

Development of a Web-Based e-Commerce Platform for a Telecommunications Provider

Adrian-Costin MINEA

*National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania
adrianminea99@gmail.com*

Beatrice Alexandra LUPU

*National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania
Beatrice.alexandrescu@gmail.com*

Andreea BARBU

*National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania
barbu.andreeab@yahoo.com*

Mihaela-Ramona BULBOACĂ

*National University of Science and Technology POLITEHNICA Bucharest, Bucharest, Romania
ramonabulboaca@yahoo.com*

Abstract. *This paper describe a simple platform create for a telecommunication company. It was created because more people want in the present multiple digital services, after pandemic period. Many old platforms are difficult to be used and do not allow users to choose custom subscription plans, to easily combine products and also to have inscreased security. I've used basic instruments like HTML,CSS, PHP and MySQL to create a safe and easy-to-use platform. It works with live data, manage subscriptions and keep information safe. This platform is build using small parts, which help it grows, to stay safe and to work with others users. It include tools for automatic invoicing, enhanced security and future planning using data. The results shows that this platform helps companies to work better and gives users a better experience from the navigating point of view. In the future, will be added new functionalities like cloud microservices for better performance, blockchain for safer payments and AI support for faster customer help. These mentioned features will help telecom companies better and faster services.*

Keywords: E-commerce, Telecommunications, Web Development, PHP, MySQL, Security, User Experience.

Introduction

In the present, telecom companies are pressed to offer fast, secure and simple services. Also, people depend more on digital tools in their daily life, so telecom companies need better online systems. This need became stronger with the advent of COVID-19, who changed the way companies and customers interact. This issue has increased the need for online subscriptions, secure data usage and real-time access to services.

This project focuses on building a web-based e-commerce platform designed for a telecommunications company. It explores important issues such as keeping data secure, keeping the platform fast and providing a good user experience. The goal is to use web technologies to create a system that is secure, can grow when needed, and can change with customer needs and new technologies.

By ditching old service methods and focusing on digital tools, telecom companies can work better and connect more with their customers. This research helps by presenting a flexible and future-proof system for telecoms e-commerce. It supports both what the market needs now and what technology will bring in the future.

Literature review

Contextualizing the research

The rapid growth of digital technology has changed the way businesses work. Today, e-commerce platforms are very important as they help businesses talk to customers and manage sales online. In the telecommunications industry, this digital shift has also affected the way services are delivered. Telecom companies now need to build powerful, flexible and secure online systems. This part of the paper looks at the ideas and research behind e-commerce in telecommunications. It talks about how these platforms are built, what new technologies are being used, how to create a good user experience and what problems companies face when implementing these systems.

E-commerce in the telecommunications industry

E-commerce in the telecom industry is no longer just about selling products online. It now includes things like subscription plans, service bundles and AI-powered smart suggestions (Singh, 2019). More and more customers now want to manage their own services online, which has pushed telecom companies to focus more on digital tools (Chaffey, 2021). Research shows that telecommunications providers need to offer fast, real-time payments and allow users to personalize their services to differentiate themselves from competitors (Liu et al., 2020).

E-commerce platform models and architectures

Current e-commerce platforms are built in different ways. Some use a 'monolithic' design, where everything is built together into one big system (Richardson, 2018). These are easier to create, but harder to develop or modify. Others use a "microservices" design, in which the system is made up of smaller parts that can be updated or replaced separately. This makes it easier to add new features or connect with other tools (Newman, 2022). Studies also show that the use of APIs (application programming interfaces) is very important. APIs help platforms to seamlessly connect with other services, such as payment systems or AI chatbots (Fielding & Reschke, 2014).

Technological Trends in e-commerce development

New technologies such as cloud computing, artificial intelligence and blockchain have greatly improved what e-commerce platforms can do. Cloud-based systems help telecommunications companies to scale more easily and save money on hardware and servers (Chodorow, 2013). Artificial intelligence improves the customer experience by studying user behavior to suggest the right services and adjust prices (Russell & Norvig, 2021). Blockchain helps secure the platform, especially when it comes to stopping fraud and ensuring that transactions are secure and verified (Nakamoto, 2008).

UX/UI and personalized user experience in e-commerce

User experience (UX) is very important for customer retention. Research shows that telecom e-commerce platforms should have responsive design, user-friendly menus, and personalized dashboards (Garrett, 2011). AI tools, such as virtual assistants and chatbots, also help by speeding up assistance and keeping users more engaged (Adam et al., 2020). However, a big challenge is to provide a personalized experience while protecting user data and complying with privacy laws such as GDPR (Voigt & Bussche, 2017).

Challenges and common issues in implementing telecom e-commerce platform

Even with all the new technologies, telecom e-commerce platforms still face big challenges. These include cybersecurity risks, the difficulty of connecting different systems, and the need to keep everything running quickly and smoothly (Singh, 2019). Because there are so many real-time transactions, the system needs to be powerful enough to handle the load without slowing down or crashing (Ullman, 2011). Another problem is that many telecommunication companies are still using old systems, making it difficult to add new digital tools (Date, 2004).

While many studies talk about the general issues of e-commerce, very few focus on the specific needs of telecommunications. These include issues such as flexible subscription plans, automatic billing and the use of artificial intelligence to stop fraud. Also, little research explores how AI and blockchain can work together to improve security in telecom e-commerce. This study aims to fill these gaps by offering a flexible, secure, and easily scalable platform designed specifically for telecom companies.

Research methodology

The development of the e-commerce platform for the telecommunications company followed a clear and organized method to ensure that the system is efficient, easy to scale and secure. This method included several important steps: understanding the needs of the system (requirements analysis), designing how it will work (system design), building the database (database modeling), creating both the user interface (frontend) and server functions (backend), assembling all the elements (deployment), testing, and finally launching (deployment) This approach follows an incremental development model, which means that the system is built in small steps and improved over time based on testing and feedback.

To help explain the process better, Figure 1 shows a diagram of the workflow used in this project:

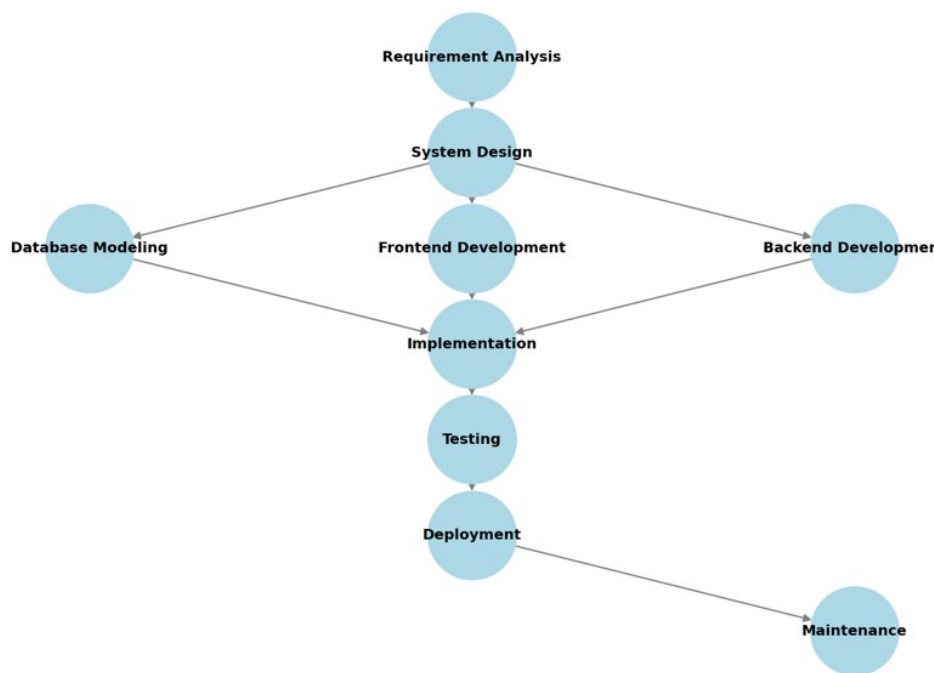


Figure 1. Workflow diagram - e-commerce platform development

The development process started with the requirements analysis phase, where the main features of the platform were identified. These included secure user authentication, subscription management, product bundling, real-time data management, automated billing and administrator control tools. This was followed by the system design, which used a modular structure. This made it easier to scale the platform and add new features in the future. The system followed a three-layer architecture:

- Frontend layer: HTML, CSS, Javascript, Bootstrap – ensuring responsiveness and UX optimization
- Backend layer: PHP for server-side logic and API-based functionalities
- Database layer: MySQL for structured data storage, with optimized query execution.

The database was carefully designed to manage users, subscriptions, products and invoices. Using entity-relationship modeling, the team mapped how the different parts of the system are related to each other. The database also included user roles, subscription details, product catalogs, invoice generation, and tools to keep data safe and fast (such as indexing and data constraints).

The front end was designed with Bootstrap to look good on all devices, and the back end used PHP to connect to the MySQL database. An administrative dashboard was created to give full control over products, services and customer information.

To ensure the platform worked well, it was thoroughly tested for functionality, speed and security. After passing these tests, the system was launched on a cloud platform, which helps keep it online at all times and protects against failures. After launch, the platform was continuously monitored and updated to improve features and security. To measure how well the platform worked, two main goals were used:

- Fast response times – all actions should finish under 2 seconds
- No security risks – the system had to be free of critical security issues before going live

Results and discussions

The completed e-commerce platform offers powerful features and runs smoothly. Figure 2 shows a live report with important performance figures and real-time data from the system. This type of dashboard helps administrators to track services, products, orders, orders, invoices and users in one place. Similar techniques have been used in previous studies (Liu et al., 2020), which found that tools such as data caching and optimized database queries can greatly improve performance, especially when the system has many concurrent users.

Invoice Order Listing [Vodafone]

Invoice No.	Invoice Date	Description	Actions
9	10/01/2024	Services/Subscriptions	View Invoices
10	12/01/2024	Services/Subscriptions	View Invoices
11	04/04/2024	Products/Phones	View Invoices
12	04/04/2024	Services/Subscriptions	View Invoices
13	04/04/2024	Services/Subscriptions + Products/Phones	View Invoices
14	04/04/2024	Services/Subscriptions + Products/Phones	View Invoices
15	23/04/2024	Products/Phones	View Invoices

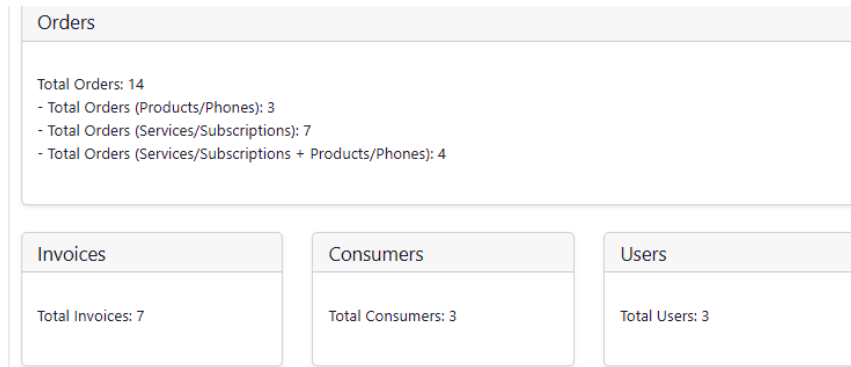


Figure 2. Listing of all existing invoices

Source: Authors' own research.

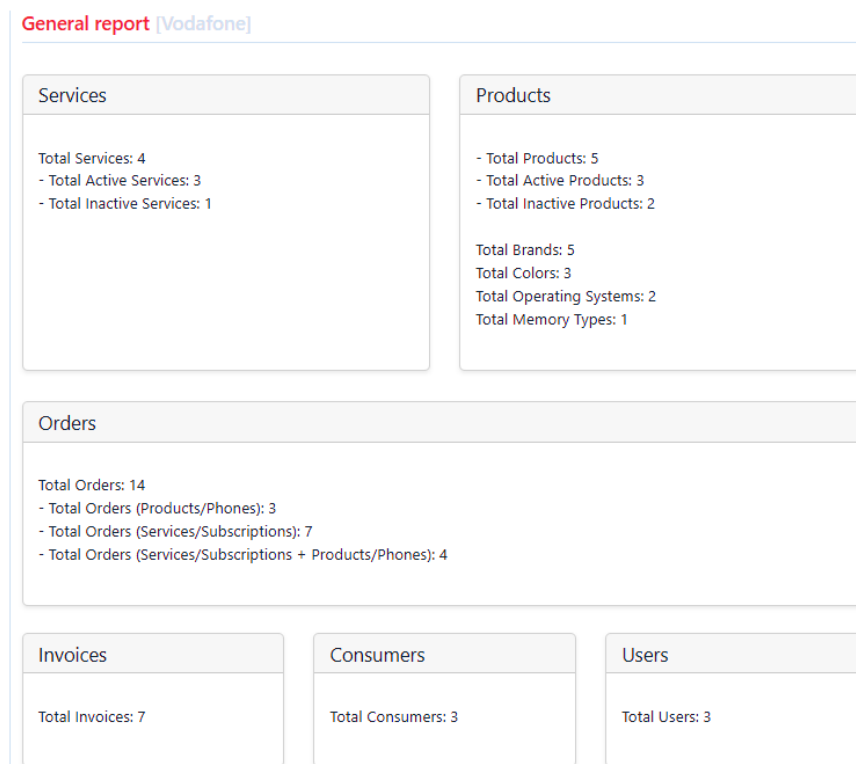


Figure 3. General dashboard report

Source: Authors' own research.

Figure 3 shows how the platform manages invoices in a secure and organized way. Each invoice includes the date, type of service or product and a link to view the details. This system helps track all transactions clearly and securely. Similar methods have been used in artificial

intelligence-based fraud detection systems (Russell & Norvig, 2021), which automatically check transactions to detect anything unusual or risky.

Invoice Order Listing [Vodafone]

Invoice No.	Invoice Date	Description	Actions
9	10/01/2024	Services/Subscriptions	View Invoices
10	12/01/2024	Services/Subscriptions	View Invoices
11	04/04/2024	Products/Phones	View Invoices
12	04/04/2024	Services/Subscriptions	View Invoices
13	04/04/2024	Services/Subscriptions + Products/Phones	View Invoices
14	04/04/2024	Services/Subscriptions + Products/Phones	View Invoices
15	23/04/2024	Products/Phones	View Invoices

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Figure 4. Listing of all existing invoices

Source: Authors' own research.

Add Users [Vodafone]

User

Password

Password confirmation

Name

Surname

Email

Figure 5. Adding administrator accounts

Source: Authors' own research.

Figure 4 shows how new users are added to the platform using a secure form. Each user has to enter a username, password and e-mail address, along with their name. This system also includes password confirmation to prevent mistakes. These steps are part of a role-based access control system, which means that users only get access to the parts of the platform they need.

Research on e-commerce in telecommunications (Newman, 2022) shows that the use of automated role management helps reduce human error and improve security. It also makes the platform more efficient and manageable, especially when dealing with many users.

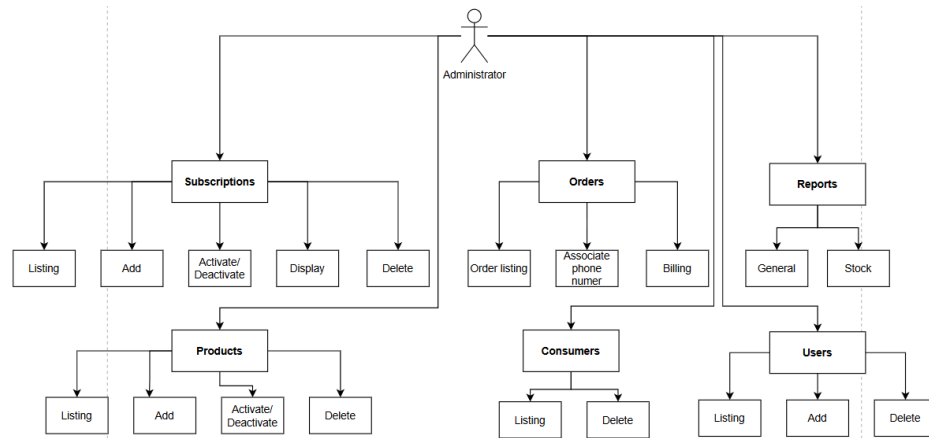


Figure 6. System usage diagram for administrators

Source: Authors' own research.

This work adds to earlier studies by proving that a modular layout, an optimized database, and a user-first interface can work well together in telecom e-commerce. Figure 5 shows what an administrator can do inside the platform. From one screen, the admin can:

- manage Subscriptions (list, add, activate/deactivate, display, delete)
- manage Products (list, add, activate/deactivate, delete)
- handle Orders (view order list, link a phone number, create bills)
- view Reports (general and stock)
- look after Consumers (list or delete)
- manage Users (list, add, delete)

Having all these tasks in one place, with live data, helps managers make quick, informed choices — an approach that enterprise-resource-planning studies say is very effective (Chaffey, 2021).

1. Our tests show that the telecom e-commerce platform meets three big goals:
2. Scalability – the modular design lets us add new features or handle more traffic without a full rebuild.
3. Security – role-based access, encrypted data, and careful testing keep the system safe.
4. Ease of use – a clean dashboard and fast pages give users and admins a smooth experience.

Next steps will focus on:

- adding more AI automation to cut manual work,
- using blockchain to make transactions even safer, and
- pushing more services to the cloud so the platform can grow or shrink on demand.

Conclusions

In summary, this project built a simple, secure and flexible online platform for a telecommunications company. It utilizes front-end tools, such as HTML, CSS and Bootstrap, and back-end tools, such as PHP and MySQL, to create a system that works well and handles many tasks. The platform keeps user data safe with strong security and is designed to grow and improve in the future. It has been created with both the technical side and the users' needs in mind, which is why it runs smoothly and is easy to use. In the future, the platform can become even better by adding AI to help customers and using machine learning to understand how people use the system.

Another good idea is adding blockchain technology, which can make payments and subscriptions more secure and automated. It can also help users to control their own data and still follow all privacy rules. This platform is a solid foundation for telecom companies looking to improve their online services.

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