive Maintenance Score: Predicting maintenance needs based on historical data analysis, enabling proactive maintenance to prevent downtime and failures.
- Energy Efficiency Ratio (EER): Measuring the efficiency of energy utilization within battery systems, essential for optimizing energy usage and reducing operational costs.
- Customer Satisfaction Index (CSI): Gauging overall customer satisfaction with the solution, reflecting its effectiveness, reliability, and value proposition.

Pricing strategy

- Subscription-Based Pricing: Customers pay a recurring fee for access to the solution and related services, ensuring steady revenue and predictable budgeting.
- Tiered Pricing: Offering different pricing tiers with varying levels of functionality or support, allowing customers to choose the option that best fits their needs and budget.
- Value-Based Pricing: Setting prices based on the perceived value delivered, considering factors like improved battery performance and operational efficiency gains.
- Value-Added Services Pricing: Bundling the solution with additional services like consulting and support, creating added value while generating additional revenue streams.

4.4. UC4

Based on the information provided about Philips IGT and FEops NV, as well as their respective business needs, we can propose a new and innovative business model enabled by an Edge-cloud-based clinical applications platform for Image Guided Therapy (IGT) and diagnostic imaging systems for the market. This model leverages the strengths and capabilities of both companies to create a comprehensive solution that addresses the needs of healthcare providers and patients. This would be the proposed business model.

Business Model Name: HealthEdge Solutions

Value Proposition:

HealthEdge Solutions offers a unified platform that integrates advanced imaging systems and predictive modelling capabilities. This platform enables healthcare providers to access real-time imaging, predictive analytics, and personalized pre-operative planning tools, leading to improved patient outcomes and procedural efficiency.

By combining advanced technology with predictive modelling expertise, we offer a revolutionary solution that enhances patient outcomes and procedural efficiency in structural heart disease interventions. Our platform provides healthcare professionals with real-time insights and predictive analysis, enabling companies to make informed decisions and optimize treatment strategies for individual patients.

- Predictive modelling for pre-operative planning of structural heart interventions.
- Cloud-based solution allows access anywhere, anytime.
- AI-based anatomical analysis for efficient planning.
- Improved procedural efficiency and clinical outcomes.

Key Components:

- Edge-Cloud-Based Clinical Applications Platform: The platform combines edge computing capabilities for real-time data processing with cloud-based storage and analytics for advanced predictive modelling and decision support.
- Imaging Systems: Integrated with the platform, imaging systems provide high-quality imaging during procedures, enabling precise guidance and monitoring.
- Predictive Modelling: Leveraging predictive modelling algorithms, the platform offers personalized pre-operative planning solutions for structural heart interventions, such as TAVI and LAAO.
- AI-Powered Anatomical Analysis: Incorporating AI-based anatomical analysis, the platform enhances the accuracy and efficiency of pre-operative assessments, enabling physicians to make better-informed decisions.

Business Needs Addressed:

- Expansion of market reach by offering an integrated solution that enhances the value of its imaging systems and strengthens its position in the image-guided therapy market.
- Scalable platform for delivering predictive modelling services to a wider range of healthcare providers, increasing revenue potential and market penetration.
- Monetization Strategy: HealthEdge Solutions offers a subscription-based pricing model, with tiered pricing based on usage volume and feature access. Healthcare providers pay a monthly or yearly fee for access to the platform, with additional charges for premium features and personalized predictive modelling services.
- Sales and Distribution: The platform is marketed and sold through direct sales channels, leveraging the existing networks of the users. Target customers include hospitals, clinics, and healthcare facilities performing structural heart interventions.

- Partnerships: HealthEdge Solutions establishes strategic partnerships with healthcare organizations, implant manufacturers, and research institutions to drive adoption and integration of the platform. Collaborations with key opinion leaders and industry partners ensure ongoing product development and validation.
- Customer Support and Training: Comprehensive customer support and training programs are provided to ensure healthcare providers can maximize the value of the platform. This includes onboarding assistance, ongoing technical support, and access to educational resources and clinical best practices.

Key Benefits:

6. Improved Patient Outcomes: By integrating advanced imaging, predictive analytics, and personalized planning tools, HealthEdge Solutions enhances the quality and precision of structural heart interventions, leading to better patient outcomes and satisfaction.
7. Enhanced Procedural Efficiency: The platform streamlines pre-operative planning processes, reduces procedural risks, and increases efficiency, allowing healthcare providers to optimize resource utilization and throughput.
8. Scalable and Flexible: HealthEdge Solutions offers a scalable and flexible platform that can adapt to evolving healthcare needs and technological advancements, ensuring long-term value and relevance for customers.
9. Competitive Advantage: By offering a unique and comprehensive solution, HealthEdge Solutions differentiates itself in the market and strengthens the competitive position of the user.

Channels*:*

- Direct sales to hospitals and clinics: Direct sales teams are responsible for engaging with healthcare institutions and professionals to promote our platform and facilitate adoption.
- Collaboration with implant manufacturers as distribution partners: Strategic partnerships with healthcare organizations and medical device manufacturers help us reach a broader audience and integrate our solution into existing workflows. Furthermore, collaboration with industry partners and key opinion leaders amplifies our reach and credibility within the healthcare community.

Customer Segments:

We target a diverse range of customers, including hospitals, clinics, and healthcare centers specializing in structural heart disease interventions. Within these institutions, our services cater to healthcare professionals such as interventional cardiologists and electrophysiologists who rely on advanced imaging and predictive modeling for pre-operative planning and decision-making.

- Hospitals and clinics performing minimally invasive procedures.
- Interventional cardiologists and electrophysiologists involved in Transcatheter Aortic Valve Implantation (TAVI) and Left Atrial Appendage Occlusion (LAAO).

Customer Relationships:

- Training and support provided to physicians: Our customer relationships are built on a foundation of support and collaboration. We offer comprehensive onboarding programs and ongoing training initiatives to ensure that healthcare professionals are proficient in utilizing our platform effectively.
- Collaboration with hospitals and implant manufacturers for clinical projects and visibility: our educational resources offer valuable insights and best practices for optimizing patient care

Key Resources:

- Research and development team. A dedicated research and development team, we continuously innovate and enhance our platform to meet the evolving needs of our customers
- Quality and regulatory team.
- Operations team.
- Therapy and business development team.

Key Activities:

- Design and development of medical device software. Integrating advanced imaging systems with predictive modelling capabilities, conducting research and development to enhance platform functionality, and providing training and support to customers.
- Provision of pre-operative planning services.
- Customer support and training. Our customer support and training team play a crucial role in ensuring customer satisfaction and retention, providing ongoing assistance and education.

Key Partnerships:

- Collaboration with clinical organizations and hospitals. Co-develop and validate our platform, leveraging their expertise and insights to inform our product roadmap
- Partnership with implant manufacturers for distribution and feedback. It will facilitate the integration of our platform with existing hardware and provide distribution channels for our solution.
- Strategic alliances with industry partners and key opinion leaders help us promote our platform and establish credibility within the healthcare community.

Cost Structure:

- Human capital for R&D, quality, operations, and business development. This includes salaries, benefits, training, and other personnel-related expenses for employees involved in designing and improving our HealthEdge platform, ensuring compliance with regulatory standards, overseeing day-to-day operations, and driving strategic initiatives to expand our market presence and revenue streams.
- Computational modeling and manual steps for pre-operative planning. This includes expenses related to acquiring, processing, and analyzing medical imaging data, developing and refining predictive models, and performing simulations to assess device-patient interaction and optimize

procedural outcomes. There may be costs associated with employing trained case analysts to review and validate the results generated by the platform, ensuring accuracy, reliability, and clinical relevance.

- Automation for AI-based anatomical analysis. As part of our ongoing efforts to enhance efficiency, accuracy, and scalability, we incur costs associated with developing and implementing automation technologies for AI-based anatomical analysis within our HealthEdge platform.

Key Metrics:

- Number of Subscriptions Sold: This metric measures the total number of subscriptions to our HealthEdge platform sold to hospitals, clinics, and healthcare professionals. It provides insights into the adoption and market penetration of our platform, reflecting the demand for our integrated imaging and predictive modelling solutions.
- Volume of Cases Handled: The volume of cases handled refers to the total number of pre-operative planning cases processed through our HealthEdge platform. This metric quantifies the utilization and engagement levels of our platform by healthcare providers, indicating the extent to which our solutions are being integrated into clinical workflows and decision-making processes.
- Customer Satisfaction and Retention Rates: Customer satisfaction and retention rates are essential indicators of our platform's performance and the overall quality of the customer experience. These metrics measure the level of satisfaction and loyalty among our customers, reflecting their perceptions of our platform's usability, reliability, and effectiveness in improving patient outcomes and procedural efficiency.

Pricing Strategy:

We generate revenue through various streams:

- Subscription-based model linked to a volume of cases for accessing to our HealthEdge platform, which offers flexible pricing options based on usage and features.
- Additional charges for exceeding yearly volume.
- Additionally, fees are charged for premium features and personalized predictive modeling services, providing additional value to customers
- Engineering consulting for implant manufacturers. Leveraging our expertise to support the development of innovative medical devices.

4.5. UC5:

Based on the information provided about NUNSYS and DAM, along with their business needs and capabilities, we can propose a new and innovative business model enabled by cloud and edge services in the field of water and environmental engineering for the market. This model aims to leverage the strengths and expertise of both companies to address the growing demand for sustainable water management solutions. Here's the proposed business model:

Business Model Name: Sustainable Water Management as a Service (SWaaS)

Value Proposition:

SWaaS offers comprehensive water management solutions powered by cutting-edge technologies such as cloud computing, edge computing, artificial intelligence (AI), and Internet of Things (IoT). It provides end-to-end support for optimizing water usage, improving environmental sustainability, and ensuring regulatory compliance. Customized solutions tailored to the specific needs of municipalities, industrial facilities, and public or private entities.

Business Needs Addressed:

1. Market Expansion and Growth: Operating in highly competitive sectors, companies aim to expand market presence and sustain growth amidst evolving dynamics. This necessitates continuous innovation, diversification of product/service offerings, and capturing new market segments while staying ahead of competitors.
2. Technology Adoption and Integration: To provide comprehensive solutions, staying abreast of technological trends is vital. This involves adopting and integrating emerging technologies such as artificial intelligence, cybersecurity, and virtual reality to enhance customer value and competitiveness.
3. Strategic Partnerships: Companies heavily rely on partnerships with sector leaders, suppliers, and key customers to enhance capabilities, expand market reach, and access new opportunities. Building and nurturing strong relationships with partners is crucial for securing resources, expertise, and market insights necessary for sustained growth.
4. Customer Satisfaction and Retention: Ensuring long-term customer partnerships and satisfaction is essential. This requires continuous support, training, and consultancy services to help customers maximize the value of investments in digital solutions and maintain loyalty in competitive market landscapes.
5. Operational Excellence and Efficiency: Optimizing processes, leveraging technology for predictive maintenance, and ensuring reliable and cost-effective operation to meet client needs and regulatory requirements.
6. Market Differentiation and Leadership: Offering cutting-edge solutions and positioning as a leader in the industry, leveraging expertise, technology, and track record to win contracts and maintain a competitive edge.
7. Customer Relationship Management: Building collaborative relationships with customers is crucial, understanding their unique needs, providing tailored solutions and support, and ensuring satisfaction to foster long-term partnerships and repeat business.

Key Benefits:

1. **Market Expansion and Growth Opportunities:** By leveraging cloud and edge services to develop innovative digital solutions, users can expand their market reach and tap into new growth

opportunities. These technologies enable them to offer comprehensive and cutting-edge products and services, positioning them as leaders in their respective sectors and attracting a broader customer base.

2. **Enhanced Competitiveness and Differentiation:** The adoption of cloud and edge services allows users to differentiate themselves from competitors by delivering more efficient, scalable, and technologically advanced solutions. This enhances their competitiveness in the market and strengthens their value proposition, attracting clients who seek innovative and sustainable water management and technological solutions.
3. **Improved Operational Efficiency and Cost Optimization:** Cloud and edge services offer scalable infrastructure and data processing capabilities, enabling users to optimize their operations and reduce costs. By leveraging these technologies, they can streamline workflows, automate processes, and improve resource utilization, leading to greater efficiency and profitability.
4. **Enhanced Customer Experience and Satisfaction:** The use of cloud and edge services enables users to deliver a seamless and personalized customer experience. By leveraging data analytics and AI-driven insights, they can better understand customer needs, anticipate demand, and tailor their offerings to meet specific requirements, thereby enhancing customer satisfaction and loyalty.
5. **Sustainable and Resilient Operations:** Cloud and edge services facilitate the development of sustainable and resilient business operations for users. By adopting environmentally friendly practices, optimizing resource usage, and leveraging technology for predictive maintenance and risk mitigation, they can enhance their sustainability credentials and ensure the long-term viability of their business models.

Key Activities:

- Research and Development (R&D): Continuous investment in R&D to develop innovative water management technologies and solutions tailored to the specific needs of clients.
- Implementation and Integration: Expertise in implementing and integrating water management systems, including sensors, data analytics platforms, and control systems, to optimize resource usage and operational efficiency.
- Monitoring and Maintenance: Ongoing monitoring and maintenance of water infrastructure using IoT-enabled devices and predictive analytics to detect and address potential issues before they escalate.
- Transfer Learning: Continuous learning from on-site edge devices so that the data it was trained on can be applied to a different data set model.
- Consultancy and Training: Provision of consultancy services and training programs to educate clients on best practices for sustainable water management and technology adoption.

Key Partnerships:

- Technology Partners: Collaborate with leading technology providers to integrate cutting-edge solutions such as AI algorithms, edge computing platforms, and IoT sensors into SWaaS offerings.
- Industry Partners: Form partnerships with industry associations, research institutions, and government agencies to access domain expertise, regulatory insights, and funding opportunities.

- Client Partnerships: Establish long-term partnerships with clients to co-create and co-implement customized water management solutions aligned with their sustainability goals and operational requirements.

Key Resources:

- Technological Infrastructure: High-performance cloud computing infrastructure for data storage, processing, and analysis, coupled with edge computing capabilities for real-time monitoring and decision-making.
- Expertise and Talent: A team of water management experts, data scientists, software engineers, and project managers with deep domain knowledge and technical skills.
- Data and Insights: Access to vast amounts of data collected from IoT sensors, environmental monitoring systems, and client operations, enabling data-driven decision-making and optimization.

Customer Relationships:

- Collaborative Approach: Adopt a collaborative approach with clients, engaging them as partners in the co-creation and implementation of sustainable water management solutions.
- Continuous Support: Provide ongoing support and guidance to clients throughout the entire lifecycle of their water management systems, including troubleshooting, optimization, and upgrades.
- Knowledge Sharing: Facilitate knowledge sharing and community-building among clients through workshops, webinars, and online forums to foster a culture of innovation and continuous improvement.

Distribution channels:

- **Online Platforms:**
    1. Utilize the company website as a central hub for information about SWaaS solutions, featuring detailed product descriptions, case studies, and customer testimonials.
    2. Offer self-service options for potential customers to explore available packages, request demos, and initiate the subscription process online.
    3. Implement a customer portal where existing clients can access support resources, submit service requests, and track the performance of their water management systems.
- **Direct Sales:**
    1. Employ a dedicated sales team to engage with potential clients, understand their specific needs, and tailor solutions accordingly.
    2. Conduct personalized product demonstrations and consultations to showcase the value proposition of SWaaS and address any concerns or questions from prospects.
    3. Build relationships with key decision-makers within target organizations through networking events, industry conferences, and strategic partnerships.
- **Partnerships with Industry Associations:**

1. Collaborate with industry associations and trade organizations related to water management, environmental engineering, and sustainability to reach a broader audience.
2. Participate in industry events, webinars, and workshops organized by these associations to showcase SWaaS solutions and establish thought leadership in the field.
3. Leverage the credibility and reach of partner organizations to gain access to potential clients and enhance brand visibility within the industry.

- **Government Agencies:**
  1. Forge partnerships with government agencies responsible for water regulation, environmental protection, and infrastructure development to position SWaaS as a preferred solution for addressing regulatory compliance and sustainability goals.
  2. Participate in government-led initiatives, pilot programs, and funding opportunities aimed at modernizing water infrastructure and promoting sustainable practices.
  3. Collaborate with government agencies to incorporate SWaaS solutions into public-sector projects and initiatives, leveraging public-private partnerships to drive adoption and scale.

Customer Segments:

- **Municipalities:**
  1. Target municipal governments responsible for managing water treatment facilities, wastewater infrastructure, and sanitation networks in urban and rural areas.
  2. Offer SWaaS solutions to help municipalities optimize water usage, reduce operational costs, and improve the efficiency of water treatment processes.
  3. Address specific challenges faced by municipalities, such as aging infrastructure, regulatory compliance, and the need for sustainable water management practices.
- **Industrial Facilities:**
  1. Focus on industrial facilities across various sectors, including manufacturing, food and beverage, chemicals, and pharmaceuticals, that require water for production processes and wastewater treatment.
  2. Provide tailored SWaaS solutions to help industrial clients monitor water usage, mitigate environmental risks, and comply with regulatory requirements related to wastewater discharge and effluent quality.
  3. Offer predictive maintenance capabilities to optimize the performance of water treatment equipment and minimize downtime, ensuring uninterrupted operations for industrial facilities.
- **Public or Private Entities:**
  1. Serve a diverse range of public and private entities, including commercial enterprises, educational institutions, healthcare facilities, and recreational facilities, with unique water management needs.
  2. Customize SWaaS solutions to address the specific requirements of each client segment, whether it's water conservation initiatives, water quality monitoring, or sustainable landscaping practices.

3. Engage with stakeholders within public or private entities to understand their sustainability goals, operational challenges, and budget constraints, offering flexible solutions that align with their objectives.

Pricing Strategy:

- **Subscription-based Model:**
    1. Tiered Pricing: Offer different subscription tiers based on the scale of operations and specific needs of the customer. Higher tiers can include additional features, support, and customization options.
    2. Usage-based Pricing: Charge customers based on the volume of water managed or the number of facilities monitored, providing flexibility and scalability.
    3. Contract Length Discounts: Offer discounts for customers willing to commit to longer-term contracts, incentivizing loyalty and reducing churn.
- **Project-based Fees:**
    1. Value-based Pricing: Determine project fees based on the value delivered to the customer, taking into account factors such as complexity, scope, and potential cost savings or revenue generation.
    2. Fixed Pricing: Provide upfront quotes for project-based fees, ensuring transparency and predictability for customers.
- **Consulting Services:**
    1. Hourly Rates: Charge customers based on the number of consulting hours required, with different rates for different levels of expertise.
    2. Retainer Agreements: Offer retainer agreements for ongoing consulting services, providing customers with access to expertise on an as-needed basis.

5. Conclusions

This chapter serves as a conclusion of the deliverable, which discusses the potential barriers to adopting the proposed business models as well as showcasing the differences between the existing business models covered in Chapter 1 and the new proposed business models developed thanks to the TRANSACT framework.

5.1. Potential barriers or limitations of the proposed business models

After having reviewed their respective business models, all partners were asked to offer feedback regarding different limitation possibilities to implementing the proposed business models. They were asked to assess their chance of foreseeing potential technical barriers such as a lack of technical knowledge or accessibility to software, physical barriers such as equipment unavailability or logistical issues, and methodology barriers such as uncertainty regarding a particular aspect of the proposed business model.

The feedback received was a highly satisfactory common positive response towards the proposed business models, with very few identified potential drawbacks. Nevertheless, some of the points brought up per Use Case will be highlighted here so as to offer a transparent review of the proposals which can be translated to general advice in case companies from the overall market decide to apply these business models.

UC1

The main comment provided by VIN was an uncertainty towards the pricing strategy, given that, while it is in line with their intended plan, it is not clear if they will be able to apply the proposed strategies because purchasing authorities usually determine the pricing model via tenders.

UC2

GUT brought up the idea that as a public entity financing may prove to be a barrier, as they require public approval for further development of particular components, given that some subcomponents may still need some further development as their current TRL might be too low.

UC3

AVL indicated that the potential challenge of scalability lies in the industrialization of the telematic unit or gateway. Moreover, they also discussed that it would be good to have a more detailed understanding of the product philosophy, although they also understand that this could be an internal effort that companies should invest in.

UC4

The main concerns from partners in UC4 were mainly centred around the dilemma between integrating new business routes and focusing on their core value propositions, as one objective could distract from the other one.

UC5

DAM offered a couple of potential precautions for the application of the business model, the first of which being that a characteristic of public wastewater treatment plants is their heterogeneity. This should be considered as a physical barrier regarding architecture, communication protocol, and control equipment, in addition to the potential obsolescence of plant equipment. Furthermore, they also discussed that public entities or municipalities tend to seek investments with a higher proportion of CAPEX than OPEX.

5.2. Differentiation and unique selling points from the existing business models

As a conclusion to this report and as a way to come full circle on the topics addressed, the newly proposed business models will now be compared to the existing busines models described in Chapter 1. In doing so, the objective is to identify how these proposals differ from what the market is used to, and shed a light on how companies can develop unique selling points by applying them.

1. **Monetization Strategy:**

While current business models like Subscription and Freemium rely on recurring revenue streams and upselling premium features, the proposed business models such as Cloud-Enabled Traffic Management Solutions and HealthEdge Solutions offer innovative pricing models. For instance, the Cloud-Enabled Traffic Management Solutions may offer a usage-based pricing model, charging municipalities or transportation agencies based on the volume of traffic data processed or insights generated. Similarly, HealthEdge Solutions could adopt value-based pricing, charging healthcare providers based on the improved patient outcomes achieved through their predictive modeling and decision support platform. These alternative monetization strategies offer flexibility and align more closely with the value delivered to customers.

2. **Customer Acquisition and Retention:**

Current business models often put the focus on customer retention through continuous engagement and product updates, while the proposed business models aim to differentiate themselves by offering tailored solutions to address specific industry challenges. For example, the Maritime Decision Support Alliance may attract customers in the maritime industry by offering predictive analytics tools to optimize vessel routing and fuel efficiency, thereby reducing operational costs and environmental impact. Similarly, Sustainable Water Management as a Service (SWaaS) could differentiate itself by providing comprehensive water management solutions that help municipalities and industrial facilities optimize water usage, mitigate environmental risks, and ensure regulatory compliance. These industry-specific solutions offer compelling value propositions that attract and retain customers.

3. **Value Proposition:**

These new proposed business models distinguish themselves by offering transformative solutions that leverage advanced technologies to address industry-specific challenges. For example, Integrated Cloud-Edge Battery Management Solution offers advanced battery management systems with cloud-edge hybrid architecture, enabling remote monitoring, predictive maintenance, and performance optimization for batteries across diverse applications. This comprehensive solution enhances operational efficiency, maximizes battery performance, and drives innovation in sectors reliant on battery technology. Similarly, Cloud-Enabled Traffic Management Solutions offer intelligent traffic management systems powered by cloud computing, edge computing, and AI, providing real-time traffic insights and optimizing traffic flow to reduce

congestion, improve safety, and enhance urban mobility. These value propositions go beyond traditional approaches, delivering tangible benefits and competitive advantages to customers.

4. **Technology Integration:**

Finally, the proposed business models distinguish themselves by leveraging cutting-edge technologies such as cloud computing, edge computing, AI, IoT, and predictive analytics to deliver innovative solutions. For instance, HealthEdge Solutions integrate advanced imaging systems with predictive modeling capabilities to provide personalized pre-operative planning tools for structural heart disease interventions. By combining technology with predictive modeling expertise, they offer solutions that improve patient outcomes and procedural efficiency. Similarly, Sustainable Water Management as a Service (SWaaS) leverages cloud computing, IoT sensors, and data analytics to optimize water usage, improve environmental sustainability, and ensure regulatory compliance. These solutions represent a convergence of technology and industry expertise, offering transformative capabilities that address critical challenges and opportunities in their respective sectors.

In summary, the unique selling points of the new business models lie in their innovative pricing models, tailored solutions for specific industries, transformative value propositions, and integration of cutting-edge technologies. These differentiation points enable them to deliver tangible benefits, solve complex problems, and create value for customers in ways that traditional business models cannot, proving that the TRANSACT framework has opened the door for new business approaches and exploitation plans.