INTELI - INSTITUTO DE TECNOLOGIA E LIDERANÇA

JOSÉ VITOR MARCELINO
LUIZ FERNANDO COVAS
RAFAEL MATEUS ZIMMER TECHIO
YURI FREITAS ANGELO TOLEDO

From Services to SaaS: Creating a Service-First, Product-Next Startup for International Trade Companies

São Paulo
2025

JOSÉ VITOR MARCELINO
LUIZ FERNANDO COVAS
RAFAEL MATEUS ZIMMER TECHIO
YURI FREITAS ANGELO TOLEDO

From Services to SaaS: Creating a Service-First, Product-Next Startup for International Trade Companies

_____

Prof. Cesar Almiñana (Supervisor)

_____

José Vitor Marcelino (Student)

_____

Luiz Fernando Covas (Student)

_____

Rafael Mateus Zimmer Techio (Student)

_____

Yuri Freitas Angelo Toledo (Student)

ACKNOWLEDGMENTS

This work expresses sincere gratitude to Cesar Alminana for his invaluable guidance, insightful corrections, and continuous support throughout the development of the project. His direction was fundamental in shaping the structure and quality of the work.

Thanks are also extended to Inteli for providing the necessary support, infrastructure, and resources that enabled the development of this project. The environment and tools offered by the institution were essential for its successful completion.

ABSTRACT

This work presents the development of a Service-First, Product-Next B2B startup focused on the international trade sector. The startup emerges from the intersection of entrepreneurial experience and a culture of continuous innovation, emphasizing close customer interaction, rapid experimentation, and validated learning as core principles. Initially, the team provides consulting-like services to identify client pain points, map workflows, and co-create tailored solutions, generating immediate value while acquiring deep sector knowledge.

Building on prior entrepreneurial experience and a network inherited from previous ventures, the startup applies these insights to design scalable software-as-a-service (SaaS) products that address real market needs. The approach is guided by a community-oriented mindset, fostering collaboration with clients and partners to create sustainable and impactful solutions. This work highlights the importance of practical experimentation as a foundation for developing products that are both relevant and effective, demonstrating a model that integrates academic rigor, systemic thinking, and market pragmatism in the process of creating innovative B2B solutions.

Keywords: SaaS; B2B; Business Model Validation; Product Development.

LIST OF ACRONYMS

- **SaaS** – Software as a Service
- **B2B** – Business to Business

Summary

1. Introduction

This work presents the development of a B2B startup guided by the Service-First, Product-Next model, focusing on the creation of SaaS solutions to automate the issuance and receipt of Electronic Service Invoices (NFS-e) in the context of international trade. The startup originates from the founders' previous entrepreneurial experience, inheriting from Clonex values such as resilience, pragmatism, and an established client network. Initial operations focus on the international trade sector, identifying urgent needs and automation opportunities while aiming to develop a scalable product aligned with market demands.

1.1 Problem

The Brazilian international trade market faces complex and often manual fiscal processes. Issuance and receipt of NFS-e involve multiple channels, manual entries, risk of inconsistencies, lack of traceability, and auditing difficulties. Existing tools, such as ERPs and taxtechs, only partially meet these needs, leaving gaps in integration, automation, and real-time visibility. These factors lead to rework, increased costs, and exposure to fiscal risks, highlighting the need for automated and scalable solutions.

1.2 Objectives

The general objective of this work is to develop a SaaS solution to automate the issuance and receipt of NFS-e, starting with applied consultancy and gradually evolving into a scalable product.

1.2.1 Specific Objectives

Map and understand the problems and needs of the international trade sector related to NFS-e issuance and receipt;

Apply Service-First practices to co-create solutions with clients, validating business hypotheses;

Develop prototypes and MVPs using technologies such as n8n, Supabase, OCR, and AI APIs;

Ensure data security, compliance, and integrity according to LGPD;

Evaluate technical feasibility and scalability of the solution for subsequent SaaS development;

Generate dashboards and KPIs for real-time monitoring and control.

2. Methodology

The methodology combines applied research with incremental development, guided by Action Research, enabling continuous learning from practical interactions with clients and hypothesis validation in real scenarios.

2.1 Action Research Methodology

Action Research focuses on solving real-world problems collaboratively with stakeholders, promoting continuous learning and adjustment. In this startup, it was used to identify client pain points, map NFS-e workflows, test technical solutions, and validate the feasibility of a scalable SaaS product.

2.2 Action Research Approach

The Action Research cycle involved iterative steps of diagnosis, planning, implementation, evaluation, and reflection. Each project module — from business discovery to final product consolidation — corresponded to a sprint with hypotheses, experiments, and validations. This approach ensured that solutions were aligned with real market needs and allowed the technological architecture to be adjusted according to practical results.

3. Project Context

The project was structured into four main modules, focusing on NFS-e automation in the Brazilian international trade sector.

3.1 Startup Background

The founding team brings entrepreneurial experience and a culture of continuous innovation inherited from Clonex. Core values include resilience, pragmatism, validated learning, and collaboration with clients and partners. Initial operations target micro and small companies in international trade, leveraging pre-existing connections and addressing urgent market needs.

3.2 Market Context

The fiscal automation market in Brazil—particularly related to the issuance and management of Electronic Service Invoices (NFS-e) within the foreign trade sector—is undergoing a structural and technological transformation. In 2024, the country registered approximately 28,800 exporting companies and 55,800 importing companies, reflecting the sector's economic relevance and operational complexity (Sebrae, 2024). Additionally, the service sector accounted for 61.6% of newly established companies, mostly composed of micro and small enterprises that face significant challenges in fiscal compliance and document control.

The issuance of NFS-e remains fragmented across more than 5,000 municipalities, of which only around 1,037 (19%) have adopted the new national standard (Fenacon, 2024). This heterogeneity of layouts, protocols, and local regulations increases system maintenance costs and compliance risks. Companies operating in multiple jurisdictions—such as those in foreign trade—face even greater complexity in handling diverse XML/RPS formats and digital certification requirements, making current manual processes slow, error-prone, and expensive in terms of fiscal operations.

In this context, fiscal automation emerges as a driver of efficiency and competitiveness. The integration of ERPs with automated NFS-e issuance and validation platforms eliminates manual steps and significantly reduces operational errors and compliance costs. Technologies such as Artificial Intelligence (AI), Robotic Process Automation (RPA), and Machine Learning (ML) have been applied to interpret fiscal documents in multiple formats, extract data from PDFs and emails, and automatically insert them into accounting systems—reducing processing time by up to 85% (Fenacon, 2024; UiPath, 2023).

With the implementation of Complementary Law No. 214/2024, which will make the national NFS-e standard mandatory from January 2026, the market is expected to consolidate around scalable and interoperable solutions. This regulatory milestone represents a strategic innovation window, enabling the emergence of unified SaaS platforms that combine issuance, validation, reconciliation, and fiscal analytics within a single ecosystem.

Although the market already includes established players such as TecnoSpeed, Codemasters, eNotas, and NFe.io, there remain significant gaps in automation tailored to the foreign trade context—particularly regarding the management of invoices from multiple municipalities and integration with systems like Siscomex and DUIMP. Furthermore, there is a notable shortage of solutions that provide predictive fiscal intelligence, integrated analytical reporting, and simplified user interfaces designed for small and medium-sized enterprises.

From a technological perspective, the adoption of cloud-native architectures, microservices, RESTful APIs, and event-driven architectures (EDA) is fundamental to ensuring scalability, resilience, and low latency in large-scale fiscal data processing. Complementarily, the application of Big Data and Business Intelligence (BI) enhances analytical capacity, enabling continuous monitoring of fiscal indicators and early detection of inconsistencies.

Regulatory frameworks such as the General Data Protection Law (LGPD, Law No. 13.709/2018) and Bank Secrecy Law (Complementary Law No. 105/2001) impose strict requirements for data privacy and security. As a result, automated fiscal

solutions must implement end-to-end encryption, granular access control, and continuous auditing. Compliance with these standards represents not only a legal obligation but also a competitive advantage in Brazil's expanding digital fiscal ecosystem.

In summary, the market context demonstrates a growing demand for automated, interoperable, and secure solutions capable of addressing new regulatory standards while reducing the operational burden caused by Brazil's tax fragmentation. The convergence of digital transformation, regulatory reform, and automation technologies establishes a fertile ground for innovation and growth in the NFS-e automation market for international trade companies.

3.3 Business Model and Approach

The startup applies the Service-First, Product-Next model, beginning with applied consultancy to identify pain points, map workflows, and co-create solutions. This phase generates immediate revenue, provides practical learning, and forms the foundation for a scalable SaaS product.

3.4 Technical Context

The technical architecture involves:

- **n8n**: low-code workflow automation;
- **Supabase**: scalable database and storage;
- **OCR/OpenCV and AI APIs**: automatic data extraction from NFS-e;
- **Integration with ERP**s and existing systems;
- **Monitoring**, **logging**, and **manual fallback** for risk mitigation.

3.5 Risks and Requirements

Critical risks include ERP integration, OCR/AI accuracy, data security, and dependence on external APIs. Functional requirements cover automatic capture, validation, normalization, and secure storage of NFS-e, alongside minimal

dashboards. Non-functional requirements include availability, scalability, security, observability, and modularity.

This work presents the development of a B2B startup guided by the Service-First, Product-Next model, focusing on the creation of SaaS solutions to automate the issuance and receipt of Electronic Service Invoices (NFS-e) in the context of international trade. The startup originates from the founders' previous entrepreneurial experience, inheriting from Clonex values such as resilience, pragmatism, and an established client network. Initial operations focus on the international trade sector, identifying urgent needs and automation opportunities while aiming to develop a scalable product aligned with market deman

4 Module Artifacts

Module 1 focused on establishing the strategic and technical foundations for the development of a Minimum Viable Product (MVP) for an intelligent fiscal automation platform, designed to optimize the issuance and reception of electronic service invoices (NFS-e). The overarching objective was to explore the market, identify client pain points, and select an initial project aligned with a service-first, product-next approach. This module integrated market insights, process analysis, and technological evaluation, culminating in a comprehensive understanding of opportunities, risks, and system requirements.

Sprint 1 – Hypotheses and Objectives

During Sprint 1, the team conducted an initial strategic structuring of the startup, focusing on understanding client needs in the foreign trade sector and defining a validated direction for the project. Three hypotheses were formulated: automating NFSe ingestion, inventory control via invoices, and a tax simulation tool. After analyzing feasibility, impact, and dependencies, the team prioritized the NFSe ingestion automation as the first project focus, as it offered immediate operational value, technical viability despite ERP integration challenges, and a foundation for future solutions.

Strategically, the sprint established a “Service-First, Product-Next” approach, deciding to engage directly with clients through applied consultancy to validate solutions and generate early insights. The roadmap was structured with incremental stages: identify real operational pain points, select the most critical problem, develop a service-based solution, validate and collect sector knowledge, and progressively convert the validated solution into a scalable SaaS product. This approach resulted in a clear alignment on strategic objectives, including reducing operational costs, ensuring data reliability, and building a reusable knowledge base for subsequent products.

The outputs of Sprint 1 were: a consolidated hypotheses document, a prioritized project focus, and a strategic roadmap detailing steps from consultancy to product scalability, providing a concrete foundation for MVP development and guiding future sprints.

Sprint 2 – Market Research

During Sprint 2, the team focused on conducting an in-depth market research on the automation of electronic service invoices (NFSe) within the foreign trade sector. The objective was to validate the relevance of the problem identified in Sprint 1, map the competitive landscape, and identify opportunities for differentiation and strategic positioning of the proposed solution.

The research involved analysis of industry reports, benchmarking of existing solutions, and direct interactions with key stakeholders. This investigation confirmed that the manual processing of NFSe represents a significant operational bottleneck for organizations, leading to inefficiencies, increased risk of errors, and compliance challenges. Competitor analysis revealed that current software solutions offer partial automation, often limited to document capture or ERP integration, but rarely provide an end-to-end workflow combining ingestion, validation, and structured data output, leaving space for a differentiated value proposition.

Key findings indicated a strong demand for solutions that reduce operational costs, improve data accuracy, and ensure regulatory compliance, particularly for SMEs operating with high volumes of invoices. The research also highlighted the importance of ease of integration with existing ERPs, security of sensitive fiscal data, and scalability of the solution to support growing transaction volumes. Insights from early client interactions guided the prioritization of features for the MVP, reinforcing the decision from Sprint 1 to focus initially on automating the ingestion of NFSe, as this directly addresses the most pressing pain point while laying the foundation for future modules such as inventory control and tax simulation.

As a result of Sprint 2, the team established a validated problem statement, defined market segments with the highest adoption potential, and confirmed the feasibility and strategic relevance of the proposed solution. These outcomes provided evidence-based guidance for the next phase of the project, ensuring that the development of the MVP is aligned with real market needs, maximizing both technical and commercial impact.

Sprint 3 – Process Mapping and Opportunity Identification

During Sprint 3, the team conducted an extensive mapping of the current NFSe processes at the current partner company. This company operates in the foreign trade sector. The objective was to gain a deep understanding of the as-is workflow, identify bottlenecks, and highlight opportunities for automation and process improvement.

The analysis revealed that the management of electronic service invoices is highly manual, fragmented, and error-prone. Key issues included repetitive data entry, lack of integration between municipal portals, email systems, and internal ERPs, and a significant dependency on human intervention for compliance verification. The process of issuance required multiple steps, such as municipal registration, digital certificate handling, manual data entry in the portal, transmission for authorization, and generation of DANFE documents. Each step introduced delays and potential errors. Similarly, the reception process was fragmented, with notes arriving in varying formats (PDF, XML) and requiring manual validation, entry, and storage, creating inefficiencies and compliance risks.

From this mapping, the team identified five major opportunities for automation:

- Automation of manual tasks – parsing XML and PDFs, eliminating repetitive data entry.
- System integration – connecting ERP, municipal portals, and email for seamless data flow.

- Real-time visibility and dashboards – providing consolidated data on invoices, taxes, and payment status.
- Centralized and compliant storage – secure cloud repository with automatic indexing for audit readiness.
- Co-creation model with clients – delivering tailored automation services to validate solutions and finance the SaaS product development.

As a result of Sprint 3, the team was able to validate critical pain points, prioritize automation opportunities, and define the initial scope of the MVP, aligning it with client needs and operational realities. Decisions made during this sprint directly informed the technical design and feature set, ensuring that the MVP would target the highest-impact areas first, while establishing a foundation for future scalability and product development.

Sprint 4 – Technical Feasibility

In Sprint 4, the team focused on evaluating the technical feasibility of automating electronic service invoices (NFS-e) while considering existing manual processes and the project's rapid prototyping model. The main goal was to identify technologies capable of capturing, interpreting, validating, and structuring invoices, ensuring compatibility with the client's daily operations and delivering immediate value through a consultancy-first approach. This strategy allowed the team to work closely with clients, understand operational nuances, and validate which points most significantly impact fiscal and accounting workflows.

The analysis revealed that invoice ingestion, particularly in import operations, is highly complex and error-prone. Clients receive documents in multiple formats, such as PDFs, spreadsheets, and scanned files, often without standardization. Manual handling of these documents increases the risk of inconsistencies in values, tax codes, and compliance reporting while consuming significant time from the finance team. The lack of centralized storage further complicates traceability and access during audits.

Based on these findings, the team made strategic technological choices to balance rapid prototyping, accuracy, and immediate operational impact. The workflow automation platform n8n was selected to orchestrate the capture, validation, and storage of invoices, providing flexibility to integrate emails, APIs, and internal systems without extensive coding. Supabase was chosen as the central database and storage solution, enabling secure and organized storage of invoices and supporting traceability. AI-based data extraction services were adopted to reliably interpret both structured and unstructured documents, reducing manual input and error rates while accelerating compliance checks. The system was designed to integrate directly with the client's ERP, replacing repetitive manual entry and streamlining operational processes.

This combination of tools enabled the definition of a clear MVP architecture that could be deployed quickly, demonstrating feasibility and delivering immediate value. The chosen solution reduces manual work, increases accuracy, and provides centralized control and compliance readiness. Early engagement with clients confirmed that the approach addresses critical pain points, while the flexible architecture allows adjustments to accommodate different invoice formats and future scaling requirements. Sprint 4 concluded that the proposed technical solution is not only feasible but also practical, supporting the project's short-term objective of delivering consultancy value while establishing a solid foundation for a scalable and robust SaaS product in subsequent sprints.

Sprint 5 – Risks, Requirements and Insights

The final sprint of the module focused on consolidating insights obtained throughout the previous stages, prioritizing key problems and opportunities, and establishing initial requirements to guide the development of the MVP. The consolidation document integrated findings from market research, client processes, and technological analysis, providing a unified vision that highlighted both strategic opportunities and operational constraints. Among the key insights were the identification of recurring process inefficiencies, potential points of failure, and areas

where technological interventions—such as AI-powered document parsing, low-code workflow automation (n8n), and cloud-based database management (Supabase)—could enhance automation and user experience.

A risk and requirements matrix was developed to systematically assess potential risks and their impact, while also defining the initial functional and non-functional requirements of the system. Functional requirements included capabilities such as real-time monitoring of processes, automated validation of actions, and user notification mechanisms, whereas non-functional requirements addressed system performance, reliability, security, and scalability constraints. These elements were informed by both the observed inefficiencies in the client's processes and the technological opportunities identified during the analysis.

Additionally, the Value Stream Mapping (VSM) provided a detailed visualization of the client's value flows, revealing bottlenecks, redundant activities, and areas where process optimization—supported by modular architecture and automated ERP integrations—could deliver measurable improvements. By integrating these insights into the system requirements, the sprint established a structured framework for MVP development, ensuring alignment between business objectives, technical feasibility, and operational effectiveness.

REFERENCES

Sebrae. (2024). Número de pequenos negócios exportadores mais que dobra em uma década. Agência Sebrae de Notícias. Retrieved from https://agenciasebrae.com.br/arquivo/numero-de-pequenos-negocios-exportadores-mais-que-dobra-em-uma-decada

Fenacon. (2024). Emissão de Nota Fiscal de Serviços Eletrônica já atingiu 70% de adesão das capitais do país. Sistema Fenacon. Retrieved from https://fenacon.org.br/noticias/emissao-de-nota-fiscal-de-servicos-eletronica-ja-atingiu-70-de-adesao-das-capitais-do-pais

Brazil. (2018). Lei nº 13.709 – Lei Geral de Proteção de Dados Pessoais (LGPD). Diário Oficial da União. Brasília, DF.

Brazil. (2001). Lei Complementar nº 105 – Dispõe sobre o sigilo das operações de instituições financeiras. Diário Oficial da União. Brasília, DF.

Brazil. (2024). Lei Complementar nº 214 – Institui o padrão nacional da Nota Fiscal de Serviços eletrônica (NFS-e). Diário Oficial da União. Brasília, DF.

UiPath. (2023). RPA in Financial Automation: Benchmark Report 2023. UiPath Research. Retrieved from https://www.uipath.com/resources

TecnoSpeed. (2024). Soluções de automação fiscal e emissão de NFS-e em múltiplos municípios. Retrieved from https://tecnospeed.com.br

Codemasters. (2024). Hiperautomação fiscal integrada à Receita Federal. Retrieved from https://codemasters.com.br

eNotas. (2024). Automação de notas fiscais e integração com plataformas digitais. Retrieved from https://enotas.com.br

NFe.io. (2024). API de emissão e gestão de notas fiscais de serviço. Retrieved from https://nfe.io