

# Master Thesis

Enhancing ACaaS Adoption: Refining Nedap Access AtWork's Business Model for SME customers in the ACaaS Industry

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## Abstract

This research explores necessary improvements to the business model of Nedap Access AtWork (AtWork), a cloud-native access control system from Nedap Security, to better attract and serve small and medium-sized enterprises (SMEs) within the Access Control as a Service (ACaaS) market. Although AtWork initially identified SMEs as early adopters of cloud-based access control solutions, gaining traction in this segment proved more difficult than anticipated due to the company's limited experience with ACaaS and the unique needs of SMEs. This challenge prompted a critical evaluation of the existing business model, leading to the key research question: *"What improvements are required in AtWork's business model to effectively serve and attract SME customers in the ACaaS market?"* To answer this question, the Business Model Canvas (BMC) framework was adapted to the SaaS context, focusing on five key components: value proposition, channels, customer relationships, revenue streams and key partners. A qualitative research methodology was applied, using data from 13 semi-structured interviews with potential end-users from different industries in the Netherlands. The data was analysed using a deductive coding approach and several key areas for improvement were identified. These include improving the value proposition by emphasising advanced security features, seamless integration capabilities and the benefits of remote access. In addition, the study highlights the need to improve the user experience, adopt a proactive customer relationship management (CRM) strategy, prioritise web browser engagement as a key channel, and cultivate strong local and regional partnerships. The research also recommends the introduction of a flexible pricing model that includes tiered, user-based and feature-based pricing options. This study adds to the literature on SaaS adoption by identifying 'remote access' as a new critical factor for SMEs, providing insights into effective pricing strategies, and highlighting the importance of local partnerships for successful SaaS adoption. Ultimately, the findings suggest that for AtWork to successfully penetrate the SME market, it must adopt a fundamentally new approach tailored to the specific needs and concerns of SMEs in the ACaaS landscape.

**Keywords:** AtWork, Access Control, ACaaS, SaaS, Business Model

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# 1. Introduction

This chapter begins with an overview of Access Control, highlighting its importance and the current market landscape. The chapter then introduces the case organisation for this study, Nedap Security, a subsidiary of Nedap N.V. (Nedap), which has been providing Access Control solutions for almost five decades. The research focuses on Nedap's Security innovation, Nedap Access AtWork (AtWork), a cloud-native Access Control system. The challenges AtWork faces with its business model are discussed, which serve as the basis for the key research question. Finally, the chapter outlines the theoretical and practical contributions of this study and concludes with an overview of the research structure for the remainder of the thesis.

## 1.1 Access Control, Market Analysis, and Nedap

Access Control systems are vital for organisations to ensure the safety of employees, protect sensitive information, and secure assets from unauthorised access and potential threats. These electronic security systems address three fundamental questions in building management: Who has access? Where do they have access? And when do they have access? (Masoumzadeh, van der Laan, & Dercksen, 2022). An Access Control System uses identifiers, such as key cards or key fobs, to authorise people to enter or leave certain areas. These systems also keep a record of who has access to different parts of a site. This information is valuable for managing facilities, planning staffing levels and maintaining records for compliance and risk management. Using an Access Control system is important because traditional methods such as guards or metal keys are outdated and not secure enough. Keys are prone to loss, copying, and sharing, and they fail to monitor entry and exit. Additionally, you cannot customize them for different times or temporary access. And carrying multiple keys for different areas is inconvenient and increases security risks. Access Control systems solve these problems by providing a secure, flexible and professional way to manage access, making workplaces safer and more efficient.

Access Control involves several steps that are common to such systems. At the first level, the system grants people permission to enter specific areas at specific times, based on their role and status (employee, contractor, or visitor). A system administrator manages this and can update these permissions as needed. When someone arrives, they use a credential such as a card, pin code, smartphone, QR code or key fob to authenticate their identity. If the system recognises and validates the credential, it sends a signal to unlock the access point and allow entry. Administrators continuously manage and monitor these permissions, adjusting them as necessary and reviewing access logs to ensure that only authorised people are gaining access. If there is a security concern, they examine the access logs and may share the information with authorities, deciding how long to keep the logs based on security needs and regulations. Essentially, an Access Control system determines who gets access, to what locations, and at what times.

The global market for Access Control systems has experienced significant growth in recent years, reaching a value of approximately \$14.3 billion in 2023. Forecasts indicate that this market will continue to grow at a rate of 6% per year, potentially approaching \$20 billion by 2028. Several factors are contributing to this upward trajectory, including escalating security concerns, increased investment in physical security, the need for regulatory compliance, and the growing importance of workplace safety and flexibility. These developments underline the dynamic and rapidly evolving nature of the Access Control market (Memoori, 2023, p. 39).

A driver of this growth is the emergence and increasing adoption of Access Control as a Service (ACaaS) (Memoori, 2023, p. 81). ACaaS manages building Access Control by combining a software application with hardware. It does this through a software-as-a-service (SaaS) model instead of traditional on-premises systems. Designed to provide a scalable, cloud-based solution, ACaaS offers greater flexibility, ease of management and lower up-front costs compared to traditional on-premises systems. While on-premises systems require software to be installed and managed on the user's hardware and servers, the SaaS model is delivered over the internet, eliminating the need for users to deal with server capacity, hosting, or maintenance (Loukis et al., 2019).

Introduced about a decade ago, ACaaS initially experienced slow growth, but the last five years have seen a significant acceleration in demand. The market for cloud-based Access Control systems is expanding at a faster rate than on-premises solutions, with a projected annual growth rate of 8.5%. This growth is expected to drive global market revenues from \$0.67 billion today to \$1.10 billion by 2028. However, forecasts indicate that cloud-based Access Control systems are steadily closing the gap, with the on-premises Access Control software market expected to reach \$1.61 billion by 2028 (Memoori, 2023, p. 82).

Contributing to this market is Nedap, a Dutch public company headquartered in Groenlo, in the eastern region of the Netherlands. Founded in 1929 as the 'Nederlandsche Apparatenfabriek' and listed on the Euronext stock exchange in 1947, Nedap has evolved from producing various hardware products based on orders to becoming a more software-oriented company. Currently, Nedap's revenue is generated partly from the sales of products and systems (non-recurring), partly from software subscriptions (licenses), and partly from the services sold (recurring). Nedap operates in seven business units, with four key markets identified: Healthcare, Livestock Management, Retail, and Security. The Healthcare unit develops software services that support Dutch healthcare institutions with planning, registering, and administrative care. Livestock Management focuses on the global automation of individual animal identification. Retail provides global solutions for optimized inventory management, streamlined shopping processes, and loss prevention. And lastly, central to this research, Nedap Security which offers Access Control systems globally, addressing and solving complex physical security issues (Nedap, 2024, p. 8). By the end of 2023, Nedap reported a revenue of 262 million euros and employed just over 1,000 employees worldwide (Nedap, 2024, p. 5).

## 1.2 Nedap Security & AtWork

Nedap Security has been a player in the Access Control market for more than 45 years. The company introduced its first Access Control badge in 1978, marking a significant milestone in its development. In 2000, Nedap launched AEOS, its first fully web-based security system, designed for organisations requiring robust security and control on their premises. Today, AEOS (Nedap Security, n.d.) serves approximately 6,000 organisations worldwide, ranking among the top ten competitors to market leaders (Memoori, 2023).

In 2023, Nedap Security launched AtWork, a cloud-native Access Control system offered as ACaaS. Nedap Security manages, hosts, and maintains the software for AtWork, which utilizes the same hardware as the AEOS system. This shift places the responsibility for system security, accessibility and updates on Nedap's own IT infrastructure, rather than the end user (Nedap Security, n.d.). In addition, this transition also represents a shift from only selling products (non-recurring) to offering subscriptions (recurring). Figure 1 shows both logos of Nedap Security's Access Control solutions:

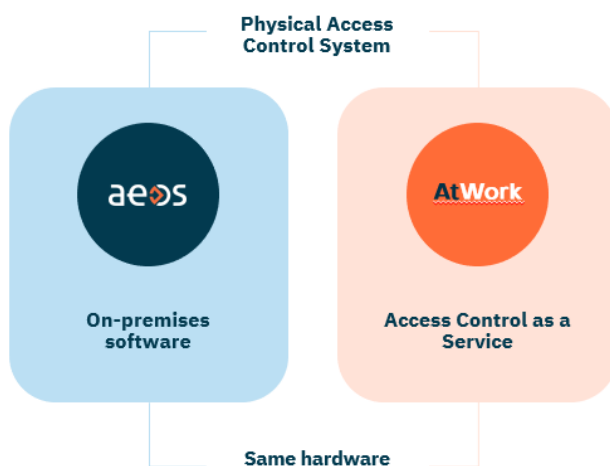


Figure 1: Nedap Security Management Access Control solutions

Various factors led to the development of AtWork. Firstly, market reports indicated a growing demand for cloud-based systems as customers increasingly sought to reduce the burden on their IT departments by avoiding the complexities of managing and hosting in-house servers. In addition, the COVID-19 pandemic acted as a significant catalyst for cloud adoption, driving demand for remote management capabilities and encouraging organisations to move towards as-a-service models (Memoori, 2024, p. 101). Finally, at the time of development, few Access Control vendors were offering ACaaS solutions, providing an opportunity for Nedap Security to gain a competitive advantage in the market.

Nedap's internal strategy, the Create-Scale-Core (CSC) model, guides the current phase of AtWork. In the Create phase, the primary objectives are to validate the market potential of the product and establish differentiation from

competitors. This phase focuses on developing a validated value proposition and a scalable business model, which includes acquiring initial paying customers and preparing the organisation for scaling. The next phase, Scale, focuses on growing market share by increasing sales and marketing efforts and building the organisational infrastructure required to support customer deployment of the solution. The last phase, Core, is all about making the business as profitable as possible by constantly coming up with new products, improving business activities, and putting in place plans to cut costs and streamline processes (Nedap, 2024, p. 13). In figure 2, the CSC model is presented.

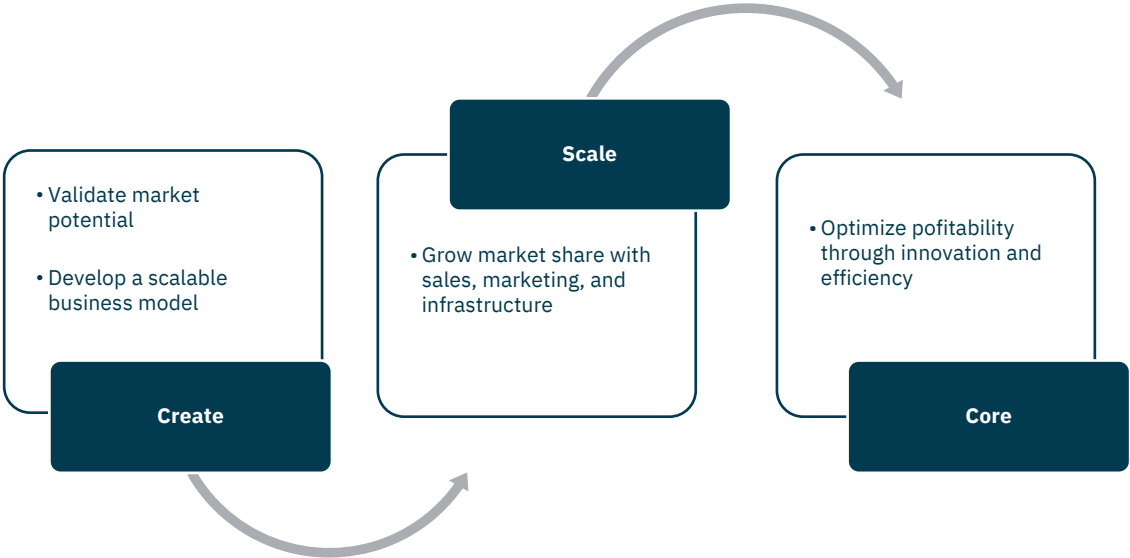


Figure 2: Nedap’s Create-Scale-Core model

*Apply the CSC model to AtWork:* Nedap Security made sure there was a market for cloud-native Access Control (Memoori, 2023, 2024), and they created a scalable business model before launching AtWork in 2023. With the first paying customers on board and the management team validating AtWork’s value proposition, the organisation is moving from the Create phase to the Scale phase. The primary objective in this Scale phase is to grow market share by increasing subscriptions and effectively rolling out AtWork. Small and medium-sized enterprises (SMEs), identified as early adopters due to the benefits of reduced IT workload and lower upfront costs offered by cloud-based solutions, are the focus of increasing market share (Memoori, 2024). Another reason for targeting this segment is that larger organisations require advanced features, such as integration with other systems, which the AtWork team is still developing.

Therefore, the immediate focus remains on increasing market share among SMEs, while the organisation works towards moving into the Core phase in the longer term.



### 1.3 Problem & Research Question

Industry reports clearly point to SMEs as early adopters of cloud-based Access Control systems, but AtWork has struggled to increase its market share in this segment. Until now, AtWork has not effectively leveraged this observed trend, failing to meet the initial expectations of increasing market share through subscription growth, a key objective in the Scale phase. These difficulties reflect Nedap Security's limited experience with ACaaS and the SME market segment. Historically, the company has primarily targeted and served large organisations with complex security needs through its on-premises solutions, and this approach has been consistent across other key markets. Consequently, the company has not specifically targeted its products for the SME market, resulting in limited experience. This lack of experience has made the launch of AtWork and increasing their market share among SMEs more challenging than originally anticipated. Fundamental doubts have emerged regarding the suitability of AtWork's current business model for SMEs. According to Baden-Fuller & Haefliger (2013), a successful business model must clearly identify its customers, engage with their needs, deliver satisfaction, and effectively monetize value. While the target customers for AtWork—SMEs—are clear, significant challenges remain in fully understanding and addressing their specific needs.

The AtWork business model faces several challenges, as highlighted by feedback from sales meetings, internal research and discussions with commercial management. First, there is a lack of clarity about the value proposition identified during the Create phase. AtWork's value proposition is based on several factors: ease of use, with an intuitive interface and a new authorisation model for granting permissions and rights, and the advantages of cloud-native software over on-premises systems, such as cost savings and reduced IT burden. However, it remains uncertain whether SMEs clearly understand and find these aspects of the value proposition relevant.

In addition, marketing and sales are struggling to reach potential customers and communicate the value proposition. Online channels like LinkedIn, email campaigns, and cold calling dominate efforts, with traditional marketing methods like trade journals and advertisements serving as a supplement. Despite these efforts, engagement with SMEs has not been successful. In addition, there are concerns about the transition from one-off to subscription-based sales and the impact on customer relationship management (CRM). Customers have been found to have higher expectations of service, support and proactive relationship management in a subscription-based model, compared to the more limited expectations of on-premises products that require a one-time payment. Although the relatively small customer base has not yet led to clear problems, the organisation recognised the need to prepare, especially as customer retention is crucial. AtWork must onboard a new customer (with the same number of users) to maintain the same level of recurring revenue in the event of customer loss.

Concerns have also been raised about AtWork's pricing model. Since its launch, AtWork has offered a single subscription-based pricing model, with charges based on the number of doors connected to the application and a small usage fee, charged monthly for active users. Potential customers' feedback during sales meetings indicates that they perceive this pricing model as excessively expensive compared to the value it offers, implying that the

true customer value of AtWork remains unclear to SMEs. This perceived mismatch between cost and value is likely to contribute to slower than expected adoption of the service.

In addition, questions are being raised about the suitability of Nedap Security's partner network to effectively engage with SMEs. Nedap Security outsources its implementation activities, such as installing hardware and dealing with onboarding issues. This approach has been effective for AEOS and serves as a successful channel as these partners have strong relationships with end customers. However, these same partners have yet to effectively promote and sell AtWork to SMEs, thereby raising questions about the alignment of the current partner network with SME needs.

As AtWork continues to evolve, it is essential to reassess and refine its business model to better align with the expectations and requirements of SME customers. This thesis addressed the following key research question:

**"What improvements are required in AtWork's business model to effectively serve and attract SME customers in the ACaaS market?"**

Five sub-questions were developed, each focusing on different elements of the business model, based on the research context and the challenges identified within the business model.

1. Which metrics of AtWork's value proposition need to be enhanced to meet the specific needs of SME customers?
2. What marketing and sales strategies are most effective for reaching SMEs in the ACaaS industry?
3. How can AtWork improve its customer relationship management strategy to meet the needs of SMEs?
4. What is the most effective revenue model strategy for SMEs in the ACaaS market?
5. What types of partners are most effective for AtWork to engage with SMEs so that it serves as a commercial tool?

### **1.3.1 Relevance**

#### *1.3.1.1 Theoretical*

This research addressed various gaps in the literature on SaaS business models, particularly in relation to SME customers. The focus on the SaaS business model was chosen because it is consistent with AtWork's role as an ACaaS provider. Although AtWork includes a hardware component, it shares key characteristics with SaaS providers as defined by Mell and Grance (2011) of the National Institute of Standards and Technology.

Previous research on SaaS business models has generally overlooked the SME segment. Louoma et al. (2013) examined different SaaS business models but did not focus on SMEs. Clohessy et al. (2020) highlighted the

benefits of SaaS business models, but their findings were not directly applicable to SMEs. Similarly, Floerecke (2018) and Whalter et al. (2012) identified key success factors for SaaS providers, but their studies did not specifically address SMEs. Labes et al. (2017) classified various SaaS business models, yet they did not establish a direct connection with SME customers. Studies on SaaS adoption drivers such as cost savings, security, and interoperability are the only ones that specifically focus on the SME segment (Kim et al., 2017; Valdebenito et al., 2019; Jayelo, 2012; Ibrahim et al., 2023). However, while these studies have examined adoption drivers such as cost savings, security and interoperability specifically for SMEs, they have not explored how these factors affect the SaaS business model. Differences in adoption factors between larger organisations and SME customers suggest that these factors may have different implications for the design of SaaS business models targeted at SMEs, a gap that remains underexplored in the existing literature.

Researchers have conducted additional research on specific elements of the business model, including the value proposition (Walter et al., 2019; 2021), marketing and sales strategies (Kavcic, 2015; Tyrväinen & Selin, 2011), and revenue streams (Saltan et al., 2021; Hinterhuber, 2023). However, there is a lack of research that specifically examines how these business model elements - such as value proposition, marketing and sales strategies, and revenue streams - are adapted or applied to meet the unique needs of SMEs as customers.

In summary, while there has been research on SaaS business models, adoption factors, and related business model elements, there has been little focus on SMEs as a customer segment. This research aims to fill that gap.

#### *1.3.1.2 Practical*

In practical terms, this research is highly relevant to organisations, particularly those offering SaaS products, as it addresses the common challenge of effectively targeting SMEs. By identifying critical areas within the business model that require adjustment, the research provides actionable insights that can help these organisations better meet the needs and expectations of smaller businesses. For any organisation looking to expand into the SME market or to optimise its current approach, these findings are crucial in guiding strategic decisions and improving market penetration.

For Nedap, the research is particularly relevant as it provides valuable guidance on how to adapt its traditionally large customer-focused business models to better serve SMEs. This aligns with Nedap's mission to improve the lives of professionals through technology. In the European Union, SMEs make up around 67% of the total employment which means there is still a large untapped market opportunity (European Commission, 2024). The insights of this research can directly contribute to increasing the number of technology users within this segment, thereby supporting the expansion and diversification of Nedap's product offering tailored to SMEs.

The results are also very helpful for AtWork because they help them understand the needs and habits of SMEs, especially why they prefer cloud-based Access Control systems to traditional on-premises ones. The research

holds practical significance for AtWork, as it aims to enhance its business model, tackle the obstacles of expanding its market share in the ACaaS industry, and tap into the largely unexplored SME market. The findings will be instrumental in guiding AtWork's commercial strategy, ultimately driving revenue growth and improving SME customer acquisition.

#### **1.4 Research Structure**

The structure of this research is as follows. Firstly, a review of the literature is presented, focusing on relevant themes such as business models, SMEs and SaaS, which together form the conceptual framework. Chapter 3 then provides a detailed explanation of the methodology, including the data collection methods, sample descriptions and data analysis techniques used. Chapter 4 then presents the results of the empirical data collection. Chapter 5 analyses these findings by comparing AtWork's current business model with the desired one and suggests improvements where necessary. Finally, Chapter 6 concludes by answering the research questions, discussing the findings, exploring the implications for theory and practice, and outlining the limitations of the study.

## 2. Theory

This chapter presents the theoretical underpinnings of this research. First, it outlines business models and presents selected frameworks. It then provides a detailed overview of cloud computing concepts and cloud service models, focusing on the SaaS model. An explanation of SMEs' relationship with SaaS follows. Finally, the chapter discusses the SaaS business model, covering all the key elements and variations, and concludes with a conceptual framework that brings together the findings from the previous sections.

### 2.1 Business Models

Academically, a lot of research has defined what a business model is (Peric et al., 2017). In this research, we use Baden-Fuller and Haefliger's (2013, p. 419) definition: *"A business model is a system that solves the problem of identifying who the customer(s) are, addressing their needs, delivering satisfaction, and monetising value."* This definition is useful because it focuses on ensuring that the business model meets the needs of the target audience, in this case SMEs.

A business model explains an organisation's current situation or its future. It can be seen as a way of understanding an organisation that includes three main points: 1) How do the key parts and functions of the organisation work together to deliver value to customers. 2) How do these parts are connected within the organisation and with its supply chain and networks. 3) How does the organisation makes money or value through these connections (Joyce et al., 2016). In addition, a business model can help analyse different strategic and operational parts of an organisation. This approach helps us understand how businesses operate and compete in a more complex and interconnected world (Teece, 2010).

A business model serves several important purposes for organisations. First, it clarifies what value the business provides. It identifies the target market or customer group, explaining who the customers are, what they need and how the company will make money by meeting those needs. Next, the business model outlines the steps needed to deliver that value efficiently and effectively. It also estimates the operating costs and potential profits, considering both the value provided and the method of delivery. Moreover, it explains how the business fits into the wider market and its relationships with customers. A strong business model provides a strategy for staying competitive and ahead of other businesses (Chesbrough & Rosenbloom, 2002; Teece, 2010).

#### 2.1.1 Emergence of the Business Model

The idea of a business model has become very important in the management and study of organisations and has changed significantly in recent years. The term 'business model' has become popular as companies try to explain

how they create, deliver and capture value (Nielsen et al., 2018). In figure 3, a presentation of the use of the term “business model” in the Google Scholar database is shown, where the increase is visualised.

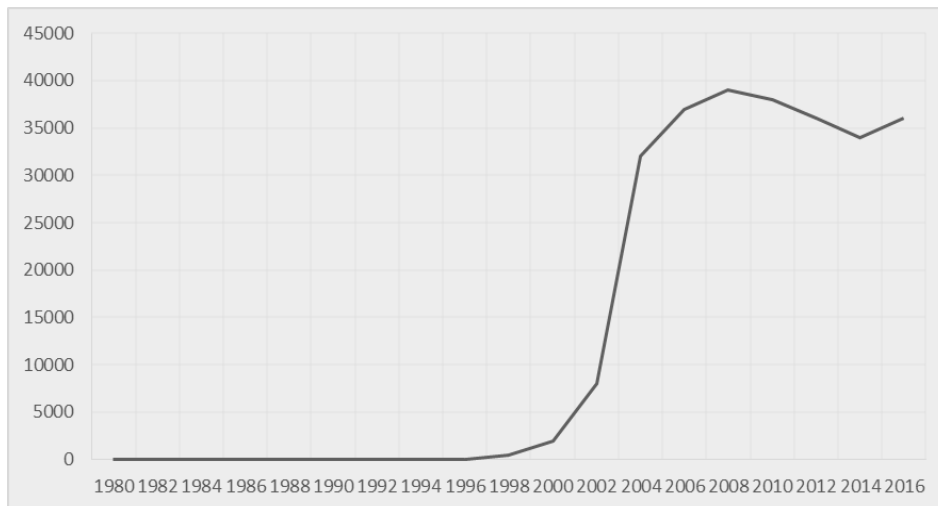


Figure 3: The increase of the term “Business Model” in the Google Scholar database between 1980 and 2017, derived from Nielsen et al., 2018

Initially, there was considerable diversity in the understanding and application of the concept across different fields. Recent studies, however, have started to converge on a more unified understanding. Wirtz et al. (2016) provided a comprehensive review of the business model concept, tracing its origins and theoretical development. They identified four essential research focus areas: innovation, change and evolution, performance and control, and design. This convergence towards a unified view helps in systematically studying business models and applying the concept across various domains (Wirtz et al., 2016).

Snihur and Eisenhardt (2022) argued that the business model has emerged as a fundamental strategic tool, potentially surpassing traditional strategy in significance. They emphasised the role of managerial cognition and learning processes in designing effective business models, suggesting that these elements are crucial for adapting to major disruptions and fostering innovation (Snihur & Eisenhardt, 2022). Bibliometric methods have also influenced the development of business model research. Budler et al. (2021) used these methods to trace the evolution of business model literature, highlighting its roots in strategy, entrepreneurship, and innovation. Industry 4.0 and sustainability were named as new areas of research that are connecting business model research with bigger economic and technological trends (Budler et al., 2021).

### 2.1.2 Business Model Frameworks

Closely related to the idea of a business model are the components that describe what a business model contains (Fielt, E., 2013). Various researchers have created different frameworks and tools to effectively manage, design and develop business models. Here are some well-known frameworks that provide a good overview:

One of the most widely used frameworks is the Business Model Canvas (BMC) by Osterwalder and Pigneur (2010). It consists of nine building blocks based on the Business Model Ontology by Osterwalder (2004). Another similar framework is the Four-Box Business Model by Johnson (2010). This model focuses on the value proposition, the profit formula, the key resources and the key processes and shows how they are interdependent. Unlike the BMC, which has a separate customer block, the four-box model integrates customer aspects into the value proposition. Key partnerships are included under key resources in the Four Box Model, whereas they are a separate element in the BMC. The Four-Box Model also provides more detailed operational and financial information than the BMC.

In addition to identifying the elements, Morris et al. (2005) developed six critical questions from a business perspective. By answering these questions, an organisation can decide and develop its business model. Another useful framework is the STOF model by Bouwman et al. (2008), designed for business model analysis and design. It focuses on the interrelated areas of service, technology, organisation and finance, emphasising the links between these areas to ensure a complete approach to business strategy and operations.

Table 1 provides an overview of the elements, building blocks, questions and domains for each framework.

Business Model Framework	Elements / Building Blocks / Questions / Domains
Business Model Canvas (Osterwalder, 2004) Osterwalder & Pigneur, 2010)	Customer Segments, Customer Relationships, Channels, Value Proposition, Key Resources, Key Activities, Key Partnership, Revenue Streams, and Cost Structure
Four-Box Business Model (Johnson et al., 2008; Johnson, 2010)	<ul style="list-style-type: none"> <li>▪ Customer Value Proposition: Job-to-be-done, Offering</li> <li>▪ Profit Formula: Revenue Model, Cost Structure, Target Unit Margin, Resource Velocity</li> <li>▪ Key Resources</li> <li>▪ Key Processes: Processes, Business Rules &amp; Success Metrics, Behavioural Norms</li> </ul>
Entrepreneur’s Business Model (Morris et al., 2005)	<ol style="list-style-type: none"> <li>1) How do we create value?</li> <li>2) What do we create value for?</li> <li>3) What is our source of competence?</li> <li>4) How do we competitively position ourself?</li> <li>5) How we make money?</li> <li>6) What are our time, scope, and size ambitions?</li> </ol>
STOF Framework (Bouwman et al., 2008)	<ul style="list-style-type: none"> <li>▪ Service: Focuses on the value proposition and customer interactions.</li> <li>▪ Technology: Covers the technical infrastructure and capabilities.</li> <li>▪ Organisation: Involves the business structure, processes, and partnerships.</li> <li>▪ Finance: Examines the revenue models, cost structures, and economic viability</li> </ul>

Table 1: Overview of the selected Business Model Frameworks

Various frameworks approach and describe a business model framework differently, using questions, elements, building blocks, domains, etc. However, organisations often use these frameworks, resulting in similar outcomes. In practice, companies frequently employ multiple business models to target different customer groups or industries. This strategy enables them to adapt to changing market conditions and simultaneously capitalise on various opportunities (Schwarz et al., 2017).

The comprehensive structure of Osterwalder and Pigneur's (2010) BMC which consists of nine building blocks that provide a holistic view of the business, serves as the basis for analysis in this research. The BMC was chosen for its versatility and practicality in both evaluating and designing business models, making it particularly useful for understanding and improving complex business systems such as SaaS solutions. In addition, the BMC's customer-centric approach, which focuses on delivering value to different customer segments, aligns closely with the objectives of this research - namely to enhance AtWork's ability to attract and serve SMEs. By enabling detailed analysis of value propositions, channels, customer relationships and revenue streams, the BMC enables the targeted customisation that is critical to addressing the specific needs and challenges of SMEs in the ACaaS market. In addition, its adaptability to different business contexts makes it an effective tool for tailoring offerings, ensuring that this research remains grounded in both theoretical rigour and practical relevance.

#### *2.1.2.1 Business Model Canvas*

As previously mentioned, Osterwalder & Pigneur (2010) proposed the BMC, which is one of the most popular and widely used frameworks for describing, visualizing, evaluating, and changing business models. The BMC consists of nine building blocks that together provide a comprehensive overview of the various elements that make up a business model, making it a versatile tool for both analysis and strategic planning.

The value proposition defines the unique benefit offered to customers that addresses their needs or problems. Customer segments identify the specific groups that the company targets. Channels are how the company delivers its value proposition to these customers, ensuring accessibility and convenience. The nature of customer relationships outlines how the company interacts with its customers, whether through personal assistance or automated services. Revenue streams illustrate the various ways the company generates revenue, from sales to subscriptions. Essential to delivering the value proposition are key resources, which include physical, intellectual, and human assets. Key activities are the critical actions taken to ensure that the business model works effectively. Collaboration with external entities, known as key partnerships, enhances efficiency and scalability. Finally, the cost structure breaks down the primary expenses associated with running the business, highlighting fixed and variable costs (Osterwalder & Pigneur, 2010). Figure 4 presents the BMC framework.



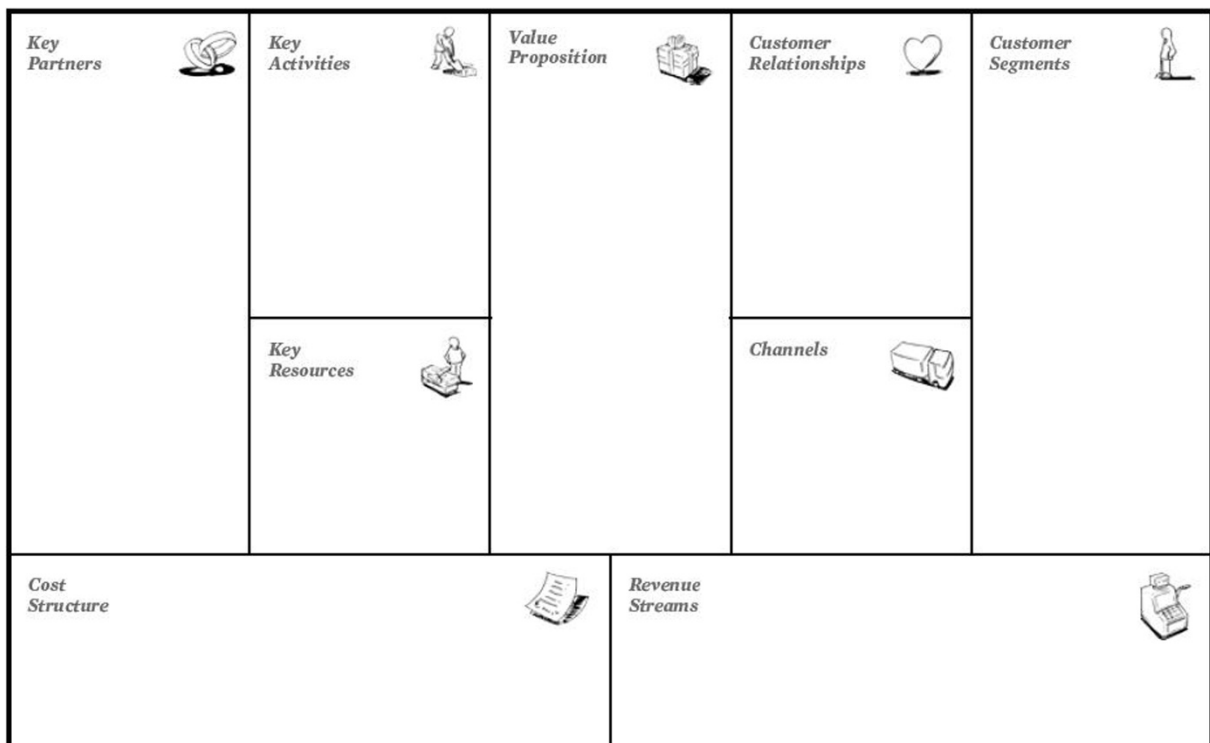


Figure 4: The nine building blocks of the Business Model Canvas (Osterwalder & Pigneur, 2010).

Each of these parts works together to ensure the overall effectiveness and sustainability of the business model. Proper alignment of these parts ensures that the organisation operates smoothly and can adapt to changes and challenges in the business environment. Despite the diverse nature of these components, four main dimensions consistently emerge for analysing, describing and classifying business model elements: Value proposition, value co-creation, value delivery and value capture (Peters et al., 2015).

## 2.2 On-premises, Cloud Computing & Service Models

Traditionally, software was installed directly on the customer's own hardware, known as the on-premises model. This means that the software was kept on site, such as in an office or data centre. The customer had to run the software on their own servers and take care of everything related to it, including maintenance, updates and security (Rehman et al., 2020). However, with technological advances, software is now available through cloud computing.

According to Mell and Grance (2011), cloud computing allows you to use computing services over the internet. It provides an easy way to access a variety of computing resources such as networks, servers, storage, applications and services whenever you need them, without much management or interaction with service providers. In simple terms, instead of keeping software and data on personal servers, customers can use powerful servers located elsewhere, called data centres. This allows them to store data, run programmes and access software from anywhere with an Internet connection. Cloud computing offers users three main service models: Infrastructure

as a Service (IaaS), Platform as a Service (PaaS), and SaaS (Miyachi, 2018). Each model provides users with different levels of control, flexibility and management.

IaaS provides virtual servers, storage, and networking on a pay-as-you-go basis, allowing users to run applications and operating systems without the need for physical hardware (Noor et al., 2018). This means that users can tailor their computing resources as needed, while the provider takes care of the physical hardware (Shallal & Bokhari, 2016). PaaS provides a platform for developers to build and deploy applications and manages the underlying infrastructure for them (Ambrust et al., 2010). It provides tools for developing, testing, deploying and maintaining applications and enables the creation and modification of user interfaces through web-based tools (Shallal & Bokhari, 2016). SaaS delivers software over the internet, accessible through a web browser, eliminating the need for local installation and maintenance (Mell & Grance, 2011). The SaaS provider owns the infrastructure and software, allowing customers to use them simultaneously (Miyachi, 2018). A common example of SaaS is email, which is available online to everyone at the same time. Application programming interfaces (APIs) allow users to integrate the software with other applications without the need for updates. APIs allow different software applications to communicate with each other, ensuring a unified and centralised delivery (Shallal & Bokhari, 2016). Essentially, SaaS builds upon PaaS, which operates on IaaS.

Table 2 shows the different levels of management responsibility between traditional on-premises IT and different cloud service models: IaaS, PaaS and SaaS. With on-premises software, customers manage everything themselves. In cloud models, the software provider takes on more management responsibility as you move from IaaS to PaaS to SaaS.

<b>On-premises</b>	<b>IaaS</b>	<b>PaaS</b>	<b>SaaS</b>
Applications	Applications	Applications	Applications
Data	Data	Data	Data
Runtime	Runtime	Runtime	Runtime
Middleware	Middleware	Middleware	Middleware
Operating system	Operating system (O/S)	Operating system (O/S)	Operating system (O/S)
Virtualization	Virtualization	Virtualization	Virtualization
Servers	Servers	Servers	Servers
Storage	Storage	Storage	Storage
Network	Network	Network	Network

	<b>Managed by end-customer</b>
	<b>Managed by provider</b>

Table 2: Similarities and differences in management responsibilities between on-premises systems, IaaS, PaaS, and SaaS.

### 2.2.1 Software-as-a-Service

This research placed a strong emphasis on the cloud service model, SaaS. SaaS has experienced explosive growth worldwide, including in the Netherlands. Revenues from SaaS have increased from approximately \$750 million in 2016 to a projected \$4 billion in 2024 (ACM, 2022). SaaS has transformed the software delivery model, transitioning to a subscription-based model where customers pay a fixed fee for software usage (Kingelin, 2020). Service level agreements (SLAs) are implemented to ensure quality and reliability. These agreements outline the service levels that the provider must deliver, including performance standards and responsibilities, to ensure that customers receive a consistent and reliable service (Mirobi et al., 2015). In addition, SaaS operates under a single licence, allowing multiple users to access the same version through multi-tenant architectures and technologies. This setup benefits users by providing immediate access to new features and simplifying the software update process (Wu, Wortmann, & Tan, 2014). In summary, Tyrväinen & Selin (2011) mentioned six requirements for a SaaS business model. First, the application must be accessible through a web browser. Second, it should provide a standardised software application without customisation. Third, customers should not have to install any software. Fourth, there should be no major integration or installation required for deployment. Fifth, the fee structure should be based on usage, making the model scalable. Finally, multiple customers should be able to use the same multi-tenant application (Tyrväinen & Selin, 2011).

So, instead of the traditional method where the end customer has to manage everything, the SaaS model allows the provider to handle all tasks related to hosting, updating, and managing the software (see Table 2). This convenience means users do not have to set up any hardware or software themselves (Alotabi, 2016). Additionally, customers do not need to set up any hardware or software to access top-end IT capabilities. Table 3 summarises additional benefits of SaaS for both customers and providers (Alnumay, 2020; Ibrahim et al., 2023; Benlian et al., 2011; Wu et al., 2014).

Possible benefit	Description
<b>Risk</b>	SaaS providers often offer a free trial so customers can test the software before using it, minimizing the risk.
<b>Commitment</b>	SaaS contracts can be easily ended, except when long-term contracts are in place.
<b>Costs</b>	From a cost perspective, SaaS is more efficient than buying software licenses, hardware, and managing version updates by oneself.
<b>Access and updates</b>	Customers have access to the latest version of the software at any time.
<b>Scalability</b>	A SaaS model is easily scalable.

Table 3: Possible benefits SaaS model

Some key factors determine how much benefit customers get from SaaS, as found by Loukis et al. (2019). The SaaS model's adaptability and the customer's ability to absorb and apply new knowledge significantly influence these benefits. Additionally, having a good contract with the SaaS provider, known as contractual governance, is important. This enhances innovational benefits, while operational benefits are impacted by the customer's IT

adaptations. Besides possible benefits for end-customers using SaaS, it does have some overall disadvantages or challenges (Benlian et al., 2011; Gibson et al., 2012; Ibrahim et al., 2023). Security is a big concern because storing data with the provider can lead to data breaches. Ensuring consistent performance is another issue since SaaS depends on internet access, which can be unreliable. Although SaaS initially offers cost savings, larger companies may experience reduced savings as they expand, and their control over updates and maintenance may diminish as the provider handles these tasks. Knowing these challenges helps organisations make better choices and manage risks when using SaaS.

## **2.3 Small and Medium-sized Enterprises (SMEs)**

SMEs include micro-enterprises, small and growing enterprises and medium-sized enterprises. Their role as economic drivers, major employers and innovators has remained unchanged for decades (Thrassou et al., 2020). SMEs benefit from being more flexible and quicker to innovate than larger firms. This ability to adapt and implement new ideas leads to the development of innovative products and services (Prassana et al., 2019).

However, SMEs face several challenges compared to larger firms. They often have limited internal and external knowledge, smaller product ranges and market sizes, and fewer opportunities to reduce costs (Bonga, 2017). They also have simpler organisational structures and limited management resources (Miller et al., 2021). A major challenge identified by Gamage et al. (2020) is keeping up with technological advances and integrating new technologies such as SaaS products. The next section explains the relationship and adoption factors between SMEs and SaaS models.

### **2.3.1 SMEs and SaaS**

Cloud computing offers significant benefits to SMEs by providing access to advanced technology without the need for significant infrastructure investment (Mudge, 2010). Instead of purchasing expensive hardware and software, SMEs can use a pay-as-you-go model, making systems such as Enterprise Resource Planning (ERP) more affordable and accessible from anywhere. This approach ensures that businesses only pay for what they use, eliminating the need to estimate resource requirements (Armbrust et al., 2010; Marston et al., 2011). In addition, cloud storage enhances data security by protecting information from disasters and ensuring its availability during emergencies (DFD, 2013).

In contrast to larger companies, SMEs often face resource constraints that limit their ability to innovate and manage IT (Rosenbusch et al., 2011; Durst & Edvardsson, 2012). They typically lack specialised IT staff and have limited financial and managerial capacity to take full advantage of cloud computing (Georgiadis & Pitelis, 2012).

A comprehensive literature review by Jayelo et al. (2012) highlighted the key factors influencing the adoption of cloud computing by SMEs. The most important factor is cost savings, as cloud computing reduces capital

expenditure on hardware and software and lowers maintenance costs through a subscription-based model. In addition, executive support is crucial, reflecting the commitment of senior management, and compatibility is essential, referring to how well cloud services integrate with existing organisational values, needs and practises. Jayelo et al. (2012) emphasize that compatibility encompasses the seamless integration of cloud services with existing systems, thereby promoting a seamless transition. Focusing specifically on SaaS as a cloud service model, Ibrahim et al. (2023) identified significant challenges to SaaS adoption by SMEs. Security concerns, such as unauthorised access and data breaches, are prominent issues. Data privacy requires advanced technologies to protect sensitive information, while ensuring data confidentiality requires robust authentication and Access Control measures. Effective governance is essential for proper data asset management and regulatory compliance. Interoperability challenges can arise due to a lack of standardised protocols, making it difficult to integrate SaaS solutions with existing systems. In addition, management resistance and financial constraints are significant barriers, as many SME managers may not fully understand the benefits of SaaS or lack the budget for implementation (Ibrahim et al., 2023). Together, these challenges might hinder the widespread adoption of SaaS by SMEs.

## 2.4 SaaS Business Model

To define the SaaS business model, the definitions of Baden-Fuller et al. (2013) on business models and Mell & Grance (2011) on SaaS were combined. A SaaS business model describes how a company delivers software online, responds to customer needs, and generates revenue through ongoing services rather than one-time purchases. While general research on SaaS business models is limited, Luoma et al. (2018) highlighted that specific elements of these models have received more attention. Previous research by the same authors identified two general business models for SaaS providers: the pure-play SaaS model and the enterprise SaaS model (Luoma et al., 2012).

The pure-play SaaS model offers basic, standardised software with minimal customisation, emphasising affordability and scalability for a broad customer base. On the other hand, the enterprise SaaS model offers more customised and complex software solutions tailored to large enterprises, with a focus on personalised service and long-term partnerships. For a more general idea of SaaS business models, Labes et al. (2017) divided them into three main groups based on factors that affect business model success:

1. *Newcomers*: These are newer companies that focus on niche markets and provide customised services. They often rely on partnerships and ancillary services for revenue but face challenges in competing in crowded markets.
2. *Experienced players*: These companies offer standardised cloud services to a wide audience, emphasising efficiency, strong customer support and solid partner networks. Their main source of revenue is subscriptions.

3. *Specialised providers*: These are the most successful, offering complex and customised cloud solutions to meet specific customer needs. They focus on security, integration and building strong customer trust.

Specialized providers excel at delivering tailored and trusted services, while new entrants face significant competitive challenges (Labes et al., 2017).

#### **2.4.1 Adapting the SaaS Model to the BMC Framework**

The SaaS business model has been further conceptualised by adapting it to the BMC framework, as there is more research available on specific elements of the model than on the concept as a whole. Five of the BMC framework's nine building blocks are studied because they are relevant to the study and focus on the customer: the value proposition, channels, customer relationships, revenue streams, and key partners. Key activities and – resources have already been fixed, while the cost structure is considered outside the scope as it is more internally focused and not driven by customer needs. Finally, the customer segment is identified as SMEs. Consequently, the focus is on five of the nine building blocks adapted to the SaaS model.

##### *2.4.1.1 Value Proposition*

Osterwalder & Pigneur (2010) outline that a SaaS provider's value proposition centers on the unique benefits it offers customers to meet their needs and solve their problems. From a customer perspective, SaaS offers several key benefits as already briefly explained (Loukis et al., 2019; Alnumay, 2020; Ibrahim et al., 2023; Benlian et al., 2011; Wu et al., 2014). SaaS significantly lowers the cost of entry for smaller companies, allowing them to access advanced business tools that were previously only available to larger companies. Further, an advantage is that SaaS provides almost instant access to hardware resources, eliminating the need for large up-front investments. This reduces the time it takes for companies to bring their products or services to market (Oliveira et al., 2019). Adoption of SaaS leads to a shift from a capital expenditure (CapEx) model, involving large upfront investments in hardware and software, to an operational expenditure (OpEx) model, where businesses pay ongoing fees for services. This shift makes it easier for businesses to innovate and focus on their core activities. In addition, SaaS offers scalability, allowing businesses to adjust their use of cloud services according to demand without requiring significant additional investment (Bo et al., 2023; Avram, 2015).

For SMEs, the total cost of ownership (TCO) - which includes the total cost of purchasing, implementing and maintaining a system is a significant advantage and a key pillar of the SaaS value proposition. This advantage arises primarily from the efficiencies that SaaS providers achieve by managing applications for multiple customers, resulting in shared resources and economies of scale (Waters, 2005; Churakova & Mikhranova, 2010). By using SaaS, SMEs gain access to cutting-edge IT capabilities without having to develop or maintain these systems in-house, effectively outsourcing the necessary expertise (Ibrahim et al., 2023). As a result of the switch

from a CapEx model to an OpEx model, SMEs can plan their IT spending more accurately. Cloud-based systems are also easier to set up and can grow with your business (Churakova & Mikhranova, 2010).

Success metrics, as defined by Whalter et al. (2012), could identify the unique value proposition of a SaaS provider. These metrics, rooted in the operationalization scheme by Delone and McLean (2004), clearly outline what distinguishes the SaaS provider's value proposition. Table 4 presents the scheme.

Components	Definition	Metrics
System Quality	Desirable characteristics of SaaS	Performance, Availability, Flexibility, Ease of Implementation, Interoperability, Functionality, Installation, Actuality, Ease of Use
Information Quality	Desirable quality of system outputs	Security, Privacy, Compliance
Service Quality	Quality of the IT support	Helpdesk Quality
Net Benefits	Degree to which SaaS contributes to the success of the stakeholders	Cost Savings, Financing, Concentration on Core Competencies, Cost Flexibility, Planning, Innovation Ability, Mobility, Higher Investment Security, Accounting Benefits

Table 4: Value propositions' Success Metrics for SaaS providers (Whalter et al., 2012)

The value proposition scheme, created by Whalter et al. (2012), is an important tool for figuring out what makes a SaaS model special. It does this by giving a structured way to evaluate four important factors: system quality, information quality, service quality, and net benefits. By applying specific metrics to each component, it provides an objective assessment of how effectively the SaaS offering meets customer needs and expectations. This approach clarifies the SaaS provider's competitive advantages, aligns its strengths with customer priorities, and guides strategic decisions to improve the value proposition.

2.4.1.2 Channels

The 'channels' element in the BMC framework for SaaS providers refers to how the value proposition is delivered to customers (Osterwalder & Pigneur, 2010). Marketing plays a key role here, involving the creation, promotion, delivery and exchange of products or services that bring value to customers, clients and society as a whole (Brunswick, 2014). The goal of effective marketing is to make the product so well-known and trusted that sales become almost unnecessary, achieving a "self-selling" status (Einarsson et al., 2020). However, marketing strategies for SaaS differ from those in the traditional software market due to the shift from products to services.

Based on research by Kavcic (2015), five essential marketing activities are important for SaaS providers, identified using the 4Ps framework: product, place, price and promotion. First, providing valuable content such as case studies, training materials, and industry news helps build authority and trust. Second, creating a network of

partners and special programmes can improve service distribution and generate referrals. Third, providing clear evidence of benefits, such as cost savings, helps customers understand and trust the product. Fourth, maintaining options for personal interaction alongside automated support ensures customer satisfaction. Finally, understanding the market landscape, customer needs and key players enables the development of effective marketing strategies (Kavcic, 2015).

Sales is another critical element within the channel building block, especially if the product has not reached a self-sold status. Sales refers to the activities that lead to the sale of goods or services (Dussel, 2006). In the context of SaaS, it focuses on selling a service. Tyrväinen & Selin (2011) highlighted that the sales process for SaaS involves a close link between marketing and sales channels.

An empirical study found that in a business-to-business context, personal selling is often more effective than using the Internet as a sales channel. In addition, the customer relationship is crucial and includes both the development of new sales and after-sales maintenance. Floerecke (2018) identified two key success factors specific to SaaS: First, marketing and sales teams must clearly explain the concept of cloud computing and address concerns about data security, which is a major consideration (Ibrahim et al., 2023). Second, SaaS providers should develop a SaaS-specific sales incentive system. Unlike traditional on-premises products, SaaS deals typically involve customers subscribing for longer periods, so regular sales transactions are less common and ongoing customer retention becomes key (Floerecke, 2018).

In addition, selling a SaaS solution, especially complex software, often involves a consultative approach known as solution selling. In this approach, the salesperson acts as a consultant, helping to solve the customer's problem by finding the right solution (Eades & Kear, 2007). This method, also known as value-based selling, focuses on developing compelling value propositions, building strong relationships and aligning sales activities with the customer's buying process. It requires new skills, such as deep customer insight and effective communication of value, while overcoming internal and external challenges (Töytäri, 2018).

#### *2.4.1.3 Customer Relationship*

Customer relationships involve the ongoing process of building and maintaining connections with customers, a practice closely associated with customer relationship management (CRM). CRM encompasses strategies and tools aimed at effectively creating and maintaining these relationships (Osterwalder & Pigneur, 2010; Hassan et al., 2020). The primary goal of a CRM strategy is to retain customers and reduce churn, which refers to the loss of SaaS subscriptions and therefore customers (Sukow & Grant, 2013). For SaaS providers, maintaining the same level of recurring revenue and profitability requires replacing each lost customer with an equivalent number of users (Ostlender, 2022).



For SaaS vendors, CRM is critical to improving customer retention. A systematic literature review by Schleckser (2023) of six recent peer-reviewed articles suggests that CRM strategies should prioritise building trust, which is essential for long-term customer retention. Consistent delivery on commitments, transparency, and open communication foster trust. In addition, facilitating effective knowledge transfer within the CRM strategy - by providing training tools and involving customers in the product roadmap - emphasizes the value of the customer relationship. Service quality, as outlined in Whalter et al.'s (2012) value proposition scheme, is another key pillar. This includes monitoring response times and measuring customer satisfaction. Also, churn can be avoided early on by actively monitoring and dealing with possible risks, such as falling customer satisfaction among certain groups. Overall, the seamless integration of both social and technical aspects into CRM strategies is essential to ensuring that customer relationships are continuously and proactively improved. An overview has been presented in Table 5:

CRM Strategy	Description
Building Trust	Ensure trust through consistent commitments, transparency, and open communication.
Knowledge Transfer	Provide training and involve customers in the product roadmap.
Service Quality	Monitor response times and customer satisfaction to enhance retention.
Risk Monitoring	Track risks and intervene early to prevent customer churn.
Seamless Integration	Combine social and technical aspects to continuously improve relationships.

Table 5: Overview of the CRM factors influencing customer retention in a SaaS setting

Moreover, research on traditional retention factors in SaaS (Schermer, 2021) shows that the length of the relationship has less impact on retention, especially when innovation disrupts established relationships. More important is the breadth of the relationship when customers use multiple products from the same supplier, retention improves due to higher switching costs and increased satisfaction. Timely after-sales service, especially at renewal time, is also crucial. Emphasis should be placed on expanding the customer's product usage and maintaining strong, timely interactions to improve retention (Schermer, 2021).

2.4.1.4 Revenue Streams

The revenue model element of a business model provides an organisation with a clear framework for generating revenue. It provides the company with details of the different revenue streams available, the value offered, pricing strategies and identification of paying customers (Priem, 2007; Osterwalder & Pigneur, 2010). For SaaS companies, revenue comes mainly from subscription-based streams, where customers pay regularly (mostly monthly or yearly) to access and use the software services offered by the SaaS provider (Chun & Choi, 2013).

This discussion focuses on the elements of revenue streams, including pricing structures, strategies and models, to determine the goals, logic and framework for SaaS pricing. This includes an exploration of the terms of use and the principles that guide the evolution of pricing, all approached from a strategic level (Saltan & Smolander, 2021).

A SaaS business model could employ a variety of pricing approaches, categorized into fixed and dynamic prices. Fixed includes the subscription pricing where users pay on a recurring basis to access the software and pay-per-use pricing which means users only must pay for what they use. Dynamic pricing means adjusting prices based on real-time factors like demand, usage, or customer behaviour (Chun & Choi, 2013). This pricing strategy was still uncommon, since for the user fixed pricing is easier to understand and customers seek predictable operation costs by using SaaS, but dynamic pricing is unpredictable for them (Li & Kumar, 2022). However, there has been a significant increase in adopting this pricing approach (Hinterhuber, 2023).

The following dynamic pricing strategies are known: Penetration pricing, which allows the provider to start with the lowest possible price and gradually increase it over time; Skimming pricing involves introducing the solution at the highest possible price and then lowering it to attract more customers; premium pricing enables maintaining a higher price than competitors, reflecting superior quality or features; and economy pricing employs a strategy to consistently maintain a lower price than competitors, appealing to cost-sensitive customers (Saltan & Smolander, 2021).

Determining the pricing foundation is crucial, and there are several approaches to consider: cost-based, competitive-based, customer value-based, and market-based. Cost-based pricing, which gives the provider a way to set prices based on the costs and cost structure involved in developing and delivering the solutions; Value-based pricing, which allows for pricing to be determined by the value the solution provides to customers; Competition-based pricing, offering the provider a strategy to set prices in line with those offered by competitors for similar solutions; and Market-based pricing, which provides a method to define prices based on market demand, particularly when there is a lack of competition and customers' willingness to pay (Saltan & Smolander, 2021). According to Poyar (2021), value-based pricing, where the price reflects the customer's perceived value, is the most used method, accounting for 39% of practices. Other methods include best judgement (27%), based on gut feeling, competitor-based (24%) and cost-based pricing (10%).

The underlying pricing approaches closely influence the choice of pricing model. According to Saltan & Smolander (2021), vendors have several pricing models at their disposal to meet different customer needs and strategic objectives. These include flat-rate pricing, which offers a fixed fee for the service, and pay-as-you-go pricing, which allows payments to fluctuate based on actual usage metrics. Tiered pricing provides them with multiple price points, each offering specific features and usage conditions, while user-based pricing charges based on the number of users under the same account. Feature-based pricing allows for payments based on the number of features accessed, and variable pricing allows for individually negotiated terms. These models are further broken down by Dempsey et al. (2018) and Hinterhuber (2023), which give providers a wider range of ways to make money, such as perpetual license models, subscription-based models, usage-based models, and performance-based models. Usage-based models, which charge customers based on usage metrics, have become particularly prevalent and offer a flexible option for many. Future trends anticipate pricing to align with specific performance

metrics or outcomes (Hinterhuber, 2023). Within this, Spitz & Noily (2019) note that key metrics include the number of seats, total usage, number of employees and functionality. Essentially, these different SaaS pricing models offer flexibility to providers, allowing them to tailor pricing strategies to specific needs, usage patterns, and strategic objectives. Furthermore, research reveals that SaaS providers recognize a flexible pricing model that caters to individual customer needs and business circumstances as a crucial success factor for customer satisfaction (Floerecke, 2018).

Overall, a SaaS provider's revenue model and pricing strategy have been dependent on several factors: the type of customers, market segments, value delivered and willingness to pay, complexity of purchase and use, and niche specialisation. Based on these, Saltan et al. (2019) identified four general SaaS pricing approaches.

- *Mass market pricing* targets individual consumers and small businesses, focusing on customer acquisition and market share growth. It uses value-based and market-based pricing with freemium models and ad-supported free options, driven by data.
- *Generalist pricing* serves a wide range of businesses and aims to acquire, monetise and retain customers through value-based and competitive pricing. It includes penetration pricing and tiered options, often negotiated for larger customers.
- *Specialist pricing* is for niche B2B companies focused on retaining and monetize existing customers. It uses true value-based pricing based on perceived value, relies on customer feedback and involves sales teams in the buying process.
- *High-rise pricing* is for large organisations and combines value-based and cost-based pricing to cover the high cost of complex solutions. Individual negotiations and value-added services tailor pricing, typically keeping information confidential.

Figure 5 provides an overview of the SaaS revenue model based on the overall pricing approach, including pricing strategies, foundations, and models.

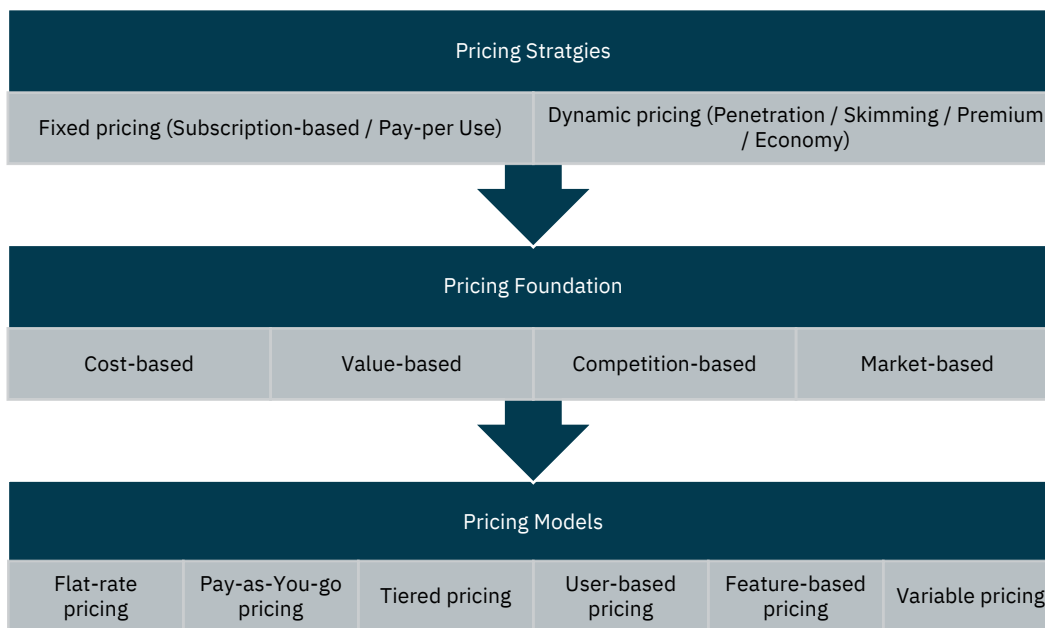


Figure 5: Overview of the SaaS pricing strategies, pricing foundations and models.

#### 2.4.1.5 Partnerships

The key partnership building block describes the network of suppliers and partners that make the business model work (Osterwalder & Pigneur, 2010). In the SaaS model, these partnerships are critical as they include third-party developers, service implementation partners and resellers, all working together to enhance the SaaS offering. Distribution channels play an important role, involving other organisations that help implement the services and bridge the gap between the SaaS provider and customers (Coyle et al., 2003).

This ecosystem is more diverse and fluid than traditional on-premises models, allowing SaaS providers to maximise total value through iterative and feedback-driven processes (Williamson & De Meyer, 2012). Effective management of these partnerships and distribution channels is critical to reaching target markets, fostering innovation, and maintaining a competitive edge in the cloud services landscape. A thriving partner ecosystem serves as a sales and marketing channel, with partners acting as resellers to provide greater customer proximity, geographic coverage, and reach to customer segments beyond the direct reach of the provider. In addition, partners provide essential services such as training and support that enable the optimal use of SaaS services (Floerecke, 2018). However, there is limited literature on the specific types of partners for SaaS providers.

## 2.5 Conceptual framework

The conceptual framework developed in this research provides a structured approach to applying customer insights to the relevant elements of a SaaS provider's business model. It highlights key activities, success factors and strategic decisions that should be tailored to the specific needs of different customer segments. Rather than

offering a one-size-fits-all solution, the framework presents multiple options for each element, ensuring flexibility in adapting the business model based on customer-driven insights. Figure 6 illustrates this structured overview, detailing the insights for each business model element and the theoretical underpinnings. Above each element, it is specified whether it pertains to a strategic decision, success factor, or key activity.



Figure 6: Conceptual Framework of a SaaS business model

**Value proposition:** To create an effective value proposition for a SaaS provider targeting SMEs, the focus is on four key elements: system quality, information quality, service quality and perceived benefits (Whalter et al., 2021). These elements help tailor the value proposition specifically for SMEs. Although the literature on SME-specific value propositions is limited, adoption factors identified were used to establish relevant metrics for each of these four elements. These metrics considered critical to the value proposition include data security and privacy, interoperability, governance and compliance, management understanding, and financial constraints (Jayelo, 2012; Ibrahim et al., 2023). These factors are highlighted in bold as key metrics.

**Channels:** The channels element integrates marketing and sales strategies for SaaS providers. Kavcic (2015) identified five essential activities in marketing to effectively communicate the value proposition: content marketing, partnership networks, evidence-based marketing, customer interaction and support, and market understanding. The customer relationship elements incorporate the customer interaction and support activities.

According to Tyrväinen & Selin (2011), addressing customer concerns (Floerecke, 2018), and adopting a value-based selling approach are crucial for sales. This approach emphasises creating compelling value propositions and aligning sales activities with the customer's buying process (Töytäri, 2018).

**Customer Relationship:** Operationalizing customer relationships within a SaaS model involves building trust through transparency and consistent communication. It also requires facilitating knowledge transfer through training and customer involvement, ensuring high service quality by monitoring response times and customer satisfaction, and proactively monitoring risk. In addition, seamless integration with CRM tools is essential to strengthen relationships, reduce churn and improve customer retention (Schleckser, 2023).

**Revenue streams:** When defining the revenue model, strategic decisions need to be made in three areas:

1. Pricing strategy: Fixed or dynamic.
2. Pricing foundation: Cost based, competitive, customer value based, market based or gut feeling (Saltan et al., 2021).
3. Pricing model: Options include flat-rate pricing, pay-as-you-go pricing, feature-based pricing, tiered pricing, user-based pricing, and variable pricing (Hinterhuber, 2023).

Among these, Floerecke (2018) emphasizes the pricing model's flexibility as a crucial success factor.

**Key partners:** While the existing literature discusses the role of partners in a SaaS provider's business model (Williamson & De Meyer, 2012), it often lacks specificity regarding the types of partners. However, Floerecke (2018) highlights the importance of cultivating the right partner ecosystem, as partners can serve as both marketing and sales channels. Therefore, identifying the right types of partners is essential for success.

## **3. Method**

This chapter outlines the methodology used to answer the research questions. First, the data collection process is discussed. This is followed by a description of the sampling method, including an overview of the respondents and interview characteristics. The interview guide is then presented. Finally, a detailed description of the data analysis method is given.

### **3.1 Data Collection**

A qualitative research methodology was selected as the most appropriate approach to identify improvements to AtWork's business model to better serve SME customers in the ACaaS industry. Semi-structured interviews were chosen as the primary data collection method due to their flexibility in exploring complex issues. This flexibility allows the interview questions to be adjusted based on participants' responses, thereby providing a deeper understanding of the topics discussed (Kallio et al., 2016). However, structure is still necessary to ensure that the research questions are effectively addressed. Therefore, interview questions were carefully prepared in advance to align with the research objectives, while remaining flexible enough to capture detailed and unexpected insights.

Quantitative methods such as surveys and structured questionnaires, while providing broad numerical data and statistical insights, often lack the depth and nuance required to understand the specific improvements required in the AtWork business model for SMEs. These methods typically fall short in exploring the complex behaviours, perceptions and motivations that are critical to this study (Eyisi, 2016). Although mixed methods, which combine both qualitative and quantitative approaches, could provide a comprehensive view by using data from multiple sources, they tend to be resource-intensive and time-consuming (Harris & Brown, 2010).

Given the focus on understanding detailed strategic adjustments and the exploratory nature of the study, a purely qualitative approach is considered more appropriate. This approach allows for a deeper exploration of participants' experiences and insights, which are essential for identifying nuanced improvements to the business model (Eyisi, 2016). By focusing on qualitative methods, the study gathers rich, detailed data that provides a thorough understanding of the specific needs and challenges faced by SMEs in the ACaaS market, leading to more targeted and effective business model implications.

### **3.2 Interview Guide**

The semi-structured interviews were conducted using an interview guide, detailed in Appendix A, structured around the conceptual framework of the SaaS business model. For each element of the business model, open-ended questions have been developed to discover customer insights on these elements and their preferences. To explain further, each element is discussed.

The value proposition questions were structured around the four components of the value proposition scheme developed by Whalter et al. (2012). For each component, two questions were asked: one about their expectations for an Access Control system in general (System Quality), another about their information preferences and expectations (Information Quality), followed by questions about service quality expectations when seeking help (Service Quality), and finally the unique benefits of an ACaaS system, with a specific focus on cloud-based Access Control. To uncover effective marketing and sales strategies (channels), open-ended questions explored the process of finding a new Access Control system. The aim was to identify the channels used and understand how decision-makers approached the selection process, providing insight into the key factors influencing their choice.

Questions relating to the customer relationship element sought to discover what customers expected from their relationship with the SaaS provider, helping to determine the best ways to manage and improve these relationships to ensure satisfaction and loyalty. For revenue streams, questions focused on identifying the appropriate pricing strategy, base and model, including questions about payment preferences, which provided insight into the three key elements of revenue streams. Finally, the key partnerships building block included questions about the current types of partners and their roles, helping to understand the importance of these partners regarding an Access Control system.

Overall, the questions were designed to gather clear and useful information about each part of the business model, helping to create a complete understanding of the important elements.

### **3.3 Sample**

A purposive sampling method was used, specifically the homogeneous type, to obtain a sample whose units share the same characteristics (Rai & Thapa, 2015). To determine these characteristics, several inclusion and exclusion criteria were established. The focus was on potential clients, namely non-existing clients of the Nedap Security. For inclusion, respondents had to hold a professional role responsible for Access Control within their organisation, such as facilities manager, security manager, IT officer, facilities coordinator, security officer or chief information security officer. In addition, their employers had to be headquartered in the Netherlands, have between 10 and 250 employees, and manage fewer than five buildings. Exclusion criteria included potential respondents working in industries with complex security requirements for Access Control, as detailed in Appendix B, derived from internal documents.

Respondents were approached through a clear and systematic process. First, a list of potential respondents was selected based on the inclusion criteria, using the LinkedIn Sales Navigator as an effective tool. This list was carefully vetted internally to ensure that no current clients were included. Next, contact details such as email addresses and phone numbers were obtained using two platforms, Lusha and Cognism, which specialise in providing accurate contact and company information. Traditionally designed to assist marketing and sales teams



with lead generation, these tools proved effective for this purpose as well. Finally, personalised emails were sent to all potential respondents, with a follow-up reminder sent a week later to those who did not initially respond. In total, 178 potential respondents were contacted.

This process resulted in 13 interviews conducted between June 14, 2024, and June 26, 2024. Table 6 provides an overview of the respondents and interview characteristics. Most of the interviews were conducted online using Microsoft Teams and recorded using the same application. The face-to-face interviews were recorded using a mobile phone application.

The interviews were conducted across a wide range of industries, with no two organisations operating in the same sector. Most interviewees held the position of facility manager within their organisation. In addition, the actual duration of each interview was recorded, excluding time spent on introductions and post-interview discussions.

<b>Respondent</b>	<b>Position</b>	<b>Organisation Size (Employees)</b>	<b>Industry</b>	<b>Locations</b>	<b>Duration (mins)</b>	<b>Interview type</b>
1	Facility Manager	50	Education	1	35	Online
2	Facility Manager	180	Medical Systems	1	30	Online
3	Facility Manager	200	Energy	2	36	Online
4	Facility Manager	250	Insurance	4	46	Online
5	Facility Manager	218	Environmental Technology	2	27	Online
6	Facility Manager	75	Construction	1	38	Online
7	Facility Manager / ex-owner	138	Software	2	34	Online
8	Facility Officer	150	International Trade	2	26	Online
9	Facility Manager	119	Technology	1	31	Online
10	Interim Facility Manager	480	Electronics	1	27	Online
11	Consultant Facility	350	Government	1	33	Online

12	Facility Manager	580	Hardware	2	34	In-person
13	IT Manager	145	Law Enforcement	3	34	Online

Table 6: Respondent – and interview characteristics

Although some respondents were later found to be outside the scope of the research due to a higher number of employees or locations, their interviews were still included. This decision was based on the similarity of their security needs and industry focus. However, the data obtained from these respondents did not provide unique insights compared to the rest of the sample.

### 3.4 Data Analysis

Thematic analysis was used to examine the data collected from the interviews. This method is useful for finding, analysing and reporting patterns (or themes) in qualitative data, such as transcripts of semi-structured interviews. It is particularly good for use in business contexts (Majumdar, 2022), which fits well with this study.

First, a coding scheme was developed based on the conceptual framework to ensure consistency with both the structure and content of the interview guide. This alignment allowed for a coherent and systematic analysis of the data, where each relevant business model element was categorised as a theme. Within these themes, specific activities, decisions or success factors were identified and linked to the corresponding business model areas. This approach ensured that the analysis was consistent with both the conceptual framework and the interview guide. The full coding scheme is presented in Appendix C.

The recorded semi-structured interviews were then transcribed and translated into English. Turboscribe, software that efficiently converts audio and video recordings into text, was used for transcription. DeepL's premium package, known for its advanced AI and high accuracy across multiple languages, was used for translation into English. The files were securely encrypted when uploaded to ensure that only personal accounts with login credentials could access them. Once transcribed and translated, the data was coded based on the respondents' transcribed quotes. This coding was done manually and entered into an Excel file, which made it easier to filter and sort the different codes and themes for each interview. The codes were then grouped into related themes, each corresponding to one of the five BMC building blocks. For example, the value proposition had its own labels for the overall theme, and these were coded accordingly. Finally, all themes were reviewed to ensure that they accurately reflected the coded excerpts and the full dataset. This review ensured that the data was presented clearly and accurately.

By following these steps, it was possible to analyse the data for each relevant business model element, which allowed the identification of the desired business model and therefore the necessary improvements compared to

the current business model. The current business model was identified by reviewing internal documents such as brochures, as well as public information available on the AtWork website and other product-related documents such as pricing schemes, etc. The results of the analysis are discussed in detail in the next chapter. Chapter 5 delves deeper into the results of this analysis.

## 4. Results

The results of the data collection are shown in this chapter. Before, it is useful understanding the current business model, which was established through internal discussions with AtWork's management team and by reviewing internal documents such as brochures, as well as public information available on AtWork's website and other product-related documents.

AtWork's business model is to provide a cloud-native access control system with a focus on ease of use. Key components of its value proposition include an intuitive interface, faster customisation capabilities and an authorisation model based on inheritance. Cloud-related features such as IT offloading and automatic updates ensure that the system is always up to date. In addition, AtWork offers customers the flexibility to transition from CapEx operational expenditure OpEx through a monthly subscription model. The system is also designed to integrate seamlessly with existing hardware from other vendors.

AtWork reaches its target audience through a combination of online and offline channels. Online marketing efforts include LinkedIn ads, email campaigns, Google ads (both search and display) and video marketing initiatives. Offline, AtWork engages potential customers by attending roundtable events, trade shows and other industry-related gatherings. The customer relationship approach is mainly reactive, offering second-line support after onboarding, with no proactive engagement once the system is in place. Revenue is generated from two main sources: a subscription-based pricing model based on the number of doors connected to the system and the number of active users per month, and the sale of hardware required to implement AtWork's solutions. The key partners include a network of major installers who handle national and global projects, and technology partners who contribute to the integration and continued success of the system.

The following sections describe the findings based on the data analysis of the interviews. They are organised according to the conceptual framework of SaaS business model elements set out in section 3.3 of the interview guide. The chapter begins with an overview of the value proposition, where its four key components are elaborated. The chapter then presents customer insights related to channels, with an emphasis on marketing and sales strategies. Next, the chapter examines customer relationship expectations and explores customer revenue model preferences. Finally, the chapter provides an overview of key partnerships, outlining the types of partners, their role in access control systems and their influence on the decision-making process when considering a new system.

## 4.1 Value Proposition

### 4.1.1 System quality

Ease of use is a key point mentioned by many participants. They emphasised the need for the system to be simple, easy to implement, and user-friendly, even for those who are not tech-savvy. One respondent said, *"It has to be easy to apply. And easy to implement"* (respondent 11) highlighting the importance of a user-friendly design. Another added, *"Ease of use is an important aspect for me in such a system"* (respondent 2) reflecting a common view. Participants like systems that are easy to manage for tasks like adding new users or setting permissions. One comment was *"The system must be simple and fast-acting. You have to have a good overview on the computer, what you are doing."* (respondent 3). The ease of handing over the system to another colleague was also important: *"You want to spend as little time as possible on that to explain such a very complicated system."* (respondent 4). The look and feel of the interface also matter. *"It has to look a bit good graphically. That it is not cobbled together"* (respondent 9) noted one user, pointing out the need for a good user-interface. Overall, a smooth implementation and ease use are crucial since they do prefer not to spend much time managing the Access Control system.

Moreover, nearly all respondents cited the system's reliability as a crucial aspect of an Access Control system. End-users expect that the system just works and that under any circumstances employees, contractor, or visitors can go in – and out of the building or door and this could be managed via the application. So, they expect a flawless communication between the application and the door hardware. Respondents commented about this, saying it *"might be somewhat obvious"* (respondent 2) and that they assume *"that the system does not cause any failure"* (respondent 6). In addition, regarding the application's reliability one person commented *"If I say block a tag or I give someone rights, it should work."* (respondent 3). Regarding this expectation, some respondents commented on the thought behind the importance of a reliability because it *"can't afford breakdowns in that area."* (respondent 5) and that *"if this breaks down and everyone can no longer enter the town hall, then of course we do have a problem"* (respondent 10). This reliability is crucial because any downtime of the application can have severe consequences. Therefore, it must always operate flawlessly and under any circumstances to prevent potential damage.

In addition to ease of use and reliability, other important characteristics of an Access Control system include flexibility and availability. These were frequently mentioned as key factors for the system's success, particularly because they allow users to access the system remotely. This remote access means that users don't have to come to the office, which is essential for many of them. Respondent 6 commented that *"the biggest advantage is that you can log in online from home"* which enables them to do their job from anywhere and at any time: *"Whether you're working at home, physically at work. Or you're on the other side of the world."* (respondent 5).

Another important characteristic is that the Access Control system enables integration with other systems, also called the interoperability. More than a half of the respondents commented about this. To give an example, one commented *"it would also be convenient if it could eventually be linked to a camera surveillance system"*

(respondent 1). The importance and convenience of having systems integrated with each other have been explained by another respondent: *"I also see it as a big advantage the moment we block an account from IT, I immediately have the possibility to block that access as well."* (respondent 7). This is important because it eliminates the need to manage multiple separate systems for physical security. Instead, interconnection reduces the risk of flaws or mistakes and reduces the overall time required to manage the system.

Finally, one respondent summarised all the important system quality metrics in one sentence *"I'll just mention five. These are reliability, user-friendliness, the integration possibilities with, for example, a registration system, scalability, so that you can easily create and close employees, and the security part, so how secure do I make the system."* (respondent 6).

#### **4.1.2 Information Quality**

The International Organization for Standardization (ISO), which sets standards to ensure quality, safety, and efficiency, came up several times when discussing compliance. It is important for a customer to comply with these standards in order to maintain a good reputation and comply with legal requirements. Therefore, understanding the type of information the system collects and ensuring its accuracy is crucial, as it directly impacts compliance with these standards (respondent 3).

Besides its connection to compliance, there are not many high expectations for the quality of the information. It was not checked regularly, only in cases of emergencies or if the end-user suspects someone, *"So if I have an emergency. Or I suspect someone ... I want to pull who has been there."* (respondent 9). If customers want to know who has accessed specific areas, when, and for how long, the information should be easily viewable in a dashboard or other reporting tool (respondent 5, 6, and 10).

Furthermore, respondents repeatedly mentioned the importance of information and data security in relation to an ACaaS (cloud) application. The external cloud storage of data raised concerns among the respondents. Respondent 5 highlighted that the main issues were that the *"high confidential data was shot into the cloud"* and that *"You don't have a constant view of who or what can access that data."* Their primary concern was the management and security of information within an ACaaS application. The respondents' limited knowledge of cloud-based systems (respondents 1, 4, 6, 7, 8, 9, 10) may have contributed to this concern. As one respondent noted, *"I don't know much about cloud systems. We rely on our IT consultant for that."* (respondent 10). Additionally, many participants were unclear about the differences between on-premises and cloud systems. For example, respondent 4 said, *"No, we don't use the cloud at the moment. I'm not sure what the benefits would be,"* and respondent 8 added, *"We haven't considered cloud systems. I'm not sure how they differ from what we use."*

This overall lack of familiarity with cloud systems suggests there is limited knowledge about these systems and their advantages over on-premises systems.

#### **4.1.3 Service Quality**

The expectations regarding service quality, particularly in terms of IT support, are quite clear. End-users prefer to have a fixed contact person or a specific phone number they can call when issues arise with the system. Generally, they dislike using email or other help desk methods, as illustrated by one respondent who said, *"I want to call. I find chatting or AI chatting... I would like to do it easily. Let me call. That's the quickest way."* (respondent 8). They simply want quick assistance, as another respondent mentioned: *"I expect we can call [Current Supplier] if there's a problem and that they are easily reachable and solve the problem quickly for us."* (respondent 2).

It does not matter whether the contact person is from the installation partner or the system's end supplier. While the end supplier should handle major issues, the installation partner can handle simpler questions, according to one respondent. However, for more complex issues related to the system, they prefer to contact someone from the end supplier (respondent 4). Furthermore, users expect quick and always-available service. Regardless of the time of day, they want immediate assistance, as respondent 8 expressed: *"You always want to be helped at times that are not convenient. 10 pm, 3 am. So you do want to feel also that you can be helped."*

For IT support, users expect fast assistance and a consistent contact person, whether from the installation partner or the end supplier. This aligns with the expectation that an Access Control system should be free of flaws, as discussed in section 4.1.1. Additionally, they expect the system to function reliably, minimising the need for help from the end supplier. However, they are comfortable reaching out to the installation partner for smaller issues, such as setup.

#### **4.1.4 Net Benefits**

Respondents highlighted several perceived benefits of using cloud-native Access Control (ACaaS) over an on-premises system. One of the biggest perceived benefits is not having to run the system on their own servers, which simplifies maintenance and saves server space. Respondents 2, 5, 7, 9, 12, and 13 also perceive the outsourcing of software backup and management as advantageous, as it lessens the risk of external hacking (respondent 2). This preference is likely to be in line with their desire to minimise the time spent managing an Access Control system, as discussed in section 4.1.1.

Moreover, respondents indicated that they do not need to run their own updates anymore and that they are always using the latest version of the software (respondents 9 and 11). Additionally, a great benefit is that they have remote access to their Access Control system, which overlaps with the expectations of system quality mentioned earlier. They see this as a great benefit as elaborated by: *"If I am at home and there is a failure, I can do something with that."* (respondent 8). In their current situation, they must travel to their office whenever there are issues

because they use an on-premises system. This is time-consuming and inconvenient for their work-life balance, especially if it happens often. Therefore, the respondents see this as a significant benefit.

There was no consensus for certain perceived benefits. Frequently, respondents did not mention cost savings as a clear advantage, and one respondent questioned the provision of such savings. They asked if the monthly payments included a guarantee for possible repairs, thus making it an all-inclusive price (respondent 1). While the lower entry costs were seen as beneficial, it was noted that *“on the other hand, you keep paying monthly”* (respondent 1), indicating that, for now, it is not considered a net benefit.

Another perceived benefit that lacked consistency among respondents was the security aspect of using a cloud-native system since the server is not physically located on-site (respondents 2, 3, 8, and 13). Some respondents did not view this as a problem, with one stating, *“I believe everything is well-secured nowadays. So, for me, it’s fine.”* (respondent 2). However, others questioned whether a cloud-native system is safer than an on-premises one (respondents 1 and 5). Overall, security remains a significant concern when considering the adoption of cloud systems, as discussed in section 4.1.2.

## 4.2 Channels

When end-users are looking for a new Access Control system, they typically follow several steps. Initially, they perform a simple Google search for “Access Control Systems” to explore available options. Their goal is to *“find out what’s there. And what does it cost? How fast can they deliver it?”* (respondent 9). Generally, this first step involves conducting online research to survey the current market landscape (respondents 3, 6, 9, 10, and 12).

Next, they tap into their personal and professional networks. This involves asking colleagues within the organisation and reaching out externally to gather their experiences and opinions. One participant noted that the search is driven by *“mainly word of mouth”* (respondents 1, 5, and 8). Additionally, they consult with their current installation partner to get insights into the state of the Access Control system market (respondent 11).

Some respondents with prior experience in selecting a new system attended trade fairs for Access Control systems, engaging directly with potential suppliers to collect information (respondents 7 and 9). However, direct messaging via social media platforms like LinkedIn proved less effective for reaching potential end customers. One respondent remarked, *“I find LinkedIn is not a medium for me to sell stuff to me. LinkedIn is a medium for me to ask questions and share information with my connections and with my contacts. But not so much that a supplier tries to sell my stuff through LinkedIn.”* (respondent 8). Another simply stated, *“that doesn’t happen”* (respondent 10). Instead, phone calls and emails were seen as *“somewhat logical channels”* (respondents 8 and 10).



The process is relatively straightforward. However, it is important to note that not all respondents had direct experience with searching for a new Access Control system. Consequently, some of their responses were based on hypothetical scenarios.

### 4.3 Customer Relationship

Regarding the customer relationship, the interview results revealed limited feedback on the preferred relationship with the ACaaS provider. The primary expectation expressed by respondents was the availability of support, particularly during the implementation phase and for any questions that may arise. Section 4.1.2 provides details on this topic. However, they generally expect the system to function reliably, with some expressing a desire to handle minor issues independently. As one respondent noted, *“able to fix certain things yourself”* (respondent 6).

Overall, support and service, especially when it comes to updates or new feature releases, are the primary customer relationship expectations. However, not many respondents provided detailed comments on this aspect. This could be because not many respondents have experience functioning as end-users for SaaS applications, leaving them without a clear idea or view on this topic and thus leading to limited expectations.

### 4.4 Revenue Streams

The revenue streams were questioned through the respondent’s preferences for a subscription payment since there are several options. More than a half of the respondents mentioned a model where you can use the system up to a certain number of users and above this, you are going to have a new package. This model is also known as tiered pricing. Several commented (respondent 3, 4, and 5) on this *“That appeals to me. And that I then fall into the next bin after that. From another cubicle.”* (respondent 4) and *“That you agree at the beginning of an agreement or a term. This is the fixed amount per month. You can go up to something like five hundred users.”* (respondent 5). Good to mention that they would like to see paying a different amount (less) when they have reached the limit of their package, *“The more, the less you pay”* (respondent 8).

However, some respondents preferred a pay-per-use model where the reason was mainly based on their operational activities (respondent 9 and 11). For some organisations there was a lot of fluctuation among employees or they were not in the office for a longer period because they were working externally. Therefore, a user-based model that charges customers based on their actual monthly product usage is more attractive to them. One commented based on experience and gut feeling that besides the organisational context, organisational size matters to this: *“I can see smaller companies preferring to pay per user for accurate pricing. For a larger company, tiered pricing might be more flexible.”* (Respondent 2)

In addition, respondents expressed curiosity about the price's inclusions, which aligns with the ongoing discussion about the system's cost-saving potential. Some respondents proposed that a supplier offer two options to the

customer so they could create a business case based on their current situation. A respondent said the following on this, *"But I would then do a comparison of an average of what we see of people coming in."* (respondent 10). Last, respondents indicated a preference that suppliers offer several packages, based on features, that they could choose from because they said, *"I wouldn't want to pay for something I don't use"* (respondent 6). Which features these are, have not been mentioned, however, the same respondent commented that *"at least it has to be scalable"* (respondent 6). However, no other distinct features of the system were identified.

Overall, organisational contexts do play a role, as they determine the most cost-effective subscription. Therefore, they would like to see different pricing models (tiered pricing and pay-per-use) so that they can decide for themselves. They would also like to see different packages based on features.

#### **4.5 Partners**

The type of partner preferred by respondents was consistently clear throughout the interviews. Respondents typically have a fixed partner for their installation work and therefore for their Access Control system. The choice of a particular partner was based on several factors. Primarily, these partnerships are rooted in an open-ended contract and are *"purely based on history"* (respondent 7). In addition, respondents expressed a preference for a local partner *"who knows the building"* (respondent 10) and ensures proximity in case of problems that need to be addressed (respondents 2, 4, 8, 10, 11).

In addition, respondents prefer to work with a single partner for all installation projects, not only for their Access Control system but also to streamline management by dealing with only one party (respondent 9). These key partners also play an important role in the decision-making process when selecting a new Access Control system. As one respondent noted, *"They also ultimately play ... an important role in the decision-making process for a new Access Control system"* (Respondent 11). The relationship is often long-term and in some cases contracts are permanent. Therefore, the key partner plays a crucial role when questions or problems arise with the Access Control system.

#### **4.6 Overview Results: Ideal Business Model Characteristics**

Based on the data analysis, several key characteristics of an ideal business model were identified. These characteristics were derived by focusing on the majority opinions expressed in the interviews, excluding less frequent comments in order to retain the most relevant insights.

First, in terms of value proposition, several metrics are critical for SME customers. These include ease of use, reliability, data security, integration with other systems, remote access capabilities, reduced IT burden and ease of implementation. In terms of sales channels, the data suggests that most customers initially search online, typically using web browsers, to gather information about new access control systems. Offline, they often attend

specific facility management trade shows where they meet suppliers directly. They also prefer face-to-face sales by phone or email for more direct communication.

In terms of customer relationships, no significant expectations emerged, as customers generally expect the system to work seamlessly. However, in the event of queries, they expressed a preference for a designated contact person at the supplier's end, while day-to-day queries could be handled by the installation partner. When it comes to revenue models, flexibility is preferred. Given the different contexts of organisations, the ability to choose the most cost-effective option is important. Three pricing models stood out based on the majority preferences: the pay-per-use model, tiered pricing and feature-based pricing. Finally, for key partners, it was consistently found in all interviews that local installation partners are often involved. These partners play a critical role in the decision-making process when selecting a new access control system.

## 5. Analysis

This chapter analyses and compares AtWork’s current business model with the desired business model for SMEs as a target customer segment. The comparison is structured around five key BMC building blocks. Key differences between the current and aspirational models have been identified, highlighting the necessary changes AtWork needs to implement. These findings are explored in greater detail in Chapter 4, with Table 7 providing a schematic representation of the results.

BMC building block	Current business model	Desired business model
<b>Value proposition</b>	<p>Current product-related metrics mentioned:</p> <ul style="list-style-type: none"> <li>▪ Ease of use:               <ul style="list-style-type: none"> <li>○ Interface;</li> <li>○ Faster adjustments.</li> </ul> </li> <li>▪ Authorisation model – inheritance</li> <li>▪ Cloud – native related benefits:               <ul style="list-style-type: none"> <li>○ IT unburdening;</li> <li>○ Always up to date.</li> </ul> </li> <li>▪ Monthly subscription (from capital expenditures (CAPEX) to operational expenditures (OPEX))</li> <li>▪ Integration with existing hardware from other suppliers</li> </ul>	<p>Desired product-related metrics mentioned:</p> <ul style="list-style-type: none"> <li>▪ User friendliness</li> <li>▪ Reliability (works from everywhere at any time)</li> <li>▪ (data) Security</li> <li>▪ Integration with other systems</li> <li>▪ Remote access</li> <li>▪ Not managing, hosting, and updating software (IT unburdening)</li> <li>▪ Ease of implementation</li> </ul>
<b>Channels</b>	<p>A variety of online and offline channels</p> <ul style="list-style-type: none"> <li>▪ Online: LinkedIn Ads, E-mail marketing, Display Ads, Google Ads, Google Ads Search, Video Marketing Campaigns.</li> </ul>	<p>Online:</p> <ul style="list-style-type: none"> <li>▪ Google ads – related content</li> <li>▪ LinkedIn for campaigns – evidence based marketing</li> </ul> <p>Offline:</p>

	<ul style="list-style-type: none"> <li>Offline: Round Table Events, Trade Shows / Events.</li> </ul>	<ul style="list-style-type: none"> <li>Facility management trade shows/events</li> </ul> <p>Personal selling through targeted phone and email outreach.</p>
<b>Customer Relationship</b>	<p>After onboarding, no proactive relationship with end-customer.</p> <p>Only reactive: second line support.</p>	<p>Fixed contact person at the end supplier if complex questions.</p> <p>Day-to-day questions via installation partner.</p>
<b>Revenue Streams</b>	<p>Two revenue streams:</p> <ol style="list-style-type: none"> <li>subscription-based (monthly) pricing model, based on: <ul style="list-style-type: none"> <li>Amount of doors connected to the Access Control system.</li> <li>A fee per active user in that month.</li> </ul> </li> <li>Sale of hardware – required for implementing AtWork</li> </ol>	<p>Two revenue streams: subscriptions (Monthly) and sale of hardware – required for implementing AtWork.</p> <p>Three pricing models:</p> <ul style="list-style-type: none"> <li>Pay-per-Use: Charges are based on the number of active users within a given month, with payment made accordingly.</li> <li>Tiered pricing: A fixed fee is applied to specific user ranges, such as 10-100 users (X€) or 100-250 users (X€). Moving to a higher user range results in a lower cost per user.</li> <li>Feature-based pricing: Customer can choose from Basic, Standard, and Premium packages, with each tier offering different features and capabilities.</li> </ul>
<b>Key Partners</b>	<ul style="list-style-type: none"> <li>The existing channel partner network for AEOS which are major installers managing national – and global projects.</li> </ul>	<p>A nationwide network of regional and local installation partners aligned with SMEs.</p>

- Technology partners

Table 7: Current and desired business model SMEs as customer segment

## 5.1 Differences with Desired Business Model

Differences have been found comparing AtWork's current business model and the desired business model, which was developed based on the customer insights derived from interviews. The differences per relevant business model element is presented below.

Value Proposition: The current business model overlooks several key aspects that are essential for an ACaaS application. One of the key issues is the inconsistent emphasis on security, especially in the context of a cloud-native system, which leads to significant customer concerns. This is a critical area that needs to be addressed. In addition, the value proposition fails to highlight the benefit of remote access, which allows users to access the system from anywhere at any time - one of the key benefits of an ACaaS application. Another key feature missing from the current model is integration with other systems, such as HR applications, camera systems and intrusion systems. Most respondents consider this capability essential for their needs. Smaller customers do not perceive the current monthly subscription-based pricing model as a significant benefit and may require less emphasis. While not currently highlighted in the value proposition, customers consider ease of implementation as a critical factor when selecting a new Access Control system. Although the current value proposition mentions reliability, there are ongoing concerns about the reliability of a cloud-native environment.

Customer Relationship: The key difference between the current and ideal situation in AtWork's customer relationship element, based on the literature, is the approach to customer engagement. Currently, AtWork's interactions with end customers are limited and reactive, occurring primarily during onboarding and when second-line support issues arise. Additional communication is occasional, through newsletters or customer days. In contrast, the ideal model described in the literature emphasises a proactive and continuous engagement strategy, with a focus on nurturing long-term relationships and customer retention. This ideal approach emphasises the need for ongoing, customer-centric interactions to prevent churn, rather than relying solely on issue resolution or periodic communication.

Channels: AtWork currently uses a variety of online marketing channels to reach customers. However, interviews revealed that decision makers at smaller companies rely primarily on Google to find information about new Access Control systems. Therefore, emphasising Google as a primary marketing channel could significantly increase reach and effectiveness. AtWork follows Nedap Security's history by maintaining a presence offline at major trade shows and events. However, to better connect with SMEs it is recommended to increase participation in smaller

trade shows and events specifically targeted at facility managers. Focusing on face-to-face selling is crucial for sales, as online channels like LinkedIn appear to be more effective than emailing or calling.

Revenue streams: AtWork's revenue model currently offers a single subscription-based pricing structure based on the number of doors and a small usage fee. However, customers have expressed interest in comparing different pricing models to find the most cost-effective option for their specific organisational needs. The focus was on three pricing models: user-based pricing, which charges based on the number of active users within a given month; tiered pricing, where a fixed fee applies to certain user ranges, with a lower cost per user as the range increases; and feature-based pricing, where customers can choose from basic, standard and premium packages, each offering different features and capabilities.

Key Partners: AtWork is currently being sold through the existing global channel partner network, which was originally developed for AEOS in the high-end market. However, the SMEs typically rely on local and regional installers, who play a crucial role in their decision-making process for new Access Control systems. By building partnerships with these local and regional installers, AtWork could significantly improve its market penetration and increase customer satisfaction within the SME segment.

## 5.2 Business Model Improvements

Several improvements were proposed to address the identified gaps between the current and desired business model for AtWork, with a focus on targeting SMEs. Findings from the literature review support some of these improvements, reinforcing their effectiveness. These improvements are presented and structured according to the five elements of the BMC.

### Value Proposition

- *Increased focus on security:* Given the significant security concerns around cloud-based systems such as ACaaS, it is critical to integrate a stronger focus on security features into the value proposition. This enhancement will help address and alleviate customer concerns about cloud security.
- *Emphasise remote access:* The value proposition should place more emphasis on the benefits of remote access, which is a key benefit of an ACaaS application for SME customers. Highlighting this feature can make the product more attractive to potential buyers.
- *Interoperability (integration with other systems):* The value proposition should highlight the ability to integrate with other critical systems, such as HR applications and camera systems. This integration is essential to meet the needs of SME customers who require seamless connectivity between disparate systems.

- *Ease of use and implementation:* Customers place a high value on the ease of use and implementation of new Access Control systems, but the value proposition currently undervalues this aspect. Addressing this factor will make the offering more attractive to potential SME customers.
- *Reliability concerns:* Concerns about reliability persist despite the mention of a cloud-native environment. These concerns should be addressed more directly to reassure customers and build confidence in the product.

### **Customer Relationship**

- *Proactive CRM:* Although no additional expectations regarding customer relationship management were mentioned, it is recommended that AtWork develop a proactive CRM strategy. This strategy would help to maintain and improve customer relationships, ensuring better retention as the customer base grows. According to the research, some important things to think about are establishing trust, making sure service quality is high, allowing for effective knowledge transfer, actively managing risk, and ensuring that social and technical aspects of CRM strategies are seamlessly integrated (Schleckser, 2023).

### **Channels**

- *Focus on web browser channels:* Research indicates that decision-makers seeking new Access Control systems often begin their search with desk research. Therefore, a strong online presence on popular web browsers such as Google is an effective tool for increasing visibility and making initial contact with potential customers. To enhance this approach, it is important to focus on evidence-based marketing, address customer concerns such as security (Floerecke, 2018) and build a partnership network (Kavcic, 2015).
- *Increase face-to-face sales:* Research shows that contacting potential leads via mail or phone is more effective than using social media platforms like LinkedIn. Adopting a value-based selling approach that emphasises a value proposition tailored to the customer's needs and aligns sales activities with the customer's buying process is essential (Töytäri, 2018).
- *Building a SaaS sales incentive system:* Although not derived from empirical data, it is important to build a SaaS sales incentive system. Traditionally, the focus has been on on-premises systems, but shifting incentives to SaaS sales can better align with current market demands (Floerecke, 2018).

### **Revenue streams**

- *Implement multiple pricing models:* Customers have expressed interest in comparing different pricing models to find the most cost-effective options for their needs. It is recommended to implement three



different pricing models: pay-per-use, tiered pricing and feature-based pricing (Saltan et al., 2021). The specific pricing strategy could not be determined; however, the pricing models identified suggest a fixed pricing approach.

- *Pricing based on customer value*: Customers want to know exactly what they are paying for. It would therefore be beneficial to establish a customer value basis, as suggested by Saltan et al. (2021). This approach should highlight the value customers receive for their investment, particularly in comparison to other ACaaS providers, and emphasise the benefits of using an ACaaS application over an on-premises system.
- *Pay attention to the total cost of ownership (TCO)*: Stressing the total cost of ownership (TCO) in the revenue model communication would make the advantages of using an ACaaS solution even clearer. TCO is a key factor in SME adoption decisions, so it is crucial to clearly communicate this aspect (Ibrahim et al., 2023).

#### **Key partners**

- *Move from national partners to regional and local partners*: The current sales strategy relies on a global network of channel partners, which is effective for the high-end market but less suitable for the SME segment. SMEs typically prefer to work with local and regional installers who play a critical role in their purchasing decisions. By building partnerships with these local and regional installers, AtWork can better penetrate the SME market and improve customer satisfaction by aligning the sales strategy with the preferences and needs of this segment.

## 6. Conclusion

Even though market reports show a clear trend toward the adoption of cloud-based Access Control systems and identify SMEs as early adopters of cloud-native Access Control systems (ACaaS) like those offered by AtWork (Memoori, 2024), the company is having a hard time growing its market share among SME customers.

The guiding research question for this study was: **"What improvements are needed in AtWork's business model to effectively serve and attract SME customers in the ACaaS industry?"** This question was addressed by developing five sub-questions focusing on key elements of the business model: value proposition, channels, customer relationships, revenue streams and key partners.

To better serve and attract SME customers in the ACaaS industry, AtWork should refine its business model by placing a greater emphasis on security features. This focus would directly address significant concerns that SMEs have about cloud-based systems (Ibrahim et al., 2023), thereby helping to alleviate security-related fears. In addition, highlighting the benefits of remote access - a key advantage of ACaaS for SMEs - could make the product more attractive to potential customers. The value proposition should also emphasise integration with other critical systems, such as HR applications and camera systems, which are essential for SMEs that require seamless connectivity across multiple platforms. Ease of use and implementation, which are highly valued by customers, should also be emphasised to increase the attractiveness of the product to potential SME customers. Addressing ongoing concerns about the reliability of cloud-native environments is critical to reassure customers and build confidence in the product.

In terms of customer relationships, the development of a proactive CRM strategy is recommended. This strategy would support the maintenance and enhancement of customer relationships, ensuring better retention as the customer base grows. Some important things to think about are gaining trust, making sure service quality is high, helping people share knowledge effectively, actively managing risk, and making sure that social and technical aspects of CRM strategies work together smoothly (Schleckser, 2023).

Regarding channels, prioritising the web browser channel is essential, as many decision-makers start their search for new Access Control systems by researching online. Enhancing AtWork's online presence on popular web browsers such as Google, coupled with evidence-based marketing and a focus on addressing customer concerns such as security, can increase visibility and improve initial contact with prospects (Kavcic, 2015). In addition, increasing personal sales through outreach by mail or phone rather than relying solely on social media platforms such as LinkedIn may prove more effective (Floerecke, 2018). Adopting a value-based selling approach that aligns sales activities with the customer's buying process is also crucial (Töytäri, 2018). Establishing a SaaS sales incentive system is essential, as shifting incentives towards SaaS sales would be more in line with current market demands (Floerecke, 2018).

Offering multiple pricing models - tiered pricing, user-based pricing and feature-based pricing - would give customers more options to find cost-effective solutions (Saltan et al., 2021). Implementing customer value-based pricing that highlights the value customers receive for their investment, especially in comparison to other ACaaS providers, would be beneficial. TCO is an important factor for small businesses when deciding what to buy (Ibrahim et al., 2023) so it is important to stress it in revenue model communications.

Finally, a shift from national to regional and local partners is recommended. SMEs often prefer to work with local and regional installers who understand their specific needs and play a crucial role in their purchasing decisions. By building partnerships with these local and regional installers, AtWork can better penetrate the SME market, increase customer satisfaction and align its distribution strategy with the preferences and needs of this segment.

## **6.1 Discussion**

The research findings provide valuable insights into how AtWork can improve its business model to better serve and attract SME customers in the Access Control as a Service industry. Several key areas for improvement were identified, including AtWork's value proposition, customer relationship management, marketing and sales practices, revenue model and partner network. However, the challenges associated with implementing these changes need to be considered and further research and customer insight may be required to tailor these recommendations to the wider customer base.

Improving the value proposition and product features, such as ease of use and system interoperability, will require significant development resources and time. Given limited resources, careful prioritisation is essential and a well-defined product roadmap should be established to guide this process. The roadmap should focus on incremental feature development with clear milestones to ensure that customer needs are addressed efficiently. In addition, addressing security and reliability concerns requires a proactive communication strategy. Internally developed narratives can be used to reassure customers about the robustness of the system. Ease of integration also emerged as a key factor, requiring a transparent implementation schedule that is easily accessible to potential customers. Internal discussions with implementation managers and installation partners should aim to streamline procedures and reduce administrative overhead.

As AtWork's customer base grows, developing an effective CRM strategy becomes increasingly important. Customer retention must be prioritised to protect recurring revenue, as losing customers has a direct impact on financial stability. In practice, this means AtWork should invest in a dedicated customer success team, implement CRM software to track interactions and customer satisfaction, and create personalised communication plans. Moving to a customer success strategy that focuses on building long-term relationships requires a medium-term investment. However, more research is needed to determine which customer retention practices are most effective for SMEs, as the current sample size may not fully capture the needs of the entire market.

Marketing efforts should focus on addressing customer concerns about the reliability and security of cloud-based solutions. This can be achieved through evidence-based marketing strategies that emphasise the security features of AtWork's services. Increasing AtWork's visibility through digital channels such as Google will require both financial investment and ongoing adjustments based on performance. Regular evaluation of the overall marketing approach will ensure that it remains relevant in the rapidly evolving digital landscape. In addition, the sales team should adopt a more personalised approach, focusing on direct engagement via email and telephone. Management should support this shift by implementing an incentive system tailored to the unique challenges of selling SaaS solutions. Attending relevant facility management exhibitions will also increase AtWork's chances of meeting decision makers within the access control market.

In terms of revenue streams, exploring new pricing models such as pay-per-use, tiered pricing and feature-based pricing could align AtWork's offering more closely with the needs of SMEs. However, implementing these models will require restructuring service level agreements and developing new pricing schemes, which will require close collaboration between sales and external communication with customers. Further research is needed to determine which pricing models will resonate best with SMEs, and insights from broader customer research will help refine the approach. Subscription-based billing software could be considered to facilitate these new pricing models, but this option also requires further investigation.

Expanding and managing AtWork's partner network will be critical to penetrating the SME market. AtWork should develop a strategy for identifying and onboarding regional and local installation partners, with internal partner managers playing a key role in this expansion. As these managers have traditionally focused on national level partnerships, shifting their focus to local markets will require time and resources. Effective management of these relationships is critical as partners are an integral part of the implementation process. The onboarding of new partners will also require adequate training and ongoing support. Further research into local market dynamics will help ensure that selected partners are well equipped to meet the needs of SME customers.

Ultimately, to effectively target SMEs, AtWork needs to take a different approach to the one it has traditionally taken with larger organisations. Larger organisations typically have dedicated teams with experience of access control and cloud-based systems, whereas SMEs often lack this in-house expertise. This research highlights the need to address the specific concerns of SMEs, particularly around the reliability and security of cloud solutions. While this research provides a strong foundation, further research is needed to develop a deeper understanding of SME customers and their specific needs. Extending the research to a more representative sample of potential SME customers will help to refine these recommendations and ensure that AtWork successfully addresses the opportunities and challenges within this segment.

## 6.2 Theoretical Implications

By focusing on the SaaS business model specifically for the SME as a customer segment, an area not extensively explored in the existing literature, this research filled a significant theoretical gap. This research has identified several implications for existing theory.

First, the study identified important SaaS business model enhancements that are relevant to SMEs as a customer segment. To fill that gap, it looked at the SaaS business model without focusing on small and medium-sized businesses (Louoma et al. (2013), Clohessy et al. (2020), Floerecke (2018), and Whalter et al. (2012); Labes et al. (2017). Second, the literature on SaaS adoption, which had identified critical factors for SME customers, confirmed some factors (Jayelo et al., 2012; Ibrahim et al., 2023). It was shown that for these types of customers, 'data security and privacy', 'interoperability' and 'compliance' are key drivers for SaaS adoption in the SME customer segment. However, his study did not find that 'management understanding' and 'cost savings' were key drivers for adoption. This suggests that this may be industry-specific, particularly in the Access Control industry.

This study has some theoretical implications for the five relevant business model elements in the context of SaaS, structured according to Osterwalder & Pigneur's (2010) BMC framework. For the value proposition, which was defined using the value proposition metrics scheme of Whalter et al. (2012), it was found that for SMEs 'reliability', 'ease of implementation', 'security' and 'ease of use' are important. An important metric that could not be directly linked to any of the metrics in the scheme for SME customers was 'remote access'. This could be an extension of the model developed by (Walter et al, 2012). In terms of marketing and sales strategies describing the channel element, the process of searching for a new ACaaS application was found to be quite simple. Given that these customers and decision-makers handle their own desk research when seeking new Access Control systems, Kavcic (2015) suggests that a SaaS provider need to conduct the five relevant marketing activities. However, no clear evidence of this was found. SMEs prefer personal and face-to-face sales, which confirms the findings of Tyrväinen & Selin (2011). On CRM, it was found that SME customers do not have many expectations on this, except for service and support during onboarding or when they have questions. Therefore, no theoretical implication could be made about the literature of Schlekser (2023).

In terms of the right revenue streams, it was found that offering multiple pricing models is preferred for SMEs, which confirms the success factor of having a flexible pricing model (Floerecke, 2018). Furthermore, the study identified tiered pricing, feature-based pricing, and user-based pricing as the preferred pricing models for SMEs, contributing to the existing literature by Saltan et al. (2021) and Hinterhuber (2023). Some evidence was found for a customer value-based approach to pricing, but this was too small to make a theoretical implication and may also be industry specific. The same was true for pricing strategies, such as a fixed-price strategy, but this is mainly based on the pricing model preferred by SMEs. The findings of success factors on this topic align with the importance of key partners and the importance of building the right partner ecosystem for success (Floerecke,

2018). The study also found that while local and regional partners are critical to success, their dependence on industry is significant as they also play an implementation role.

### **6.3 Practical Implications**

The results of this research provide several actionable insights for SaaS vendors targeting SME customers, derived from the analysis of AtWork's business model. First, given the importance of data security, interoperability and compliance, SaaS providers should prioritise these features in their product development and marketing efforts. They can address the main concerns of small businesses (SMEs) and boost adoption rates by making sure their systems are secure and easy to integrate.

In terms of marketing and sales strategies, SMEs' preference for conducting their own research before making purchasing decisions suggests that SaaS providers should invest in a strong digital presence. Comprehensive online resources such as detailed product information, case studies and customer testimonials can help SMEs make informed decisions. In addition, the continued preference for personal, face-to-face interactions suggests that vendors should continue to focus on building relationships through direct sales efforts.

Flexibility in pricing is another key finding. Offering a variety of pricing models, including tiered, feature-based and user-based options, will meet the diverse needs and budgets of SMEs. This flexibility not only makes SaaS solutions more accessible but also increases customer satisfaction by providing options that meet their specific needs. The research also highlights the importance of local and regional partnerships. To increase market penetration and provide localized support, which SMEs highly value, SaaS providers should actively build and maintain relationships with partners in specific regions or industries. Finally, the research shows that SMEs have minimal expectations of CRM, focusing more on service and support during onboarding and problem resolution. SaaS providers should therefore focus on providing exceptional customer support to ensure SMEs get the help they need quickly and effectively.

By implementing these practical strategies, SaaS providers can better meet the needs of SME customers, leading to increased adoption, customer satisfaction, and long-term success in this market segment.

### **6.4 Limitations & Future Research**

This research on ACaaS has several limitations that should be acknowledged. Firstly, the study's limited data set limits the generalisability of the findings. Most respondents were facilities managers, which may have skewed the results. Including a wider range of roles, such as IT managers or security officers, might have provided a more diverse set of perspectives. Additionally, conducting the research with only one ACaaS provider limits consideration of alternative business models that may exist in other industries. The study's exclusive focus on the Access Control industry limits its relevance to other sectors.

he research's geographic focus on the Netherlands further restricts the findings' applicability to other countries with varying regulatory frameworks and market conditions. Furthermore, the respondents, accustomed to on-premises solutions, lacked prior experience with ACaaS, potentially influencing their opinions and responses. Another important limitation of this research is that it focused on SMEs with fewer than 250 employees, some of which managed large numbers of users. This means that larger SMEs may face different challenges than smaller ones, but these differences were not explored in depth. In addition, the study did not explore the remaining four building blocks of the BMC framework, which is another limitation and leaves room for future research to explore these areas in more detail.

To build on the current findings, future research should focus on several key areas. First, a cross-industry analysis of the ACaaS business model for SMEs is needed. By studying how these enhancements perform across different industries, researchers can identify common strengths and unique challenges, making the business model more adaptable and robust. Gathering feedback from current users of ACaaS products will provide practical insights into real-world applications, highlighting both the benefits and challenges that new users may face. Another important avenue of research is to explore the ACaaS business model within software-only SaaS businesses that do not integrate with hardware. This approach will allow a clearer validation of business model improvements by focusing solely on software aspects, without the complexities associated with hardware. Testing the consistency of the ACaaS business model across different countries is another critical area for research. Different regulatory environments, market conditions and user preferences may require modifications to the business model to ensure global applicability and success. In addition, future studies should include the perspectives of partners and internal management. Insights from these stakeholders may reveal operational efficiencies, strategic opportunities and potential challenges that may not be apparent from the customer perspective alone.

By addressing these areas, future research can deepen the understanding and development of the ACaaS model and thus SaaS model, ultimately making it a more effective and universally applicable solution.

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## Appendix A – Interview Guide

### Introduction:

- Mutual introductions:
  - o Share details about each other's organisation, job role and key responsibilities.
  - o Include a brief introduction to Nedap and Access AtWork.
- Research overview:
  - o Provide a brief explanation of the purpose and objectives of the research.
- Confirm consent to record the interview.
- Outline the interview structure:
  - o Explain the structure and flow of the interview to set expectations.
- Discuss the current state of (physical) Access Control:
  - o Explore the current state of physical Access Control within the organisation.

### Topics:

#### Value Proposition

##### *System Quality:*

1. What factors do you consider most important regarding the quality of an Access Control system?
2. What is your experience with, and what are your thoughts on, a Cloud-Native Access Control system?

##### *Information Quality:*

3. What is important for you regarding the information and data within an Access Control system?
4. What specific types of information or reports do you expect from an Access Control system?

##### *Service Quality:*

5. What is your preferred method for seeking assistance if you have questions or encounter issues with the system?
6. What are your expectations regarding Service quality, particularly in terms of response time and technical expertise?

##### *Perceived Benefits:*

7. What do you consider the greatest benefits of having a Cloud-Native Access Control System compared to an On-Premises system?
8. How can a Cloud-Native system be beneficial for your organisation?

### **Channels & Customer Relationship**

9. How would you handle a process when you are seeking a new Access Control system, for example, when building a new office?
10. How do personal messaging and marketing by Access Control system suppliers influence your decision-making process?
11. Can you describe any experiences you have had with the process of finding an Access Control system? What did that process look like?

### **Revenue Streams**

12. If you are using an ACaaS system, what are your preferences regarding the payment and pricing structure?
13. Would you prefer a flexible pricing model based on the features included in the system? If so, what features would you be willing to pay more for?

### **Key Partners**

14. What kind of installation partner do you have, and what is their role of managing the Access Control system?
15. Do they play a role in choosing a new Access Control system? How significant is their influence in the decision-making process?

### **Questions**

### **Closing**

## Appendix B – Excluded industries

Based on the sectors, presented on the internal website of, the industries with complex and high security needs are excluded of the target group.

- **Utilities:** “Utility companies have more to deal with than ever before. From a complex regulatory environment, to ecological issues and pressure to increase profits. Not to mention the fact that, as part of the critical infrastructure, business continuity is paramount. This means your Access Control must be robust, flexible and have advanced functionalities.”
- **Aviation:** “The aviation industry demands some of the highest levels of security and safety. Because airports not only attract high volumes of people, they’re often at the core of a country’s infrastructure and economy.”
- **Government and Defence:** “Access Control for the government and defence sector is a challenging balance. Threats to some locations could have serious implications, including severe economic damage, social disruption or even loss of life, so security needs to be incredibly robust.”
- **Oil & Gas:** “As oil and gas are critical energy sources, this sector faces an increased risk of terrorist and other attacks, so high security levels are essential at every stage – upstream, midstream and downstream. And your systems must be able to adapt to meet new and changing risks.”
- **Pharmaceuticals:** “The pharmaceutical sector faces a high level of intricate needs for physical Access Control. Your research and development facilities need robust security to protect intellectual property.”
- **Chemical industry:** Staying in control of what happens on an industrial site is essential to protect people, the planet and your profits. Highlighting risks and taking security management to a higher level is a constant challenge.

## Appendix C – Coding Scheme

BMC element	Themes	Codes
<b>Value Proposition</b>	System Quality	Reliability, Ease of Use, Ease of Implementation, Interoperability, Availability, Flexibility, Scalability
	Information Quality	Security, Privacy, Reporting
	Service Quality	Helpdesk Response Time, Customer Service expectations
	Perceived Benefits of Cloud-Native Access Control	Cost Savings, Financing, Operational Efficiency, Convenience, Security, Financing,
<b>Channels</b>	Marketing	Marketing channels, buying process
	Sales	Outreach preferences, Social media
<b>Customer Relationship</b>	Customer Relationship preferences	Service, Support, Training, Knowledge, Update Information
<b>Revenue Streams</b>	Pricing Strategy	Fixed, Dynamic
	Pricing foundation	Cost based, Competitive, Customer Value Based, Market Based, Gut Feeling
	Pricing Model	Flat-rate, Pay-as-you-go, Feature-based, Tiered, User-based, Variable



**Key Partners**

Partner Preferences

Current partner, Influence on Access  
Controls, Role of installation partner,  
Partner type



