

ANALYSIS OF REQUIREMENTS FOR CREATING A POINT OF SERVICE SYSTEM FOR RESTAURANTS AND CAFES IN UKRAINE

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Анотація

У цьому роботі розглянуто вимоги до розробки системи точки обслуговування відповідно до потреб закладів харчування, зокрема ресторанів і кафе.

Ключові слова: Харчова промисловість, ресторан, кафе, сфера послуг, точка обслуговування, POS, вимоги, аналіз, розробка програмного забезпечення, законодавчі вимоги, українська харчова промисловість, Україна, управління ресурсами, управління персоналом, управління інвентаризацією, управління замовленнями.

Abstract

This paper examines the requirements for the development of a Point of Service system according to the needs of establishments in the food service industry, specifically restaurants and cafes.

Keywords: Food service industry, restaurant, cafe, service industry, point of service, POS, requirements, analysis, software development, legal requirements, Ukrainian food service industry, Ukraine, resource management, employee management, inventory management, order management.

Introduction

The restaurant and cafe industry has experienced rapid digital transformation over recent years. The establishments started to rely on point of service systems to streamline the process of taking, processing and amending orders as efficiently as necessary, while improving record keeping and automating significant portions of accounting on many levels. The implementation of a Point of Service (POS) system serves to mitigate and minimize errors that might otherwise be introduced by human operators, as well as recording and providing valuable information, such as the inventory and sales trends. As restaurants and cafes increasingly adopt digital solutions to enhance operational efficiency, the complexity of their requirements also increase.

This paper examines the requirements for the development of an effective POS system, identifying core functionality and system architecture considerations for the food services industry. The research methodology employed in this paper is based in autoethnographic analysis, drawing on nearly a decade of firsthand experience across various levels of the food service industry, encompassing roles ranging from waiter to managerial positions, as well as insights from a wide range of professionals working in different capacities. Additionally, this study incorporates an examination of Ukrainian legislation, existing POS systems, such as the Ukrainian TurboPos[1] and Odoo's POS package[2], and the operational needs, requirements, and expectations of various establishments. This combined approach ensures a comprehensive understanding of both practical industry insights and regulatory frameworks.

The purpose of this paper is to improve the profits of restaurants and cafes located in Ukraine by reducing operational costs and instabilities caused by traditional POS systems, by identifying the requirements to create a new POS system that suits them more.

General Outline of the Requirements for Developing a POS System

The effectiveness of a POS system for restaurants and cafes depends primarily on its ability to efficiently manage orders, dynamically adjust menu configurations, and handle inventory management. Order management constitutes a key feature, which includes support for multiple ordering methods, including table-side entry, counter service and online transactions. The system must provide real-time tracking, ensuring that modifications can be made seamlessly without disrupting workflow. For example, when a mistake is eventually and inevitably made, the system should allow the operator to correct it without needing to start the process of taking an order anew.

A well-structured menu configuration system is another critical aspect, necessitating a system capable of updating menu items, pricing structures, promotional offers, and analogous operations in real time. Equally important is the integration of inventory control mechanisms to maintain inventory levels and track ingredient usage. The incorporation of these elements into a POS system is essential for operational efficiency and cost optimization.

Payment processing is a crucial component that requires a secure and versatile framework. The system must support a variety of payment options, including cash, credit and debit cards. This matters greatly as, if the customer is paying with cash, the system should calculate the change automatically in order to speed up the payment interaction and greatly reduce the chance of a mistake occurring, and there might be differences in processing of the card and the payment depending on whether it is a debit or credit card. Fortunately, most card related transactions are handled by companies that specialize in handling payments in such a way, and the system only needs to integrate the systems of the mainstream providers such as Visa[3] and MasterCard[4] companies.

Moreover, the integration of automated billing and receipt generation functions would streamline customer interactions by ensuring accuracy in tax calculations, tipping options, and invoice management; it would also enable membership subscriptions. The integration of these features helps create a smoother and much faster ordering experience, increasing customer satisfaction and operational efficiency, as well as opening the door for more ways of generating revenue. Additionally, integration with financial and accounting software facilitates would automate revenue tracking, thereby minimizing manual errors.

The following section of this paper will examine specific requirements that were deemed the most critical, as well as some government regulations and integrations.

The Specifics of the Main Requirements

Order and menu management – the system must include an interface for managing orders and their contents, preferably designed as a set of buttons that allow operators to quickly add products to the currently selected order. It should support the simultaneous handling of multiple active orders, ensuring that orders remain in the system until they are either canceled or paid in full, at which point they should be archived for record-keeping and reporting purposes. To enhance usability, the interface should allow menu buttons to be grouped based on categories or custom preferences, reducing screen clutter and streamlining the ordering process. This approach minimizes cognitive load, prevents workflow disruptions caused by an excessive number of options, and ensures fast and accurate order processing.

The system must also include a similar dedicated subsystem that enables efficient management of menu items and pricing through an intuitive interface for managers.

Inventory management – the system must have an inventory management system that can, at the minimum, account for products that are sold as is, such as bottled beverages, packaged goods, and so on. The addition of a subsystem that keeps track of ingredients the establishment has by allowing the managers to enter, override, and observe how much of each of the ingredients the establishment has, automatically deducing a predetermined amount of each ingredient upon sale of a dish that requires the use of such ingredients, preferably showing a chart that demonstrates the stocks of the ingredients over a set period of time, and issuing automatic reminders to managers once the stocks get low would greatly increase the value of the POS system overall.

Payment processing – must accommodate a diverse range of payment methods, including cash, credit and debit cards. This feature is pretty much non negotiable, a POS system that cannot precalculate the prices, totals, and change for cash payments is not a complete POS system, as this is a core point of the entire concept. Credit and debit payments might be made through 3rd party devices such as those that banks provide, but must still be somewhat integrated to the wider POS system ecosystem in order to be legally compliant with Ukrainian law as well as keeping proper accounting, calculating commissions and tax.

Software registrars of settlement operations (SRSO) and registrars of settlement operations (RSO) – according to the current legislation the use of SRSO[5] or RSOs are now mandatory for establishments in the food service industry, with the gradual phasing out of the RSOs [6].

RSOs are stand alone devices, usually not really comfortable to use and require manual input of all prices, codes, and names of products, according to the government registrations of the products, one by one. Needless to say, this was a really troublesome and tedious process that was also very open to human-made mistakes that can take even more time, as well as costing resources, as checking the inputted data for mistakes often involved printing out the entirety of the data.

SRSOs, on the other hand, are software that can either be directly used in the same way as the RSOs, but as an application on virtually any device that can run a modern chromium browser, as well as native applications. The more important part of this technology, however, is its API, which allows other software such as ERP and POS software to be able to process payments and send the data over to the government servers immediately, without the need for a standalone device or application. Any modern POS or ERP system that targets Ukrainian businesses must integrate and work with the government SRSO API as their competition will have already integrated it and as it will enable the POS system to handle the taxation information required to print out official receipts [7].

License information for products that require per-product identification numbers – some products, such as alcoholic beverages require their unique identifier to be inputted in order to be sold officially, this can be done manually or by scanning the barcode on the product. As this is pretty much mandatory to acquire and whether an SRSO system is integrated or not, the identifier needs to be swiftly recorded in order to not make the customers wait for longer than necessary so as to not upset them. In case of SRSO integration, the information can immediately be passed to the government servers upon transaction completion, whereas if it is not integrated, the information can be saved in order to allow the operator to input it to a standalone SRSO or RSO system in order to legally conclude the transaction, as well as helping preserve a separate copy of the details of products with extra legislations in order to help with audits and inspections.

Support for peripherals that are commonly used in the sector – support for peripherals such as the aforementioned barcode reader, credit and debit card readers, readers for cards that the establishment might issue, whether for workers or for customers as proof of membership or subscription in order to get some service, and similar devices should be kept in mind while developing a POS system as they can and do greatly increase efficiency and introduce new opportunities for business. The system should aim to reduce the manual and duplicate data entry by automating or eliminating these steps, as alongside having an ample amount of opportunities for mistakes to be made, at this stage the mistakes can cost the business, and more importantly, the customer, a lot of money, resources, and time to fix up.

It is possible to go on further and further with the expectations, the requirements, and the demands, but these are the core features that need to be implemented before everything else. Upon the completion of the aforementioned functionalities, the development can be steered in the direction of more “quality of life” features, improving the design and experience of their tools, and then move onto edge case and more advanced but less frequently needed functionalities, such as the capability to function offline for an indefinite amount of time and to synchronize with the government and management services afterwards, in the event of a client having network issues for a prolonged amount of time.

Additionally, the potential and reliability of the system could be significantly enhanced if the components related to resource and employee management were self-hosted by the company utilizing the system, on their own servers, thereby improving data security. Moreover, configuring the front-end terminals to

operate within an intranet would further reinforce system security, ensuring that only the server responsible for handling connections to government and payment services maintains direct access to the internet, preventing a lot of potential data security issues.

Conclusion

The development of a POS system requires a structured approach that prioritizes functional efficiency, data security, and regulatory adherence. The critical requirements for a POS system for the food service industry were examined, identifying main functionalities, system architecture considerations, and best practices for ensuring both usability and compliance with legal regulations. Menu, order, and inventory management, integration of payment processing systems, SRSO compliance and integration, consideration of special steps that need to be taken when selling specific products that require additional identifying information to be submitted, support for peripherals that are commonly used in the sector were identified as the main requirements.

REFERENCES

1. TurboPos. [Electronic resource] – URL: <https://turbopos.net/en> (date of reference: 19.03.2025).
2. Odoo. A point of sale system you can depend on – [Electronic resource] – URL: <https://www.odoo.com/app/point-of-sale-shop> (date of reference: 19.03.2025).
3. Visa. What we do – [Electronic resource] – URL: <https://corporate.visa.com/en/about-visa.html> (date of reference: 19.03.2025).
4. MasterCard. Who we are – [Electronic resource] – URL: <https://www.mastercard.com/europe/en/home.html> (date of reference: 19.03.2025).
5. State Tax Service of Ukraine. Software registrars of settlement operations – [Electronic resource] – URL: <https://tax.gov.ua/en/baner/software-rco> (date of reference: 19.03.2025).
6. Верховна Рада України. “Про застосування реєстраторів розрахункових операцій у сфері торгівлі, громадського харчування та послуг” (30.12.2024) – [Electronic resource] – URL: <https://zakon.rada.gov.ua/laws/show/265/95-%D0%B2%D1%80> (date of reference: 19.03.2025).
7. Державна податкова служба України. Опис API фіскального сервера контролюючого органу – [Electronic resource] – URL: <https://tax.gov.ua/baneryi/programni-rro/opis-ari-fiskalnogo-servera> (date of reference: 19.03.2025).

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