MASTER IN BUSINESS ADMINISTRATION (MBA)

Trabajo Fin de Máster
Capstone project

Inventory automation for Ailin Health: diagnosis, benchmarking, and implementation roadmap

Author: Águeda Pelayo
Supervisor: Antonio Tena

Madrid
22 May 2026

Abstract:

This project addresses a core operational challenge faced by Ailin, a Spanish home-based diagnostic kit company, the absence of a structured, data-supported approach to inventory management and demand forecasting. As the company scales across seven European markets, its reliance on manual processes generates increasing friction across purchasing, warehousing, and customer fulfillment. Through process mapping, bottleneck analysis and a benchmarking of six inventory management solutions, the project diagnoses the root causes of these inefficiencies and defines sixteen functional requirements for a technology solution suited to Ailin's operational context and regulatory environment.

The recommendation is a phased approach. First an immediate combination of the e-commerce platform's inventory module, Power BI, and automated Excel, delivering real-time visibility and analytical capability within six months at an estimated total cost of ownership of 18.700 euros; followed by a medium-term migration to SAP Business One once defined operational thresholds are met. Financial modelling under both standard and conservative scenarios confirms Phase 1 is viable without external financing, while Phase 2 remains sustainable under standard conditions. Together, the two phases provide a realistic, evidence-based path from Ailin's current manual model toward a fully integrated, compliance-ready inventory infrastructure.

Key words: inventory automation, demand forecasting, diagnostic kits, ERP implementation, online store platform.

Index

Index of figures

1. Introduction

This project addresses a specific operational challenge faced by Ailin, a home-based diagnostic company offering self-test kits with results delivered within 48 hours. The challenge is the absence of a structured, data-supported approach to inventory management and demand forecasting.

As the company grows and the volume of orders increases, its reliance on manual processes and experience-driven judgment creates increasing friction across purchasing, warehousing, and customer fulfillment. The main consulting task is to design a comprehensive proposal to professionalize stock management and demand forecasting, reducing dependence on manual processes and improving coordination with suppliers.

Three research questions help structure the diagnostic and prescriptive work that follows. The first question concerns forecasting accuracy, the second examines the operational cost of manual processes, and the third looks forward. These are:

- How accurately does Ailin's current demand forecasting approach predict actual sales, and what are the main sources of deviation between forecasted and realized demand?
- To what extent do existing manual stock management processes contribute to inefficiencies such as excess inventory, stockouts, and delayed replenishment?
- How can a more professionalized stock management and forecasting model improve coordination with suppliers in terms of order planning, lead times, and inventory availability?

The importance of answering these questions is easy to justify. As order volumes grow, managing inventory manually is no longer a viable option for their operating model, and its consequences extend well beyond the warehouse. More accurate forecasting and a more structured approach to inventory would help reduce excess

stock and eliminate the costly pattern of last-minute emergency orders that arise from poor demand visibility.

At the same time, better planning protects sales, customer confidence, and the company's brand reputation. A clearer and more systematic process also creates the conditions for stronger supplier relationships. When purchasing cycles become more predictable and order signals become clearer, procurement decisions can be grounded in data rather than intuition, giving the company a meaningfully stronger negotiating position. Coordination improves not as a matter of goodwill, but because the underlying processes make it possible.

Additionally, from an academic point of view, this project sits at the intersection of supply chain management, operations management, and applied consulting, with a particular focus on small and medium-sized companies. While inventory optimization and demand forecasting are well-covered domains in the existing literature, most existing research assumes advanced systems, large volumes of historical data, and highly structured organizational environments.

Therefore, this project addresses a more practical and less explored gap, how SMEs can realistically move from manual, experience-driven inventory management toward more professional, data-supported approaches under real-world constraints. In this way, it delivers both actionable recommendations for Ailin and academically grounded insights into operational transformation, fulfilling the dual objective of a capstone consulting project.

To achieve this and answer the three research questions, the project pursues six interconnected specific objectives:

1. Analyze current inventory flow and warehouse processes from receipt to delivery.
2. Identify critical inefficiencies such as errors, lack of visibility, downtime, stockouts, etc.

3. Map out the functional requirements for an inventory management and forecasting system.
4. Evaluate relevant technological solutions (ERP, MRP, RFID, specialized software, or hybrid options).
5. Analyze the operational, and human impact of implementing these solutions.
6. Propose the tool or combination of tools that best suits Ailin's needs and context.

The methodology that structures this work follows a sequential logic. It begins with internal interviews with key employees in operations and management, building a grounded understanding of current processes, constraints, and decision-making practices. These insights then provide the basis for an external benchmarking phase, in which relevant market solutions and supplier practices are analyzed to identify feasible, context-appropriate alternatives. Building on this diagnosis, the project models future-state processes and associated financial scenarios to assess the operational and economic implications of different paths forward. The project concludes with the consolidation and presentation of a selected proposal, translating analytical findings into a coherent set of recommendations aligned with Ailin strategic and operational objectives.

2. Company context: Ailin

Ailin is a Spanish health e-commerce startup that specializes in remote clinical diagnostics through home-collection kits. The company's focus is to redefine the traditional laboratory analysis experience by making health monitoring accessible, private, and easy to understand.

Ailin's mission is to shift the healthcare model from one focused on curation to one focused on prevention. The company envisions empowering patients to take control of their health through clinical-grade testing without the need for travel or waiting rooms. Its core value lies in transforming complex clinical data into actionable patient insights, reducing the burden on traditional healthcare systems while fostering a culture of proactive prevention. (Ailin, 2026)

The company was founded in 2022 by Isabel Caruana. The idea originated from Caruana's personal experience during the COVID-19 pandemic, where she faced saturated health centers and long wait times for routine blood work. This led her to identify a significant gap in the Spanish market for accessible, home-based diagnostics compared to international standards. (CDTI Innovación, 2025)

Since then, Ailin Health has operated a hybrid business model targeting both Direct-to-Consumer (DTC) and Business-to-Business (B2B) segments. Ailin's market spans health-conscious individuals, chronic patients, people with fertility or hormonal concerns, and professional entities such as healthcare providers, insurers, and corporations seeking preventative health solutions. (Ailin, 2026)

The company delivers value through a streamlined four-step process:

- Selection and online order: the user purchases a kit online
- Collection and kit activation: the user performs a 5-minute home sample collection (blood, urine, or breath)

- Schedule pickup and shipment to the lab logistics: Ailin manages the home pickup and delivery to accredited laboratories

- Insights and results: results are delivered digitally through their app within 24–72 hours, featuring medical interpretation and personalized recommendations.

Revenue is generated through the online sale of the diagnostic kits. The company also offers subscription models for recurring health monitoring. In the B2B sector, Ailin partners with insurers, pharmaceutical companies, private clinics, and corporations to scale prevention programs. (Ailin, 2026)

Ailin's portfolio is over thirty different laboratory tests across several areas:

- Preventive and chronic health: including cardiovascular health, diabetes, renal function, and prostate cancer prevention.

- Hormonal health: focused on fertility, menstrual cycle control, thyroid function, and testosterone levels.

- Sexual health (STI/ETS): providing discrete testing for eleven major infections, including HIV, Syphilis, Chlamydia, etc.

- Digestive and functional health: including tests for SIBO, food intolerances (Lactose, Fructose), and Celiac disease.

- Performance: specializing in tests for sports performance measuring biomarkers like cortisol, creatine kinase, and liver enzymes to optimize training and recovery.

With this broad offer, Ailin occupies a pivotal position in the European digital health landscape. The company sits at the intersection of digital health and personalized medicine, leveraging the maturity of information and communication technologies to bridge the gap between home-based convenience and clinical grade accuracy. Moreover, what sets Ailin apart is its ability to combine accredited laboratory rigor

with the scalability of AI-driven technology, positioning it as a meaningful player in the ongoing digital transformation of European healthcare. (CDTI Innovación, 2025)

Unlike traditional laboratories or pharmacy rapid tests, Ailin integrates high-standard clinical partnerships, including Clínica Universidad de Navarra and Reference Laboratory, both ISO 15189 and CAP certified[1], with AI models trained by and for doctors. These models generate clear, visual diagnostic reports while preserving final human medical validation, ensuring both accessibility and clinical credibility. (Ailin, 2026)

Lastly, Ailin is currently in its scaleup phase, having expanded from Spain and Portugal into seven European countries through pilot programs and strategic partnerships. Its progress has been widely recognized, with awards including the Premio Emprendedoras 2022 for Innovation and the Expansión Health Award, as well as a finalist position at AI Andalus Innovation Venture. (AI-Andalus Innovation Venture, 2023)

[1] international accreditation standards for medical laboratories that certify the lab meets rigorous quality and competency requirements for diagnostic testing

3. AS-IS stock management process mapping

3.1. End-to-end inventory flow

Ailin's inventory lifecycle consists of three stages: first, components are received from suppliers; then, they are internally assembled into semi-finished kits; and finally, they are turned into finished kits before being shipped to end customers. The weaknesses in Ailin's current model are not concentrated in a single step, but are spread across every transition point in the chain. (A. da Silva, personal communication, May 2026)

Incoming inventory arrives in the form of raw components, mainly lancets, microtubes, urine collection tubes, breath test tubes, biosafety bags, instruction leaflets, cardboard packaging, and auxiliary materials such as gloves and gauze. Upon arrival they are manually counted and logged into a spreadsheet. Lot numbers and expiry dates are also entered manually. There is no systematic scanning or barcode-based receipt system, meaning that the accuracy of the goods-in record depends entirely on human performance. (A. da Silva, personal communication, May 2026)

Once the components arrive at the warehouse, they remain there until they are needed for the manufacture of the kits. The kits can be either manufactured in their entirety (finished kits) or in part (semi-finished kits), therefore, following each manufacturing process, both finished and semi-finished kits are returned to the warehouse, depending on current needs and demand. (A. da Silva, personal communication, May 2026)

In the case of semi-finished kits, the core kit contents are partially assembled but not sealed or labelled in final form. This intermediate stage of the assembly process is a deliberate response to the constraints imposed by the expiry dates of healthcare products. Because finished kits have a usable life of approximately six months from assembly, pre-assembling to the finished state too early would unnecessarily consume that shelf-life window. (A. da Silva, personal communication, May 2026)

Thus, the semi-finished stock works as a buffer, it preserves optionality by allowing Ailin to finalize assembly closer to the point of confirmed demand and it reduces the risk of expiry on fully built units.

The assembly process is triggered reactively. When an order volume warrants it or when finished kit stock falls to a certain level, the operations team manually takes semi-finished kits and completes the final assembly step, inserting expiry-dated consumables, adding labelled packaging, attaching identification stickers and verifying kit completeness. (A. da Silva, personal communication, May 2026)

Outbound fulfillment begins when a customer order is received through the online store or it is placed by a business. Orders are picked manually from the finished kit stock, packed and dispatched via a logistics partner for home delivery or return-to-lab coordination. (A. da Silva, personal communication, May 2026)

Once a kit leaves the warehouse, it does not re-enter the inventory record under any circumstances. This one-way flow complies with regulatory and hygiene requirements, but it means there is no mechanism for recovering or reallocating stock once it has left the warehouse, even in cases where orders are cancelled.

3.2. Process mapping and time analysis

The monthly manual inventory count is the most time-consuming inventory management task in Ailin's current model, consuming approximately ninety minutes of skilled employees' work. A complete count covers components, semi-finished kits and finished kits. (A. da Silva, personal communication, May 2026)

The reconciliation step that follows is where the most significant time loss occurs. Discrepancies between the physical count and the spreadsheet must be investigated manually, which makes it impossible to estimate how long it can take.

The production planning process, determining how many semi-finished kits to advance to finished status, is similarly informal. There is no established planning cycle, no formal demand sign justifying the decision and no systematic linkage between sales history and assembly volume. The person responsible for this decision draws on accumulated experience and current visibility of finished stock. (A. da Silva, personal communication, May 2026)

The time spent on this activity is included in the overall workload rather than being measured as a separate planning cost, which means it is not perceived as a cost factor; however, this does not make it any less significant in terms of its impact.

Purchase order generation follows a comparable pattern. When a component is perceived to be running low an order is placed, typically to a single supplier for that component type. The trigger for ordering is not a data-based reorder point but a subjective recognition that stock appears insufficient, often identified during or shortly after the monthly count. (A. da Silva, personal communication, May 2026)

Lead times and minimum order quantities are known informally but are not incorporated into order sizing decisions. The result is a purchasing pattern that varies substantially from one month to the next with no consistent relationship to actual consumption rates.

The current dataset records approximately forty discrete SKU entries, each with individual lot numbers, expiry dates, unit-per-box configurations and box counts. The total number of active lot entries requiring simultaneous expiry monitoring exceeds thirty. Managing this volume manually, across monthly cycles, entails a considerable administrative burden, which is incompatible with the reliability required of a regulated medical device.

3.3. Bottlenecks, dependencies, and failure points

The most consequential structural bottleneck in Ailin's current model is the single-person dependency in inventory management. The decision of how many kits to assemble, when to reorder components and how to prioritize assembly across SKUs is concentrated in one individual.

This individual is not exclusively dedicated to inventory management, its role spans multiple operational functions. The result is that decisions regarding stock are made reactively, over limited periods of time, rather than proactively through a structured planning process.

This concentration of knowledge and decision-making power creates fragility at multiple points. When demand spikes, the response is delayed because the planning decision must compete with other priorities for that person's attention. Furthermore, when that person is unavailable, inventory decisions are either postponed or made by others without the same knowledge. Since the planning logic is not documented or encoded in any system, it cannot be audited, improved or handed over cleanly.

A second bottleneck appears at the component level. Ailin's diagnostic kits, despite their diversity as finished products, share a large proportion of the same components. This means that a stockout of a single shared component simultaneously blocks the production of every finished kit that requires it.

The current system has no mechanism for identifying this risk. The team cannot determine from looking at the spreadsheet which finished kits are at risk of a production blockage caused by a component shortage.

Another dependency is found in the supplier relationship. Ailin purchases components from a relatively narrow set of specialized medical supply vendors. Minimum order quantities, supplier lead times and pricing structures are not formally documented. When a component is urgently needed, the absence of documented

lead time data makes it difficult to evaluate whether a standard reorder will arrive in time or whether an expedited order is necessary.

4. Analysis of the current challenges in inventory management

4.1. Challenges stemming from manual intervention: errors and delays

Manual data entry produces errors because of the complexity of repetitive numerical tasks at high volume. Studies show that even careful manual inventory processes have error rates of around 1–3%. That might seem quite small, but in a business, it translates directly into lost sales, excess stock and unhappy customers.

Typically, manual inventory counts are done quarterly or annually, but in the case of Ailin they are done once per month. The main risk present in this manual system is that accuracy is directly constrained by fatigue and concentration limits. This practice is very cognitively demanding, time-sensitive and prone to error.

In the current model every inventory record, component quantities, lot numbers, expiry dates, etc., is entered manually into a spreadsheet. During the reconciliation process that follows, more errors arise. When the physical count does not match the spreadsheet, there is no transaction log to explain the inconsistency. Movements and changes in inventory that occur between counts, such as components drawn for assembly, partial lot usage or materials taken for quality checks, are not individually recorded in real time.

Therefore, the reconciliation process does not differentiate a genuine counting error or data entry error from an unrecorded movement or a theft or damaged product. This outcome undermines the integrity of the stock record and diminishes the accuracy of the data the team is working with.

Along with the lack of real-time transaction logging, the warehouse also has no effective access control from an inventory perspective. Meaning, multiple team members enter the storage area and handle components, but these movements are not recorded in the system.

In high-activity periods, such as in the weeks before a major B2B campaign dispatch or during demand peaks, the impact of unrecorded movements accumulates and can create a meaningful gap between the spreadsheet and the actual availability. Stockouts, if not recorded, lead to delays because the kits cannot be completed.

4.2. Challenges stemming from the system: visibility, traceability and data gaps

The most significant visibility problem in Ailin's current model is the absence of any linkage between the three inventory levels: components, semi-finished kits and finished kits. Only components and other raw materials are listed on the spreadsheet, while semi-finished and finished kits are still kept in the warehouse until they are sold. Not knowing how many kits are available for sale becomes a serious visibility problem.

Another severe visibility issue is when a high-demand SKU faces a component shortage. Because most kits share the same components, if one component’s stock falls below the minimum required to assemble the next production run, it does not affect a single SKU in isolation, it simultaneously blocks every kit that requires that component.

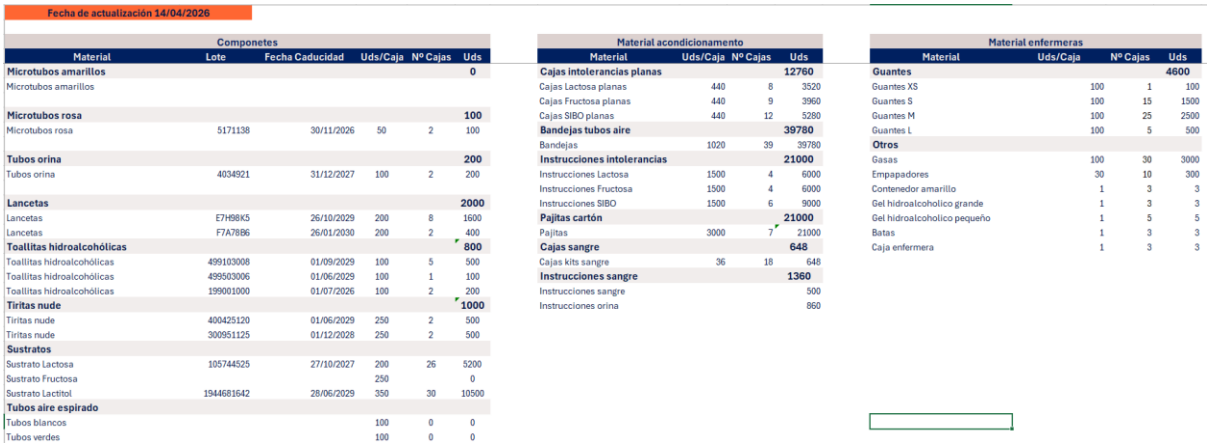
In the current system this shortage is most likely not visible until the assembly team begins the production run and discovers the gap. At that point, the only available response is an emergency procurement order, which typically involves a cost premium and a lead time that may not be compatible with pending order commitments.

Lot traceability is similarly incomplete. The April 2026 inventory snapshot records lot numbers and their expiry dates for the majority of component entries. Many components have more than one lot and corresponding expiry date, for example hydroalcoholic wipes. Managing this multi-lot complexity manually, without

automated FEFO enforcement, holds the risk that older lots are consumed after newer ones simply because they happen to be physically more accessible or because the person using them is unaware of the different expiry dates.

Moreover, lots are not linked to customers in the inventory record, and the absence of a digital trail means that in the event of having to recall a batch of kits, manual reconstruction from order records, shipping documents and memory is not reliable and fast enough.

Lastly, data gaps go beyond the warehouse into the demand side of the kits. Order data generated by the e-commerce platform and B2B channel is not systematically consolidated with inventory records. Failing to link this information means that the inventory management function operates without access to demand signals, which should be its most important input data. Therefore, purchasing decisions are based on current inventory levels and recent experience, rather than on a forecast of what demand will be during the next replenishment period.



Fecha de actualización 14/04/2026

Componetes

Material	Lote	Fecha Caducidad	Uds/Caja	Nº Cajas	Uds
Microtubos amarillos					**0**
Microtubos amarillos					
Microtubos rosa					**100**
Microtubos rosa	5171138	30/11/2026	50	2	100
Tubos orina					**200**
Tubos orina	4034921	31/12/2027	100	2	200
Lancetas					**2000**
Lancetas	E7H98K5	26/10/2029	200	8	1600
Lancetas	F7A78B6	26/01/2030	200	2	400
Toallitas hidroalcohólicas					**800**
Toallitas hidroalcohólicas	499103008	01/09/2029	100	5	500
Toallitas hidroalcohólicas	499503006	01/06/2029	100	1	100
Toallitas hidroalcohólicas	199001000	01/07/2026	100	2	200
Tiritas nude					**1000**
Tiritas nude	400425120	01/06/2029	250	2	500
Tiritas nude	300951125	01/12/2028	250	2	500
Sustratos					
Sustrato Lactosa	105744525	27/10/2027	200	26	5200
Sustrato Fructosa			250		0
Sustrato Lactitol	1944681642	28/06/2029	350	30	10500
Tubos aire espirado					
Tubos blancos			100	0	0
Tubos verdes			100	0	0

Material acondicionamento

Material	Uds/Caja	Nº Cajas	Uds
Cajas intolerancias planas			**12760**
Cajas Lactosa planas	440	8	3520
Cajas Fructosa planas	440	9	3960
Cajas SIBO planas	440	12	5280
Bandejas tubos aire			**39780**
Bandejas	1020	39	39780
Instrucciones intolerancias			**21000**
Instrucciones Lactosa	1500	4	6000
Instrucciones Fructosa	1500	4	6000
Instrucciones SIBO	1500	6	9000
Pajitas cartón			**21000**
Pajitas	3000	7	21000
Cajas sangre			**648**
Cajas kits sangre	36	18	648
Instrucciones sangre			**1360**
Instrucciones sangre			500
Instrucciones orina			860

Material enfermeras

Material	Uds/Caja	Nº Cajas	Uds
Guantes			**4600**
Guantes XS	100	1	100
Guantes S	100	15	1500
Guantes M	100	25	2500
Guantes L	100	5	500
Otros			
Gasas	100	30	3000
Empapadores	30	10	300
Contenedor amarillo	1	3	3
Gel hidroalcoholico grande	1	3	3
Gel hidroalcoholico pequeño	1	5	5
Batas	1	3	3
Caja enfermera	1	3	3

Figure 1: Ailin's inventory excel.

Source: Ailin 2026

5. Functional requirements for a technological solution

5.1. Core inventory management requirements

The basis of an effective inventory solution for Ailin has to be a reliable and continuously updated record of stock status. The shortcomings of Ailin's current model, monthly manual counts, reconciliation delays, and a lack of channel-level visibility, make this the most operationally urgent requirement area.

The following requirements define the minimum capabilities the system must provide to ensure that inventory data is accurate, current, and actionable across all sales channels and storage locations. These requirements are based on an initial conversation with A. Vacas, the operations manager.

- Requirement 1: Real-Time, multi-channel inventory visibility

The system must maintain and display current stock levels across all active sales channels and physical locations simultaneously. For Ailin, this means real-time synchronization between its e-commerce storefront, any B2B order portals, and the warehouse, so that every transaction, whether a direct consumer sale, a corporate order, or an internal stock movement, is immediately reflected in a unified inventory record.

The absence of this capability is one of the primary causes of stockouts and overstocking episodes, since decisions made on last month's count have no reliable relationship to actual availability at the moment of sale. The system must be capable of handling simultaneous updates from multiple channels without creating discrepancies in the underlying stock record.

- Requirement 2: FEFO stock rotation and expiry date management

Given that Ailin's products are perishable medical devices with finite shelf lives, the system must enforce First-Expired, First-Out (FEFO) stock rotation logic as a core operating principle rather than as a manual override. This means that whenever a

pick or fulfillment instruction is generated, the system must automatically direct warehouse staff toward the units with the earliest expiry date, regardless of receipt sequence.

Moreover, the system must maintain a complete, searchable expiry register across all SKUs and storage locations, with configurable automated alerts triggered at user-defined thresholds, for example thirty days before expiry. This allows the operations team to take pre-emptive action, whether through promotional pricing, reallocation, or supplier returns, before products become unsellable.

- Requirement 3: Lot-level traceability and product recall readiness

Ailin's products are regulated medical devices in markets subject to European health and consumer protection standards. Accordingly, the system must support granular lot and batch tracking from the moment a shipment is received from a supplier through to final delivery to the end customer. This bi-directional traceability, forward from supplier receipt to customer shipment, and backward from a customer complaint to the specific lot of origin, is an essential prerequisite for executing a product recall in a compliant and timely manner.

Therefore, the system must be capable of generating a complete lot history for any item, identifying all customers who received units from a given batch, and flagging remaining units of that batch as quarantined or recalled within the active stock record. This requirement is key given the regulatory environment in which Ailin operates.

- Requirement 4: ABC-XYZ inventory classification

Not all of Ailin's more than thirty SKUs carry equal operational weight or demand the same management intensity. The system must support, or enable, classification of the product portfolio using a combined ABC-XYZ framework. ABC classification based on revenue contribution or cost weight, and XYZ classification based on demand variability.

This segmentation directly informs differentiated replenishment policies, safety stock levels, and review frequencies, ensuring that high-value, unpredictable SKUs receive closer monitoring while lower-value, stable products can be managed with lighter-touch automation.

While this analysis can initially be conducted outside the system using Power BI dashboards as a transitional measure, the target state solution should be capable of applying and refreshing these classifications automatically as transactional history accumulates.

- Requirement 5: Cycle counting and inventory auditing support

Ailin currently conducts a full inventory count once per month, consuming significant staff hours and producing a snapshot that is already partially outdated by the time it is reconciled.

The system must enable a transition to continuous cycle counting, in which sub-sets of the product portfolio are counted on a rolling basis throughout the month without interfering operations.

The system must support configurable cycle count schedules, generate count tasks and discrepancy reports automatically, and update the perpetual inventory record in real time upon completion. This approach maintains a consistently accurate inventory record while dramatically reducing the labor burden compared to periodic full counts.

5.2. Forecasting, planning, and replenishment requirements

The operational cost of poor forecasting at Ailin manifests in two ways: emergency orders placed at premium prices when stock runs out unexpectedly, and unused working capital tied up in slow-moving inventory accumulated through over-purchasing.

Both conditions stem from the same root cause, a reliance on experience-based judgment rather than data-driven demand modeling. The requirements in this section define what the system must be capable of in order to replace that judgment with structured, model-informed planning.

- Requirement 6: Automated demand forecasting adapted to Ailin's variability profile

Ailin's demand is characterized by structural instability, seasonal health trends, periodic disease outbreaks, media-driven spikes in consumer interest, and asymmetric B2B order patterns, all introduce variability that simple averages cannot adequately capture.

The system must support statistical demand forecasting methods suitable for irregular, intermittent, or seasonally driven demand patterns. This includes support for time-series decomposition capable of separating seasonal, trend, and residual demand components, and ideally incorporates ARIMA-class or machine learning-based models for SKUs with sufficient historical data.

Forecast accuracy must be measurable through standard metrics such as Mean Absolute Percentage Error (MAPE) and Forecast Value Added (FVA), enabling continuous monitoring and model improvement. Where historical data is insufficient, as may be the case for recently launched SKUs, the system should support a transition period in which manual estimates or analogous-product benchmarks can be used as interim inputs.

- Requirement 7: Automated reorder point calculation and safety stock optimization

The system must calculate and maintain dynamic reorder points and safety stock levels for each active SKU based on actual demand variability and supplier lead times, rather than static thresholds set by management judgment. Reorder points must be updated automatically as demand patterns and lead time data evolve,

ensuring that the triggers that initiate replenishment remain calibrated to current operating conditions rather than historical assumptions.

Safety stock levels must reflect the desired service level for each product category, incorporating lead time variability and demand variability in their calculation. This is particularly critical for Ailin's highest-frequency SKUs, where a stockout can directly translate to a lost sale, a degraded customer experience, and potential reputational damage in a market where trust in health-related services is very important.

- Requirement 8: Automated purchase order generation and supplier coordination

When a reorder point is reached, the system must be capable of generating a draft purchase order automatically and routing it for human approval before transmission to the supplier.

The order quantity logic must incorporate Economic Order Quantity (EOQ) principles, balancing ordering costs against holding costs to identify the financially optimal order size given current cost parameters. The system must allow managers to review, amend, and approve orders before they are sent, preserving human judgment over final purchasing decisions while eliminating the manual effort involved in preparing orders from scratch.

Upon approval, purchase orders should be transmissible directly to suppliers through the system, either via email automation or API integration, creating an auditable procurement record aligned with each supplier's lead time and minimum order quantity parameters.

- Requirement 9: Deadstock detection and clearance workflow support

Inventory that approaches its expiry date without a confirmed demand path represents a direct financial write-off for Ailin, compounded by the disposal costs and regulatory implications associated with medical waste.

The system must proactively identify at-risk inventory stock approaching expiry with insufficient projected demand to clear it within the usable window, and surface it to the operations team with sufficient advance notice to take corrective action.

This may include priority picking rules that route near-expiry stock to the next available order, promotional pricing recommendations, or reallocation to high-demand channels. The system must support the tagging and management of deadstock through to final resolution, maintaining a record of each disposition decision for regulatory and financial reporting purposes.

5.3. Integration, data, and reporting requirements

The value of any inventory management system is substantially conditioned by its ability to communicate with the broader operational ecosystem in which it sits. However, Ailin's current data architecture is fragmented: inventory data lives in spreadsheets, order data lives in the e-commerce platform, and supplier information is managed through email and informal records.

A solution that solves the inventory tracking problem in isolation while leaving these interfaces manual would replicate rather than solve the underlying information fragmentation. The requirements in this section define the connectivity and reporting capabilities the system must provide.

- Requirement 10: Native or API-based integration with the e-commerce platform

The system must integrate directly with Ailin's existing e-commerce platform, such that every customer order placed online immediately reduces available stock in the inventory system without requiring any manual data entry. This bidirectional synchronization, order out, stock down, is the integration requirement and eliminates one of the most frequent and consequential sources of error in the current model.

The integration must handle product variants, multi-unit orders, and order cancellations correctly. It must also support the automated generation of fulfillment instructions, picking lists, and shipping confirmations within a coherent order management workflow.

- Requirement 11: Centralized reporting and KPI dashboard

Decision-making at Ailin currently depends on manually done reports that are labor-intensive to produce and quickly become obsolete by the time they are reviewed. The system must generate automated, near-real-time dashboards covering the core inventory performance indicators relevant to Ailin's business. These include stock coverage by SKU, days of inventory on hand, fill rate, perfect order rate, carrying cost rate, stockout frequency, and expiry-related write-offs.

Dashboards must be accessible to relevant stakeholders, operations, procurement, and management, without requiring technical expertise to navigate. The ability to export underlying data in structured formats for further analysis remains important, particularly during the transitional period before a fully integrated solution is in place.

- Requirement 12: Data portability and vendor independence

Given Ailin's current scale and growth trajectory, the company may need to migrate between systems as its operational complexity increases. Any solution selected must allow full export of historical inventory data, transaction logs, and supplier records in standard, machine-readable formats.

Vendor lock-in, whether through proprietary data schemas, restrictive export policies, or bundled dependencies, represents a meaningful long-term risk for a company at Ailin's stage. This requirement also applies to integration configurations: the system's API layer must be documented and accessible, enabling future integrations with laboratory management systems, ERP modules, or additional sales channels without requiring vendor authorization or bespoke development work.

5.4. User, scalability, and change management requirements

The most technically capable system will fail in practice if it is not adopted by the team that operates it. Ailin is a small, fast-moving organization in which operational staff are asked to wear multiple roles, and where the tolerance for complex workflows or lengthy onboarding processes is limited.

Equally, the solution selected today must remain viable as the company scales through its planned European expansion, rather than requiring replacement within a short horizon. The requirements in this section address the human and organizational dimensions of system selection.

- Requirement 13: Usability and operational accessibility

The system must be operable by non-technical staff without requiring deep training in inventory management software or IT systems. Key workflows, receiving goods, processing a sale, initiating a reorder, running an expiry report, must be fulfillable in a small number of steps, with clear confirmation messages and error handling that guides the user toward resolution.

Mobile accessibility is important in a warehouse or pick-and-pack context, where staff are unlikely to be seated at a desktop workstation during operations. The interface must be available in Spanish and ideally in the other languages of the European markets in which Ailin wants to operate, reducing challenges for any non-English speaking members of the operations team.

- Requirement 14: Scalability for European market expansion

Ailin has expanded beyond Spain into seven European countries through pilot programs and partnerships, and its growth strategy implies continued geographic reach. The system must be capable of supporting multi-country, multi-currency, and

multi-warehouse operations, even if these capabilities are not activated at the point of initial implementation.

A solution that meets current needs but requires replacement at the two or three hundred order-per-day threshold creates implementation risk and disruption cost that is entirely avoidable with appropriate solution selection now.

- Requirement 15: Phased implementation compatibility and low disruption risk

The transition from Ailin's current manual model to a more structured automated one must be managed progressively to avoid operational disruption during the migration period.

The selected solution must support a phased rollout, for example, beginning with real-time inventory tracking and expiry management before adding demand forecasting and automated replenishment, so that the team can build familiarity with the system incrementally.

This requirement rules out solutions that require a full organization-wide go live before delivering any operational benefit. It also implies that the solution must support a parallel run period during which both the existing process and the new system operate simultaneously, allowing discrepancies to be identified and resolved without putting live customer orders at risk.

- Requirement 16: Total cost of ownership compatible with SME financial constraints

Ailin is an early-stage scaleup operating under real financial constraints. The total cost of ownership of any selected solution, encompassing licensing or subscription fees, implementation costs, integration development, training, and ongoing maintenance, must be proportionate to the operational benefit delivered and to the company's current revenue base. The preferred solution must deliver a credible return on investment within eighteen to twenty-four months of full deployment.

6. Benchmarking of inventory management and forecasting solutions

For any company, inventory represents tied-up capital, with its corresponding operational risk. Understanding how to manage it better is often one of the fastest ways to improve performance. Automation is a great opportunity for efficiency.

Inventory automation is the use of technology to track, manage and update stock levels and forecast demand automatically, without requiring constant manual intervention. Movements are recorded in real time whenever something happens, such as receiving goods from a supplier, using materials internally, or fulfilling a customer order.

In practice, the scope of automation can range from something as simple as a barcode scanning system at a single location, to a fully integrated platform connecting suppliers, warehouses, retail points, and customers across multiple countries. The key idea is that the system becomes the single source of information, continuously updated as operations happen.

6.1. Benchmarking approach and evaluation criteria

This benchmark provides a structured, evidence-based evaluation of six inventory management solutions for Ailin. The evaluation is designed to support Ailin’s team in making an informed, cost-conscious decision about which technology approach or which combination of approaches best addresses the company's operational requirements today and accommodates its anticipated growth trajectory.

Ailin’s model introduces specific inventory management challenges that differentiate it from conventional product companies: shelf-life sensitivity and expiry-driven stock rotation; demand variability driven by seasonal health trends, media cycles, and disease outbreaks; direct-to-consumer fulfillment requiring precise pick-pack-ship accuracy; regulatory sensitivity around lot traceability and product recall readiness;

and supplier concentration risk in a specialized components market. Any inventory solution must be evaluated against these structural realities.

Six solutions were analyzed across eleven criteria, weighted to reflect Ailin Health's operational priorities. The solutions range from enterprise ERP platforms (SAP) to lightweight operational philosophies (JIT), with CRM-based tools, automation bots, analytics stacks, and platform-native inventory tools examined in between. Each solution is assessed on its own merits and in terms of its potential role within a broader technology ecosystem.

6.2. Overview of selected market solutions

The following provides a structured assessment of each solution's capabilities, limitations, and contextual fit for Ailin’s operational model.

1. SAP (ERP-based inventory management)

SAP represents the standard in companies’ resource planning and offers the most comprehensive inventory management capabilities of any solution evaluated. SAP serves as a centralized source of information by consolidating all business functions (finance, procurement, warehouse, and sales) into a unified data model. Its mechanics rely on in-memory computing (SAP HANA), which allows it to process massive datasets in real-time, enabling immediate updates to inventory across all steps of the supply chain when a transaction occurs. (SAP, 2026)

Its modules, particularly SAP EWM (Extended Warehouse Management) for granular bin-level control and SAP IBP (Integrated Business Planning) for demand sensing, provide end-to-end control over stock levels, demand signals, supplier coordination, and regulatory compliance. For a healthcare diagnostics company, SAP's built-in support for FEFO (First Expired, First Out) rotation, GS1 barcode compliance, lot traceability, and serialization are critical differentiators. (SAP, 2026)

The fundamental challenge for Ailin Health is SAP's cost and complexity profile. A full SAP S/4HANA implementation routinely requires six-figure licensing fees, a certified implementation partner, a multi-year deployment timeline, and dedicated IT infrastructure. (SAP, 2026)

These demands typically price out companies with fewer than 200 employees or annual revenues below fifty million euros. Moreover, implementing SAP requires significant IT infrastructure and typically a multi-year deployment involving certified consultants to map complex business processes.

Unless Ailin Health has secured institutional investment and is planning for significant scale within a 3–5 year horizon, SAP should be considered a future-state aspiration rather than an immediate solution.

However, SAP Business One offers a more modular, SME-focused alternative; and provides a more accessible entry point with substantially reduced licensing and implementation costs while retaining core inventory and compliance features. (SAP, 2026)

SAP Business One:

The system is structured around a set of tightly integrated functional modules that collectively cover most core business activities. Purchasing and Inventory functionalities handle procurement processes, goods receipts, landed costs, and inventory master data, including stock transfers and pricing structures. Additionally, for companies with manufacturing needs, the Production and MRP module enables the management of bills of materials (BOMs), work orders, and material requirements planning. (SAP, 2026)

These operational capabilities are complemented by robust reporting and analytics tools, including integration with SAP Crystal Reports and, in HANA-based environments, advanced real-time dashboards and predictive insights. (SAP, 2026)

By 2026, SAP Business One has evolved significantly, incorporating intelligent automation and artificial intelligence capabilities. Tools such as SAP Document AI and SAP Build Process Automation streamline repetitive, high-volume processes like invoice handling and sales order entry. The introduction of a modern, Fiori-based web client has further enhanced usability, allowing secure browser-based access from multiple devices and improving overall user experience. (SAP, 2026)

For organizations requiring high performance, the system can run on the SAP HANA in-memory database, which processes data directly in RAM and enables rapid analysis of large datasets compared to traditional disk-based systems. (SAP, 2026)

From a technological standpoint, businesses can choose between on-premise deployment and cloud-based hosting, often delivered through SAP-certified partners or hyperscalers. In terms of database options, companies typically decide between Microsoft SQL Server and SAP HANA. While SQL Server represents a more cost-effective and traditional solution suitable for moderate data volumes and standard reporting, SAP HANA offers advanced capabilities such as enterprise search, real-time cash flow forecasting, and interactive dashboards. (SAP, 2026)

The licensing model for SAP Business One is partner-driven and generally structured around user roles and pricing approaches. Licenses are divided into Professional users, who have full system access, and Limited users, whose access is restricted to specific functional areas such as finance, CRM, or logistics. Pricing can follow either a subscription-based cloud model, with monthly per-user fees, or a perpetual license model involving a one-time payment plus annual maintenance costs. (SAP, 2026)

Implementation of SAP Business One typically varies in scope depending on business complexity, ranging from approximately 25.000 to over 150.000 euros. The system is also highly extensible, offering integration capabilities through its Integration Framework (B1i) and a modern Service Layer based on OData and REST APIs, enabling seamless connections with third-party applications, mobile solutions, and eCommerce platforms. (SAP, 2026)

2. Salesforce (CRM + inventory capabilities)

Salesforce operates as a Platform-as-a-Service (PaaS) feeding demand signals directly from customer interactions into the supply chain. Its primary value proposition for Ailin Health lies in its customer relationship management capabilities, not its inventory management depth. Through the Salesforce platform, teams can track orders, customer interactions, subscription history, and demand signals from a single system, a meaningful advantage for a diagnostic company where customer data is a key strategic asset. (Blanch, 2025)

However, Salesforce does not offer a built-in, purpose-built inventory management module. Its mechanics for inventory management rely on metadata-driven customization and inventory functionality must be added through third-party AppExchange applications such as Fishbowl, Skuvault, or custom Salesforce Objects, which increases implementation complexity and cost. (Salesforce, 2026)

Critically, Salesforce lacks the healthcare-specific compliance features, lot tracking, expiry management, cold chain monitoring; that Ailin Health requires. As a standalone inventory solution, Salesforce scores poorly. As a complement to a dedicated inventory or ERP system, it offers genuine value as the customer-facing intelligence layer, feeding demand signals into a more capable back-end system. (Salesforce, 2026)

3. RPA — Robotic Process Automation

Robotic Process Automation consists of software bots that mimic human interactions with digital systems, such as clicking on screens, typing credentials, and moving files between applications. RPA tools, such as Blue Prism, Automation Anywhere or Microsoft Power Automate, do not constitute an inventory management system in themselves. Rather, they serve as automation bridges between systems that do not natively communicate. (El ecosistema startup, 2026)

RPA does not require changing the underlying code of existing software. Instead, it works at the presentation layer (UI), making it ideal for connecting legacy systems that lack modern APIs. Advanced implementations (Intelligent Process Automation) can integrate OCR and AI to handle non-structured data like reading PDF invoices. (Microsoft, n.d.)

A standard RPA architecture involves a Client Layer (where bots are designed), a Server Layer (an Orchestrator to schedule and monitor bots), and a Persistency Layer (for database logging). (Iberdrola, n.d.)

For Ailin Health, RPA can be a high-value tactical tool: automating the transfer of order data from the online store into spreadsheets or an ERP, triggering purchase orders when stock thresholds are crossed, reconciling supplier invoices against received inventory, or generating weekly inventory reports from disparate data sources.

RPA is most effective when the underlying processes are well-defined, stable, and repetitive. Its key weakness is fragility, since bots break when the underlying UI or data format changes, requiring ongoing maintenance. RPA should be viewed as a bridge technology that extends the life and capability of existing tools, not as a strategic inventory platform. For Ailin Health at its current stage, a focused RPA implementation targeting two or three high-frequency manual processes could yield a meaningful productivity gain at relatively low cost. (Microsoft, n.d.)

4. Power BI + automated Excel

The combination of Microsoft Power BI for high-end visualization and Excel (with Power Query and macro automation) for data management and manipulation represents a pragmatic and widely accessible approach for companies in Ailin Health's maturity range. This stack allows teams to build real-time dashboards, automate routine reporting, and construct semi-automated reorder models without enterprise software costs. (Microsoft, 2026)

The engine of this approach is Power Query, which automates the ETL (Extract, Transform, Load) process. It can consolidate data from multiple files, clean irregular formats, and cross-reference tables automatically every time the source data is updated. Dynamic array formulas (e.g., FILTER, UNIQUE) allow for ranges that automatically resize as data grows. (Shaikh, n.d.)

Furthermore, Power BI is genuinely best-in-class for business intelligence, and its ability to connect to multiple data sources, including the online store, supplier portals, and internal spreadsheets; makes it a powerful analytical layer. (Datahack, 2026)

For Ailin Health, this approach typically involves using Excel macros (VBA) to manage a structured expiry tracking log and Power BI to build dashboards for ABC-XYZ inventory classification.

The critical limitation is the Excel component, while Power Query and VBA macros reduce manual effort, Excel is fundamentally not an inventory system. It lacks multi-user transaction control, audit trails, and the batch or lot tracking required for diagnostic kit compliance. (Microsoft, 2026)

This stack is a strong transitional solution appropriate for Ailin Health today, but will become inadequate as transaction volumes grow. The recommended approach is to use Power BI + automated Excel now while building toward a dedicated inventory system.

5. Inventory management via online store (Shopify, WooCommerce, etc.)

Platform-native inventory management, offered by e-commerce systems such as Shopify, WooCommerce, or BigCommerce, is the most contextually relevant starting point for a DTC diagnostic kit company. Platform-native tools are embedded directly into the order management system, eliminating the need for complex external integrations. (Ellacott, 2023)

These platforms track stock levels in real time, trigger low-stock alerts, manage product variants, and, in Shopify's case, integrate with third-party logistics (3PL) providers and barcode scanning workflows. (Shopify, 2026)

For multichannel operations, tools like Stock Sync can automatically poll supplier CSV feeds or Google Sheets to update store inventory on a schedule. Extensions like Scanventory or Shopify's barcode apps enable physical warehouse scanning via smartphones. (Shopify, 2026)

The limitations are meaningful but manageable. Native platform inventory tools do not support lot tracking, expiry date management, or regulatory compliance documentation out of the box. Demand forecasting is rudimentary. Multi-location inventory management is possible but limited. (Woocommerce, 2026)

For Ailin Health operating at current scale, the online store's inventory module likely covers 70–80% of operational needs. The remaining gaps, shelf-life tracking, demand forecasting, supplier coordination, can be addressed through targeted add-ons (e.g., Katana, Linnworks, or DEAR Inventory integrated with Shopify) rather than a full ERP replacement. (Woocommerce, 2026)

6. Just-in-Time (JIT) inventory system

JIT is an operational philosophy rather than a specific software system. JIT aims to minimize inventory holding costs by synchronizing procurement precisely with demand, receiving goods only when they are needed for production or fulfillment. Its origins in lean manufacturing make it highly effective in high-volume, predictable production environments with reliable suppliers and stable demand. (Alonso, 2025)

It utilizes a "Pull" system, where production is guided by real-time customer demand rather than static forecasts. This is managed through Kanban signals (visual cards or digital markers) that trigger replenishment only when a specific bin is emptied. (Institute for Manufacturing, n.d.)

JIT demands a highly reliable supplier network located in close proximity to minimize lead times. It also requires a Total Productive Maintenance (TPM) approach to ensure zero equipment downtime, as there is no safety stock buffer to absorb delays. (Cvetkovic, 2022)

For Ailin Health, JIT presents significant challenges that outweigh its cost-reduction benefits. Diagnostic kit demand is inherently variable, seasonal health trends, disease outbreaks, and media attention can trigger sudden demand spikes that JIT is structurally ill-equipped to absorb. Supplier lead times in the diagnostics supply chain can be long and subject to disruption, making just-in-time replenishment a stockout risk rather than a cost advantage.

Finally, diagnostic kits are perishable, regulated products, running on minimal safety stock with no buffer against demand variability or supplier delays is an operationally dangerous posture. JIT principles may inform specific process improvements, such as reducing overstock of slow-moving SKUs, but should not be adopted as a primary inventory strategy.

6.3. Comparative analysis: functional coverage and limitations

The following matrix evaluates all six solutions across eleven criteria on a 1–5 scale. Scores between 4 and 5 reflect strong performance, where outcomes consistently meet or exceed expectations. A score of 3 indicates acceptable performance, with requirements generally fulfilled but some room for improvement. In contrast, scores of 1 to 2 denote weak performance, where key expectations are not adequately met and substantial improvement is required. These scores reflect the solution's fitness for a company with Ailin’s profile.

The eleven selected criteria are:

- Implementation costs

- Implementation speed
- Scalability
- Real-time visibility
- Demand forecasting
- Automation depth
- Regulatory/shelf-life management
- Reporting and analytics
- Integration capability
- Maintenance burden
- SME suitability

Multi-criteria evaluation matrix of inventory management solutions:

	SAP	**Salesforce**	**RPA**	**Power BI + Excel**	**Online store**	**JIT**
Implementation costs	1/5	2/5	3/5	4/5	4/5	5/5
Implementation speed	1/5	2/5	3/5	4/5	5/5	4/5
Scalability	5/5	4/5	3/5	3/5	3/5	2/5
Real-time visibility	5/5	3/5	2/5	2/5	4/5	1/5
Demand forecasting	5/5	2/5	2/5	3/5	2/5	2/5
Automation depth	5/5	3/5	5/5	2/5	3/5	1/5

Shelf-life management	5/5	1/5	2/5	3/5	2/5	2/5
Reporting and analytics	5/5	4/5	2/5	5/5	3/5	1/5
Integration capability	5/5	4/5	4/5	3/5	3/5	1/5
Maintenance burden	2/5	3/5	2/5	3/5	4/5	4/5
SME suitability	1/5	3/5	3/5	4/5	5/5	4/5
Total	**40**	**31**	**31**	**36**	**38**	**28**

Figure 2: Multi-criteria evaluation matrix of inventory management solutions

Source: own work

- SAP:

SAP scores the overall best result. Although SAP scored the worst on implementation costs and speed and SME suitability, since its deployment typically requires a high six-figure investment in licensing and implementation, with timelines ranging from 12 to 24 months.

In contrast, it scored the highest on all other dimensions, except for maintenance burden. SAP represents a fully integrated, enterprise-grade inventory automation solution that once operational offers extensive scalability, capable of supporting virtually any transaction volume or organizational growth. The platform also provides full real-time visibility across all supply chain nodes, supported by advanced demand forecasting capabilities, including built-in machine learning and ARIMA models.

Automation is comprehensive, spanning end-to-end processes across ERP modules. SAP also includes robust regulatory and shelf-life management features, such as FEFO (First Expired, First Out) logic, lot tracking, and GS1 compliance.

From an analytics perspective, SAP delivers a complete business intelligence suite with KPI-driven dashboards. Integration capabilities are equally strong, with native support for EDI, APIs, and ERP-to-ERP connectivity.

Finally, SAP comes with a significant maintenance burden, as ongoing support typically requires certified SAP consultants. As a result, while SAP is highly capable, it is generally considered excessive for most SMEs due to its high total cost of ownership.

- Online Store:

The online store's overall results were second best. Scoring positively on implementation costs and speed, real-time visibility, maintenance burden and suitability for a SME. This is because the online store platforms provide a lightweight and accessible entry point into inventory automation, particularly suited for direct-to-consumer operations. Implementation costs are minimal, as inventory functionality is typically native to the platform, and deployment can be completed within days to weeks using built-in tools.

These platforms offer real-time visibility of stock levels within their ecosystem and support basic automation features such as reorder alerts and fulfillment workflows. However, scalability (3/5) is dependent on the underlying platform and may be constrained by SKU limits or transaction volumes.

Also scoring a medium/acceptable performance are maintenance requirements, which are low as the platform provider manages infrastructure and updates. Reporting functionality is basic, though data can be exported for external analysis, and integration is largely confined to native e-commerce ecosystems, with limited ERP connectivity.

Lastly, the online store fails on two important categories: demand forecasting and shelf-life management. Demand forecasting capabilities are limited to basic trend analysis, and regulatory or shelf-life management features are minimal, with no native support for batch or lot tracking.

Despite this, online store solutions are highly suitable for SMEs, particularly as an initial step into inventory management, but they lack the depth required for more complex operational environments.

- Power BI+Excel:

In the top three, the combination of Power BI and Excel offers a low-cost and accessible approach. Implementation is relatively fast, with initial dashboards typically developed within 4 to 8 weeks, and costs are largely limited to software subscriptions. This setup outperforms in reporting and analytics as well, with Power BI providing best-in-class visualization and dashboard capabilities.

Nonetheless, real-time visibility (2/5) is limited, as data refreshes occur on a scheduled basis rather than continuously. And automation (2/5) is partial, requiring human intervention for validation and decision-making.

As for the remaining criteria, acceptable performance (3/5) is achieved. This model still requires manual intervention, which prevents it from scoring higher. Demand forecasting must be conducted manually within Excel, as there are no built-in machine learning capabilities. Maintenance is also manual, particularly for spreadsheet-based processes. Regulatory and shelf-life management are handled manually too, increasing the risk of errors.

At last, scalability is a key limitation, as Excel-based processes tend to break down at higher data volumes, but integration is possible via APIs but typically requires developer support.

Despite these limitations, this approach remains highly prevalent among SMEs due to its accessibility and flexibility.

- Salesforce:

Salesforce provides a CRM-centric approach to inventory management, requiring additional modules or third-party applications to extend into inventory functionality. Implementation costs are mid-range, but the need for add-ons increases overall complexity. Deployment timelines typically range from 6 to 12 months, often following a CRM-first implementation approach.

The platform offers high scalability in its core CRM functions, though inventory-related extensions may not scale as effectively. Real-time visibility is near real-time, contingent on integration quality. Demand forecasting capabilities are basic and generally require third-party AI applications for more advanced functionality.

Automation is strong within CRM workflows but limited in inventory-specific processes. Salesforce is not inherently designed for regulatory or shelf-life management, particularly in highly regulated industries such as healthcare. Reporting capabilities are robust for CRM metrics but less effective for inventory-specific KPIs.

Integration is a key strength, supported by a large API ecosystem with over 3,000 available integrations. However, maintenance can be resource-intensive, requiring ongoing administrative oversight and app management. Salesforce is feasible for SMEs when properly scoped but may require careful configuration to align with inventory requirements.

- RPA:

Robotic Process Automation (RPA) solutions provide targeted automation by replicating human interactions with digital systems. Implementation costs are moderate and vary depending on the scope of processes being automated, with individual bot deployments typically taking 3 to 6 months.

RPA offers moderate scalability, as each new process requires the development and maintenance of additional bots. Real-time visibility is limited, as processes are generally executed in batches rather than continuously. While RPA can automate data collection and integration tasks, it does not provide native demand forecasting capabilities.

Automation depth is high for specific, well-defined tasks, enabling significant efficiency gains in repetitive processes. However, regulatory and shelf-life management depend on scripted rules, making them potentially fragile. RPA does not generate reporting outputs directly but instead feeds data into other systems.

Integration is achieved by bridging disparate systems without requiring deep system integration. However, maintenance is a notable challenge, as bots are sensitive to changes in user interfaces or process flows. RPA is best suited for SMEs seeking to address specific automation gaps rather than implement a comprehensive inventory solution.

- JIT:

Just-in-Time (JIT) is not a software solution but an operational philosophy focused on minimizing inventory levels through precise supply chain coordination. Implementation costs are minimal in direct financial terms, relying instead on organizational discipline and supplier alignment. Deployment can be rapid, though success depends heavily on supplier reliability.

Scalability is limited, particularly in complex supply chains, as the model requires tight coordination and predictability. JIT does not provide system-based real-time visibility, instead relying on the physical flow of goods. Similarly, demand forecasting assumes stable and predictable patterns rather than incorporating advanced analytical models.

Automation is minimal, as JIT is executed through operational practices rather than technology. Regulatory and shelf-life management are dependent on supplier

compliance rather than system controls. Reporting and analytics are not inherent to the approach, requiring manual KPI tracking.

There are no integration capabilities, as JIT does not function as a system. Maintenance efforts are centered on ongoing supplier relationship management. JIT is suitable only in simple, stable environments where variability is low and supply chain coordination can be tightly controlled.

6.4. Synthesis of benchmarking results

No single solution covers all of Ailin's needs at its current stage. The practical answer is a combination of tools, with a clear migration path as the business grows. The online store platform (Shopify or equivalent) is the natural starting point. It is native to Ailin's DTC channel, can be deployed in days, and covers roughly 70–80% of current operational needs at minimal cost. Its critical gaps, lot tracking, expiry management, and demand forecasting, can be addressed through targeted add-ons, rather than replacing the platform entirely.

Alongside the store, Power BI combined with automated Excel provides strong analytical capability. Power BI is genuinely best-in-class for business intelligence, and the combination allows for ABC-XYZ inventory classification, expiry tracking logs, and real-time dashboards at a fraction of enterprise software costs.

Although SAP scored highest overall across the eleven criteria and is the only solution that genuinely covers all of Ailin's operational requirements, FEFO stock rotation, GS1 compliance, lot traceability, machine learning-based demand forecasting, and full regulatory readiness; implementation costs range from 25,000 to over 150,000 euros, deployment takes 12 to 24 months, and ongoing support requires certified consultants. Therefore, SAP Business One should be treated as a 3–5 year aspiration, the destination to migrate toward once transaction volumes, SKU complexity, and regulatory exposure justify the investment.

7. Business case and Implementation roadmap

7.1. Recommended solution or combination of tools

Evaluating the benchmark results, the recommendation is a combination of tools that activates immediately and builds toward the SAP Business One migration over a 3 to 5-year horizon, as transaction volumes, SKU complexity and regulatory exposure make that investment justified.

First, Ailin's e-commerce platform already includes a functional inventory module that can be activated immediately at no additional cost. This module eliminates the most damaging current gap, the absence of real-time stock synchronization between the online store and the warehouse record. Every customer order placed through the DTC channel immediately reduces available stock, removing the most common source of overselling and emergency fulfillment failures.

Then, for the B2B channel, where order patterns are larger and less frequent, a manual synchronization process can bridge the gap during this initial phase. The online store platform also has barcode scanning integrations (via Shopify's Scanventory or similar apps) that allow the warehouse employees to receive the goods and confirm the picks with a mobile phone. This creates a continuous transaction log and does not require any scanning hardware, since it can be done with a phone.

Simultaneously, Power BI and an automated Excel working together provide the analytical intelligence feature that the online store platform does not supply. A Power Query automates the consolidation of inventory records, order data from the e-commerce platform and B2B order records into a unified data model, updated on a scheduled refresh cycle.

Additionally, Power BI dashboards highlight the key inventory KPIs that Ailin currently lacks. These are stock coverage by SKU, days of inventory on hand, fill rate, units flagged for expiration and stockout frequency.

When used together, both tools enable the application of the ABC-XYZ classification. By identifying revenue contribution (ABC) and demand variability (XYZ), the analytics platform develops a replenishment policy: high-value, high-variability SKUs are assigned tighter safety stock margins and more frequent review cycles, while more stable, lower-value products are managed with less strict rules.

Additionally, an automated Excel model that tracks expiration dates generates FEFO compliance alerts. This serves as a temporary measure until a dedicated inventory platform is implemented.

7.2. Phased implementation plan

The implementation plan is structured across two phases. The first phase implements the recommended combination of tools and delivers measurable improvements within the first six months. The second phase represents the transfer to SAP Business One, which is planned for the medium term, when defined thresholds will be met.

The overall objective in phase 1 is to achieve real-time inventory synchronization between the warehouse and the online store. This creates the base for future data-driven decision making and for the data discipline necessary in the second phase.

To start with, in the first month a complete physical/manual count will be conducted to enter the updated data into the online shop platform. This will resemble the current inventory record, including lot numbers and expiry dates for all active SKUs. Once this is achieved, the next step is to activate and configure the platform's inventory module to synchronize DTC orders, so that warehouse stock levels automatically update following online purchases. For the time being, B2B orders will still be synchronized manually as an interim practice.

During the second month, low-stock alert thresholds will be set for the ten highest-frequency SKUs, identified through the ABC-XYZ analysis, facilitating replenishment

management. Additionally, barcode scanning capability will be introduced through a smartphone-compatible extension, allowing warehouse personnel to record goods receipts and pick confirmations digitally.

In the third month, an automated Excel supported by Power Query will be deployed to consolidate the e-commerce and B2B order records into a unified daily data model that updates on scheduled cycles. With this integrated dataset the first Power BI dashboard can be built. The dashboard will include stock coverage per SKU, days of inventory on hand, fill rate, stockout frequency, and units approaching expiry within a 60-day period. Power BI helps increase visibility and reduces the risk of components expiring.

In the next two months, the ABC–XYZ classification of the SKU portfolio will take place. The classification will be based on accumulated sales and demand variability data. Based on the results, differentiated safety stock policies can be established according to SKU importance and predictability of demand. The benefits of it are improving inventory allocation while reducing stockout and overstock risks.

Throughout this period, operations and warehouse teams will also undergo training on the new platform workflows, including goods receipt procedures, picking confirmation and cycle counting. The training should only take up to two days.

Lastly, the sixth month serves as a review and stabilization period. The new measures introduced are evaluated through KPIs to assess the success of Phase 1.

Although Phase 1 is designed to be fully operational within six months of go-live, the financial absorption of the investment extends beyond that point. The investment is absorbed progressively as the company's revenue grows and its cost structure stabilizes, with full absorption reached in 2027.

At that point, based on the results, growth forecasts and other operational thresholds, Ailin can assess a potential switch to SAP Business One. Unlike phase 1, phase 2

does not follow a fixed timeline, but is rather triggered by operational complexity and organizational growth between years 3-5.

In this phase the main goal is to establish a single integrated platform capable of supporting inventory management, procurement, demand forecasting, and regulatory compliance. SAP Business One would be acquired once Ailin's scale justifies the required investment.

The switch is initiated when at least one predefined operational threshold is reached, implying that the existing combination of tools is no longer sufficient to support business complexity. The thresholds could be the following or equivalent:

- The SKU portfolio goes beyond 80 active lines
- Annual revenues exceed 5 million euros
- Warehouse operations take place in more than two locations
- The Phase 1 system has reached its practical limitations

During the initial months of the second phase, Ailin oversees a formal solution review with a certified SAP Business One partner to define project scope, implementation methodology, system requirements and the expected go-live timeline, which typically ranges between 12 and 18 months.

Shortly after, historical inventory records, transaction logs, supplier databases and operational data accumulated during Phase 1 are exported, cleaned and validated to prepare for data migration into the new system. Once the data is in the system, SAP Business One modules are configured to support purchasing and inventory management, material requirements planning (MRP), production planning and regulatory compliance.

During this stage, SAP Business One is also integrated with the company's e-commerce platform and B2B orders channel, replacing the manual synchronization bridge implemented in Phase 1.

Following the system's configuration, a trial period of approximately 6 to 8 weeks should be carried out, during which both the Phase 1 system and SAP Business One will run in parallel to minimize risks and to verify data integrity, process accuracy and system performance before the previous system is decommissioned. This dual-operation stage also enables employees to adapt to the new workflows while allowing implementation teams to resolve any inconsistencies before full deployment.

Once the new infrastructure and the inventory record have stabilized, demand forecasting, automated reorder point calculation and purchase order generation modules are activated.

7.3. Cost and financial viability of the solution proposed

In order to assess Ailin's financial capacity to absorb the investment required for the proposed solution, a projected income statement has been drawn up based on estimated historical data, as Ailin's actual financial figures were not available. To estimate these figures other similar companies in the home diagnostics and health e-commerce sector have been used as a benchmark.

Therefore, the losses reflected in the early years of the projection are not indicative of Ailin's real performance, but rather a consequence of the data source used. A startup benchmark captures the loss-making phase typical of early-stage companies in this sector, which may or may not reflect Ailin's current financial situation.

Ailin Health — Projected P&L Statement					
	Hist. (2025)	2026	2027	2028	2029
Revenue	**800**	**1.120**	**1.512**	**1.890**	**2.268**
CGS	(304)	(414)	(544)	(662)	(771)
Gross margin	**496**	**706**	**968**	**1.229**	**1.497**
Personnel	(224)	(302)	(378)	(435)	(499)
Marketing	(144)	(179)	(212)	(246)	(272)
Logistics	(80)	(101)	(121)	(151)	(159)
Technology	(24)	(45)	(60)	(113)	(136)
G&A	(64)	(78)	(106)	(113)	(136)
Tech investment (non-recurring)	(14)	(5)	-	(45)	(15)
EBITDA	**(54)**	**(4)**	**91**	**126**	**280**
Depreciation (est. 2% revenue)	(16)	(22)	(30)	(38)	(45)
EBIT	**(70)**	**(26)**	**61**	**88**	**235**
Taxes (est. 20%)	-	-	12	18	47
Net Profit	**(70)**	**(26)**	**49**	**70**	**188**

Figure 3: Ailin projected p&l statement

*In thousand euros. Source: own work

In case business conditions deteriorate, a more conservative scenario has been modelled in which revenue growth rates fall by 30% and operating costs rise by a further 5 percentage points each year. This scenario is designed to assess the resilience of the investment under less favorable conditions and to identify the minimum level of financial return required for the technology investment to remain economically viable.

Ailin Health — Projected P&L Statement					
	Hist. (2025)	2026	2027	2028	2029
Revenue	**800**	**1.024**	**1.331**	**1.597**	**1.837**
EBITDA	**(73)**	**(57)**	**(9)**	**42**	**138**
Depreciation (est. 2% rev)	(16)	(20)	(27)	(32)	(37)
EBIT	**(89)**	**(77)**	**(36)**	**10**	**101**
Taxes (est. 20%)	-	-	-	(2)	(20)
Net Profit	**(89)**	**(77)**	**(36)**	**8**	**81**

Figure 4: Ailin projected p&l statement

*In thousand euros. Source: own work

The required investment is as follows:

Costs	Combination of tools	SAP Business One
Platform licensing / subscription	360–1.440€ (Power BI Pro × 18 months)	36.000–72.000€ (annual licensing × 1,5 years)
Implementation and configuration	6.000–15.000€ (Power BI / Excel consultant)	25.000–100.000€ (certified SAP partner)
Staff training	1.000–3.000€ (two-day onboarding)	5.000–15.000€ (SAP user training)
Support / maintenance	2.400–4.800€ per year	12.000–30.000€ per year
Total	**10.760–26.640€**	**78.000–217.000€**

Figure 5: costs structure.

Source: own work. Information retrieved from: (Microsoft, 2026), (SAP, 2026) and (Shopify, 2026)

In both scenarios (standard and conservative), the initial phase remains highly affordable. Phase 1 has an estimated total cost of ownership (TCO) of 18.700 euros, calculated as the midpoint of the projected cost range (10.760–26.640€). This represents approximately 2,34% of Ailin's 2025 revenue. Under this phase, no external financing is required in either scenario, as the investment can be comfortably absorbed within the company's existing operating budget.

The financial viability of upgrading to SAP Business One (phase 2) diverges based on performance, primarily driven by the required 45.000€ year 1 deposit.

In the standard scenario, Ailin achieves strong economic performance, resulting in a healthy projected operating cash flow of approximately 152.000 euros in 2028. SAP requires an initial deposit of 45.000 euros. This deposit would be using up to 29,6% of this cash flow, leaving over 70% of Ailin's generated cash untouched. Since the remaining 107.000 euros are more than enough to maintain daily business

operations, phase 2 is sustainable. Ailin can comfortably fund the SAP transition on its own using its own cash, with absolutely no need for loans or external financing.

Conversely, in the conservative scenario, there is a higher risk present, as a lower performance would drop the operating cash flow down to 65.000 euros in 2028. In this case, the SAP deposit uses 69,2% of the company's available cash flow. Although covering the deposit is technically possible, allocating nearly 70% of available liquidity threatens daily operations, making partial external financing advisable and highly recommended to safely absorb the investment.

To consolidate the financial impact of the Phase 1 investment, the projected balance sheet below reflects Ailin's estimated financial position at the close of 2027, the year in which the technology investment is expected to have been fully absorbed. It captures how the Phase 1 costs have been progressively integrated into the company's asset and liability structure, providing a grounded snapshot of Ailin's financial health once the investment has been fully digested and its operational benefits are actively contributing to the business.

Ailin Health — Projected Balance Sheet as of December 31 2027				
Assets			**Equity and liabilities**	
Current assets			**Current liabilities**	
Cash and cash equivalents	192		Accounts payable	52
Accounts receivable	124		Accrued expenses and other payables	45
Inventory	45		Short-term credit line	30
Prepaid expenses and other current assets	18		Deferred revenue (subscriptions)	12
Total	**379**		**Total**	**139**
Non-current assets			**Non-current liabilities**	
Intangible assets (Phase 1 software)	6		Long-term debt	40
Property, plant and equipment	12		Other non-current liabilities	8
Security deposits and other non-current ass	8			
Total	**26**		**Total**	**48**
			Share capital and paid-in surplus	250
			Retained earnings (accumulated losses)	(47)
			Other reserves	15
			Total shareholder's equity	**218**
Total	**405**		**Total**	**405**

Figure 6: Ailin's projected balance sheet.

*In thousand euros. Source: own work

Lastly, to evaluate if the investment is worth it, the return of the inversion (ROI), the payback period and the internal rate of return (IRR) have been calculated.

For this purpose, the assumed investment cost for phase 1 is 18.700€, calculated as the midpoint of the estimated total cost of ownership range of 10.760€ to 26.640€. This approach provides a balanced baseline assumption, reflecting a neutral estimate between the most conservative and most optimistic cost scenarios.

ROI = (Total 5-year net profit – Investment) / Investment × 100

ROI (standard scenario) = (211.200 - 18.700) / 18.700 × 100 = 192.500 / 18.700 × 100 = 1.029%

Total net profit = -70.000 - 26.000 + 48.800 + 70.400 + 188.000 = 211.200€

ROI (conservative scenario) = (- 113.040 - 18.700) / 18.700 × 100 = - 704%

Total net profit = - 89.000 - 77.480 - 35.620 + 8.050 + 81.010 = -113.040€

The negative ROI in the conservative case confirms that if the business performs in line with this scenario, the company does not generate a positive return on any investment within this horizon.

Payback period:

The payback period measures how long it takes for the company's cumulative net profit to recover the technology investment of 18.700€. Given that the company is loss-making in 2025 and 2026, the cumulative net profit is negative through most of the projection window.

- Standard scenario:

Cumulative net profit after 2027 = - 70.000 - 26.000 + 48.800 = - 47.200€

In 2028 the company earns 70.400€.

The fraction of 2028 needed to close the gap from -47.200€ to 18.700€ is:

(18.700 + 47.200) / 70.400 = 65.900 / 70.400 = 0,936

Payback is therefore reached approximately 0,94 years into 2028, that is to say around November 2028, approximately 3,9 years from the baseline year 2025 or roughly 34 months after Phase 1 go-live.

- Conservative scenario:

Cumulative net profit at end of 2029 = - 89.000 - 77.480 - 35.620 + 8.050 + 81.010 = -113.040€.

The investment is not recovered within the 5-year projection window under the conservative scenario. This reflects the deeper and more prolonged loss profile of this scenario, not a failure of the technology investment per se, but of underlying business performance.

IRR:

In the standard scenario, the investment generates an IRR of 34,1%. This means the technology investment is effectively earning 34,1% annually, which is well above the 12% hurdle rate, confirming it is a financially sound decision. The 12% hurdle rate has been applied as a standard SME benchmark in the absence of a company-defined required rate of return.

In the conservative scenario, the business never generates enough cumulative profit over five years to recover the initial investment of 18.700 euros. When that happens, there is no valid IRR to calculate.

7.4. Risk assessment and mitigation measures

The main risks found in both the selected solution and its implementation process can be classified into three categories: technical risks, operational risks and organizational risks.

Concerning technical risks, the most likely and severe one is related to phase 1. This is data inaccuracy in the migration process, particularly in opening balances, lot numbers and expiry dates. If it were to happen and the errors were carried forward, it could corrupt the new system. Another risk is found in inventory desynchronization between the online store and the warehouse records due to integration failures or platform updates. This could potentially lead to inaccurate stock visibility and issues with replenishment.

Other concerns include the reliability of Power BI dashboards, which may display outdated information if automated data does not refresh and it goes unnoticed, and Excel's macro fragility. These risks are mitigated through reconciliation controls, monitoring mechanisms, documented spreadsheet logic and temporary manual backup procedures until a more robust ERP solution is implemented.

Regarding operational risks, the greatest one, although unlikely, is that a critical regulatory gap appears between Phase 1 go-live and SAP Business One activation, leaving Ailin without full bidirectional lot-level traceability. Additionally, the ABC-XYZ inventory model could miscalibrate safety stocks for high-variability SKUs, potentially causing stockouts during demand spikes.

Other risks are that manual synchronization of B2B orders into the online store inventory system creates a channel blind spot prone to errors and delays during high-volume periods, and that it takes longer than expected to implement SAP Business One.

These risks can be mitigated through enforcing strict manual tracking logs, setting conservative initial parameters and timeline buffers, establishing clear execution protocols, and leveraging low-cost automation to ensure continuous operational stability.

As for organizational risks, the main one is single-person dependency. The transition may become overly reliant on just one implementation lead, consequently creating delays or execution gaps if that person becomes unavailable during key stages of deployment.

Another organizational risk is that employees do not adopt the new system, but continue relying on spreadsheet-based methods and underuse the new inventory workflows, compromising data accuracy and reducing the effectiveness of the implementation. This can be linked to resistance to change, especially if the staff

perceives the new procedures as an additional administrative burden rather than an improvement.

These risks are mitigated through clear internal ownership, structured onboarding, process documentation, cross-training and ongoing post-implementation reviews to reinforce adoption and address friction points early.

Technical risks

Risk description	Impact	Probability	Mitigation
Data errors in the migration process. Inaccurate opening balances and/or lot data. If carried forward they can corrupt the new system record.	High	High	Conduct a physical stock count immediately before migration. Assign a person to review and validate lot numbers, expiry dates and unit quantities before any data is uploaded. Run a full reconciliation report on day one to detect discrepancies before they propagate.
E-commerce desynchronization. The online store inventory module falls out of sync following a platform update or integration failure.	High	Medium	Configure a daily automated reconciliation report that compares online store order records against warehouse inventory counts. Maintain a documented manual synchronization protocol as a fallback. Monitor platform update announcements and test integrations in a staging environment before applying

			updates to the live system.
Errors when updating Power BI data. Scheduled updates fail without warning, causing dashboards to display out-of-date inventory data.	Medium	Medium	Add a visible timestamp showing the last update to every page in the Power BI dashboard. Set up automatic email alerts in the event that a scheduled update fails. Review Power Query data connections on a quarterly basis to ensure that source file paths and formatting structures remain consistent.
The limitations of Excel macros. VBA-based expiry tracking logic fails when the structure of the spreadsheet is modified, which disables automatic alerts.	Medium	Medium	Document all macro logic and protect the sheet structure from unintentional modification. Designate one person as the owner of the Excel model. Test the macro against the full inventory dataset after any update to the underlying data format.

Figure 7: Technical risks chart

Source: own work

Operational risks

Risk description	Impact	Probability	Mitigation
Regulatory traceability gap.	High	Low	Maintain the manual lot tracking log in structured Excel format

Between phase 1 go-live and SAP Business One activation, Ailin operates without full bidirectional lot-level traceability.			throughout phase 1, updated after every goods receipt and dispatch event. This log provides a defensible audit trail in the event of a regulatory inspection or product recall before phase 2 activates. The expiry alert system in the VBA model also contributes to demonstrating proactive shelf-life governance.
Safety stock miscalibration. The ABC-XYZ model sets safety stock buffers too low for high-variability SKUs, resulting in stockouts during demand spikes.	Medium	Medium	Set the initial safety stock parameters conservatively, opting for slightly higher safety margins during the first quarter of operation. Review and tune parameters monthly as demand history accumulates. The ABC-XYZ classification should be refreshed quarterly using updated Power BI data rather than treated as a one-time analysis.
B2B channel blind spot. Manual synchronization of B2B orders into the online store inventory system introduces errors	Medium	Medium	Define a clear, documented protocol for B2B order entry frequency. Assign a person for B2B channel reconciliation. Evaluate whether an RPA bot can bridge B2B order data into the platform at low cost, removing the manual

and delays during high-volume order periods.			synchronization dependency.
Phase 2 migration delay. SAP Business One implementation overruns its planned timeline, extending dependency on phase 1 tools beyond their capacity.	Low	Medium	A phase 2 delay does not cause operational failure. Phase 1 continues delivering measurable benefits. Build a conservative timeline buffer into the phase 2 project plan. Define a minimum viable SAP configuration for the initial go-live, with additional features activated in subsequent phases, to reduce the scope risk of the migration itself.

Figure 8: Operational risks chart.

Source: own work

Organizational risks

Risk description	Impact	Probability	Mitigation
Single-person project dependency. The implementation stalls if the operations lead is unavailable during the critical first months.	High	High	Document all configuration decisions, integration settings and workflow procedures in a shared knowledge base from month one. Cross-train at least one additional team member on core system workflows so that day-to-day operations are not dependent on a single

			individual.
User adoption failure. Staff revert to spreadsheet habits, leaving the new system underpopulated and undermining data integrity.	High	High	Make the new system the required and sole input channel for all warehouse transactions from day one, eliminating the spreadsheet option. Track adoption through system login frequency and transaction completeness metrics in the first 90 days. Address friction points in a structured 30-day post-go-live review.
Reluctance to change. The team perceives the new workflows as an additional administrative burden rather than an operational improvement.	Medium	Medium	Communicate the before-and-after impact in concrete terms: hours saved per month, stockout events avoided, expiry losses prevented. Involve warehouse staff in user acceptance testing before go-live so that feedback is incorporated into workflow design. Schedule a 30-day post-go-live review to address friction rapidly.

Figure 9: Organizational risks chart

Source: own work

8. Conclusions and social and environmental impact

On forecasting accuracy, the analysis confirms that Ailin operates without any formal demand model. Purchasing is triggered by a subjective recognition that stock appears low, rather than by a data-driven projection of future needs. The consequences are visible, recurrent emergency procurements at premium cost, slow-moving stock accumulation and an inability to anticipate the demand spikes generated by seasonal health trends or B2B campaign cycles.

On the contribution of manual processes to inefficiency, the findings are equally clear. Inventory knowledge is concentrated in one individual who is not exclusively dedicated to that function. Monthly physical counts produce a snapshot that is already partially outdated by the time it is reconciled, and the absence of a real-time transaction log means discrepancies cannot be traced to their origin. The spreadsheet cannot enforce FEFO rotation, link component availability to kit production capacity or flag expiry risk across the more than thirty active lot entries that require simultaneous monitoring.

The recommended solution answers directly to these concerns. The combination of the e-commerce inventory module, Power BI and automated Excel is affordable, deployable within six months and does not require the company to commit to an enterprise platform before really needed. Then, Phase 2, the migration to SAP Business One, should be triggered by operational thresholds rather than a fixed calendar, ensuring that the investment is made when the business complexity justifies it.

And finally, the social and environmental implications of this project extend beyond its financial case and are best understood through four Sustainable Development Goals directly implicated by Ailin's operational model.

SDG 3: Good Health and Well-Being is the most immediate. Ailin's mission is to make clinical-grade diagnostics accessible outside traditional healthcare settings.

That mission is undermined every time a stockout prevents a kit from reaching a customer on time. The proposed solution reduces stockout risk through real-time component visibility, automated reorder triggers, and FEFO-compliant rotation that protects product quality up to the point of delivery.

Additionally, the scalable infrastructure proposed in Phase 2 enables Ailin to extend accessible diagnostics to a broader European population, amplifying the social value of its model. The current manual system, precisely because it is structurally vulnerable to stockouts and expiry losses, constitutes a practical obstacle to this goal.

SDG 8: Decent Work and Economic Growth is engaged at two levels. At the individual level, the current model places an unsustainable administrative burden on a single employee who must simultaneously manage purchasing, assembly planning, monthly counts, and discrepancy resolution across multiple operational functions. The automation proposed in Phase 1 frees this person from hours of manual reconciliation per month, redirecting that capacity toward higher-value work.

At the organizational level, the financial modelling demonstrates that the investment supports business viability and growth, which in turn sustains and potentially expands employment. Moreover, the change management framework embedded in the implementation plan ensures that the technology transition is experienced by staff as an improvement rather than a displacement.

SDG 12: Responsible Consumption and Production is the goal most directly implicated by an inventory management project. Ailin's current model generates two specific and avoidable forms of material waste. The first is product expiry, without automated FEFO enforcement and lot-level expiry alerts the risk of consuming newer stock before older stock is structural, and units that expire unused become regulated medical waste with associated disposal costs. The second is systematic overstock, uncertainty-driven purchasing accumulates inventory that may not be consumed

within its shelf life, representing physical materials produced, transported, stored and ultimately discarded without delivering value.

The proposed solution addresses both failure modes directly, FEFO alerts in Phase 1 and system-enforced rotation logic in Phase 2 eliminate the first; dynamic safety stock calibration and ABC-XYZ classification eliminate the second.

SDG 9: Industry, Innovation, and Infrastructure is advanced by the project's demonstration that operational professionalization is not exclusive to large organizations. The tools recommended in Phase 1 are accessible, affordable, and capable of delivering regulatory-grade inventory practices without enterprise-scale investment. The phased migration toward SAP Business One in Phase 2 further positions Ailin as a scalable, innovation-driven company capable of operating across European markets, contributing to the broader digital transformation of the European health sector.

References

- Ailin. (2026). *Clinical and Blood Analysis at Home - Ailin.Health*. Ailin.Health. https://ailin.es/en/
- Ailin. (2026). *How it works*. Ailin. https://ailin.es/en/how-it-works/
- Ailin. (2026). *Our kits*. Ailin. https://ailin.es/en/shop/
- Al-Andalus Innovation Venture. (2023, July 22). *Ailin, kits de pruebas diagnósticas que trasladan el laboratorio a casa*. https://alandalusinnovation.com/ailin-kits-de-pruebas-diagnosticas-casa/
- Alonso, J. C. (2025, October 16). *método de producción just in time | El método Just in time: concepto, origen y cómo se aplica en un almacén | Toyota Material Handling*. Toyota. https://blog.toyota-forklifts.es/origenes-just-in-time
- Banton, C. (2025, November 10). *Just-in-Time (JIT): Definition, Example, Pros, and Cons*. Investopedia. https://www.investopedia.com/terms/j/jit.asp
- Blanch, A. (2025, June 19). *¿Qué es Salesforce y para qué sirve? | Blog de Arsys*. Arsys. https://www.arsys.es/blog/que-es-salesforce-y-para-que-sirve
- CDTI Innovación. (2025, December 19). *Isabel Caruana, CEO y fundadora de Ailin Health: "El respaldo del CDTI Innovación y los fondos europeos MRR nos ha permitido avanzar más rápido en el desarrollo tecnológico y en la validación de nuestro modelo de diagnóstico"*. https://www.cdti.es/noticias/isabel-caruana-ceo-fundadora-ailin-respaldo-cdti-innovacion-MRR-diagnostico-kit-autotoma
- Cvetkovic, A. (2022, February 7). *Just-In-Time Inventory: A Retailer's Guide To Get Started*. Shopify. https://www.shopify.com/blog/just-in-time-inventory?term=&adid=803689462471&campaignid=19724533104&utm_medium=cpc&utm_source=google&matchtype=&network=g&gad_source=1&gad_campaignid=19724533104&gbraid=0AAAAAC3Mv8-cQxiLLr-7gibLrlC0jq3m7&gclid=Cj0KCQjw_b_QBhC

- Datahack. (2026). *Automatización en Excel: qué puedes hacer sin saber programar (y cómo empezar)*. Datahack. https://www.datahack.es/automatizacion-en-excel/
- El ecosistema startup. (2026). *RPA: ¿Qué es RPA? Robotic Process Automation — Guía 2026*. El ecosistema startup. https://ecosistemastartup.com/glosario/rpa-que-es-robotic-process-automation/
- Ellacott, E. (2023, October 26). *Store Operations: Ensuring Your Inventory Management System Works for You*. WooCommerce. https://woocommerce.com/posts/ecommerce-inventory-management/
- Iberdrola. (n.d.). *Robotic process automation (RPA) in businesses and its impact on industry*. Iberdrola. https://www.iberdrola.com/about-us/our-innovation-model/rpa-what-is-it
- Institute for Manufacturing. (n.d.). *JIT Just-in-Time manufacturing*. Institute for Manufacturing (IfM). https://www.ifm.eng.cam.ac.uk/research/dstools/jit-just-in-time-manufacturing/
- Microsoft. (2026). *Comprar Microsoft Excel (PC o Mac) | Precio de Excel independiente o con Microsoft 365*. Microsoft. https://www.microsoft.com/es-es/microsoft-365/p/excel/cfq7ttc0pbmf
- Microsoft. (2026). *Data Visualization with Excel and Power BI*. Microsoft. https://www.microsoft.com/en-us/power-platform/products/power-bi/excel-and-power-bi
- Microsoft. (2026). *Power BI: Plan de precios*. Microsoft. https://www.microsoft.com/es-es/power-platform/products/power-bi/pricing
- Microsoft. (n.d.). *¿Qué es RPA (Automatización de procesos robóticos)?* Microsoft. https://www.microsoft.com/es-es/power-platform/products/power-automate/topics/robotic-process-automation/what-is-rpa
- Pascoe, N. (2025, November 21). *Shopify Flow Inventory Automations — 5 Step-by-Step Workflows for Makers*. Craftybase. https://craftybase.com/blog/shopify-flow-inventory-automations

- Salesforce. (2026). *Salesforce*. Salesforce Products. https://www.salesforce.com/eu/products/
- Salesforce. (2026). *Salesforce: The #1 Agentic AI CRM*. Salesforce. https://www.salesforce.com/eu/
- Salesforce. (n.d.). *What Is CRM (Customer Relationship Management)?* Salesforce. https://www.salesforce.com/eu/crm/what-is-crm/
- SAP. (2026). *Información técnica para SAP Business One*. SAP. https://www.sap.com/spain/products/erp/business-one/technical-information.html
- SAP. (2026). *Precios*. SAP. https://www.sap.com/spain/products/technology-platform/pricing.html
- SAP. (2026). *¿Qué es SAP? | Definición y significado*. SAP. https://www.sap.com/spain/about/what-is-sap.html
- SAP. (2026). *SAP Business AI Platform*. SAP. https://www.sap.com/spain/products/business-suite.html?url_id=banner-es-homepage-row1-cta-autonomous-enterprise-260512#business-ai-platform
- SAP. (2026). *SAP Business One | Características*. SAP. https://www.sap.com/spain/products/erp/business-one/features.html
- SAP. (2026). *SAP Business One España | ERP para pequeñas empresas*. SAP. https://www.sap.com/spain/products/erp/business-one.html
- Shaikh, F. (n.d.). *How to Automate Excel Reports Using Power BI and Power Query*. IQRA Technology. https://iqratechnology.com/blogs/how-to-automate-excel-reports-using-power-bi-and-power-query/
- Shopify. (2026). *Automate everything and get back to business*. Shopify. https://www.shopify.com/es-es/flow
- Shopify. (2026). *Gestión de pedidos y entregas de Shopify España*. Shopify. https://www.shopify.com/es-es/orders
- Shopify. (2026). *Precios de Shopify - Crea y abre tu tienda online hoy - Prueba gratis*. Shopify. https://www.shopify.com/es-es/precios

- Shopify. (2026). *Shopify para empresas*. Shopify. https://www.shopify.com/es-es/enterprise
- Woocommerce. (2026). *WooCommerce Extensions, Themes, Plugins, and More*. WooCommerce. https://woocommerce.com/products/
- Woocommerce. (2026). *WooCommerce Pricing Puts You In Control*. WooCommerce. https://woocommerce.com/pricing/