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CRM SYSTEM USING PROCUREMENT LOGISTICS METHODS AND IMPLEMENTION OF ABC AND XYZ CLASSIFICATION METHODS IN THE C# PROGRAMMING LANGUAGE

CRM СИСТЕМА З ВИКОРИСТАННЯМ МЕТОДІВ ЗАКУПІВЛЬНОЇ ЛОГІСТИКИ ТА ВПРОВАДЖЕННЯ ABC і XYZ КЛАСИФІКАЦІЙНИХ МЕТОДІВ НА МОВІ ПРОГРАМУВАННЯ C#

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Abstract. *This article presents the design and development of a Customer Relationship Management (CRM) system that integrates procurement logistics methods with the implementation of ABC and XYZ classification techniques. Using C# and WinForms in Visual Studio, the system aims to optimize inventory management and decision-making processes within an organization. The paper explores key methodologies used in procurement logistics and highlights the importance of implementing classification models to segment customers and inventory. It further elaborates on the technical aspects of utilizing C# features, database integration, and the creation of a user-friendly interface using WinForms.*

Keywords: *CRM, Procurement Logistics, ABC Classification, XYZ Classification, C#, WinForms, Visual Studio, Entity Framework*

Анотація. *У цій статті представлено дизайн і розробку CRM системи, яка об'єднує методи логістики закупівель із впровадженням методів класифікації ABC і XYZ. Використовуючи C# та WinForms у Visual Studio, система спрямована на оптимізацію управління запасами та процесів прийняття рішень в організації. У статті досліджуються ключові методології, що використовуються в логістиці закупівель, і підкреслюється важливість впровадження моделей класифікації для сегментації клієнтів і запасів. Далі детально розглядаються технічні аспекти використання функцій C#, інтеграція бази даних і створення зручного для користувача інтерфейсу за допомогою WinForms.*

Ключові слова: *CRM, Логістика закупівель, Класифікація ABC, Класифікація XYZ, C#, WinForms, Visual Studio, Entity Framework*

Introduction

In today's business environment, the efficient management of customer relationships and inventory is essential for organizations aiming to maintain competitiveness. Customer Relationship Management (CRM) systems have become central to achieving this objective. Incorporating procurement logistics techniques into CRM systems enables businesses to handle customer orders, stock, and delivery processes effectively. Furthermore, applying classification methods like ABC and

XYZ allows the system to categorize customers and inventory based on importance and variability.

The choice of C# as the programming language, coupled with the development environment of Visual Studio, offers a robust platform for building desktop-based CRM applications. The use of WinForms ensures the system is accessible, visually appealing, and functional for end users.

Main Text

The developed CRM system serves as a comprehensive solution for managing customer interactions, orders, inventory, and procurement processes. It uses ABC and XYZ classification methods to distinguish high-priority customers and high-demand inventory items. The system's architecture involves a relational database managed using Entity Framework, a graphical user interface built on WinForms, and business logic implemented in C#.

The procurement logistics strategy in the CRM system includes efficient management of supplier relationships, order processing, and demand planning. This involves defining procurement categories based on historical order volumes and forecasting future trends. The CRM system is designed to optimize inventory levels, improve order fulfillment times, and reduce waste in procurement cycles.

ABC Classification categorizes items based on their contribution to overall revenue or cost. The approach divides items into three categories:

A-Items: High revenue contributors with lower inventory quantities

B-Items: Moderate revenue contributors and average inventory quantities

C-Items: Low revenue contributors with large inventory quantities

XYZ Classification complements the ABC model by segmenting items based on variability in demand:

X-Items: Stable demand with low variability

Y-Items: Moderate demand variability

Z-Items: High demand variability

The integration of these models in the CRM system enables organizations to determine their stock priority and adjust procurement strategies accordingly.

Entity Framework is used to connect the CRM system with an SQL Server database. C# classes are mapped to tables in the database, representing customers, orders, inventory items, and suppliers. The classes and their relationships are defined using LINQ queries, which facilitate CRUD operations.

For handling large data operations and database queries, asynchronous programming techniques are implemented using the async and await keywords in C#. This allows non-blocking interactions with the database, improving system responsiveness.

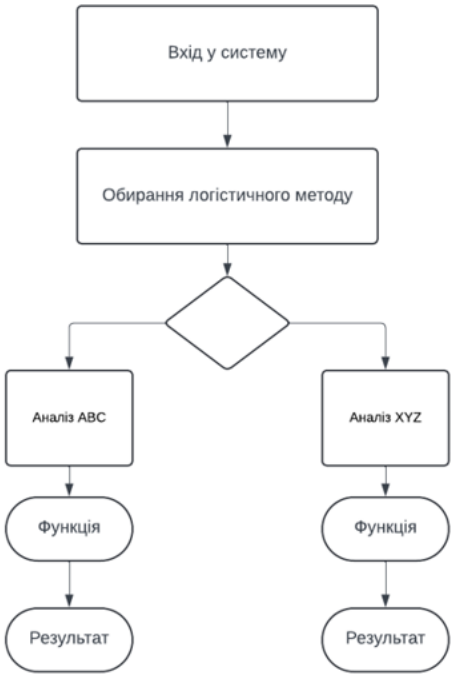

Figure 1 - Functional model of the CRM system

To manage the graphical interface, WinForms is used to create interactive forms, tables, and reports. Features like DataGridView control are utilized to display inventory lists, order details, and customer information. The design is focused on user experience, providing easy navigation and data management through controls like buttons, filters, and search functionalities.

Integration with Excel is essential for importing and exporting bulk data in the CRM system. Using the EPPlus library, we developed functions to import customer and inventory records from Excel sheets and automatically update the database. Additionally, users can export classified data into formatted Excel sheets for further

analysis or reporting.

Basic Principles

Data Integration and Synchronization: The system employs a centralized database for storing customer, inventory, and order information. Changes made through the CRM interface are immediately synchronized with the database using Entity Framework.

Usability and Flexibility: By leveraging WinForms, we provide an intuitive and dynamic user interface that allows quick navigation between various modules and efficient data entry.

Data-Driven Decision-Making: The integration of ABC and XYZ classification models supports users in identifying key inventory items and strategic customer segments. This helps in improving procurement and inventory management decisions.

Scalability and Performance: The implementation of asynchronous programming in database operations ensures the application remains responsive, even when handling large volumes of data.

Summary

In summary, this article presented a CRM system built using C# and WinForms in Visual Studio, integrating procurement logistics techniques with ABC and XYZ classification methods. By employing Entity Framework for database management, EPPlus for Excel integration, and asynchronous programming for responsive interactions, the system effectively addresses the needs of modern businesses. The classifications provide valuable insights for optimizing inventory management, enabling businesses to prioritize high-revenue items and streamline procurement processes.

The integration of these methods within a CRM system enhances customer service, reduces inventory waste, and promotes efficient procurement practices. As a result, this approach demonstrates the potential of combining software development and logistics methodologies to create impactful business solutions.

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