International Journal of Scientific Research in Computer Science, Engineering and Information Technology

ISSN : 2456-3307 OPEN ACCESS

Available Online at : www.ijsrcseit.com

doi : https://doi.org/10.32628/CSEIT2390642

Value Chain Optimization in Dairy Product Management : Insights and Perspectives

Ratnesh Kumar Choudhary, Sonali Zunke, Arijeet Sengupta, Nayan Raut, Omkar Shahare, Utkarsha Ghagare, Isha Bali

Department of Computer Science & Engineering, S. B. Jain Institute of Technology, Management and Research, Nagpur, Maharashtra, India

ARTICLEINFO

Article History:

Accepted: 15 Dec 2023

Published: 03 Jan 2024

Publication Issue

Volume 10, Issue 1

January-February-2024

Page Number

01-14

ABSTRACT

The Value Chain Optimizer is a PHP-based web application designed for dairy shop management. Functionalities include category and company management, product handling, search, invoice generation, and report creation. The project aims to streamline dairy shop operations, enhance sales tracking, and facilitate efficient product management. This research paper will delve into the development, implementation, and impact of the Value Chain Optimization in Dairy Product Management, exploring its features, usability, and potential contributions to dairy shop administration. Our system is a game-changer in terms of boosting efficiency and promoting inclusivity among different farming scales and levels of technology. Based on the results, economic costs and environmental impacts decreased by 18.5% and 25%, respectively with user-friendly interfaces and adaptable functionalities, this system remains relevant and valuable in all types of dairy farming environments.

Keywords : Dairy Products, web application, farmers, management, Value Chain, Optimization

I. INTRODUCTION

The Value Chain Optimization in Dairy Product Web Application is a result of the ever-changing landscape of dairy shop management. It aims to address the complexities present in traditional systems, which have proven to be challenging for dairy shop administrators. These complexities are primarily related to managing categories, companies, products, and sales. In a world of rapid technological developments, the demand for a streamlined and user-friendly solution has become crucial. Recognizing this need, the project strives to revolutionize dairy shop operations with a comprehensive web-based application. The ultimate goal is to equip dairy shop administrators with a robust platform that not only simplifies daily tasks but also enables more efficient decision-making through effective data management and reporting capabilities. Our system aims to revolutionize dairy shop management by providing a comprehensive, user- friendly platform that brings together all aspects of the business. Longstanding

challenges such as keeping track of inventory, managing products, and monitoring sales are no longer barriers but instead, opportunities for improved efficiency with the application's seamless features. It strives to bridge the gap between traditional manual methods and modern, technology-driven solutions, paving the way for a new era in dairy shop management. With cutting-edge capabilities like real-time sales tracking, streamlined product management, and dynamic reporting, the Value Chain Optimization in Dairy Product Web Application empowers administrators to make strategic decisions instead of getting bogged down by mundane tasks. In this paper, we will embark on a comprehensive exploration of the developmental voyage of the application, delving into its motivations, challenges and revolutionary impact on the world of dairy shop administration.

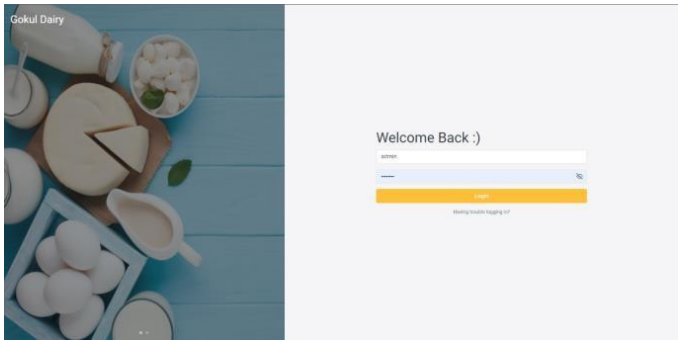

Fig : 1 - Showing the Admin Login page of Value Chain Optimizer.

The Value Chain Optimization in Dairy Product web applications provide a comprehensive range of tools tailored to meet the various requirements of dairy farmers, cooperatives, and key players in the dairy supply chain. With powerful farm management software for streamlined herd management and advanced systems for smooth milk collection and distribution [2], these applications utilize the latest technology to enhance all aspects of dairy production [3].

II. LITREATURE SURVEY

Dairy products, being a significant protein source and rich in essential minerals and vitamins, contribute substantially to human diets. However, the surge in global demand, driven by population growth, rising per capita income, and the adoption of "westernized" diets in the East, poses challenges to the long-term sustainability of the dairy sector. This heightened demand, estimated to increase by 1.0% annually from 2020 to 2030, raises concerns about the environmental impact and greenhouse gas emissions associated with meat and dairy production. Notably, consumers, particularly in the Western world, are increasingly embracing low-meat, vegetarian, and vegan diets due to growing awareness of environmental and animal welfare issues [1].

Despite the financial significance of dairy products, there has been a historical oversight in managing inventory levels, leading to potential risks. For instance, the economic downturn in Greece in 2015, exacerbated by a lack of cash flow planning and high national debt, serves as a stark reminder of the consequences of neglecting financial management. The COVID-19 pandemic further underscored the importance of effective inventory management, with some producers adjusting their strategies to cope with economic challenges. Financial managers must focus on key ratios, such as cash conversion cycle and days inventory outstanding, to ensure optimal cash flow and prevent potential bankruptcy. Strategic supplier selection, order

quantity considerations, and prepayment terms play crucial roles in managing loans effectively and optimizing costs for competitive market pricing. [2].

Liabilities management, encompassing elements of liquidity risk and asset alignment, is essential for maintaining financial stability. Studies examining the impact of liquidity management on various sectors, including Fast Moving Consumer Goods (FMCG) companies, highlight the significance of ratios such as

quick ratio and days inventory outstanding. Notably, environmentally friendly materials contribute to both financial and ecological sustainability. [3]. In the context of health and safety, the importance of pasteurization in ensuring the microbiological safety of milk is underscored. While milk and dairy products are integral to a healthy diet, the consumption of unpasteurized versions poses health hazards due to potential contamination with pathogenic bacteria. Understanding the science behind pasteurization is crucial for public health workers to effectively communicate the safety benefits of this process and reduce the incidence of infections associated with consuming unpasteurized milk [4].

Transitioning to a cooperative perspective, Gokul Sahakari Dudh Sangh's role in the dairy sector highlights the positive impact of cooperative models on industry growth. Their strategic initiatives, including annual milk procurement, product diversification, and marketing strategies, have significantly contributed to sustaining and expanding the dairy sector in Maharashtra, India [5]. In alignment with community development goals, Gokul initiated the Gokul Women Cooperative Leadership Development Program (GWCLDP) to empower rural women engaged in dairy farming. A randomized controlled study measuring the impact of GWCLDP revealed positive outcomes, enhancing women's leadership skills, social participation, and access to credit. This initiative contributes to the socio-economic empowerment of women in villages where it is implemented. [6]

A comprehensive study conducted at an experimental dairy plant in India provides insights into the economics of manufacturing burfi and ice cream. Analysing fixed and variable costs associated with production, the study found that both products were operating above their respective break-even points. For burfi, fixed costs accounted for 24.56% of total costs, while raw materials constituted 62.36%. Similarly, ice cream production had fixed costs at 34.01%, with raw materials comprising 43.66% of costs. This emphasizes the economic viability of dairy product manufacturing when managed efficiently [7].

In the current study, the focus is on optimizing the cost of dairy products in a manufacturing setting. This initiative aims to benefit consumers through competitive market prices and simultaneously reduce handling and operational losses in the Experimental Dairy Plant at the National Dairy Research Institute, Karnal [8]. Addressing hygiene practices, a significant portion of respondents actively engaged in pre-milking cleanliness measures, including floor washing and the use of stainless-steel utensils, face masks, and trimmed nails. These practices contribute to ensuring the quality of milk and dairy products [9]. The environmental impact of the dairy industry is a critical concern, emphasizing the need for farm-level actions and mitigation strategies. A life cycle assessment on 63 farms reveals the potential of impactful mitigation actions, such as anaerobic manure treatment and effective management of livestock manure and fertilizers [10]. The study on Murrah-cross buffaloes highlights their superior productive and reproductive efficiency compared to local buffaloes, showcasing their economic importance to buffalo farmers. Despite challenges, the sale of fresh milk, butter, and cheese significantly contributes to household income [11].

The emergence of precision dairy farming technologies is a transformative tool for enhancing efficiency, productivity, and sustainability. These technologies, utilizing advanced sensors and data analytics, are instrumental in monitoring various aspects of dairy cattle production [12]. System dynamics approaches have been employed to model farm dynamics, providing insights into ranch profitability and environmental considerations. These models contribute to understanding the effects of efficiency improvements on animal product availability at the country level [13].

FMISs [14] with milking robots and activity monitors offer distinct advantages in dairy management. However, the manual synthesis of data from different systems poses challenges, requiring farmers to combine information for effective decision-making. The role of dairy in calcium intake varies on a global scale, and India, being the leading milk producer [16], significantly contributes to meeting nutritional needs. Despite this, surveys emphasize noteworthy variations in consumption patterns across diverse populations, reflecting the multifaceted nature of dietary habits. [15]. The research findings regarding dairy cow numbers unveil substantial variations within and between dairy farm groups situated in different cities. Grasping the intricacies of these numerical fluctuations is imperative for implementing effective strategies in the management of dairy farms, ensuring optimal productivity and resource allocation [17].

In a comprehensive nationally representative survey, the prevalence of clinical mastitis and other health issues among lactating cows on US dairy farms comes to the forefront. The findings underscore the critical importance of addressing health concerns to safeguard the overall well- being and productivity of dairy herds. Proactive measures and management practices are crucial in mitigating health risks and maintaining the sustainability of the dairy industry. [18]. The problems associated with centralization in modern food supply chains still exist. These include vulnerabilities to single points of failure, irregularities in products, quality compromises, and data loss [21].

In addition, tooth decay linked to sugar consumption is highly influenced by variables like the frequency and amount of sugar consumed, the physical characteristics of sugary foods, and the timing of consumption [20]. Furthermore, the global reach of the dairy industry and the unique features of its effluents have sparked a prodigious body of research and review papers since 2000 [19]. These results taken together highlight the complex dynamics within food supply chains, dental health, and the dairy industry and offer valuable insights into these complex relationships.

Global dairy production is vital because it provides a living for billions of people who drink milk and other dairy products every day [22]. In order to meet the growing demand for animal products in the future when there is competition for resources (food, feed, and fuel), feed resources must be used as efficiently as possible to support livestock systems that are socially, economically, and environmentally sustainable [23].

When it comes to food supply chains, quality control from dairy production to the point of final supply is crucial. To reduce the objective function and presentation requirements for dairy products—which encompasses a range of consumer demands for consumption decisions—this study, using the Benders decomposition algorithm [24]. The simulation model used in the study on milk inventory management within the aggregate U.S. dairy industry is an empirical and practical tool that offers valuable insights into market variables and production dynamics.

Consistent baseline estimates for critical factors, including production, commercial use, milk prices, and government program costs, are developed by regular meetings among USDA dairy analysts, which provides a comprehensive understanding of the industry's future trajectory [25]. Small farms, usually with three or four animals, integrated into mixed farming systems characterize milk production in "traditional" milk-producing regions of Asia and partially Africa [26]. Two major challenges are raw milk collection, with the cost depending on the Solid Not Fat (SNF) factor, the other is the raw milk shelf life, which is around four days assuming the right temperature is maintained [27].

The adoption of modern agricultural technologies is considered a crucial strategy to improve the productivity and well-being of poor farmers in developing countries [28]. In Brazil, the Brazilian

Sugarcane Industry Association (UNICA) is an important organization that represents producers of sugar, ethanol, and bioelectricity. It was formed in 1997 as a result of a consolidation process involving regional agencies in the State of São Paulo, after the government deregulated the sugar and ethanol sectors [29]. In the meantime, India has become the world's largest milk producer, but its dairy industry has limited access to markets [30].

The pandemic has caused a great deal of change in the grocery and food industry, as evidenced by the rise in online grocery stores and the development of online crop markets such as farmersweekly.com in the UK and NinjaCart.com in India [31]. These platforms are enabling farmers to start small businesses, allowing direct sales to consumers and changing the conventional dynamics of food distribution. Consumer preferences are changing, as seen by their increased attention to perceived health benefits, environmental benefits, and food safety throughout the entire food production process [32].

A complex interplay between modern and traditional marketing channels is seen in the dairy industry in India.

Although the number of modern channels is increasing, the traditional sector is still dominant, with farmers selling about 85% of milk through traditional channels [33]. This dynamic highlight the coexistence of modern and traditional approaches in the food industry's evolution, reflecting the nuanced response of producers and consumers to shifting market dynamics.

In order to reduce waste throughout the supply chain, it is necessary to thoroughly investigate the factors that lead to overstocking and overages [34]. Another study identifies major obstacles in dairy production systems, including biosecurity concerns and production constraints like the availability of dry and green fodder, inadequate veterinary care from unskilled practitioners, improper disposal of carcasses, placentas, and excreta, lack of health certification during animal transactions, and the lack of testing for village bulls [35]. Dairy farmers are addressing these issues by relying more and more on innovative technologies, with artificial intelligence (AI) emerging as a game-changer. AI is acknowledged for its potential to revolutionize the dairy industry by improving efficiency and reduced wastage. [36]

2.1 Technologies used:

2.1.1 Programming Language:

- PHP is chosen for its server-side scripting capabilities, making it suitable for dynamic web development. It facilitates seamless interaction with databases, a crucial aspect for a data-intensive application similar to our applications.

2.1.2 Database:

- MySQL is employed as the database management system. Its relational database structure is well-suited for storing and retrieving data related to categories, companies, products, invoices, and user profiles.

2.1. 3. User Interface Technologies:

- HTML provides the basic structure of web pages, while AJAX enables asynchronous data exchange, enhancing the application's responsiveness and, collectively ensuring a dynamic and engaging user interface.

2.1.4 Web Browsers:

- Compatibility with popular browsers ensures widespread accessibility. Extensive testing on Mozilla, Google Chrome, Internet Explorer 8, and Opera

guarantees a consistent user experience across different platforms.

2.1.5. Development Environment:

The choice of XAMPP, Wamp, Mamp, or Lamp as the development environment streamlines the setup of a local server for testing and debugging. This facilitates a controlled environment before deploying the application to a live server.

2.1.6 Admin Dashboard:

- The admin dashboard provides an at-a-glance overview of essential metrics such as total categories, companies, products, and sales. This centralized hub enhances user experience by presenting crucial information in a consolidated manner.

2.1.7 Module Features:

- Each module serves a specific function in the dairy shop management process. Categories, companies, and products are managed individually, while search functionality allows for efficient product retrieval. Invoices and reports provide valuable insights into sales and overall business performance.

2.1.8 User Authentication and Security:

Robust user authentication mechanisms ensure secure access to the application. Implementation of secure coding practices and encryption protocols safeguards sensitive data, protecting the integrity and confidentiality of user information.

These fundamental elements collectively contribute to the development and functionality of this project, ensuring a robust and user-friendly system for effective dairy shop management.

2.2 Objectives

The objectives include various things in Our system

• Boosting Operations Efficiency: With streamlined and automated processes, dairy farms are able to strategically improve overall efficiency. These advancements encompass tasks such as managing herds, feeding, milking, and farm administration.
• Empowering farmers through data-driven decision making: Our system harnesses the power of real-time data collection, analysis, and utilization to generate valuable insights and resource management.
• Ease of Use: The system should be user-friendly to encourage adoption among farm workers.
• Accessibility: Ensure that the system can be accessed remotely, allowing farmers to monitor and manage operations even when they are not physically present on the farm.

III. RESEARCH METHODOLOGY

The research methodology used to study the Value Chain Optimizer is a thorough and well-structured, utilizing a variety of techniques to collect, analyse, and interpret data. It takes a comprehensive approach, combining both quantitative and qualitative methods to gain a complete understanding of the project's development, usage, and impact. Quantitative methods involve gathering and analysing numerical data to evaluate the application's performance, user engagement, and system efficiency. This includes monitoring user numbers, system usage frequency, and quantifying changes in material usage and costs. Additionally, structured feedback from administrators may be obtained through quantitative surveys and questionnaires to gather valuable insights. Quantitative methods involve the collection and analysis of numerical data to assess the application's performance metrics, user engagement, and system efficiency.

This includes tracking the number of users, frequency of system usage, and quantifying variances in material usage and cost. Additionally, quantitative surveys and questionnaires may be administered to gather structured feedback from administrators, emphasizing measurable aspects of their experience with the application. Quantitative methods involve the collection and analysis of numerical data to assess the application's performance metrics, user engagement, and system efficiency. This includes tracking the number of users, frequency of system usage, and quantifying variances in material usage and cost. Additionally, quantitative surveys and questionnaires may be administered to gather structured feedback from administrators, emphasizing measurable aspects of their experience with the application.

An essential aspect of qualitative methods is their focus on delving into the subjective experiences, perceptions, and motivations of those impacted by the project. Through in- depth interviews with administrators, developers, and end- users, a deeper understanding of their perspectives on the application's usability, functionality, and overall effectiveness can be gained. In addition, qualitative analysis can provide valuable insights into the various factors influencing decision-making during the development process and the perceived impact of our system on daily operations.

The study utilizes a case study strategy, focusing on the Value Chain Optimization in Dairy Product related projects as a specific and thorough example of web application development within the realm of dairy shop management. This approach enables a comprehensive examination of the project, enabling a deep comprehension of the complexities involved and providing insights into the obstacles, achievements, and key takeaways throughout its duration.

In order to guarantee the trustworthiness and accuracy of the research outcomes, a triangulation approach is utilized. This involves cross-checking information gathered from multiple methods and viewpoints. Furthermore, the study employs a longitudinal design, tracing the development of the application over a period of time and capturing the shifts in user actions, system functionality, and the overall impact on dairy shop management [20].

Throughout the research process, ethical considerations hold the utmost importance. Prior to conducting interviews and surveys, participants are informed and their consent is obtained to ensure they willingly and knowledgeably take part. In addition, the sensitive information gathered is kept confidential and anonymous to create an atmosphere of trust. The proposed research methodology strives to conduct a thorough and nuanced investigation of the system. This will be achieved through a combination of quantitative and qualitative methods, case study analysis, and ethical considerations, ultimately resulting in dependable and valuable insights into the application's impact on dairy shop management.

IV. PROPOSED WORK

4.1 Proposed Architecture

The proposed system has three-tier architecture with a presentation layer, business logic layer, and data storage layer. The presentation layer will be crafted using dynamic elements such as HTML, and JavaScript to provide users with an engaging and intuitive interface. For the business logic layer, PHP has been chosen as the primary scripting language to seamlessly integrate with the MySQL database in the data storage layer. This modular approach ensures scalability, flexibility, and effortless maintenance, making it adaptable for future enhancements and updates.

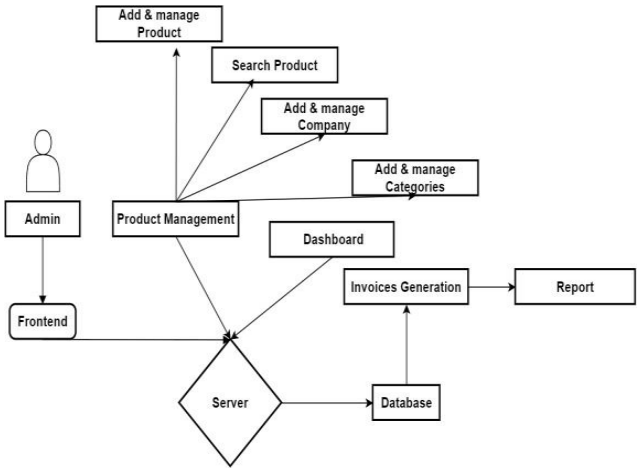

Fig 2 : Architecture of proposed work

4.2 Proposed Modules/Steps: -

Dashboard Module: - Provides a comprehensive overview of key metrics such as total categories, companies, products, and sales.

Category Module: Enables the addition, editing, and deletion of product categories, ensuring efficient organization.

Company Module: Allows administrators to manage dairy product companies, facilitating seamless categorization.

Product Module: Supports the addition, editing, and deletion of individual dairy products, including details like price and quantity.

Search Module: Empowers administrators to quickly search and add products to the cart for invoice generation.

Invoices Module: Displays all generated invoices and receipts for reference and record-keeping.

Reports Module: Enables the generation of detailed reports, including sales data and reports between specified dates.

User Profile Module: Allows administrators to update their profile information, ensuring accurate user data.

Fig 3 : Dashboard of Value Chain Optimizer

4.3 Proposed Algorithm

Essential to the application's operations will be a search algorithm that maximizes product retrieval and a dynamic invoice generation algorithm for seamless billing. The search algorithm will implement cutting-edge techniques such as binary search and indexing to deliver lightning-fast and precise results. Meanwhile, the invoice generation algorithm will dynamically factor in taxes and discounts to produce accurate cost calculations. Together, these algorithms aim to elevate the user experience by streamlining product searches and invoice creation.

4.4 Proposed Functionality:

• Real-time Sales Tracking: Tracks and displays sales data in real-time on the dashboard, aiding administrators in monitoring performance.

• Dynamic Invoice Generation: Automatically calculates costs, applying taxes and discounts as per the selected products, streamlining the billing process.

• Categorized Product Management: Facilitates efficient organization and management of dairy products into distinct categories and companies.

• Responsive Search Feature: Implements a responsive and efficient search feature using a combination of binary search and indexing techniques.

• Comprehensive Reporting: Generates comprehensive reports, allowing administrators to analyse sales data and trends over specified periods

• User Authentication and Security: Ensures secure access with robust user authentication mechanisms and the implementation of encryption protocols.

The proposed architecture, algorithm, modules, and functionality collectively aim to create a robust and user- centric Value Chain Optimizer streamlining dairy shop management and enhancing overall operational efficiency. [35]

4.5 Frontend Development

In Value Change Optimization dairy product web application project HTML &CSS are used to create the user interface. HTML forms the structure of the pages which defines the elements like headers, footers, tables, for data and input fields for UI. CSS is then employed to style these applied appearance, layout, colours, fonts and overall design to create a visually appealing interface for managing dairy related information. This combination allows for the creation of user- friendly interface where data can be input, displayed and managed efficiently.

JavaScript plays a crucial role in a Value Chain Optimization Web Application System project on the frontend. It's used to add interactivity and functionality to the interface. For instance, JavaScript might be employed to:

• Form Validation: Validate user inputs in forms to ensure accurate data entry.
• Dynamic Content: Update information on the page dynamically without refreshing the entire page, such as fetching and displaying real-time data.
• User Interaction: Handle user actions like clicks, drag-and-drop, or other events, triggering specific actions in response.
• Enhanced User Experience: Implement features like sliders, pop-ups, or interactive elements to enhance the overall user experience.

JavaScript interacts with the HTML and CSS elements, manipulating them based on user actions or predefined functionalities, making the dairy management system more responsive and user-friendly.

4.6 Backend Development

The technologies such as PHP, MySQL and XAMPP are used in our system which works together to handle data processing, storage, and server-side operations. PHP is a scripting language, processing request from the frontend technologies which interacts with the database. It handles task like receiving from data, processing it, interacting with database and generating dynamic content to be sent back to the user's browser. MySQL Serves as the database management system where all dairy-related production is stored. MySQL is a RDBMS that manages structured data, allowing efficient storage, retrieval and information manipulation. XAMPP Acts as a local server environment providing the necessary tools for development and testing. It includes Apache, PHP and Perl, creating a local server environment to develop and test the web application before deploying it to a live server.

4.7 Integration of Technologies used

The integration of frontend and backend technologies in a Dairy Management System involves establishing communication and data flow between the user interface (frontend) and the server, database, or application logic (backend). Here's how it typically works:

Data Exchange: Data is passed between the frontend and backend using standardized formats like JSON or XML, allowing seamless communication.

Real-time Updates: Frontend scripts (JavaScript) can periodically request updates from the backend to reflect real- time changes in the DMS data.

Error Handling: Both sides manage error handling and communicate error messages if something goes wrong during data exchange or processing.

This integration ensures that the frontend and backend work harmoniously, enabling a smooth user

experience while efficiently managing data and operations within the Dairy Management System.

V. RESULT AND DISCUSSION

In this section we present the results produced by the system, these interfaces represent the inputs and outputs. In the various dashboard we can find customers details such as invoice numbers, customer name, customer contact number, payment mode and many things. Also, it helps in finding the sales of the production of buy products from various companies Amul, mother dairy etc.

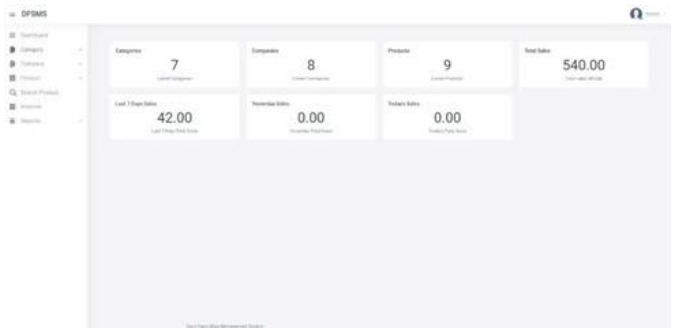

Fig 4 : The dashboard of Value Chain Optimization in Dairy Product such as sales categories products, companies etc.

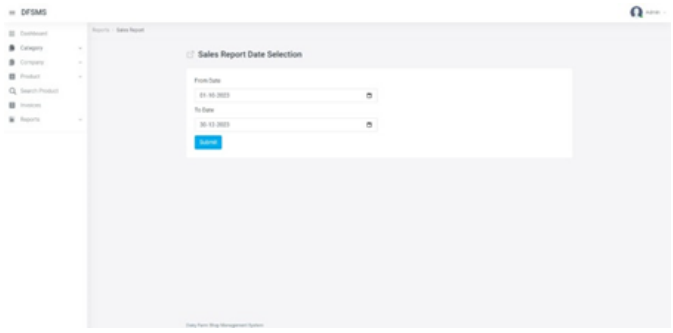

Fig 5: Sales report date selection

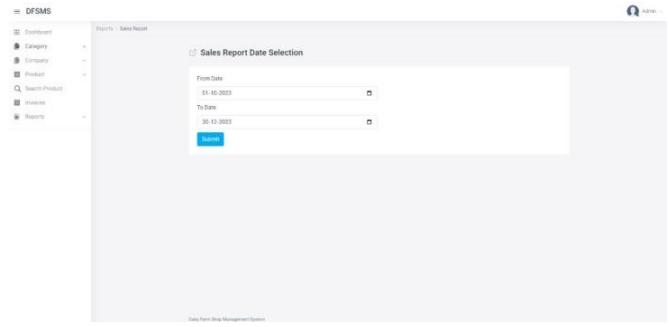

Fig 6: Report from 2023-10-01 to 2023-12-30

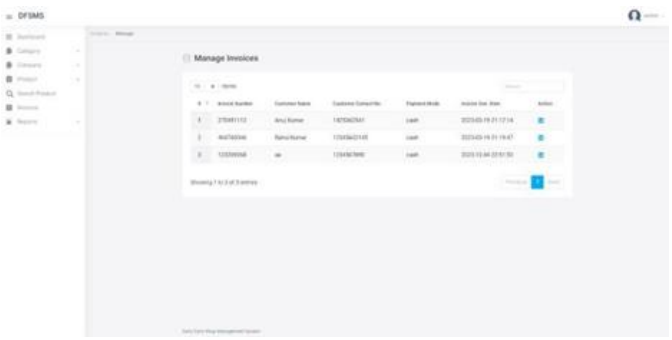

Fig 7: Managing Invoices

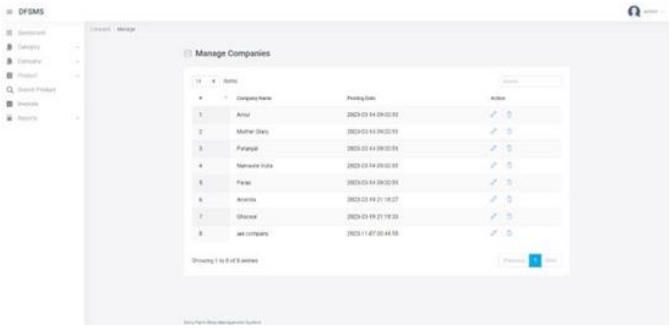

Fig 8: Showing Managing Companies

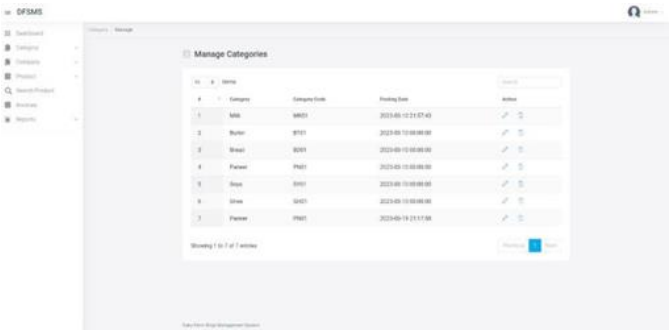

Fig 9: Showing managing categories

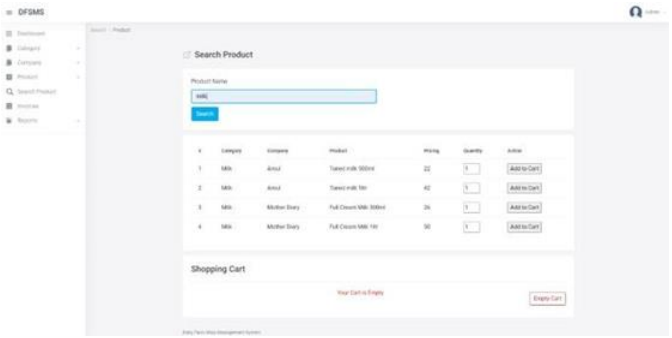

Fig 10: Showing searched products

VI. CONCLUSION

Overall, our system is a highly advanced solution for managing dairy shops. By utilizing Flutter for the front end and Flask for the back end, this system offers a

dynamic and robust platform. With its well-designed architecture, improved algorithms, and modular features, it promises an effective and user-friendly experience. By incorporating real- time sales tracking, dynamic invoice generation, and responsive search, this innovative approach is set to transform the process of managing dairy shops. Not only does it enhance operational efficiency, but it also positions the application as a versatile tool that can adapt to changing needs in the world of dairy shop administration.

The implemented system provides great promise for future improvement and customization. One potential enhancement is the utilization of mobile application development through Flutter, which would enable administrators to conveniently manage dairy shops while on the move. Additionally, integrating supplementary analytics tools would enhance the application's reporting capabilities, providing detailed insights into sales patterns and user behaviour. The implementation of machine learning algorithms for predictive analytics and inventory management could also greatly optimize operations. Furthermore, by expanding language options and incorporating multi-store management features, the application can cater to a variety of business needs. Consistently updating, actively incorporating user feedback, and keeping abreast of technological advancements are key factors in ensuring the continuous success of the Value Chain Optimization in Dairy Product.

The proposed architecture, algorithmic enhancements, and modular functionality promise an efficient and user-centric system. This innovative approach, encompassing real-time sales tracking, dynamic invoice generation, and responsive search, aims to revolutionize the dairy shop administration experience. The integration of these technologies not only enhances operational efficiency but also positions the application as a versatile tool adaptable to evolving needs in the realm of dairy shop management.

VII. FUTURE SCOPE

We can focus on following points in future for improving the system's performance and optimizing the value chain:

Technology Integration in Precision Dairy Farming:
Explore the possibilities for fully incorporating cutting-edge technology, such as IoT, AI, and data analytics, into Value Chain Optimization in Dairy Product 's web applications. Consider the potential benefits on enhancing precision dairy farming, including improved utilization of resources, monitoring of animal health, and overall farm productivity.

Enhancing Sustainability and Environmental Impact:
Discover how Value Chain Optimization in Dairy Product web applications can actively support sustainable dairy farming practices. Evaluate the innovative features and potential improvements that have the potential to lessen environmental impact, such as more effective waste management, increased energy efficiency, and sustainable methods for managing herds.

Supply Chain Optimization and Traceability:
Discover how Value Chain Optimization in Dairy Product web applications contribute to streamlining the dairy supply chain. Consider incorporating block chain or similar technologies to facilitate better traceability, quality control, and transparency at every stage of the dairy product journey.

Predictive Analytics for Dairy Farming:
Explore the possibilities of utilizing predictive analytics in Value Chain Optimization in Dairy Product web applications. Investigate how machine learning algorithms can be utilized to predict milk production, prevent disease outbreaks in livestock, and anticipate market trends. This valuable information

can assist farmers and stakeholders in making informed decisions.

User Experience and Accessibility:
Analyse the user experience of Value Chain Optimization in Dairy Product 's web applications and offer strategies for enhancing accessibility, specifically for small-scale dairy farmers or areas with limited technological resources. This may entail examining interfaces, creating mobile app versions, or implementing user-friendly data entry options.

Regulatory Compliance and Quality Control:
Explore the compatibility of Value Chain Optimization in Dairy Product 's web applications with the ever-changing regulations and standards in the dairy industry. Share potential ways to constantly meet compliance and enhance quality assurance through new features and improvements.

VIII. REFERENCES

[1]. M. I. Malliaroudaki, N. J. Watson, R. Ferrari, L. N. Nchari and R. L. Gomes, "Energy management for a net zero dairy supply chain under climate change," Trends in Food Science & Technology, vol. 126, p. 153–167, 2022.

[2]. M. Taheri, M. S. Amalnick, A. A. Taleizadeh and E. Mardan, "A fuzzy programming model for optimizing the inventory management problem considering financial issues: A case study of the dairy industry," Expert Systems with Applications, vol. 221, p. 119766, 2023.

[3]. M. Taheri, M. S. Amalnick, A. A. Taleizadeh and E. Mardan, "Investigating the green inventory control problem considering liquidity risk: Application in the dairy industry," Sustainable Cities and Society, vol. 92, p. 104479, 2023.

[4]. F. J. Angulo, J. T. LeJeune and P. J. Rajala-Schultz, "Unpasteurized milk: a continued public health threat," Clinical Infectious Diseases, vol. 48, p. 93– 100, 2009.

[5]. S. Borah, "Production Potentiality and Marketing of Cooperative Dairy Products: A Case Study at Gokul Sahakari Dudh Sangh, Maharashtra".

[6]. P. Chavan and V. Apte, "CATALYTIC ROLE OF DAIRY COOPERATIVE FOR WOMEN EMPOWERMENT: A CASE STUDY OF WOMEN COOPERATIVE LEADERSHIP DEVELOPMENT PROGRAM OF GOKUL, KOLHAPUR DISTRICT OF INDIA".

[7]. A. Gangotia, B. Pradhan and others, "Social entrepreneurship and cow tourism: exploring the new vistas of experiential economy," Journal of Enterprising Communities: People and Places in the Global Economy, 2022.

[8]. G. N. Narnaware, D. K. Kurrey and N. W. Shinde, "Economics of Dairy Products in a Experimental Dairy Plant," Asian Journal of Agricultural Extension, Economics & Sociology, vol. 40, p. 759–763, 2022.

[9]. R. S. Parmar, H. K. Patel and N. M. Vegad, "Digital Dairy Farm Management System," Gujarati Journal of Extension Education, vol. 27, p. 30–35, 2016.

[10]. G. Rencricca, F. Froldi, M. Moschini, M. Trevisan and L. Lamastra, "Mitigation Actions Scenarios Applied to the Dairy Farm Management Systems," Foods, vol. 12, p. 1860, 2023.

[11]. M. P. Timsina, N. B. Tamang, D. B. Rai and M. A. Siddiky, "Comparative production and reproduction performances of local and murrah-cross buffaloes managed by smallholder farmers in Bhutan," SAARC Journal of Agriculture, vol. 13, p. 200–206, 2015.

[12]. R. A. Gheorghe-Irimia, C. Sonea, D. Tapaloaga, M. R. Gurau, L.-I. Ilie and P.-R. Tapaloaga, "Innovations in Dairy Cattle Management: Enhancing Productivity and Environmental Sustainability," Annals of" Valahia" University of Târgovişte. Agriculture, vol. 15, p. 18–25.

[13]. A. S. Atzori, B. A. Balkan and A. Gallo, "Feedback thinking in dairy farm management: system dynamics modelling for herd dynamics," animal, p. 100905, 2023.

[14]. A. Kassahun, R. Bloo, C. Catal and A. Mishra, "Dairy Farm Management Information Systems," Electronics, vol. 11, p. 239, 2022.

[15]. S. Yang, N. Bhargava, A. O'Connor, E. R. Gibney and E. L. Feeney, "Dairy consumption in adults in China: a systematic review," BMC nutrition, vol. 9, p. 116, 2023.

[16]. M. Malik, V. K. Gahlawat, R. S. Mor, V. Dahiya and M. Yadav, "Application of optimization techniques in the dairy supply chain: a systematic review," Logistics, vol. 6, p. 74, 2022.

[17]. M. A. L. E. D. E. BIRHAN, Y. E. S. H. A. M. B. E. L. MEKURIAW, A. S. A. M. I. N. E. W. TASSEW and F.

[18]. I. R. E. W. TEGEGNE, "MULTI-SOURCE MONITORING OF DAIRY FARM MANAGEMENT PRACTICES AND MILK QUALITY ANALYSIS IN AMHARA REGION, ETHIOPIA," UTTAR PRADESH JOURNAL OF ZOOLOGY, vol. 43, p. 15– 27, 2022.

[19]. J. L. Gonçalves, J. L. de Campos, A. J. Steinberger, N. Safdar, A. Kates, A. Sethi, J. Shutske, G. Suen, T. Goldberg, R. I. Cue and others, "Incidence and treatments of bovine mastitis and other diseases on 37 dairy farms in Wisconsin," Pathogens, vol. 11, p. 1282, 2022.

[20]. A. S. Stasinakis, P. Charalambous and I. Vyrides, "Dairy wastewater management in EU: Produced amounts, existing legislation, applied treatment processes and future challenges," Journal of Environmental Management, vol. 303, p. 114152, 2022.

[21]. A. Li, Y. Ma, N. Cui, X. Zhang, Q. Zheng, P. Du and M. Sun, "Research progress of milk and dairy products to prevent caries," Journal of Functional Foods, vol. 110, p. 105837, 2023.

[22]. A. Khanna, S. Jain, A. Burgio, V. Bolshev and V. Panchenko, "Blockchain-enabled supply chain platform for Indian dairy industry: safety and traceability," Foods, vol. 11, p. 2716, 2022.

[23]. V. Ntuli, T. Sibanda, J. A. Elegbeleye, D. T. Mugadza, E. Seifu and E. M. Buys, "Dairy production: Microbial safety of raw milk and processed milk products," in Present knowledge in food safety, Elsevier, 2023, p. 439–454.

[24]. M. v. Empel, H. P. S. Makkar, J. Dijkstra and P. Lund, "Nutritional, technological and managerial parameters for precision feeding to enhance feed nutrient utilization and productivity in different dairy cattle production systems.," CABI Reviews, p. 1–27, 2016.

[25]. B. Bilgen and K. Dogan, "Multistage production planning in the dairy industry: a mixed-integer programming approach," Industrial & Engineering Chemistry Research, vol. 54, p. 11709–11719, 2015.

[26]. D. P. Blayney and D. Marketing, "The Milk Inventory Management study: Economic Modeling for Dairy Policy Analysis," 1991.

[27]. M. A. Deshmukh, S. S. Chopde, S. D. Kalyankar and V. D. Kele, "Computer applications in dairy industry," Oriental Journal of Computer Science and Technology, vol. 8, p. 24–34, 2015.

[28]. D. Ghosh and S. Mondal, "An integrated production- distribution planning of dairy industry–a case study," International Journal of Logistics Systems and Management, vol. 30, p. 225–245, 2018.

[29]. E. Janssen and J. Swinnen, "Technology adoption and value chains in developing countries: Evidence from dairy in India," Food Policy, vol. 83, p. 327–336, 2019.

[30]. R. S. Mor, A. Bhardwaj and S. Singh, "A structured literature-review of the supply chain practices in dairy industry," Journal of Operations and Supply Chain Management, vol. 11, p. 14–25, 2018.

[31]. M. Rakotoarisoa and A. Gulati, "Competitiveness and trade potential of India's dairy industry," Food Policy, vol. 31, p. 216–227, 2006.

[32]. K. V. Sakhare and I. Kulkarni, "Predictive Analysis of End to End Inventory Management System for Perishable Goods," in 2022 3rd International Conference for Emerging Technology (INCET), 2022.

[33]. F. Shafiee, A. Kazemi, A. J. Chaghooshi, Z. Sazvar and H. A. Mahdiraji, "A robust multi-objective optimization model for inventory and production management with environmental and social consideration: A real case of dairy industry," Journal of Cleaner Production, vol. 294, p. 126230, 2021.

[34]. V. P. Sharma, K. Kumar, R. V. Singh and others, Determinants of small-scale farmer inclusion in emerging modern agrifood markets: A study of the dairy industry in India, Indian Institute of management Ahmedabad, 2009.

[35]. T. Shimamura Fagle, KEY PERFORMANCE INDICATORS TO INCREASE LOGISTICS PERFORMANCE IN THE DAIRY INDUSTRY: A CASE STUDY IN THE DAIRY INDUSTRY, 2023.

[36]. J. Singh, B. B. Singh, H. K. Tiwari, H. S. Josan, N. Jaswal, M. Kaur, P. Kostoulas, M. S. Khatkar, R. S. Aulakh, J. P. S. Gill and others, "Using dairy value chains to identify production constraints and biosecurity risks," Animals, vol. 10, p. 2332, 2020.

[37]. A. Pathak and A. Rathore, "Dairy and Artificial Intelligence: Enhancing Efficiency and Productivity".

Cite this article as :

Ratnesh Kumar Choudhary, Sonali Zunke, Arijeet Sengupta, Nayan Raut, Omkar Shahare, Utkarsha Ghagare, Isha Bali, "Value Chain Optimization in Dairy Product Management : Insights and Perspectives", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), ISSN : 2456-3307, Volume 1 Issue 1, pp. 01-14, January-February 2024. Available at doi : https://doi.org/10.32628/CSEIT2390642
Journal URL : https://ijsrcseit.com/CSEIT2390642