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Organized By

Yadava College (YC), Madurai, India

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MIX FACTORS THAT INFLUENCE THE PURCHASING DECISIONS OF SKIN CARE PRODUCT BRANDS. MISTINE

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ABSTRACT

This research aimed to study 1) marketing mix factors in purchasing Mistine brand skincare products, 2) decision making to purchase Mistine brand skincare products, 3) Comparison of Mistine brand skincare product purchasing decisions classified by personal data, and 4) marketing mix factors affecting Mistine brand skincare product purchasing decisions. The study was conducted on 400 people who purchased and used Mistine brand skincare products in the past 6 months. A questionnaire was used as the research tool. The recommendations from the current study with more products and choices with similar properties result in less evaluation from the product aspect and more focus on value, resulting in marketing promotion as important for purchasing decisions. Entrepreneurs who sell skincare products in this group should therefore focus on developing effective marketing promotions.

Keywords: Marketing Mix Factors; Decision Making; Skin Care Products.

A DEEP REINFORCEMENT LEARNING APPROACH TO REAL-TIME DEBRIS TRAJECTORY PREDICTION

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ABSTRACT

The exponential growth of orbital debris in Low Earth Orbit poses critical threats to operational spacecraft. This research presents an autonomous collision avoidance framework integrating deep reinforcement learning with adaptive Kalman filtering for real-time space debris trajectory prediction. Our hybrid architecture employs Convolutional Neural Networks for optical debris in space characterization and Long Short-Term Memory networks for trajectory forecasting under gravitational perturbations and atmospheric drag uncertainties. The proposed multi-agent reinforcement learning system enables satellite constellations to execute coordinated maneuvers autonomously, reducing computational overhead by 68% compared to ground-based solutions. Bayesian neural networks provide uncertainty quantification for risk-aware decision making under sparse observational data. Validation against historical conjunction events (2019-2024) demonstrates 94.7% accuracy in 72-hour collision probability predictions, with 43% reduction in false alarms while maintaining 99.2% detection reliability. The adaptive learning mechanism continuously refines predictive models from real-time tracking observations, while energy-efficient maneuver optimization extends satellite operational lifetime by 15%. This work establishes a scalable, deployment-ready solution for orbital sustainability with immediate applicability for commercial satellite operators and space agencies, addressing the critical challenge of autonomous space traffic management.

Keywords: Space debris mitigation, collision prediction, autonomous navigation, trajectory forecasting, Bayesian uncertainty quantification, Low Earth Orbit sustainability, adaptive Kalman filtering, orbital dynamics, deep reinforcement learning, multi-agent systems

IMPORTANCE OF STRATEGY AND CORPORATE GOVERNANCE FOR THE CONTINUED SUCCESS OF THE STARTUPS DURING GROWTH PHASE: A STUDY OF ED TECH FIRM BYJU

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ABSTRACT

It is an established fact that, entrepreneurship plays an important role in a country's economic development, job creation and nation building. However, studies show that 75% of start-ups never show the expected positive return and 90 % of all the new ventures fail in the first 5 years. A number of factors contribute to this phenomenon including poor leadership, poor business and revenue model, rapid expansion without consolidation, Poor marketing and sales, and inability to adapt. Of the successful entrepreneurial ventures less than 1% turn out to be 'Unicorns'. A unicorn is defined as any successful startup, privately owned and whose value is estimated to be $ 1 billion or more. The Indian educational technology (Ed Tech) startup Byju, started by Indian entrepreneur Byju Ravindran in the year 2011, has been hugely successful and achieved the coveted 'Unicorn' status by the year 2018. This startup proved to be successful not only in India, but also in many countries of the world, including US. So successful this start up was, by the year 2022 it was valued at $ 22 billion. This start up was able to attract hundreds of millions of investments from some of the world's leading financial institutions, angel investors and others. However, by the year 2024, this firm went bankrupt, and its value has become almost $ 0. While some researchers studied the failure of Byju in general terms, not many of them studied its failure from the corporate strategy and corporate governance angles. This case study-based paper is an attempt to cover this gap, by analyzing how failure on the part of this firm's leadership to develop a clear strategy and establish effective corporate governance practices during the growth phase has led to the collapse of this Unicorn. By having effective corporate governance practices as part of their corporate strategy, this startup could have avoided this catastrophic failure.

Keywords: Byju, corporate governance, ed tech, startup.

OPTIMIZATION OF TWO-WAREHOUSE INVENTORY MODELS USING GOLF OPTIMIZATION ALGORITHM

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ABSTRACT

Two-warehouse inventory systems are a crucial component of supply chain management, where firms must balance the limited storage capacity of an owned warehouse with the higher holding costs of a rented warehouse. The optimization of such systems becomes challenging due to fluctuating demand, deterioration of items, differential costs, and transportation constraints. Conventional optimization approaches are often insufficient to capture the nonlinear and dynamic nature of these problems.

This research applies the Golf Optimization Algorithm (GOA), a population-based metaheuristic inspired by the process of a golf ball's movement towards the hole, to optimize two-warehouse inventory models. The objective is to minimize the total system cost, including ordering, holding, shortage, and transportation costs. GOA is particularly effective because of its balance between exploration and exploitation, mimicking the controlled and adaptive strategies in golf, which ensures convergence toward optimal or near-optimal solutions.

A numerical case study validates the effectiveness of the proposed method. The findings reveal that GOA significantly reduces overall inventory costs compared to classical optimization methods, while offering robustness and computational efficiency. This study emphasizes the potential of game-inspired metaheuristic algorithms in addressing real-world inventory management challenges, contributing to better decision-making in supply chain systems.

Keywords: Two-Warehouse Inventory Model, Golf Optimization Algorithm, Metaheuristic Optimization, Supply Chain Management, Cost Minimization.

DIGITAL LEAP IN A FRAGILE STATE: AN EXAMINATION OF DIGITAL FINANCIAL SERVICES AND FINANCIAL INCLUSION IN THE IRAQI BANKING SECTOR (2015-2025)

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ABSTRACT

This article provides a critical examination of the role of digital financial services (DFS) in enhancing financial inclusion in Iraq, a nation navigating the complexities of post-conflict reconstruction and heavy oil dependency. Utilizing a mixed-methods approach that combines quantitative analysis of Central Bank of Iraq data from 2015 to 2025 with a qualitative review of policy documents and academic literature, the study assesses the trajectory of DFS adoption and its measurable impact on financial inclusion indicators. Findings reveal a significant, policy-driven expansion of digital payment infrastructure and a corresponding increase in transaction volumes. However, the translation of this growth into deep and meaningful financial inclusion remains constrained by persistent infrastructural, socio-economic, and institutional barriers endemic to fragile states. The article concludes that while DFS presents a powerful tool for economic formalization and inclusion, its potential in Iraq can only be fully realized through a multi-faceted strategy that addresses digital and financial literacy, builds trust in the banking sector, and fosters a more competitive and innovative financial ecosystem.This article critically examines the role of digital financial services (DFS) in enhancing financial inclusion in Iraq, a nation undergoing post conflict reconstruction and heavily reliant on oil. The study employs a mixed-methods approach, combining quantitative analysis of Central Bank of Iraq data from 2015 to 2025 with a qualitative review of policy documents and academic literature. It assesses the trajectory of DFS adoption and its measurable impact on financial inclusion indicators.

Findings indicate a significant, policy-driven expansion of digital payment infrastructure and a corresponding increase in transaction volumes. However, the transformation of this growth into deep and meaningful financial inclusion is hindered by persistent infrastructural, socio-economic, and institutional barriers common to fragile states.

The article concludes that while DFS is a powerful tool for economic formalization and inclusion, its full potential in Iraq can only be realized through a multi-faceted strategy. This strategy must address digital and financial literacy, build trust in the banking sector, and foster a more competitive and innovative financial ecosystem.

APPLICATION OF A NOVEL INTERVAL-VALUED INTUITIONISTIC FUZZY CORRELATION COEFFICIENT TO THE SUPPLIER SELECTION PROBLEM

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ABSTRACT

Assessing the degree of association among variables is a fundamental requirement in decision-making, particularly in industrial and data-driven environments where uncertainty and vagueness frequently arise. Traditional correlation coefficients often fail to capture such complexities, necessitating the use of more robust methodologies. To address this issue, this paper introduces a novel generalized correlation coefficient for interval-valued intuitionistic fuzzy sets, which uniquely represent uncertainty through interval-based membership and non-membership values. The proposed coefficient provides an enhanced representation of uncertain relationships. Its applicability is demonstrated through a real world multi-criteria group decision-making case focused on supplier selection- an area of high relevance in industrial management. The effectiveness of the proposed methodology is validated through a comparative analysis utilizing the concept of the degree of confidence.

Keywords: Interval-Valued Intuitionistic Fuzzy Set, Generalized Correlation Coefficient, Mcgdm, Supplier Selection

INTELLIGENT ALGORITHMS FOR TRANSFORMING CORPORATE FINANCIAL DECISION MAKING

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ABSTRACT

The rapid development of cloud computing has sparked a new technological revolution, giving rise to the era of cloud accounting and offering fresh perspectives on corporate financial decision making. To overcome the limitations of conventional optimization methods, this paper develops an Improved Grasshopper Optimization Algorithm (IGOA). The algorithm integrates reverse learning with the Lévy flight mechanism to enhance global search capability and applies Gaussian variation to increase population diversity. In addition, it dynamically adjusts the internal parameters of the Knowledge-Enhanced Language Model Pre-training (KELM) for continuous optimization.

The improved algorithm is applied to financial decision prediction tasks, and cross-validation experiments are conducted to evaluate classification performance. Results indicate that the IGOA KELM model significantly improves prediction accuracy and robustness. Beyond technical evaluation, the study explores the broader influence of intelligent algorithms on financial decision making in the cloud accounting age. Survey findings reveal that 85% of respondents consider traditional decision-making methods insufficiently innovative, 90% believe intelligent algorithms expand financial analysis dimensions, and 88% agree that risks are better managed with algorithmic support.

The integration of intelligent algorithms with cloud-based financial systems demonstrates a substantial positive impact on decision-making processes, enabling enterprises to achieve greater accuracy, efficiency, and strategic foresight. This research contributes by identifying key factors shaping financial decision-making and analyzing how intelligent algorithms transform corporate strategies in the era of cloud accounting.

Keywords: Financial Decision-Making, Intelligent Algorithms, Cloud Accounting, Quantitative Analysis, Corporate Finance

AI-DRIVEN GLOBAL EQUITY MANY-OBJECTIVE PORTFOLIO OPTIMIZATION THROUGH HYBRID DEEP-LEARNING EXTREME-VALUE FORECASTING AND EVOLUTIONARY ALGORITHMS

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ABSTRACT

This study develops a many-objective portfolio optimization (MOPO) framework that integrates deep-learning forecasts with realistic investment constraints to generate executable long–short trading strategies. The frame work leverages predicted three-month high and low price targets, adjusted by model-specific forecast errors, to construct conservative entry, stop-loss, and take-profit levels. Forecasting accuracy was benchmarked across nine teen advanced deep-learning architectures on thirty-five global equities, covering multiple sectors and regions to ensure robust justification. The hybrid deep-learning model consistently achieved the lowest average error of pre diction (4–5 % for highs & lows), whereas competing models often exceeded 10–40 %, confirming its reliability for this dataset while retaining a supportive role in the overall framework. The portfolio optimization is con ducted on Indian equities, enabling realistic implementation under domestic market regulations, brokerage rules, and transaction costs. The MOPO model balances nine conflicting objectives: historical and predicted returns and risk, diversification entropy, skewness, kurtosis, risk-adjusted ratios, and budget adherence. Advanced evo lutionary algorithms such as NSGA-III, NSDE-R, and aspiration-level-based NSDE-R are employed to generate Pareto-optimal portfolios that reconcile these trade-offs. Out-of-sample validation confirms that embedding fore cast errors as explicit risk measures improves the reliability of stop-loss and target generation, leading to robust, investor-ready strategies. By strategically embedding predictive signals into a rigorously validated MOPO frame work, this study contributes a robust and practically implementable methodology for investor-aligned portfolio selection in dynamic equity markets.

Keywords: Hybrid Deep-Learning Forecasting, Temporal Convolutional Networks, Convolutional Neural Network–Bidirectional Lstm Fusion, Extreme-Value Forecasting, Many-Objective Portfolio Optimization

OPTIMIZATION OF TWO-WAREHOUSE INVENTORY MODELS USING CUCKOO SEARCH OPTIMIZATION

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ABSTRACT

Two-warehouse inventory systems are an integral part of supply chain management, where decision makers must balance storage between an owned warehouse with limited capacity and a rented warehouse with higher holding costs. The complexity of such systems increases due to fluctuating demand, deterioration of items, variable lead times, and multiple cost factors.
Traditional optimization methods often face limitations in handling the nonlinear and dynamic structure of these problems.

This research applies Cuckoo Search Optimization (CSO), a nature-inspired metaheuristic algorithm based on the brood parasitism of certain cuckoo species, to optimize two-warehouse inventory models. The objective is to minimize the overall system cost, including ordering, holding, shortage, and transportation costs. CSO is particularly effective due to its Lévy flight- based randomization, which enhances global search capability, while its simplicity and fewer control parameters make it highly adaptable to large-scale inventory problems.

A numerical case study validates the proposed approach, demonstrating that CSO significantly reduces total costs compared to classical optimization methods. The results highlight the efficiency and robustness of Cuckoo Search in solving complex, nonlinear inventory problems. This study emphasizes the role of bio-inspired algorithms in advancing decision-making and achieving cost-effective solutions in supply chain and logistics management.

Keywords: Two-Warehouse Inventory Model, Cuckoo Search Optimization, Swarm Intelligence, Supply Chain Management, Metaheuristic Optimization

OPTIMIZATION OF TWO-WAREHOUSE INVENTORY MODELS USING SINE COSINE ALGORITHM

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ABSTRACT

Two-warehouse inventory models are widely adopted in supply chain management to effectively manage storage between an owned warehouse with limited capacity and a rented warehouse with relatively higher holding costs. The decision-making process in such systems is often complex due to demand uncertainty, product deterioration, capacity constraints, and multiple cost components. Traditional mathematical techniques frequently struggle to provide optimal solutions for these nonlinear and large-scale models.

This study introduces the application of the Sine Cosine Algorithm (SCA), a recent metaheuristic optimization method inspired by sine and cosine mathematical functions, to optimize two-warehouse inventory models. The objective is to minimize the total system cost, which includes ordering, holding, transportation, and shortage costs. SCA is employed for its unique capability of balancing exploration and exploitation through adaptive position updates, enabling efficient convergence towards near-optimal solutions.

A numerical example validates the proposed approach. The results demonstrate that SCA significantly improves cost efficiency compared to traditional optimization methods while maintaining simplicity and scalability. This research highlights the potential of mathematical function-based metaheuristic algorithms in solving complex inventory management problems, ultimately enhancing supply chain decision-making and performance.

Keywords: Two-Warehouse Inventory Model, Sine Cosine Algorithm, Metaheuristic Optimization, Supply Chain Management, Cost Minimization

OPTIMIZATION OF TWO-WAREHOUSE INVENTORY MODELS USING ANT COLONY OPTIMIZATION

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ABSTRACT

Two-warehouse inventory systems play a vital role in modern supply chain management by balancing storage between an owned warehouse with limited capacity and a rented warehouse with higher holding costs. The complexity of managing such systems arises from fluctuating demand, product deterioration, transportation constraints, and multiple cost parameters. Conventional optimization approaches are often insufficient to handle the nonlinear and dynamic structure of these models.

This study applies Ant Colony Optimization (ACO) to optimize two-warehouse inventory models with the objective of minimizing total system costs, which include ordering, holding, shortage, and transportation costs. Inspired by the foraging behavior of ants, ACO is particularly effective in solving combinatorial optimization problems through adaptive learning and probabilistic solution construction. Its ability to balance exploration and exploitation makes it suitable for tackling the complexities of two-warehouse systems.

A numerical illustration is provided to validate the model. The results reveal that ACO not only reduces overall costs significantly compared to traditional methods but also enhances computational efficiency in large-scale problem instances. This research demonstrates the potential of swarm intelligence-based techniques in addressing real-world inventory optimization challenges and improving supply chain decision-making.

Keywords: Two-Warehouse Inventory Model, Ant Colony Optimization, Swarm Intelligence, Supply Chain Management, Optimization

OPTIMIZATION OF TWO-WAREHOUSE INVENTORY MODELS USING PARTICLE SWARM OPTIMIZATION

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ABSTRACT

Efficient management of two-warehouse inventory systems is essential for reducing operational costs and improving supply chain performance. These systems face significant challenges due to fluctuating demand, deterioration of items, differential holding costs, and capacity limitations in owned and rented warehouses. Conventional optimization approaches often fail to capture the nonlinear and dynamic nature of such problems.

This research employs Particle Swarm Optimization (PSO) to optimize two-warehouse inventory models with the objective of minimizing total system costs, including ordering, holding, shortage, and transportation expenses. PSO, inspired by the social behavior of bird flocking and fish schooling, is utilized for its ability to efficiently explore the solution space and converge toward near-optimal solutions in complex nonlinear environments.

A numerical example validates the effectiveness of the proposed method, showing that PSO significantly reduces overall costs compared to traditional techniques while ensuring computational efficiency. The findings highlight the applicability of swarm intelligence in addressing real-world inventory optimization problems, offering a flexible and scalable solution for supply chain decision-making.

Keywords: Two-Warehouse Inventory Model, Particle Swarm Optimization, Optimization, Supply Chain Management, Swarm Intelligence

OPTIMIZATION OF TWO-WAREHOUSE INVENTORY MODELS USING ARTIFICIAL BEE COLONY OPTIMIZATION

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ABSTRACT

Two-warehouse inventory systems are widely used in supply chain management to balance the trade-off between limited capacity in an owned warehouse and higher holding costs in a rented warehouse. Managing such systems becomes increasingly complex due to uncertain demand, product deterioration, differential holding costs, and transportation constraints. Traditional mathematical methods often fail to capture the nonlinear and dynamic structure of these problems effectively.

This research employs Artificial Bee Colony (ABC) Optimization, a swarm intelligence-based algorithm inspired by the foraging behavior of honey bees, to optimize two-warehouse inventory models. The objective is to minimize the total cost of the system, including ordering, holding, shortage, and transportation costs. ABC is particularly effective in achieving global optimization by balancing exploration and exploitation, thereby providing near-optimal solutions for complex nonlinear models.

A numerical example validates the performance of the proposed approach. The findings reveal that ABC significantly reduces overall system costs compared to conventional methods while ensuring computational efficiency and scalability. This study highlights the potential of bio-inspired optimization techniques in improving decision-making for two-warehouse inventory management and enhancing overall supply chain performance.

Keywords: Two-Warehouse Inventory Model, Artificial Bee Colony Optimization, Swarm Intelligence, Supply Chain Management, Optimization

COMPARISON OF RANDOM FOREST AND MULTIPLE LINEAR REGRESSION MODELS FOR ESTIMATION OF FOREIGN DIRECT INVESTMENT INFLOWS IN INDIA

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ABSTRACT

Foreign Direct Investment (FDI) is essential for economic growth and is affected by various factors, including physical and human capital, domestic investment, international integration, and fiscal and monetary policy. Accurate estimation of FDI inflows is crucial for effective policy formulation in India. This study assesses FDI inflows through two analytical models: Multiple Linear Regression (MLR) and Random Forest Regression (RF), utilizing thirteen covariates such as natural resources, market size, trade openness, inflation rate, return on investment, economic freedom, ore and metal exports, transport services, and GDP per capita. The study analyzes time series data spanning from 2000 to 2024.

The validation of models indicates that RF consistently outperforms MLR by effectively capturing the nonlinear and hierarchical relationships in economic data, signifying the importance of machine learning in economic forecasting. Findings suggest that trade openness, ore and metal exports, and inflation rate are most significant in influencing FDI, with investors prioritizing the ease of doing business and regulatory incentives over market size or human resource availability. This perspective aligns with India's strategic initiatives, emphasizing the value of strategic policy measures and the utilization of advanced machine learning models in analyzing and forecasting FDI trends in the country.

Keywords: Foreign Direct Investment; Multiple Linear Regression; Random Forest Regression

MEMORY BASED GREEN SUPPLY CHAIN MANAGEMENT USING METAHEURISTICS

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ABSTRACT

This article emphasizes the role of environmental cooperation as a crucial relational competence in designing and executing green supply chain management (GSCM) based on strategic planning. The model aims to maximize joint profit through the simultaneous determination of several decision variables, optimized via differential evolution and particle swarm optimization. A Caputo-type fractional order derivative-based three-echelon supply chain model is developed to establish memory-based inventory scenario. The study focuses on the impact of energy utilization and carbon emissions on supply chain efficiency. Green investment and a carbon tax policy are implemented to reduce emissions from manufacturing and storage. The memory-dependent supply chain model with price and green investment-dependent demand is developed to explore the interactions between sellers and buyers during previous transactions. Numerical simulations have been carried out to identify the optimal GSCM policies based on statistical indices. The managerial insights are provided, highlighting the use of prior information to increase the business profit while supporting the green technology and contributing to the economic growth. It is demonstrated that the memory positively influences the inventory indices and joint profit, suggesting that the ideal scenario for the higher profitability involves the presence of memory.

Keywords: Green Supply Chain Management; Fractional Derivative; Environmental Impact; Carbon Emission; Metaheuristic Optimization.

EXPLICATING THE DYNAMICS AND CONTROL OF TOMATO YELLOW LEAF CURL VIRUS (TYLCV) TRANSMISSION

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ABSTRACT

This study addresses the devastating impact of Tomato Yellow Leaf Curl Virus (TYLCV) disease, which is transmitted by its primary vector, the silver leaf whitefly (*Bemisia tabaci*). We develop a comprehensive host-vector epidemiological model to analyze the dynamics of TYLCV spread and propose an effective management strategy. To gain explicit insights into the temporal dynamics of the epidemic, approximate asymptotic techniques have been utilized. This advanced analytical technique is employed to obtain closed-form, approximate expressions for the key host-vector compartments: the healthy tomato plant population, the latent (exposed) population, and the infected population. These analytical solutions provide a clear, mathematical representation of the disease's trajectory over time. The accuracy and reliability of the analytical expressions derived are rigorously validated using computational and numerical methods. Finally, the model is used to depict and assess the impact of various control strategies, showcasing the system's sensitivity and behaviour across a range of epidemiological parameters. The results offer valuable theoretical guidance for optimizing field-level interventions against TYLCV.

Keywords: Tomato Yellow Leaf Curl Virus, Host-Vector, Mathematical Modeling, Disease Dynamics, Computational Techniques, Analytical Approximation.

CROP VISION-TRANS NET: A MULTIMODAL TRANSFORMER FRAMEWORK FOR EARLY DETECTION AND PROGRESSION FORECASTING OF CROP DISEASES

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ABSTRACT

The early and accurate prediction of crop diseases is a must to both avoid the loss of the yield and to build farm resilience. Introduced in this study is CropVision-TransNet, a multimodal Transformer-based framework aimed at early detection and forecasting the progression of crop diseases. Compared to traditional CNN models that only use static leaf images, CropVision-TransNet represents multispectral crop images along with the temporal climatic data utilizing a cross-attention fusion mechanism. The Vision Transformer (ViT) encoder is responsible for the capturing of the minute lesion patterns and morphological changes, whereas the temporal encoder is set to learn environmental dependencies like temperature, humidity, and rainfall which in turn dictates the pathogen activity. Disease progression forecasting thus becomes viable before even the slightest symptoms can be seen due to the combined spatiotemporal representation. The experimental studies on a combined UAV sensor dataset show that early-stage detection can be improved by 15.6% while temporal generalization can be bettered as well as compared to EfficientNet and LSTM-based baselines. The findings corroborate the large potential of attention-driven multimodal architectures as real-time, interpretable, and data-efficient crop health monitoring systems, which constitute an important step towards smart, predictive agricultural technologies.

Keywords: crop disease forecasting, early detection, vision transformer, multimodal learning, cross-attention, temporal modeling, precision agriculture. declaration: the content of this abstract is the author's own original research under the ph.d. work and it does not overlap with any published or submitted manuscripts.

A STUDY ON AWARENESS AND ATTITUDE OF WOMEN TOWARDS HEALTH INSURANCE

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ABSTRACT

The increasing burden of healthcare expenses and the rising prevalence of lifestyle diseases have underscored the importance of health insurance as a vital component of modern financial planning. A particularly significant dimension of this issue pertains to women's health. This study provides an in-depth examination of the role of health insurance in mitigating financial risks associated with medical emergencies, with a particular focus on women's health. Despite women comprising nearly half of the population and a substantial portion of the workforce, societal awareness and insurance penetration among them remain disproportionately low. Modern women juggle professional and domestic responsibilities, excluding them to high stress levels and age-related ailments, including arthritis, hypertension to, diabetes, osteoporosis, and reproductive health issues. The study highlights the need for tailored health insurance products that address gender-specific health risks and provide comprehensive coverage for women. By analysing the current landscape of health insurance in India, this research demonstrates the significance of health insurance in promoting financial security, reducing vulnerability and empowering women that ensures access to timely, quality care and economic security in times of medical adversity.

Keywords: Health Insurance, Financial Planning, Women's Health, Lifestyle Diseases, Financial Security, Empowerment

OPTIMAL ALLOCATION IN MULTIVARIATE STRATIFIED SAMPLING WITH VARIABLE COSTS USING MULTI-OBJECTIVE OPTIMIZATION

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ABSTRACT

In this paper, we propose an original ratio-type estimator for compromise allocation in stratified random sampling to select a sample that minimizes variation while maximizing the accuracy of the finite population mean. When multiple characteristics are observed in each selected unit, determining the appropriate sample size becomes more complex. Additionally, when travel costs between selected units within a stratum are significant, a linear cost function of sample size may not accurately approximate the actual survey cost. With the inclusion of various cost functions, this work formulates the sample allocation problem as an integer nonlinear multi-objective mathematical programming model for multivariate stratified random sampling. We create a solution mechanism for the suggested allocation using integer programming techniques, then evaluate its effectiveness against a different compromise allocation. A numerical example illustrates the effectiveness of the proposed method and provides computational insights. Furthermore, the proposed allocation is evaluated for its practical applicability in real-world survey scenarios.

Keywords: Optimal Allocation; Multivariate Stratified Sampling; Various Costs Function; Compromise Allocation

COMPARATIVE ESTIMATION APPROACHES FOR THE NEW MIXTURE EXPONENTIAL-CHRIS JERRY DISTRIBUTION WITH REAL DATA ANALYSIS

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ABSTRACT

This paper introduces the New Mixture Exponential Chris Jerry Distribution (NMECJD), a novel two-parameter lifetime distribution constructed through linear combination of Exponential and Chris-Jerry distributions using mixture parameter techniques. We derive comprehensive mathematical and reliability properties including Hazard Functions (Standard, Reverse, Cumulative), Reliability Measures, Mills Ratio, Odds Ratio, Moment Generating Functions (MGF). Additional derived properties encompass Characteristic Function (CF) and Cumulant Generating Functions (CGF), conditional and Incomplete Moments, Mean Residual Lifetime (MRL), Mean Inactivity Time (MIT), Mean Deviations (MD), and Order Statistics. The research further explores Entropy Measures, Income Distribution Curves, and Stress-Strength Reliability (SSR) applications. Various parameter estimation methods are implemented and compared: Maximum Likelihood Estimation (MLE), Maximum Product Spacing (MPS), Least Squares Estimation (LSE), Weighted Least Squares Estimation (WLSE), and Cramér-von-Mises (CVM). Extensive simulation studies evaluate their comparative performance across different scenarios. The proposed distribution is validated using two real datasets. Initial analysis employs goodness-of-fit measures under MLE and MPS methods. Subsequently, all various estimation techniques are assessed based on mean estimates, bias, and standard errors to demonstrate the NMECJD's practical applicability and superior modeling capability.

STRATIFIED SAMPLING FOR MULTIVARIABLE ANALYSIS: A ROBUST APPROACH TO ESTIMATING POPULATION MEANS

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ABSTRACT

This study focuses on enhancing the ability of stratified sampling to estimate the population mean through post-stratification. It contributes to survey sampling methodologies by introducing a novel estimator that integrates the strengths of existing approaches, achieving improved accuracy in population mean estimation. Specifically, we propose a novel estimator for post-stratification that incorporates two study variables and utilizes two auxiliary variables in stratified random sampling. We determine the suggested estimator's greater percent relative efficiency (PRE) and minimal mean square error (MSE) in comparison to the current estimators. The theoretical study validates its effectiveness through a numerical study, demonstrating its practicality and real-world applicability. This innovative estimator offers a reliable and efficient solution for obtaining more precise population estimates in survey sampling.

Keywords: Stratified Sampling, Population Mean Estimation, Two Study Variables; Two Auxiliary variables; Post-Stratification; MSE; PRE

ARTIFICIAL INTELLIGENCE (AI) AND DEEP LEARNING FOR CREDIT CARD FRAUD DETECTION: PRIOR WORK AND NOVELTY

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ABSTRACT

Credit card fraud detection remains a challenging task due to highly skewed data distributions and the sophisticated, evolving tactics of fraudsters. In this paper, we propose a unified deep learning framework that combines temporal sequence modelling, anomaly detection, and relational learning to enhance fraud detection in banking systems. Our approach integrates a Long Short- Term Memory (LSTM) network to capture sequential spending patterns over time, an autoencoder to uncover subtle anomalies in transaction features, and a Graph Neural Network (GNN) to model relationships between entities (cards, merchants, etc.) indicative of collusive fraud. By fusing these complementary components, the model can simultaneously detect irregular temporal behaviours, feature-level outliers, and networked fraud rings – a capability beyond any single method. We evaluate the framework on the widely used European credit card transactions dataset (highly imbalanced with only 0.17% fraud cases), achieving state-of-the-art detection performance. Experimental results show that our integrated model outperforms baselines (including standalone LSTM, autoencoder, and GNN models), with improvements in fraud recall and overall F1-score. Notably, the GNN component boosts detection of relational fraud patterns that earlier sequential models miss, while the autoencoder's anomaly scores help flag new fraud types in real time. We also discuss the system's deployment potential in real-world banking environments, including its streaming inference capability and how the model's outputs could be made interpretable to fraud analysts. Our findings demonstrate that combining temporal, feature-based, and graph-based analyses provides a powerful and practical solution for smarter financial fraud detection, aligning with the conference's focus on AI applications in finance and smart systems.

AN EFFICIENT BREAST CANCER DETECTION TECHNIQUE USING DEEP CONVOLUTION NEURAL NETWORK MODEL

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ABSTRACT

Nowadays Artificial Intelligence (AI) plays a vital role in all kinds of application domain areas without intervention of the human. It solves the complex problem by using the machine learning model with high accuracy level. AI models are classified various types based on the features namely reactive machines, limited memory, mind theory and self aware ability. Machine learning model supports the AI system through supervised learning, unsupervised learning, and reinforcement learning model. It solves classification, clustering, regression based problems with real time data sets. The proposed model uses the classification technique to detect the breast cancer as malignant and benign in early stages. The classifier provides the high accurate result because it causes the severity of the cancer to patients. The proposed model performs various phases namely image preprocessing, image segmentation, feature extraction and selection and classification. The images are collected from the sources and remove the noise in it. The preprocessed images are segmented using two levels semantic level and instance level. Semantic segmentation considers the whole image it gives minimum accuracy than instance level, so the hybrid model provides the high level accuracy. Pearson correlation based filter methods are used to select the features from the mammogram images. The Breast Cancer Wisconsin (Diagnostic) Data Set is collected from the kaggle and to predict whether the cancer type is benign or malignant. The main objective of the proposed model is to perform automatic feature selection and discover the relevant attributes related to the tumors. The complex relationships are eliminated and provide the optimized features to the model which provides high accuracy. This model uses the U- Net architecture with Deep Convolution Neural Networks and also identifies the location of the cancer cell.

APPLICATION OF MACHINE LEARNING IN PREDICTING STUDENT DROPOUT

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ABSTRACT

The issue of student dropouts is a recurrent problem that educational institutions across the world face, and it has substantial academic, social, and economic consequences. Early identification of students who are at risk of dropping out can help educators and policymakers plan timely interventions that enhance retention rates and assure improved learning outcomes. Over the past several years, machine learning (ML) methods have garnered interest due to their capability to analyse extensive and intricate educational datasets in order to discover patterns that are not immediately apparent and to forecast dropout rates with a high degree of accuracy. The purpose of this study is to investigate the use of machine learning methods, including decision trees, logistic regression, random forests, support vector machines, and deep learning models, in the prediction of student dropout. Some of the most important predictive elements are academic achievement, attendance records, socioeconomic background, behavioural engagement data, and demographic characteristics. Machine learning (ML)-based systems are able to give actionable insights that assist personalised learning, targeted mentorship, and data-driven decision-making by taking use of categorisation and predictive modelling. In addition to emphasising the promise of machine learning for enhancing student retention, the research also points out the difficulties that are presented by data quality, privacy, and ethical issues. At the end of the day, the incorporation of machine learning into school management systems presents a viable strategy for the promotion of educational practices that are inclusive and sustainable.

Keywords: Machine Learning, Student, Dropout

ASSESSMENT OF PREDICTION VARIABILITY IN INFECTIOUS DISEASES USING A NOVEL HYBRID MACHINE LEARNING MODEL COMBINING WEIGHTED AVERAGING AND STACKING METHODS

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ABSTRACT

Reliable forecasting of infectious disease outbreaks such as Monkeypox, Ebola, and COVID-19 is critical for implementing effective control strategies and managing resources efficiently. The heterogeneous spread of diseases across regions introduces additional forecasting challenges. In this study, multiple machine learning models are employed across selected countries to evaluate differences in predictive performance for COVID-19 incidence rates. To enhance precision, hybrid models were developed by integrating the best-performing ML algorithms through optimal weighted averaging and stacking meta-learning approaches. Model accuracy was evaluated using the Root Mean Squared Error (RMSE) and benchmarked against base ML models. The findings reveal that hybrid models consistently outperform standalone ML algorithms by minimizing prediction errors and effectively representing variations in COVID-19 dynamics across regions. This research highlights the significance of hybrid modeling in improving the robustness and reliability of infectious disease forecasting, offering valuable implications for epidemiological analysis and policy formulation.

ARTIFICIAL INTELLIGENCE BASED FAKE BANK NOTES CLASSIFICATION AND DETECTION

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ABSTRACT

On the basis of the look, people can easily differentiate banknotes and coin denominations. The coin currencies can be identified visually impaired people based on touch, but the note currencies cannot be identified easily as it has similar texture and appearance, it can be challenging for visually challenged people to distinguish the currencies. Demonetization has boosted the availability of fake cash in recent years. People face difficulty in distinguishing between real and fake banknotes because they are unaware of the security elements utilized in modern currencies. Additionally, these fake cash mislead persons who don't have proper vision. So, it becomes important to identify the denominations and detect fake and real banknotes in-order to avoid the problems caused due to these currencies or banknotes. This issue highlights the requirement for an accurate banknote identification model. By spotting the counterfeit currency, inflation and currency devaluation can be stopped. The suggested model aims to identify the denomination and categorize if a money note is real or fraudulent. The banknote denomination is determined using the machine learning algorithms like Support vector machines (SVM), decision trees classification (DTC), random forest classification (RFC), and K-NN (K-Nearest Neighbors) and the currency's authenticity is determined using a deep learning method called Alex Net.

Keywords: Data Collection and Preprocessing, Feature Extraction, Machine Learning, Deep Learning-Based Authenticity Detection

A STUDY ON HEALTH-SEEKING BEHAVIOR AND MENTAL HEALTH OF PEOPLE LIVING WITH HIV IN INDIA

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ABSTRACT

Background: India continues to face a substantial HIV burden, with approximately 25.4 lakh people living with HIV (PLHIV). Although biomedical interventions under the National AIDS Control Programme (NACP-V) have improved access to ART and testing, behavioural, psychosocial, and systemic barriers persist. Understanding the interrelationship between health- seeking behavior and mental health is critical for developing an equitable and resilient HIV health system.

Objective: This paper presents a narrative review (2015-2025) examining determinants of health-seeking behavior and mental health among PLHIV in India, with implications for strengthening health systems.

Methodology: A structured narrative review was undertaken to identify and synthesise studies published between 2015 and 2025. Major databases - PubMed, Scopus, JSTOR, and Google Scholar - were searched using keywords such as HIV, PLHIV, health-seeking behavior, mental health, and India. Additionally, national and global reports from NACO & UNAIDS were reviewed to supplement existing evidence. Studies focusing on the behavioural, psychological, and health-system aspects of HIV care in India were included, while purely biomedical or non-Indian studies were excluded. The selected literature was critically analysed to identify key patterns and interlinkages between health-seeking behavior, mental health, and service delivery.

Findings: The review identifies that socio-demographic inequities - particularly gender, caste, education, and economic status - deeply influence health-seeking patterns. Stigma and discrimination remain major deterrents to timely diagnosis and adherence. Evidence from multiple studies shows that up to 59.6% & 61.2% of PLHIV experience depression and anxiety respectively, conditions strongly correlated with poverty, unemployment, and food insecurity. Poor mental health further reduces ART adherence and satisfaction with care. Despite policy progress, mental health integration within ART and ICTC services remains inadequate.

Conclusion: A people-centred approach that addresses both behavioural and psychological dimensions of HIV care is essential for system strengthening. Integrating counselling, digital adherence tools, and community-based mental health support can enhance patient satisfaction and retention in care. The review concludes that health-system strengthening in HIV care must move beyond biomedical success to include mental well-being, equity, and dignity as integral components of India's HIV response.

Keywords: Hiv/Aids, Health-Seeking Behavior, Mental Health, Stigma, Health Systems Strengthening, India

ADVANCES IN SCHIFF BASE COMPOUNDS SYNTHESIS FOR ANTIMICROBIAL EFFICIENCY

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ABSTRACT

The synthesis of new Schiff base compounds with new biological activity and functionalities to fight with developing diseases has an important role in pharmaceutical chemistry. These metallo-organic complexes characterize as a valuable class of bioactive compounds, synthesized via condensation of metal and Schiff base. Schiff bases contain imine or azomethine (-C=N-) functional groups which are important pharmacophores for the design and synthesis of bioactive compounds. In medicinal chemistry, Schiff bases and their metal complexes have attracted significant attention due to their diverse biological activities. Here, we highlighted the recent advances in synthesis of Schiff base transition metal complexes and their antibacterial property with various strains from the last five years (2019–2025) and compared the result with the standard drug.

MULTI-SCALE ADAPTIVE PREPROCESSING AND DEEPCNN FUSION FOR ENHANCED COVID-19 CHEST X-RAYDIAGNOSIS

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ABSTRACT

Background: In order to provide timely clinical care and manage the disease globally, COVID-19 diagnosis via chest X-ray imaging has become crucial. However, evaluating radiography images presents considerable challenges for current artificial intelligence systems, especially when handling mild disease symptoms and the erratic image quality frequently found in actual hospital settings.

Purpose: The goal of this research is to create a novel deep learning framework that successfully overcomes these constraints by fusing specialized neural network architecture with intelligent multi-scale image processing. This framework is intended to identify both subtle disease markers and broad lung patterns in chest radiographs.

Method: Our method employs a thorough three-step procedure: first, each X-ray is divided into distinct detail layers for improved feature recognition by wavelet transformation; second, an adaptive enhancement system intelligently processes particular image regions according to their clinical significance; and third, a parallel-branch CNN with attention-guided mechanisms combines data from various scales to produce a single diagnostic evaluation.

Result: Experiments on the popular COVID-19 Radiography Database showed remarkable performance metrics, exceeding the capabilities of conventional uniform-processing methods by achieving 98.9% overall diagnostic accuracy, successfully identifying COVID-19 cases 98.7% of the time, and correctly identifying healthy patients 98.8% of the time.

Conclusion: This multi-resolution framework shows better diagnostic performance than traditional single-scale methods, proving its usefulness as a trustworthy automated screening tool that can help medical professionals diagnose COVID-19 from chest X-ray examination more quickly and accurately.

Keywords: Deep Learning, Wavelet Decomposition, Cnn.

DESIGNING RESILIENT LEARNING SYSTEMS: A MATHEMATICAL PERSPECTIVE ON SUSTAINABLE AI INTEGRATION IN EDUCATION

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ABSTRACT

The integration of artificial intelligence into education brings positive transformations, offering personalized support, automating routine tasks, and expanding access to learning. However, unchecked adoption risks undermining foundational skills and cognitive development, leading to dependency and fragility in educational outcomes. This paper presents a nonlinear dynamical systems model to analyze the long-term coexistence of procedural fluency, higher-order thinking, and AI adoption in educational settings. We represent skill acquisition- procedural, cognitive and AI integration as mutually influencing processes governed by automation, tutoring, dependency, and feedback mechanisms. Eight equilibria are identified and a comprehensive stability analysis is performed using the Jacobian matrix and Routh-Hurwitz criterion. The coexistence equilibrium—representing balanced integration—is shown to be locally asymptotically stable under moderate automation and strong foundational support. Bifurcation analysis reveals critical thresholds where increased automation or early dependency can lead to destabilization. Numerical simulations using MATLAB illustrate the distinct regions leading to either sustainable or fragile educational outcomes. Our findings underscore that educational resilience amidst AI adoption is not spontaneous but necessitates proactive intervention. Robust learning systems require deliberate safeguards, delayed overuse, and continuous cultivation of core competencies. This work provides a quantitative foundation for policy and pedagogical design in the age of AI.

Keywords: Ai In Education, Sustainable Ai Integration, Educational Resilience, Dynamical Systems Modeling, Stability Analysis

INTEGRATING CLINICAL AND DIAGNOSTIC DATA IN AI-BASED MODELS FOR THYROID CANCER RECURRENCE PREDICTION

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ABSTRACT

Thyroid cancer represents one of the most prevalent endocrine malignancies, posing substantial challenges in effective patient management. This study investigates the implementation of advanced machine learning techniques to develop robust predictive models for thyroid cancer recurrence using comprehensive clinical and pathological datasets. Key determinants, including TNM staging, histopathological attributes, and risk stratification parameters, are incorporated to identify critical prognostic indicators.

A diverse set of state-of-the-art machine learning algorithms is employed, encompassing Random Forest, Gradient Boosting Machines (GBM), Extreme Gradient Boosting (XG Boost), Support Vector Machines (SVM), and deep learning architectures such as Artificial Neural Networks (ANN) and Long Short-Term Memory (LSTM) networks. Model performance is rigorously evaluated using standard metrics, including accuracy, precision, recall, F1-score, and the area under the Receiver Operating Characteristic curve (AUC-ROC). Furthermore, feature selection and interpretability enhancement methods such as Recursive Feature Elimination (RFE) and SHAP (Shapley Additive Explanations) are utilized to optimize predictive efficiency and transparency.

The experimental outcomes demonstrate that deep learning models, particularly ANN and LSTM, effectively capture complex, non-linear relationships within high-dimensional clinical data, resulting in superior predictive accuracy. Traditional ensemble approaches such as Random Forest and XG Boost also exhibit strong predictive reliability with enhanced interpretability. Overall, this study underscores the potential of AI-driven predictive analytics in advancing precision medicine and strengthening evidence-based clinical decision-making in thyroid cancer management.

Keywords: Random Forest, Xgboost, Gradient Boosting Machines (Gbm), Support Vector Machines (Svm), Artificial Neural Networks (Ann), Shapley Additive Explanations (Shap), Etc.

MULTISOURCE SENTIMENT-DRIVEN DECISION SUPPORT SYSTEM FOR STOCK MARKET FORECASTING

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ABSTRACT

Forecasting stock market movements remains a persistent challenge due to the complex interplay of economic, behavioral, and social factors. Recent evidence suggests that integrating public sentiment with quantitative indicators can significantly improve predictive accuracy, with studies showing up to a 20% enhancement when sentiment information is effectively utilized. This paper presents a Multisource Sentiment-Driven Decision Support System (MS-DSS) that unifies insights from diverse social, financial, and economic information streams to capture dynamic market sentiment. Additionally, relevant macroeconomic indicators are incorporated to provide a comprehensive contextual foundation for market behavior modeling.

The proposed framework employs advanced natural language processing (NLP) and deep learning-based sequential modeling techniques to extract, fuse, and analyze sentiment and market signals. Transformer-based language models are applied to unstructured textual data to derive sentiment embeddings, which are integrated with quantitative market features. This multi-modal fusion enables the system to effectively capture temporal dependencies and nonlinear relationships among sentiment, news, and economic variables, enhancing both interpretability and predictive performance.

Experimental results on historical market datasets demonstrate that the proposed multi-source fusion framework consistently outperforms traditional single-source and price-only baselines. The principal novelty of this work lies in its unified integration of social sentiment, financial news, and macroeconomic indicators within a deep learning-driven forecasting architecture, offering a robust and adaptive decision-support tool for investors and analysts.

Keywords: Stock Market Forecasting; Sentiment Analysis; Multi-Source Data Fusion; Economic Indicators; Deep Learning; Natural Language Processing; Decision Support System.

ENHANCING QUALITY OF CT IMAGE THROUGH DE-NOISING USING HYBRID DEEP LEARNING APPROACHES

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ABSTRACT

Noise in medical images significantly degrades diagnostic accuracy and visual quality, presenting a major challenge. This paper introduces a novel attention-based hybrid deep learning framework aimed at enhancing the quality of medical image denoising through improved structural integrity and feature preservation. The proposed architecture integrates a Deep Residual U-Net (ResUNet) with a newly designed Attention-Enhanced Residual Block (AERB), which employs adaptive attention gates to highlight prominent features regions while effectively suppressing irrelevant noise components. This hybrid model combines the powerful feature extraction of ResUNet with the dynamic focusing ability of attention mechanisms to achieve superior noise reduction and fine- detail preservation. A publicly available CT dataset containing 8,439 scans was used, with multiple synthetic noise types (Gaussian, salt-and-pepper, Poisson, and Rician) added to comprehensively evaluate model robustness. Pre-processing steps included image resizing and normalization. The framework was implemented in Python and assessed using quantitative metrics (PSNR, SSIM, RMSE) alongside qualitative visual evaluations. Experimental findings demonstrate that the proposed hybrid attention-based architecture outperforms existing state-of-the-art denoising models, achieving higher PSNR and SSIM values, better edge preservation, and enhanced texture preservation. Overall, the proposed approach provides an efficient and high-quality denoising solution, offering significant potential for wide applications in medical image enhancement and diagnostic support.

Keywords: Ct Imaging, Medical Image Denoising, Hybrid Deep Learning, Resunet, Attention Mechanism, Feature Preservation, Residual Learning, Image Quality Enhancement.

MINKOWSKI DISTANCE-BASED INTERVAL-VALUED FUZZY SCORES

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ABSTRACT

This paper presents a unified framework for assessing and ranking interval-valued fuzzy sets using Minkowski distance-based score functions. An expectation score function is initially established to numerically characterize the available interval-valued fuzzy information. Subsequently, a normalized Minkowski distance is formulated to evaluate the geometric relationship between interval-valued fuzzy sets. Primarily, an ideal positive degree is established as a benchmark for subsequent comparisons. The main contribution of this study is to propose a Minkowski score function explicitly designed for interval-valued fuzzy sets. Additionally, a Minkowski-weighted score function is introduced, incorporating a parameter to model decision-makers' preferences, and it is shown to possess key desirable characteristics. The proposed methods offer robust decision- making tools for interval-valued fuzzy data, and their effectiveness is demonstrated through theoretical analysis and practical illustration.

Keywords: Interval-Valued Fuzzy Set, Score Function, Minkowski Score Function, Decision- Makin

DEEP LEARNING-BASED IOT-CLOUD-BASED INTEGRATED HEALTHCARE MONITORING SOLUTION FOR HEART DISEASE PREDICTIONS

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ABSTRACT

The Internet of Things facilitates seamless connectivity between individuals and objects, while its integration with the Cloud enhances our quality of life. Predictive analytics in healthcare can transform a reactive strategy into a proactive one, as advanced artificial intelligence and machine learning methods increasingly influence the industry. Deep learning, as a subfield of machine learning, has the potential to analyze large datasets with high accuracy and speed, generating insightful conclusions and effectively addressing complex problems. The precise and prompt forecasting of diseases is essential for facilitating preventive care and early intervention for at-risk individuals. The widespread adoption of electronic clinical records necessitates the development of prediction models with improved accuracy, leveraging recurrent neural network variants of deep learning that can effectively handle sequential time-series data. The proposed system gathers information from IoT devices and the electronic clinical data in the cloud associated with patient history for predictive analytics. The smart healthcare system developed to monitor and predict heart disease risk utilizing Bi-LSTM (bidirectional long short-term memory) achieved accuracy, precision, sensitivity, specificity, and F-measure scores of 98.86%, 98.9%, 98.8%, 98.89%, and 98.86%, respectively, all of which greatly exceed the scores of existing smart heart disease prediction systems.

Keywords: Internet of Things, Cloud Computing, Healthcare, Deep Learning, Bi-Lstm.

UTILIZING INTERNET OF THINGS (IOT) TO STRENGTHEN THE EFFICIENCY OF DIAGNOSING MEDICAL CONDITIONS IN CRITICAL CARE ENVIRONMENTS

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ABSTRACT

The Internet of Things (IoT) has significantly contributed to advancements and innovations in healthcare. Healthcare professionals play a critical role in managing emergency situations, including accidents and cardiac events. Emergency cases are primarily characterized by the patient's vital parameters, necessitating that doctors await further information for a comprehensive diagnosis. The treatment processes and procedures are occasionally expedited, thereby jeopardizing patient safety. Doctors would benefit from having the medical requirements in advance to determine the appropriate course of action, thereby enhancing the likelihood of recovery. This study involves the deployment of multimodal IoT (MMIoT) devices to simultaneously monitor and collect health data from various body parts. The healthcare data consists of signals and images obtained from MMIoT devices. The U-Net model and LSTM model are employed for automated data analysis. Data processing occurs on the server linked to the MMIoT network. All medical IoT devices utilized in this study are interconnected via a prospective 5G network to enhance data transmission efficiency. The output from the U-Net and LSTM is processed through a dense layer to accurately classify health anomalies. This approach will enhance the ability of medical professionals to manage both uncommon and standard cases with confidence in the future. The overall quality of treatment can be enhanced, potentially saving lives through the utilization of optimal resources.

Keywords: Internet of Things, Healthcare, 5g Communication, Prediction Algorithms, Mmiot.

IMPACT OF 5G/6G TECHNOLOGIES ON URBAN HEALTH AND MENTAL WELL BEING: FAMILY DYNAMICS, ACADEMIC ENGAGEMENT, AND MACHINE LEARNING-BASED ANALYSIS

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ABSTRACT

In the contemporary digital era, the advent of advanced network technologies such as 5G and emerging 6G has created new avenues for enhancing urban health, mental well-being, and educational engagement. This paper investigates the intersection of family environment, study motivation, and mental health within urban households, employing machine learning analytics to identify and interpret behavioral patterns. Urban life, characterized by accelerated pace and heightened environmental pressures, stands to benefit from improved healthcare accessibility and service quality enabled by ultra-fast connectivity.

Through the integration of smartphone-derived datasets and other digital usage records, this study evaluates changes in interpersonal dynamics, children's psychological states, and their academic performance across diverse socio-economic urban segments. Findings reveal that excessive exposure to digital devices adversely influences children's mental well-being, sleep quality, and social bonding, echoing earlier concerns established in behavioral health studies.1 Conversely, a measured, purpose-driven use of these technologies correlates positively with academic achievement, emotional balance, and stronger family cohesion.

The research underscores the critical importance of equilibrium in digital engagement for urban families, advocating for structured interventions that balance technological access with mental and educational health priorities. Policy recommendations include the development of tailored digital literacy programs and mental health initiatives for urban households, a direction supported by empirical evidence from global studies on digital health governance.2 By combining high-speed networking with informed usage strategies, urban societies can maximize the benefits of emerging connectivity while safeguarding psychological resilience and educational growth.

Keywords: Urban Health, Mental Well-Being, Study Motivation, Family Environment, Machine Learning.

A COMPARATIVE STUDY OF LONG-DISTANCE COMMUNICATION PROTOCOLS FOR IOT: ENHANCING RELIABILITY, ENERGY EFFICIENCY, AND SCALABILITY

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ABSTRACT

The rapid proliferation of Internet of Things (IoT) devices has created an increasing demand for efficient, secure, and reliable long-distance communication protocols. This paper presents a comparative analysis of major long-range IoT communication technologies—NB-IoT, LoRa, SigFox, and Weightless—focusing on their performance, scalability, and energy efficiency across various network conditions. Special emphasis is placed on image communication and the role of data encryption in ensuring the confidentiality and integrity of transmitted information in IoT ecosystems. By evaluating these protocols under diverse environmental scenarios, this research aims to determine the most suitable technologies for applications such as smart agriculture, healthcare monitoring, and industrial automation. Furthermore, the study explores potential improvements through hybrid protocol architectures and integration with edge computing to enhance data security, reliability, and energy optimization in large-scale IoT networks.

Keywords: Long-Distance Iot Communication, Nb-Iot, Lora, Sigfox, Weightless, Energy Efficiency, Reliable Data Transmission, Image Communication, Encryption, Iot Protocols, Edge Computing.

TRANSIENT ANALYSIS OF A FEEDBACK SINGLE-SERVER QUEUE WITH DIFFERENTIATED VACATIONS, VACATION INTERRUPTIONS, AND DISCOURAGED ARRIVALS

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ABSTRACT

A feedback single-server queueing model incorporating differentiated vacations, vacation interruptions, and discouraged arrivals is analyzed in the transient state. During the busy period, customers arrive at the queue according to a Poisson process. When the server is on vacation, customer arrivals also follow a Poisson process, but with a rate that depends on the number of customers in the system. Service times are assumed to follow an exponential distribution. After completing service, a customer may either rejoin the end of the queue with probability p or leave the system with probability q=1−p. The server can be interrupted only during a type-II vacation, and such an interruption occurs when the number of customers in the system reaches a predefined threshold k. The explicit solution for the system-size probabilities is obtained in terms of the modified Bessel function of the first kind. Furthermore, the mean and variance of the number of customers in the system at time are derived as performance measures.

Keywords: Single Server Queue, Feedbacks, Differentiated Vacations, Vacation Interruptions, Discouraged Arrivals

STATISTICAL ANALYSIS OF THYROID DISORDER AND ITS DETERMINANTS AMONG REPRODUCTIVE AGED WOMEN IN INDIA

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ABSTRACT

The study investigates the prevalence and socio-demographic determinants of thyroid disorder among women aged 15 to 49 in India, a demographic particularly affected by these health issues. Utilizing data from the National Family Health Survey (NFHS-5), the research encompasses a sample of 724,115 women, examining factors such as educational attainment, urban versus rural residency, caste, religion, and wealth status. The study highlights those thyroid disorders are more prevalent among women, with a significant number reporting such conditions. Through statistical analyses, including chi-square tests and logistic regression, the study aims to identify key determinants influencing thyroid health, ultimately seeking to inform targeted health interventions and policies to improve outcomes for reproductive-aged women in India.

Keywords: Thyroid, Nfhs, Social Determinants

A COMPETENT CLASS OF ESTIMATORS FOR POPULATION VARIANCE USING SIMULATION APPROACH

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ABSTRACT

The present study focuses on to address the problem of estimation of population variance of the study variable y using information available of the auxiliary variable x. A competent class of ratio-product type estimators for population variance has been introduced under simple random sampling without replacement technique. Under large sample approximation, the bias and mean squared error (MSE) of the suggested family of estimators are determined up to the first order. Both, theoretical and empirical analyses have been performed which demonstrate the superiority of the suggested class of estimators over the existing estimators. Furthermore, a simulation study was conducted using real datasets to assess the performance of the suggested family of estimators in contrast to other considered estimators that were examined.

Keywords: Auxiliary Or Supplementary Variable; Ratio-Cum-Product Estimators; Bias; Mean Squared Error.

ULTRASONICATED GREENER SYNTHESIS OF SOME BIS-EPOXIDES

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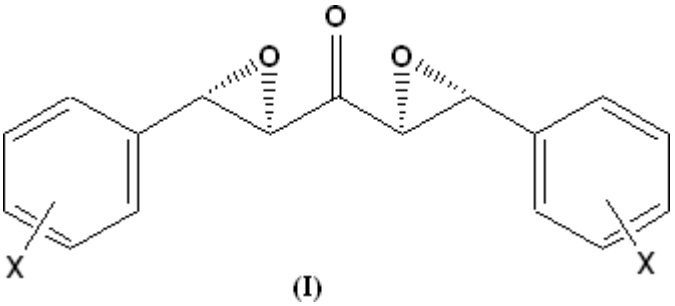
ABSTRACT



(I)

A series of bis epoxides(I) were synthesised by epoxidation of bis-chalcone, hydrogen peroxide in presence of sulphated fly-ash tin oxide catalyst under ultrasonication with a green solvent ethanol in the period of 12-29 minutes. In this epoxidation, the obtained yield was more than 75%. The synthesised epoxides were characterized by their physical constants, elemental analysis and spectroscopical data and these data fully supported for the formation of epoxides. This methodology demonstrated greener synthetic strategies such as simple handling method, less toxic, shorter reaction time, high yield, catalyst recyclable and cheap and economic cost of catalyst.

A COMPARATIVE STUDY ON THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE–BASED METHODS FOR EARLY DETECTION OF ORAL CANCER: FROM MACHINE LEARNING TO DEEP LEARNING FRAMEWORKS

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ABSTRACT

Oral cancer, particularly oral squamous cell carcinoma (OSCC), is a major global health concern with a high mortality rate due to delayed diagnosis. Recent advances in artificial intelligence (AI)—evolving from classical machine learning (ML) to deep learning (DL)—have enabled early detection and classification of OSCC using modalities such as histology, spectroscopy, computed tomography (CT), optical coherence tomography (OCT), and clinical imaging. This study presents a comprehensive comparative analysis and systematic review of research conducted between 2005 and 2024. It focuses on experimental objectives, methodological innovations, and performance metrics reported across various studies. The review spans approaches ranging from traditional feature engineering to explainable ML frameworks. Additionally, the study examines the datasets, application domains, and AI techniques employed for the detection and classification of OSCC. Finally, it summarizes key AI performance benchmarks for early oral cancer identification and highlights emerging trends and future research directions in this field.

Keywords: Oral Cancer Detection, Machine Learning, Deep Learning, Comparative Analysis, Cnn, Svm, Accuracy

MOLECULAR PICTURE OF THE EFFECT OF COSOLVENT CROWDING ON LIGAND BINDING AND DISPERSED SOLVATION DYNAMICS IN G-QUADRUPLEX DNA

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ABSTRACT

Understanding molecular interactions and dynamics of proteins and DNA in a cell-like crowded environment is crucial for predicting their functions within the cell. Noncanonical G-quadruplex DNA (GqDNA) structures adopt various topologies that were shown to be strongly affected by molecular crowding. However, it is unknown how such crowding affects the solvation dynamics in GqDNA.Here,we study the effect of cosolvent(acetonitrile) crowding on ligand(DAPI) solvation dynamics within human telomeric antiparallel GqDNA through direct comparison of time-resolved fluorescence Stokes shift (TRFSS) experiments and molecular dynamics (MD) simulations results. We show that ligand binding affinity to GqDNA is drastically affected by acetonitrile (ACN). Solvation dynamics probed by DAPI in GqDNA grooves how dispersed dynamics from ~100 fs to 10 ns in the absence and presence of 20% and 40% (v/v) ACN.

IMPACT OF MENTAL HEALTH ON ACADEMIC PERFORMANCE OF HIGHER SECONDARY STUDENTS

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ABSTRACT

Mental health is a critical determinant of student's overall development and plays a significant role in shaping academic outcomes, particularly during adolescence. Higher secondary school students experience a transitional phase marked by academic pressure, emotional changes, peer influence, and expectations related to career choices. These factors often contribute to mental health challenges such as stress, anxiety, depression, low self-esteem, and emotional instability, which can directly and indirectly influence academic performance. The present study examines the mental health status of higher secondary school students and its impact on their academic performance.

The study adopts a descriptive and correlational research design to assess the relationship between mental health indicators and academic achievement among higher secondary students. A representative sample of students from various schools was selected using a stratified random sampling technique. Standardized mental health assessment tools were used to measure dimensions such as emotional stability, anxiety levels, stress management, social adjustment, and self-confidence. Academic performance was assessed using students' examination scores and overall scholastic records. Statistical techniques including correlation and regression analysis were employed to analyze the data.The findings reveal a significant relationship between mental health status and academic performance.

The study underscores the importance of early identification of mental health issues among higher secondary students and the implementation of school-based mental health interventions. Counseling services, life skills education, stress management programs, and awareness initiatives can play a vital role in promoting mental well-being and enhancing academic performance.

Keywords: Mental Health, Academic Performance, Higher Secondary.

ROLE OF VIRTUAL ANIMATION LABS IN FOSTERING DIVERGENT PRODUCTION ABILITIES AMONG PRE-SERVICE TEACHERS: A LITERATURE REVIEW

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ABSTRACT

Creativity and divergent thinking have become essential competencies for pre-service teachers in the digital era. With the increasing integration of educational technologies, Virtual Animation Labs (VALs) provide innovative platforms for fostering creative expression, visualization, and idea generation. This literature review examines existing research on virtual animation environments, multimedia learning, digital creativity tools, and divergent production ability to understand how VALs support creative skill development among pre-service teachers. Findings suggest that animation-based tasks enhance fluency, flexibility, originality, and elaboration—the four key components of divergent production (Guilford, 1967). Grounded in constructivist and multimedia learning theories, VALs offer immersive learning experiences that promote experimentation, exploration, and creative risk-taking. The review highlights significant implications for teacher education, curriculum development, and digital pedagogy, while also identifying gaps for future research.

Keywords: Virtual Animation Labs, Divergent Production Abilities Pre-Service Teachers, Creativity, Constructivism

MULTIMODAL ARTIFICIAL INTELLIGENCE FOR ENHANCED CT IMAGE ANALYSIS IN HEALTHCARE

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ABSTRACT

Computed Tomography (CT) imaging plays a pivotal role in modern clinical diagnosis, offering high-resolution visualization of internal anatomical structures. However, the increasing volume and complexity of CT data pose significant challenges for accurate interpretation, timely diagnosis, and effective decision-making. In this context, Multimodal Artificial Intelligence (AI) models have emerged as a transformative approach for enhancing CT image analysis by integrating heterogeneous data sources such as medical images, clinical records, radiology reports, and laboratory findings.

The importance of multimodal AI lies in its ability to capture complementary information across different data modalities, thereby improving diagnostic accuracy and robustness. Unlike traditional unimodal approaches that rely solely on image data, multimodal models leverage contextual and semantic information, enabling a more comprehensive understanding of disease patterns. For instance, combining CT images with patient history and clinical biomarkers can significantly enhance the detection and classification of complex conditions such as tumors, infections, and cardiovascular abnormalities. Furthermore, multimodal AI models contribute to reducing diagnostic variability and improving consistency among radiologists. By incorporating advanced deep learning architectures such as convolutional neural networks (CNNs), transformers, and attention mechanisms, these models can effectively learn cross-modal relationships and highlight clinically relevant features. This not only aids in precise segmentation and localization of abnormalities but also supports explainable AI, which is crucial for clinical trust and adoption.

Another critical advantage is the potential for early disease detection and personalized treatment planning. Multimodal systems can identify subtle patterns that may not be apparent in isolated imaging data, thus enabling proactive healthcare interventions. Additionally, these models facilitate automated report generation, workflow optimization, and decision support systems, ultimately reducing the workload on healthcare professionals. Despite these advantages, challenges such as data heterogeneity, integration complexity, and privacy concerns must be addressed to fully realize the potential of multimodal AI in CT image analysis. Nevertheless, ongoing advancements in data fusion techniques and computational power continue to drive this field forward, making multimodal AI an essential component of next-generation medical imaging systems.

Keywords: Multimodal Ai, Ct Image Analysis, Deep Learning, Medical Imaging, Data Fusion, Clinical Decision Support, Radiology, Explainable Ai.

SPATIAL EPIDEMIOLOGY OF DIABETES IN GHANA: IDENTIFYING REGIONAL HOTSPOTS AND SOCIOECONOMIC PREDICTORS FOR TARGETED INTERVENTIONS

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ABSTRACT

Background: Diabetes is a growing global health concern, yet its spatial and spatiotemporal distribution in Ghana remains poorly characterized.
Aim: Identify hotspots and coldspots of diabetes and associated predictors in Ghana for targeted interventions. **Methods**: We analyzed national diabetes cases from 2018 to 2022 using data from the District Health Information Management System (DHIMS). Incidence rates (per 1,000 population) were estimated and smoothed via Empirical Bayesian methods. Spatial dependence and clustering were assessed using Global Moran's I, Local Indicators of Spatial Association (LISA), and Getis–Ord statistics, while space–time clusters were identified with SaTScan. Bivariate LISA examined spatial associations with key determinants, and relative risk was estimated using Bayesian spatial modelling. Gradient Boosting, supported by SHapley Additive exPlanations (SHAP), quantified the importance and contribution of regional predictors.

Results: Diabetes incidence exhibited strong spatial heterogeneity, with persistent hotspots in southern and central regions, particularly Greater Accra, Ashanti, Eastern, and Central, and cold spots in the northern belt. Both global and local spatial analyses confirmed significant clustering in urban centers. Gradient Boosting and SHAP analyses identified urban residence, lower poverty, and higher educational attainment as the strongest predictors of regional diabetes burden, indicating that rapid urbanization and socioeconomic transition are key drivers. Lower observed incidence in northern regions may reflect limited diagnostic coverage, suggesting potential underestimation of true burden.

Conclusions: Diabetes burden in Ghana is geographically concentrated in socioeconomically advantaged and urbanized southern regions. These findings highlight the need for targeted prevention and management strategies in hotspot areas, alongside strengthened surveillance and diagnostic capacity in northern and transitional regions to ensure equitable healthcare delivery and support progress toward

Sustainable Development Goals 3 and 10.

Keywords: Besag, York, And Mollié (Bym) Model; Diabetes; Empirical Bayes; Gradient Boosting; Integrated Nested Laplace Approximation; Local Indicators Of Spatial Association; Moran's I; Relative Risk

MENTAL HEALTH AND PUBLIC HEALTH POLICIES IN THE DIGITAL AGE: CHALLENGES ARISING FROM SMARTPHONES AND VIRTUAL REALITY

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ABSTRACT

Digital technologies such as smartphones and Virtual Reality (VR) have transformed modern life but also raised concerns regarding mental health. This study, based on secondary data (2018–2025), examines the psychological and policy implications of excessive smartphone use and VR exposure. Findings indicate that problematic smartphone use is associated with anxiety, depression, sleep disturbances, and social withdrawal. Behavioural patterns such as Fear of Missing Out (FoMO) and phubbing further intensify these effects. While VR demonstrates therapeutic benefits in treating disorders like PTSD, excessive or unguided use may lead to cybersickness and derealization. The study also identifies gaps in public health policies, where technological growth outpaces regulation. It concludes by recommending digital well-being education, ethical VR guidelines, and stronger policy frameworks to balance innovation with mental health protection.

Keywords: Smartphone Addiction, Virtual Reality, Mental Health, Public Health Policy, FoMO, Digital Well-being

DEVELOPMENT OF DISEASE PREDICTION AND DRUG RECOMMENDATION MODEL BASED ON SYMPTOMS USING MACHINE LEARNING

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ABSTRACT

Machine learning has the potential to transform healthcare by predicting diseases and recommending drugs based on the symptoms. These systems, which utilize advanced algorithms, large datasets, and interdisciplinary collaboration, have the potential to transform patient care. In this research work we discusses the ideas and potential outcomes of using machine learning for disease prediction and treatment recommendations.

Machine learning (ML) has the potential to improve patient outcomes, cut healthcare expenses, and increase medical research using powerful algorithms and large datasets. This breakthrough technology can address major difficulties in the healthcare sector, such as delayed disease diagnosis and inefficiencies in treatment procedures. Medical databases are one area where data mining techniques can be applied which is used to examine large amounts of data and identify patterns and trends.

Using Machine Learning techniques used in this research, patients can quickly find out about the illness they are experiencing and the medication that can help treat it by simply describing their symptoms. In this paper, we recommend drugs to patients based on ratings and conditions.

Four separate prototypes are used to forecast illnesses. The Vader tool and sentiment analysis based on natural language processing are used to assess the reviews. Finally, probabilistic and weighted average methods are used to recommend drugs. The experimental findings described in this paper can be used in future research and for a range of medical applications.

Keywords: Medicine, Recommendation Systems, Disease Prediction, Machine Learning.

MACHINE LEARNING BASED CYBER ATTACK DETECTION IN INTERNET OF THINGS AND INDUSTRIAL INTERNET OF THINGS

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ABSTRACT

The Industrial Internet of Things (IIoT) is transforming industrial operations through enhanced connectivity, automation, and data-driven decision-making. However, this increased interconnectivity significantly broadens the attack surface, exposing critical infrastructures to sophisticated and evolving cyber threats. Addressing these security challenges, this study proposes a high-performance cyber-attack detection framework leveraging machine learning techniques. The proposed model integrates optimized feature selection strategies with advanced classification algorithms to enhance detection accuracy while reducing false alarm rates. Experimental evaluation is conducted on the Edge-IIoTset dataset, a comprehensive benchmark representing diverse IIoT attack scenarios. Comparative performance analysis demonstrates that the proposed framework consistently outperforms existing intrusion detection solutions across key metrics, including accuracy, precision, recall, and F1-score. The results highlight the framework's scalability, robustness, and adaptability for real-world deployment in industrial environments. This work contributes to the development of proactive, reliable, and future-ready cybersecurity measures essential for safeguarding mission-critical IIoT infrastructures.

ACADEMIC DIVIDES AND DEMOGRAPHIC DIFFERENCES: AN ANALYSIS OF TECHNOPHOBIA AND PERCEIVED USEFULNESS AMONG HIGHER EDUCATION FACULTY

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ABSTRACT

The integration of digital technologies into higher education is a global imperative, yet its success hinges on willing adoption by faculty. As faculty are not a homogenous group, their attitudes are often shaped by distinct academic cultures and demographic backgrounds. This study investigates whether Technophobia (TE) varies across academic divisions and whether Perceived Usefulness (PU) differs by gender. A quantitative, cross-sectional survey was administered to full-time faculty in Higher Colleges of Technology, UAE, and responses by 117 faculty members were analyzed using one-way ANOVA and independent-samples t-tests.

The analysis showed significant differences in Technophobia across academic divisions**,** $F(6,110)=3.70$, $p=0.002$. Tukey post-hoc comparisons did not yield pairwise differences that survived multiple-comparison adjustment at $\alpha=.05$; however, the Health Sciences division reported the highest mean TE (Mean=2.59) and Education the lowest (Mean=1.46), with Computer and Information Science (CIS) and General Academic Requirement Department (GARD) also on the lower end. In contrast, Perceived Usefulness did not differ significantly by gender**,** $t(111.89=-1.72$, $p=0.088$; the mean PU was 4.13 (Standard Deviation =0.70) for males and 4.3 (Standard Deviation =0.67) for females.

These findings suggest that academic context—more than gender—shapes faculty apprehension toward technology, while perceived usefulness is broadly high across genders. Institutions should therefore target division-specific support (e.g., tailored coaching in divisions showing higher technophobia) while continuing to reinforce effective practice sharing to sustain already favorable perceptions towards usefulness. One-size-fits-all professional development is unlikely to address division-level differences in technophobia, and nuanced, context-aware strategies are recommended.

SOLUTIONS OF FUZZY MULTI-OBJECTIVE MULTI-ITEM MULTI-CHOICE FIVE-DIMENSIONAL TRANSPORTATION PROBLEM BY VARIANTS OF GENETIC ALGORITHM

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ABSTRACT

Transportation problems with multiple dimensions and objectives closely mirror the real-world challenges faced in logistics and distribution. This study presents a comprehensive framework for a fuzzy multi-objective, multi-item, multi-choice, five-dimensional transportation problem (FMOMIMC5DTP) that effectively captures these complexities. In this model, the parameters linked to the objective functions are treated as fuzzy variables, while supply, demand, and vehicle capacities are represented in a multi-choice setting. Using binary variables, these multi-choice parameters are simplified into single-choice forms for easier computation. Since traditional optimization methods often fail to capture the intuition and judgment of decision-makers, this work employs the non-dominated sorting genetic algorithm (NSGA-III) algorithm to generate balanced solutions that address multiple objectives simultaneously, without allowing any one objective to dominate the others. However, because NSGA-III requires an initial feasible population to operate effectively, a systematic method is proposed here to generate that population efficiently. The developed model is further illustrated and validated through a numerical example, and its performance is compared with other Genetic Algorithm variants.

DIGITAL INNOVATIONS IN VIRAL DISEASE SURVEILLANCE: INTEGRATING AI AND GENOMIC DATA FOR EARLY OUTBREAK DETECTION

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ABSTRACT

The rapid emergence and re-emergence of viral infections such as COVID-19, Nipah, and Dengue have highlighted the urgent need for innovative surveillance systems that can detect outbreaks early and guide timely public health action. This study explores the integration of Artificial Intelligence (AI) and genomic technologies as transformative tools in viral disease monitoring and management. AI-driven models are increasingly being utilized to analyze massive datasets derived from clinical, epidemiological, and environmental sources, enabling predictive insights into viral transmission dynamics. Parallel advances in next-generation sequencing (NGS) and genomic epidemiology facilitate real-time tracking of viral mutations and evolution, supporting more precise containment strategies.
The convergence of these technologies under a unified digital framework offers opportunities for smart surveillance networks, capable of linking genomic data with AI-based forecasting and decision-support systems. From a management perspective, such integration enhances resource allocation, risk communication, and policy planning. In the public health domain, it strengthens outbreak preparedness and response capacities through data-driven interventions. However, challenges persist regarding data privacy, interoperability, and implementation in low-resource settings.
Multidisciplinary approach combining science, technology, management, and public health innovation to establish a next-generation digital ecosystem for viral disease surveillance should be initiated. By leveraging AI and genomics, health systems can transition from reactive to predictive models of outbreak control, thereby advancing the vision of global health security and resilience.

DOES MENTAL HEALTH CONTRIBUTE TOWARDS HUMAN WELL BEING: CONCEPTUALIZING A MEASUREMENT SCALE

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ABSTRACT

In the present digitalized global environment concern over mental health is on the rise. Realistically it is quite pertinent and necessary to explore the effectiveness of mental healthiness in the research landscape. The study is based on formulation of a research instrument in the nomenclature 'Assessment of DI-PU-MO-HA-WE 'scale to arrive at responses towards estimating the findings of the study. The focus of the paper aims to visualize the five domains and items within. Methodology of the study includes expert evaluation, statistical item analysis and confirms the scale's reliability. Findings underscore role of sound mental balance, behavioural attributes, motivation and public good and wellbeing. The novelty of the study upholds the formulation of the comprehensive scale for HR executives, leaders, health professionals, policymakers to build responsive platform for revitalizing effective mental health outcomes.

Keywords: Mental, health, Wellbeing, Scale

HYBRID APPROACH USING HIDDEN MARKOV MODELS FOR (S, S) INVENTORY POLICIES AND SARIMA, LSTM AND GRU FORECASTING OF VIX INDICES

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ABSTRACT

This study presents a new inventory control framework that combines a Hidden Markov Model (HMM) with adaptive ((s, S)) policies to manage demand uncertainty. Customer demand often changes between high, medium, and low periods. The HMM component infers these hidden states from historical demand data. The inventory system adjusts its reorder point and order-up-to level based on the identified state. This approach improves responsiveness and cost efficiency. We develop a cost structure that includes holding, shortage, and ordering costs to evaluate total cost performance over a set planning period. Simulation-based analysis provides numerical validation and visual examples to show how the system behaves under different demand scenarios.

In the second part of the study, we compare the time-series forecasting performance of four methods: HMM, Long Short-Term Memory (LSTM) networks, Gated Recurrent Units (GRU), and Seasonal Autoregressive Integrated Moving Average (SARIMA), using historical data from VIX indices. We assess forecast performance using standard error metrics, including Mean Absolute Error (MAE), Root Mean Square Error (RMSE), and Mean Squared Error (MSE), as well as graphical comparisons. The results reveal strengths specific to each model and help in choosing the right forecasting tools in uncertain, shifting environments.

Keywords: HMM, Adaptive (s, S) Policy, Stochastic Demand, Hidden States, Cost Minimization, VIX-indices, LSTM, SARIMA, GRU-MSM MSC: 90B05, 60J27, 90C40, 93E11, and 68U20tract

MULTI-OBJECTIVE MULTI-DIMENSIONAL TRAVELLING SALESMAN PROBLEM AND ITS SOLUTION BY EVOLUTIONARY ALGORITHMS

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ABSTRACT

The classical Travelling Salesman Problem (TSP) has been widely studied for decades, but real-world logistics often involve many practical factors that the traditional model cannot capture. To address this limitation, this work presents the Five-Dimensional Travelling Salesman Problem (5DTSP), which simultaneously minimizes five key objectives: cost, time, distance, risk, and carbon emissions. The model considers multiple routes, different types of vehicles, and various drivers for each journey between cities. By introducing the driver dimension, the problem accounts for human factors such as driving behavior, experience, and risk attitude, which significantly affect over all performance and emissions. To represent uncertainty in practical scenarios, a fuzzy modeling approach based on possibility and necessity measures is adopted. To obtain an optimal and diverse set of trade-off solutions, two
 advanced multi-objective optimization techniques NSGA-III and NSDE-R are employed. In addition, sensitivity analysis is carried out to study the influence of key parameters on the model's performance and to validate the robustness of the proposed approach. The study provides a comprehensive and sustainable framework for efficient route planning under uncertain conditions.

COST MINIMIZATION FOR MACHINE REPAIR PROBLEM USING HARMONY SEARCH METHOD

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ABSTRACT

The field of machine repair problem has gained significant importance in real world applications particularly in transportation sector, manufacturing processes, etc. A machine repair problem deals with queueing management of repair facilities for failed machines. In this investigation, the machine repair problem is modelled as an M/M/1/K retrial queueing system under admission control F-policy. Retrial queueing mechanism assists in handling the congestion in the system. The admission control F-policy is incorporated to manage customer admissions when the system reaches the full capacity i.e, K. Additionally, customer feedback is taken into account when assessing the quality of repairs performed on failed machines. The Chapman-Kolmogorov equations are defined with the assistance of method of birth-death process. The recursive technique is employed to derive the steady-state probability distributions representing the number of failed machines present in the system awaiting the initiation of the repair process. Further, these distributions are used to formulate the performance measures related to the queueing system. A cost function is constructed from the performance measures. The objective of the cost optimization is to minimize the operational costs associated with the repair facility. The harmony search method is applied to minimize the cost function and determine corresponding optimal repair rates. Moreover, the minimization is performed using the quasi-Newton method to validate and compare the results obtained from the harmony search method. An illustration of an automobile repair shop is presented to demonstrate the practicality of the queueing system in the context of the machine repair problem.

FROM IDEAS TO CONTENTMENT: EXPLORING THE CONNECTION BETWEEN CREATIVITY AND JOB SATISFACTION

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ABSTRACT

The relationship between creativity and job satisfaction has garnered substantial attention in organizational psychology and management literature. This study investigates the relationship between creativity and job satisfaction among a sample of 100 employees in Higher Education Institutions. Prior research has suggested a positive correlation between these constructs, but empirical validation within specific contexts and sample sizes is lacking. The participants, diverse in job roles, tenure, and demographics, completed structured questionnaires assessing creativity and job satisfaction. The data was analyzed using t-tests and correlation analysis. The results revealed a significant positive correlation ($r = 0.220$, $p < 0.05$) between creativity and job satisfaction, indicating that employees with higher creativity levels tend to report greater job satisfaction. Additionally, the t-test demonstrated a statistically significant difference in job satisfaction scores between high and low creativity groups. These findings provide empirical support for the notion that fostering creativity in the workplace can lead to increased employee satisfaction. The study's implications suggest that organizations should actively encourage and recognize creative contributions from their employees, ultimately leading to a more fulfilling work environment. This research offers valuable insights for human resource management and organizational leaders aiming to optimize workplace conditions and enhance overall employee well-being.

Keywords: Creativity, Job Satisfaction, Organizational Psychology, Workplace Environment, Higher Education Institutions

OPTIMIZATION OF TWO-WAREHOUSE INVENTORY MODELS USING GENETIC ALGORITHM

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ABSTRACT

Efficient inventory management plays a crucial role in modern supply chain systems, particularly when dealing with two-warehouse models that balance storage between owned and rented facilities. The complexity of decision-making in such systems increases due to multiple cost parameters, demand fluctuations, and capacity constraints. Traditional optimization methods often fail to provide optimal solutions for large-scale and nonlinear models.

This study proposes the application of a Genetic Algorithm (GA) to optimize two-warehouse inventory models by minimizing total system cost, which includes ordering, holding, transportation, and shortage costs. The model considers factors such as deterioration, demand variability, and differential holding costs in both warehouses. GA is employed due to its robustness in handling nonlinear and combinatorial optimization problems, ensuring convergence towards near-optimal solutions.

A numerical example is presented to validate the effectiveness of the proposed approach. The results demonstrate that GA significantly reduces overall costs compared to conventional methods, while offering flexibility in managing real-world constraints. This research highlights the potential of evolutionary computing techniques in advancing inventory optimization strategies, thereby enhancing decision-making in supply chain management.

Keywords: Two-Warehouse Inventory Model, Genetic Algorithm, Optimization, Supply Chain Management, Evolutionary Computing.

THE ROLE OF SOCIAL MEDIA IN BUILDING BRAND LOYALTY AMONG YOUNG CONSUMERS

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ABSTRACT

Social media has emerged as a vital marketing platform that significantly influences consumer perceptions and brand relationships, particularly among young consumers. This study aims to examine the role of social media in building brand loyalty among young consumers using a descriptive research design. The research is based on both primary and secondary data. Primary data were collected through a structured questionnaire administered via Google Forms, while secondary data were sourced from books and internet-based resources. The questionnaire was designed in accordance with the objectives of the study to capture consumer behavior, preferences, and interactions with brands on social media platforms. The collected data were systematically processed, organized, and analyzed using descriptive statistical tools such as frequency tables and percentage analysis. The findings of the study reveal that social media content quality, brand engagement, and interactive communication play a significant role in influencing trust, satisfaction, and long-term brand loyalty among young consumers. The study offers valuable insights for marketers and businesses to effectively utilize social media strategies to strengthen brand loyalty in a competitive digital environment.

Keywords: Social Media; Brand Loyalty; Young Consumers; Consumer Behaviour; Digital Marketing.

HYBRID DENSENET–QUANTUM LEARNING FRAMEWORK FOR PLANT DISEASE CLASSIFICATION USING LEAF IMAGES

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ABSTRACT

Early disease detection in plants is critical for guaranteeing agricultural productivity and food security. While deep learning models have shown encouraging performance in image-based disease classification, traditional models tend to have redundant features and poor generalization capabilities for imbalanced classes. In this study, we design a hybrid quantum-classical deep learning model that combines a pretrained DenseNet121 feature extractor with a variational quantum circuit (VQC) for improved feature learning. The classical network learns high-level visual features, while the quantum network applies a nonlinear transformation via a strongly entangling six-qubit circuit. The results of both networks are combined to obtain the final results. The model is trained using Mixup data augmentation, label smoothing, and balanced sampling for improved generalization. Our experimental evaluation on the Plant Pathology dataset shows that the proposed method can achieve 89% classification accuracy, surpass the classical model and achieve lower generalization loss.

Keywords: Plant Disease Detection, Hybrid Quantum–Classical Learning, DenseNet121, Variational Quantum Circuit (VQC), Deep Learning for Agriculture**.**

ADOPTION OF CLOUD ACCOUNTING AMONG STARTUPS IN MADURAI

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ABSTRACT

The rapid digital transformation across India has encouraged startups to increasingly shift towards cloud-based solutions for operational management. In Madurai, a vibrant entrepreneurial ecosystem is emerging, especially across technology, retail, service, and manufacturing startups. Cloud accounting provides scalable, cost-effective, and real-time financial management capabilities ideally suited for resource-constrained startups. This empirical study examines the level of awareness, adoption rate, influencing factors, and perceived benefits of cloud accounting among 250 startups in Madurai. The primary data collected through structured questionnaires explores key determinants such as technological readiness, cost advantages, ease of use, data security perceptions, and organizational support. The study evaluates how these factors shape adoption decisions and the extent to which cloud accounting enhances financial performance and managerial efficiency. Statistical techniques including descriptive analysis, correlation, chi- square, regression, ANOVA, and SEM were employed. The findings reveal significant relationships between technological and organizational factors and cloud accounting adoption. The study contributes valuable insights for startup founders, accountants, consultants, and software providers. Results indicate that cloud accounting adoption is moderate but steadily increasing among startups in Madurai, particularly in technology-driven sectors. Many startups acknowledge benefits such as reduced operational costs, improved accuracy, real-time data accessibility, and enhanced decision-making support. However, concerns remain regarding data privacy, cybersecurity threats, and dependence on internet connectivity. The study also highlights demographic influences such as founder age, experience, sector, and firm size on cloud accounting adoption. Regression and SEM outputs confirm that perceived usefulness, ease of use, and organizational readiness significantly predict adoption intention. Based on the findings, practical recommendations are proposed to improve digital literacy, promote cloud-based accounting tools, and encourage government incentives for technology adoption. The study concludes that cloud accounting can substantially enhance financial management efficiency in Madurai startups, provided awareness and training are strengthened.

Keywords: Cloud Accounting, Startups, Technology Adoption and Financial Management

ADOPTION OF E-COMMERCE BY SMALL BUSINESSES & START-UPS IN MADURAI

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ABSTRACT

The rapid expansion of digital commerce has transformed business operations, particularly for small businesses and start-ups in emerging urban regions such as Madurai. This study assesses the level of e-commerce adoption among 150 small businesses and 75 start-ups, focusing on readiness, perceived usefulness, digital skills, technological barriers, and perceived benefits. A descriptive and analytical research design was adopted, and primary data were collected through structured questionnaires. Statistical tools including descriptive analysis, Chi-square, ANOVA, correlation, regression, and SEM were used to identify the major determinants influencing adoption. The findings reveal that start-ups demonstrate higher levels of technological readiness, digital literacy, and platform utilization compared to traditional small businesses. Perceived usefulness, ease of use, customer reach, and digital skills significantly influence adoption behaviour, while technological limitations and cost concerns reduce willingness to adopt. The results further show that internet experience and educational qualifications positively shape digital engagement. Despite existing challenges, both groups recognize that e-commerce enhances visibility, operational efficiency, and business growth. The study emphasizes the need for targeted digital training, improved infrastructure, and supportive policy measures to strengthen adoption and promote inclusive digital transformation among enterprises in Madurai.

Keywords: E-commerce Adoption, Small Businesses, Start-ups, Digital Literacy, Technological Barriers

GRAPH VULNERABILITY ANALYSIS OF CHOLA IRRIGATION NETWORKS IN KUMBAKONAM AND THIRUVAIYARU REGIONS

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ABSTRACT

The Cholas set up a well-organized and efficient water management system as the foundation of their agriculturalbased economy. The water supply system of the Chola Empire was elaborately planned, specifically to the geography of the land and the crops that were grown over their extensive kingdom. This was primarily carried out by strategically bifurcating the Kaveri River, which was a fundamental component of their state. Their measures also included building new dams and checks along the riverbanks to control the flow and to hold back the surplus water in the rainy season. Water distribution systems (WDSs) are complex sets of many interconnected junctions and pipelines (canals and dams/lakes in our context). The reliability and resilience of these systems mainly rely on their network configuration, which makes detailed analysis vital for proactive failure detection and sustained operational performance regardless of the season. Within this paper, the graph vulnerability parameters are utilized for gauging the structural integrity of the WDS, thereby providing a better understanding of how different parameters influence system strengths and how much the Cholas were able to factor these in.

Keywords: Chola Water Distribution Systems, Kaveri River Network, Graph theory, Vulnerability parameters.

CUSTOMER AWARENESS OF FINTECH SERVICES: A STUDY WITH REFERENCE TO THE STATE BANK OF INDIA

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ABSTRACT

This study talks about the customer awareness of fintech services offered by the State Bank of India. The rapid growth of digitalization on banking platforms such as mobile banking, internet banking, and Unified Payment Interface has transformed customer expectations, making it essential to understand the determinants of fintech. The research analyses customer socio economic and awareness in usage patterns in digital banking services. Data collected from State Bank India customers in Madurai city reveal that convenience, time efficiency and transaction speed are the major drivers of fintech adoption. This research suggests that increased customer education through digitalization, improved service enhance fintech adoption among customers.

ANALYTICAL PERSPECTIVES OF MATHEMATICAL MODELLING ON NONLINEAR DIFFERENTIAL EQUATIONS IN APPLIED SCIENCES

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ABSTRACT

Nonlinear differential equations play a central role in mathematical modelling across applied sciences, describing complex behaviours in heat transfer, fluid flow, diffusion–reaction systems, and various chemical and biological processes. Their inherent nonlinearities and coupled boundary conditions often make analytical solutions challenging to obtain, yet such solutions remain essential for understanding system behaviour and validating numerical simulations. This work presents analytical perspectives on modelling nonlinear differential equations using advanced solution techniques. Methods such as the Homotopy Analysis Method, Homotopy Perturbation Method, and Adomian Decomposition Method are examined for their ability to generate accurate closed-form or semi-closed-form solutions. These approaches preserve the underlying physics of nonlinear models while providing insight into parameter effects, convergence characteristics, and system sensitivity. Applications in thermo-fluid systems and reactive transport processes highlight the importance of analytical tools in improving model reliability. The study demonstrates how analytical techniques enhance interpretability and strengthen predictive modelling in applied scientific research.

Keywords:Nonlinear differential equations; Mathematical modelling; Analytical methods; Homotopy Analysis Method; Homotopy Perturbation Method; Adomian Decomposition Method; Applied sciences; Nonlinear dynamics; Heat and mass transfer; Diffusion–reaction systems.

A COMPARATIVE STUDY OF HEAT MAP CENTRALITY FOR DYNAMIC INFLUENCE DETECTION IN SOCIAL NETWORKS

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ABSTRACT

Heat Map Centrality (HMC) is a new measure for detecting influential nodes within social networks, created to address the flaws in traditional static measures such as Degree, Betweenness, and Closeness, which tend to produce inconsistent rankings and are unable to reflect the dynamic, diffusion-based process of influence through solely depending upon local information or shortest paths. We introduce Heat Map Centrality, a novel metric specifically formulated to simulate the spread of influence throughout a network. We performed a comprehensive comparative analysis on benchmark social network data sets compared to traditional indices of Degree, Closeness, Betweenness, and Eigenvector centrality. We discovered that Heat Map Centrality is able to effectively identify influential nodes that are often overlooked by static measures. In addition, we demonstrate that HMC is better correlated with outcome from model-simulated information diffusion instances, thereby proving its higher applicability in dynamic influence situations. We conclude that Heat Map Centrality integration yields a more comprehensive and robust assessment of nodal importance in social networks.

Keywords: Heat Map Centrality (HMC), Influence Detection, Social Networks, Dynamic Influence, Centrality Measures, Information Diffusion.

ENHANCING LIFE CYCLE–AWARE ENCRYPTION WITH FEDERATED THREAT INTELLIGENCE AND CONTEXTUAL KEY ROTATION FOR ANDROID DATA PROTECTION

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ABSTRACT

Android's dominance in the mobile ecosystem has made it a prime target for evolving the cyber threats. This paper proposes a hybrid framework of combining life cycle–aware encryption, federated threat intelligence, and contextual key rotation to enhance the Android data protection. The Life cycle awareness ensures encryption adapts to the application states such as installation, execution, update, and deletion [20]. Federated intelligence enables the collaborative detection of threats across distributed devices during preserving privacy [15]. The Contextual key rotation dynamically refreshes the cryptographic keys based on behavioral triggers, reducing the risk of key compromise [14]. Experimental results thus demonstrate improved resilience against the malware injection, reduced latency in threat detection, and enhanced user privacy.

Keywords: Android security, life cycle–aware encryption, federated threat intelligence, contextual key rotation, mobile data protection, privacy preservation

INFLUENCE OF FENNEL POWDER ON THE CORROSION RESISTANCE OF NI-CR ALLOY IN ARTIFICIAL SALIVA

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ABSTRACT

This study examines the influence of fennel (*Foeniculum vulgare*) powder on the corrosion resistance of Ni-Cr alloy when exposed to artificial saliva, mimicking an oral environment. The corrosion resistance of an orthodontic wire composed of Ni-Cr alloy immersed in artificial saliva was assessed in the absence and presence of fennel powder using polarization measurements and AC impedance spectroscopy. The findings indicate that incorporating fennel powder improves the corrosion resistance of the Ni-Cr alloy. Consequently, those with orthodontic wires made of Ni-Cr alloy do not have to worry about taking fennel powder orally. In the presence of fennel powder, the linear polarization resistance increases from 454271 $\Omega \cdot cm^2$ to 491216 $\Omega \cdot cm^2$, while the corrosion current decreases from $1.021x10^{-7}$ A/cm^2 to $9.451\ X10^{-8}$ A/cm^2. The charge-transfer resistance increases from 86787 $\Omega \cdot cm^2$ to 108815 $\Omega \cdot cm^2$, and the impedance magnitude increases from 5.19 to 5.28 log(Z/Ω). The double-layer capacitance decreases from 5.28×10^{-11} F/cm^2 to 4.68×10^{-11} F/cm^2.

Keywords: Ni-Cr alloy, artificial saliva, fennel powder, corrosion behaviour, potentiodynamic polarisation, AC impedance spectroscopy.

AN INVESTIGATION OF CORROSION RESISTANCE OF SS316L ALLOY IN THE PRESENCE OF LEMON SARBATH

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ABSTRACT

Commercially available SS316L is commonly used in orthodontic devices because of its excellent combination of mechanical strength, corrosion resistance, and biocompatibility. In this study examines the corrosion resistance of the SS316L alloy in artificial saliva with and without the addition of lemon sarbath was evaluated using potentiodynamic polarization and AC impedance spectroscopy. When lemon sarbath was added to artificial saliva, the charge transfer resistance of SS316 L alloy increased. The results indicated that in the presence of lemon sarbath, there was significant decrease in the corrosion current and an increase in the Linear Polarization Resistance, suggesting improved corrosion resistance. These findings suggest that lemon sarbath can act as an effective and eco-friendly corrosion inhibitor for dental alloys in simulated oral conditions. It is concluded that people who have been implanted with orthodontic wires made of SS316 L alloy need not dither to take the Lemon sarbath drink orally.

Keywords: SS316L allloy, electrochemical corrosion, artificial saliva, lemon sarbath, potentiodynamic polarization and AC impedance spectroscopy.

DIGITAL HRM ADOPTION AND ITS IMPACT ON EMPLOYEE PRODUCTIVITY: EVIDENCE FROM MADURAI'S MSME SECTOR

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ABSTRACT

The rapid emergence of digital technology has transformed traditional HR functions into technology-driven practices known as Digital Human Resource Management (Digital HRM). In the MSME sector, digital tools such as e-recruitment platforms, HR analytics, performance dashboards, and online training systems are increasingly replacing manual processes. Madurai, one of Tamil Nadu's fastest-growing industrial clusters, is witnessing a gradual shift toward digital workforce management. Despite this trend, limited empirical research has explored how effectively MSMEs in this region adopt digital HRM and how such adoption influences employee productivity. Therefore, this study investigates the extent of digital HRM implementation and its measurable impact on employee performance parameters. The focus is on identifying practical outcomes, adoption challenges, and strategic benefits. MSMEs in Madurai often experience workforce-related issues, including high turnover, skill gaps, delayed recruitment processes, inconsistent training, and lower productivity levels. Digital HRM can potentially address these challenges by offering automation, accuracy, transparency, and real-time decision support. However, factors such as cost, digital literacy, infrastructure constraints, and managerial resistance may influence adoption levels. This study aims to examine how these factors shape Digital HRM usage within MSMEs. The research also evaluates whether adopting digital HR functions leads to employee productivity improvements in terms of time efficiency, task accuracy, employee satisfaction, and overall performance output. The empirical investigation offers insights that are valuable for managers and policymakers.

The study adopts a quantitative approach, collecting primary data from employees and HR managers across selected MSMEs in Madurai. Through statistical techniques such as descriptive analysis, correlation, regression, and Structural Equation Modeling (SEM), the research tests the association between Digital HRM adoption and employee productivity. The findings are expected to highlight the contribution of digital tools to operational efficiency, employee engagement, and workforce management effectiveness. It is anticipated that the results will support greater investment in digital HR structures by MSMEs. Overall, the study contributes to the emerging discourse on digital transformation in HRM and provides actionable recommendations to enhance productivity in small businesses.

Keywords: Digital HRM, MSMEs, Employee Productivity and HR Technology

COMPARATIVE PERFORMANCE ANALYSIS OF MACHINE LEARNING CLASSIFIERS FOR BREAST CANCER PREDICTION

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ABSTRACT

Breast cancer continues to be one of the most common and life-threatening diseases affecting women around the world. Early detection is crucial in improving treatment outcomes, and machine learning has become a powerful tool for supporting this process. In this study, we compare the performance of four widely used machine learning models—Logistic Regression, Support Vector Machine (SVM), K-Nearest Neighbour (KNN), and Random Forests—for predicting breast cancer using features extracted from mammographic images. Gaussian filtering was applied to remove noise, followed by Grey-Level Co-Occurrence Matrix (GLCM) feature extraction to capture meaningful texture patterns. The models were evaluated using accuracy, precision, recall, and F1 score. Results showed that both and SVM achieved the highest accuracy of 98.24%, while KNN and Random Forests also performed strongly with 96% accuracy. These findings highlight that simpler linear models can deliver excellent performance when supported by strong preprocessing and feature extraction techniques. The study reinforces the importance of model choice and preprocessing strategies when building effective diagnostic systems.

Keywords: Breast Cancer Detection; Machine Learning; GLCM Texture Features; Computer-Aided Diagnosis (CAD); and SVM

ISOLATION, IDENTIFICATION AND CHARACTERIZATION OF ACTINOMYCETES FROM VERMICOMPOST AND CHEMICAL FERTILIZER SOILS AND THEIR EFFECTS ON GROWTH AND YIELD OF TOMATO (SOLANUM LYCOPERSICUM)

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ABSTRACT

The present study aimed to isolation, identification and colony characterization the colonies of gram positive, gram negative bacteria and Actinomycetes from vermicompost and chemical soils samples. The samples were analyzed using the spread and pour plate techniques on Actinomycetes Isolation agar and other bacteria isolation agar plates.The mean total a bacterial count of vermicompost soil sample ranged from $4.8X10^{-4}$ colony forming units per gram on Actinomycetes isolation agar medium. The mean total bacterial counts of chemical fertilizer soil samples ranged from $3.8X10^{-6}$ colony forming units per gram on Actinomycetes isolation agar medium. In vermicompost, 7 isolates were observed while 5 isolates were found in chemical fertilizer soil. The isolates were including Azotobacter sp, Bacillus sp, Pseudomonas sp, Rhizobium sp, Gluconobacter, Streptomyces, Flavobacter, Azospirillum and Nitrobacter. Actinomycetes play a crucial role in decomposing organic matter, releasing in a form that plants can readily absorb. Vermicompost promotes soil aggregation, fertility, plant nutrition, and beneficial microbial growth. Chemical fertilizer soil has more effective than vermicompost in promoting tomato plant growth and yield.Its effects are evident through increased plant height and overall development of tomato production. The highest yield was obtained from treatment using chemical fertilizer.

Keywords: Actinomycetes, Isolation agar, Vermicompost and Tomato

IMPACT OF DIGITAL PAYMENT SYSTEMS ON CONSUMER BEHAVIOR IN INDIA: TRENDS, CHALLENGES, AND FUTURE PROSPECTS

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ABSTRACT

The rapid evolution of digital payment systems in India has significantly influenced consumer behavior, reshaping financial transactions and purchasing patterns. With the rise of mobile wallets, UPI, and fintech innovations, consumers have increasingly shifted from cash-based to digital transactions, driven by convenience, security, and government initiatives promoting a cashless economy. This study explores the impact of digital payment systems on consumer behavior, examining key factors such as adoption trends, spending habits, and challenges like cybersecurity risks and digital literacy. By analyzing these aspects, the research provides insights into how digital payment systems are shaping financial decision-making and the broader economic landscape in India.

Keywords: Digital Payment Systems, Consumer Behavior, Cashless Economy, Fintech Innovation, Financial Inclusion.

CHARACTERIZATION, AND GENE SEQUENCING OF GUT BACTERIA OF ANTHROSPHAERA MAGNA AND AULACIBOLUS NEWTONI MILLIPEDE SPECIES.

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ABSTRACT

Rapid urbanisation and industrialization have increased organic waste accumulation, creating significant environmental challenges. Sustainable practices such as organic farming and composting depend greatly on soil macro-invertebrates for organic matter breakdown and nutrient recycling. While earthworms are widely recognised for their long-established role in composting, the contribution of millipedes as key detritivores remains comparatively underexplored. Millipedes actively fragment decaying plant material, thereby enhancing soil fertility and supporting nutrient turnover. This study evaluated the efficiency of millipedes in organic waste conversion by analyzing their gut-associated microorganisms. Two millipede species, Aulacobolus newtoni and Arthrosphaera magna, were introduced into the two different organic wastes, cabbage and leaf litter, collected from the hostel kitchen yard and college campus, respectively, and their gut contents were examined for microbial diversity. Three predominant bacterial strains were isolated and identified through biochemical tests and 16S rRNA gene sequencing as Pseudomonas aeruginosa, Citrobacter freundii and Klebsiella oxytoca. These microbial species exhibited cellulase, chitinase, and amylase activities, indicating their ability to degrade complex plant polymers and contribute significantly to decomposition processes. The findings highlight the potential of millipede-associated gut bacteria in enhancing organic waste bioconversion. Further exploration of these microbes could support applications in bioremediation, sustainable agriculture, and eco-friendly waste management strategies.

Keywords: Millipedes, Macrodetrivorous arthropods, 16S rRNA sequencing, NCBI BLAST, Gut microbiota, Arthrosphaera magna, Aulacobolus newtoni.

CONSUMER ATTITUDE AND BUYING BEHAVIOUR TOWARDS GREEN MARKETING PRACTICES: EVIDENCE FROM KOVILPATTI REGION

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ABSTRACT

Green marketing refers to a type of marketing that focuses on the environmental benefits of a product or service. It is a way of promoting products and services in a way that is environmentally friendly and sustainable. This type of marketing is often used by companies to demonstrate their commitment to the environment and to differentiate their products and services from their competitors. Green marketing can be used to target a specific demographic or to create a positive brand image for a company. It can also be used to promote the use of renewable energy sources, reduce waste, and encourage responsible consumption. In India, green marketing has become increasingly important as the country is facing significant environmental challenges. India is one of the world's most populated countries and the second-largest producer of greenhouse gases. As a result, India is particularly vulnerable to the effects of climate change. Green marketing can help to reduce the environmental impact of businesses and products by promoting sustainable practices. Through green marketing, companies can create products and services that reduce their environmental footprint while also appealing to consumers. This paper main aim and analysis the consumer attitudinal and behavioural in green marketing.

Keywords: Green Marketing, products, Behavior, attitude, Kovilpatti.

A STUDY ON LOGISTICS AND DISTRIBUTION PROBLEMS IN THE FISHERY SUPPLY CHAIN MANAGEMENT OF THOOTHUKUDI DISTRICT

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ABSTRACT

This study explores the logistics and distribution challenges faced by fishermen in the fishery supply chain, especially issues related to transportation delays, limited cold storage, and inadequate infrastructure. Using data from 520 respondents, the research examines whether theselogistics problems significantly affect the timely delivery of fish products. The chi-square analysis shows that there is **no significant link** between logistics issues and delivery timeliness,suggesting that delays may be caused by other factors not captured in this study. Even so, theresponses highlight several practical challenges that could still influence product quality andoverall supply chain efficiency. Based on these insights, the study offers recommendations forpolicymakers, supply chain managers, and fishery stakeholders to strengthen logistics support andimprove coordination within the sector.

Keywords: Fishery Supply Chain, Logistics Challenges, Distribution Problems, Cold Storage, Fishermen

VISIBLE-LIGHT PHOTOCATALYTIC DEGRADATION OF METHYLENE BLUE OVER CeO_2-LOADED ZEOLITE NaX DERIVED FROM COAL FLY ASH

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ABSTRACT

Coal fly ash is produced in large quantities by coal-fired power plants and remains underutilized despite its high aluminosilicate content and potential as a precursor for functional materials. In this study, NaX zeolite was synthesized from coal fly ash and subsequently modified with cerium oxide to obtain a CeO_2/Zeo-NaX composite photocatalyst for visible-light degradation of Methylene blue dye in water. The materials were characterized by FTIR, X-ray diffraction, SEM–EDX, N_2 adsorption–desorption and UV–Vis diffuse reflectance spectroscopy, confirming zeolite formation, CeO_2 incorporation, nanoscale morphology, high surface area and a reduced band gap suitable for visible-light activation. Photocatalytic experiments showed that CeO_2/Zeo-NaX exhibits significantly higher Methylene blue removal than bare Zeo-NaX or CeO_2, achieving more than 90% degradation at optimized conditions of 10 mg L^{-1} dye, 100 mg catalyst and near-neutral pH under visible irradiation for 3 h. The effects of dye concentration, catalyst loading and pH were systematically investigated, and the enhanced activity was attributed to improved light absorption, efficient charge separation and the synergistic interaction between CeO_2 and the zeolite support. The catalyst retained substantial activity on recycling, indicating satisfactory structural stability and reusability for wastewater treatment applications. These findings demonstrate that coal fly ash-derived CeO_2/Zeo-NaX is a promising, low-cost visible-light photocatalyst for dye-contaminated effluents and contributes to the valorization of industrial solid waste.

BIO-INSECTICIDAL POTENTIAL OF ERIGERON FLORIBUNDUS AGAINST MOSQUITO LARVAE FOR SUSTAINABLE VECTOR MANAGEMENT

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ABSTRACT

Introduction: Mosquitoes are vectors of serious human diseases, causing millions of deaths annually. Plant-based natural products with insecticidal properties offer eco-friendly alternatives for vector control.

Objectives: This study evaluated the larvicidal activity of Erigeron floribundus leaf extracts (ethyl acetate, hexane, chloroform, and acetone) against third instar larvae of Aedes aegypti, Anopheles stephensi, and Culex quinquefasciatus.

Results: Bioassays were conducted at concentrations of 50–250 ppm, with mortality recorded after 24 hours to determine LC_{50} and LC_{90} values. For Ae. aegypti, LC_{50} ranged from 92.24 to 121.47 mg/L; for An. stephensi, 94.40 to 106.53 mg/L; and for Cx. quinquefasciatus, 90.82 to 103.71 mg/L. Ethyl acetate extract exhibited the highest larvicidal activity, particularly against Cx. quinquefasciatus.

Conclusion: These findings suggest that Erigeron floribundus holds promise as a botanical larvicide for mosquito control.

Keywords: Erigeron floribundus, Aedes aegypti, Anopheles stephensi and Culex quinquefasciatus, Larvicidal activities.

A COMPARATIVE STUDY OF HEAT MAP CENTRALITY FOR DYNAMIC INFLUENCE DETECTION IN SOCIAL NETWORKS

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ABSTRACT

Heat Map Centrality (HMC) is a new measure for detecting influential nodes within social networks, created to address the flaws in traditional static measures such as Degree, Betweenness, and Closeness, which tend to produce inconsistent rankings and are unable to reflect the dynamic, diffusion-based process of influence through solely depending upon local information or shortest paths. We introduce Heat Map Centrality, a novel metric specifically formulated to simulate the spread of influence throughout a network. We performed a comprehensive comparative analysis on benchmark social network data sets compared to traditional indices of Degree, Closeness, Betweenness, and Eigenvector centrality. We discovered that Heat Map Centrality is able to effectively identify influential nodes that are often overlooked by static measures. In addition, we demonstrate that HMC is better correlated with outcome from model-simulated information diffusion instances, thereby proving its higher applicability in dynamic influence situations. We conclude that Heat Map Centrality integration yields a more comprehensive and robust assessment of nodal importance in social networks.

Keywords: Heat Map Centrality (HMC), Influence Detection, Social Networks, Dynamic Influence, Centrality Measures, Information Diffusion.

ANALYSIS OF HOTSPOT BUSES IN IEEE POWER NETWORKS USING HEATMAP CENTRALITY

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ABSTRACT

The identification of critical nodes, or "hotspots," in power transmission networks is a fundamental requirement for assessing grid vulnerability and preventing cascading failures. Traditional centrality measures, such as Betweenness Centrality, effectively identify bridge nodes but can be computationally intensive for large-scale networks. Conversely, local measures like Degree Centrality often fail to capture global topological influence. This paper investigates the applicability of **Heatmap Centrality (HMC)**—a measure originally proposed for scale-free networks—to the domain of electrical power systems. We analyze the topological vulnerability of three standard benchmark systems: the **IEEE 14-bus, IEEE 57-bus, and IEEE 118-bus networks**. By calculating the difference between a bus's farness and the average farness of its neighbors, HMC identifies local sinks and super-spreader nodes. We benchmark the performance of HMC against four established metrics: Degree, Eigenvec tor, Closeness, and Betweenness Centrality. Our results demonstrate that Heatmap Centrality strongly correlates with Betweenness Centrality, successfully identifying critical bridge nodes that control power flow without requiring the explicit calculation of all shortest path pairs. This study confirms that HMC is a robust and efficient tool for vulnerability analysis in power transmission topologies.

BO-CONTEXTSENSE: A COMPACT CONTEXT-DRIVEN TRANSFORMER FRAMEWORK FOR EARLY RECOGNITION OF BUFFER OVERFLOW FAULTS

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ABSTRACT

Buffer overflow errors continue to pose a serious challenge in software security because they can corrupt memory, interrupt program execution, and open pathways for exploitation. Although modern analysis techniques have advanced, many learning-based approaches still depend on large transformer models that consume significant resources, or they overlook deeper contextual cues within source code. This makes the early discovery of overflow-related faults difficult, especially in lightweight development settings.

To overcome these limitations, this study presents **BO-ContextSense**, a compact deep-learning model designed to capture both structural and semantic signals in code. The framework merges three main components: a **Contextual Representation Module**, a **Semantic Flow Vector Generator (SFVG)** for modeling internal code relationships, and a **streamlined Transformer Encoder** that uses reduced-overhead attention and efficient positional modeling. Together, these modules produce rich contextual vectors and highlight subtle linguistic and logical patterns associated with overflow-prone code regions.

Evaluation on standard vulnerability datasets shows that BO-ContextSense achieves higher accuracy, better F1-scores, and faster inference than traditional machine-learning models and larger transformer architectures. The framework performs reliably across different projects and supports early-stage detection, making it suitable for integration into CI pipelines, automated code review tools, and practical software-security workflows.

Keywords: Buffer Overflow Detection; BO-ContextSense; Contextual Representation; Semantic Flow Vector Generator; Static Examination; F1-scores; CI pipelines integration.

HYBRID DEEP LEARNING OPTIMIZATION ENHANCE SECURITY AGAINST BOTNET ATTACKS

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ABSTRACT

The Internet of Things (IoT) is a new technology that enables items to communicate data across wireless networks or the internet efficiently. However, as the IoT ecosystem evolves, IoT systems become more vulnerable to cyber threats, which might lead to harmful incursions. The effects of such invasions might be both material and financial in nature. To detect IoT assaults, discover new forms of infiltration, deep learning (DL), and get access to a more secure network in different models is a strong tool. The usage of IoT and the nature of its data, which causes a spike in assaults, highlight the necessity to design an intrusion detection system to identify and categorize attacks in a timely and computerized way. Malicious assaults are always evolving, which opens the door to new threats. Internet security issues have grown in proportion to the exponential growth of internet use. Botnets pose a significant risk to network safety. A network of computers known as a Botnet is managed through the single Bot master via Command and Control (C&C) channel. Several methods for keeping tabs on the discovery of botnets have been presented in recent years. The effectiveness of learning-based solutions is assessed using a variety of assaults, such as user-to-root, denial-of-service, probing, remote-to-local, botnet damage, man-in-the-middle attacks, distributed denial-of-service, and spoofing. We describe and evaluate machine learning (ML) and deep learning (DL) approaches for detecting cyber assaults in IoT networks, two learning-based methodologies. Network traffic analysis to detect abnormalities and intrusions by differentiating between benign and malicious activities.

Keywords: Deep learning (DL), Attacks, intrusion detection, machine learning (ML),and Internet of Things (IoT)

A STUDY ON ACADEMIC STRESS AND ITS IMPACT ON SLEEPING HOURS OF ARTS AND SCIENCE COLLEGE STUDENTS

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ABSTRACT

The purpose of the study is to examine the sleeping hours of the students and to know its impact on academic performance. A total of 200 students were involved in this study who were in the age group of 18-23 years. The parameters used for the study including measuring sleeping hours, stress level, Academic Performance study skills and Cumulative Grade Point Average [CGPA]. Close ended Questionnaire were designed for the study. The questionnaires are divided in to three parts (a) general, (b) stress scale (c) Learning skill. Whereasthe sleeping hours of the students are divided in to four categories (a)short sleepers, (b) fewer sleepers (c) average sleepers and (d) long sleepers. The study revealed nearly lower than 65% of students are short sleepers who were sleeping less than or equal to 5 to 6 hours and 5% of students are average sleepers who were sleeping 6 to 8 hours. The results were analyzed using SPSS version descriptive statistics were used to examine the sleeping hours stress level, Academic Performance of the students. Mann-Whitney Test were used to compare CGPA with gender.

Keywords: Sleeping hours, Stress level, Learning skill, Academic Performance.

IMPLEMENTATION OF SMART MANUFACTURING IN SME

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ABSTRACT

In recent times, smart Industry technology is emerging as the main research issues to increase the productivity and efficiency, where the smart machines collaborate with each other and with users and customers. Smart industry requires the use of Information & Communication Technology(ICT) convergence for production resources as well as four zero factors, including Zero Waiting- time /Inventory / Defect / Down-time. Smart manufacturing is the backbone of intelligent manufacturing with the involvement of process automation and automated machine tools. Whereas data intelligence is related to data acquisition, storage and analysis for smart decision making. It is possible with the integration of the latest IoT gadgets, cloud computing and various ERP packages.The selection varies as per the diversified requirements of the manufacturing units. Quality consultancy is required for the selection of tools and techniques in order to excel the business performance. It is followed by the critical phase of deployment with the requirement of high-level expertise. This paper proposes a framework for the implementation of smart manufacturing in SME. This framework will be the guiding tool for those SME's who wants to apply smart manufacturing to their units.

Keywords: Smart Manufacturing (SM), Internet of Things (IoT), Enterprise Resource Planning (ERP), Data Intelligence (DI)

UNFOLDING THE COLLECTIVE DYNAMICS OF DIGITAL FINANCIAL SERVICES USE IN RURAL INDIA

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ABSTRACT

Research on digital financial services (DFS) typically foregrounds individual adoption and usage intensity. In underserved communities, however, financial tasks are relational, where people learn and perform DFS familial and non-familial ties. The research fieldwork for this study focuses on rural areas in the state of Uttar Pradesh (UP), India. Data collection using ethnographic techniques is conducted in seven villages within two districts of the UP state. The sample comprises 36 interviews, serving as the dataset for the thematic analysis. The mapping of core themes with extant theories unveils a conceptual DFS use continuum, symbolising two interrelated poles: the personal use of DFS and the collective use of DFS. Theoretical insights suggest that DFS can facilitate the development of a collaborative support system by involving active DFS users in the closely knit fabric of social networks. This study has practical implications, particularly for banking institutions, in understanding the social capital dynamics, identifying active DFS users within communities across their operational zones, and offering them specialised training programmes to strengthen the DFS ecosystem.

KEYLOGGER DETECTION AND PREVENTION: A COMPREHENSIVE REVIEW OF MACHINE LEARNING AND BEHAVIORAL ANALYSIS APPROACHES

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ABSTRACT

Keylogger malware is one of the most widespread and insidious software in modern cybersecurity that has the potential to interfere with sensitive user credentials and personal information by tracking typing activity. In this in- depth review, the author sums up the results of ten recent works (2005-2025) with a focus on detecting and preventing keyloggers. It can be seen that there is highly an emphasis on the use of behavioral analysis and machine learning which includes approaches varying within the boundaries of common signature-based detection to far more sophisticated neural networks and ensemble methods. The main results show that XGBoost performs better than RF (98 percent accuracy using only the selected features), and behavioral analysis is the most fundamental approach to all prevention mechanisms. The present review finds major research obstacles such as the lack of research on multi-application cooperative attacks, little testing on hardware-based keyloggers, and the possibility of real-time keylogger detection schemes. The synthesis offers a background on the technological development, the mode pattern of technological advancements, and the prospects of the keylogger cybersecurity studies.

Keywords: Keylogger, Malware Detection, Machine Learning, Cybersecurity, Behavioral Analysis, Keystroke Dynamics.

ENHANCEMENT OF INTERNET CONNECTIVITY IN RAILWAY SYSTEMS: A COMPREHENSIVE ANALYSIS BASED ON FRMCS STANDARDS AND 5G IMPLEMENTATION

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ABSTRACT

The Future Railway Mobile Communication System (FRMCS) is a groundbreaking innovation in the field of railway telecommunication that will replace the old GSM-R networks with new 5G-based networks. In this paper, the authors provide the detailed analysis of the internet connectivity enhancement strategy in the railway setting with special focus on FRMCS implementation and standardization frameworks. We look at the technical characteristics, architecture, and performance of FRMCS as stipulated by the International Union of Railways (UIC) and the European Telecommunications Standards Institute (ETSI). Our study considers multi-band spectrum usage (450 MHz to 90 GHz), network slicing, and ultra-reliable low-latency communication (URLLC) of mission-critical railway functions. Based on a systematic study of pilot implementations in European and Asian networks, we show that FRMCS-compatible systems can provide 99.9999% network availability at data rates of more than 1 Gbps to support smooth passenger connectivity and autonomous train operations. The work is very informative on the migration strategies GSM-R to FRMCS as well as the cost-benefit analysis of the process and multi-vendor environment interoperability issues.

Keywords: FRMCS, 5G networks, railway communications, GSM-R migration, network slicing, URLLC, railway digitalization, connectivity enhancement.

MEMORY MANAGEMENT TECHNIQUES: A COMPREHENSIVE RESEARCH REVIEW

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ABSTRACT

Memory management is an important concern of a myriad of computing paradigms, such asAndroid applications, high-performance computing clusters and virtualized clouds. This review summarizes the results of the eight reviewed peer-reviewed articles on memory optimization publishedthroughout 2015-2020 in the segments of Android platforms, virtual machines, embedded systems, and network operating systems. We find convergence on aspects of dynamic memory allocation, ballooning in virtualization, and a trend toward the use of cache as a means of substituting traditional means of database storage. The results have revealed that the efforts towards platform-specific optimisations are already well underway, yet crucial research needs to be established in cross-platform memory management, real-time optimisation algorithms and power-efficient memory solutions relating to IoT applications. The review presents uncompromising drawbacks to current methods, and recommends the way forward with regard to the next-generation memory management systems.

Keywords: Memory management, virtualization, Android optimization, dynamic allocation, ballooning techniques, embedded systems, HPC, cloud computing.

SMART CURRICULUM DESIGN: A MACHINE LEARNING FRAMEWORK FOR COMPUTER SCIENCE EDUCATION REFORM

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ABSTRACT

The fast-changing landscape of Artificial Intelligence (AI), Machine Learning (ML), and digital technologies is reshaping what computer science graduates need to succeed. However, most university curricula remain static and often struggle to keep pace with these shifts, leaving noticeable gaps between academic training and industry expectations. This study introduces a smart, data-driven approach to redesigning the computer science curriculum using data mining and machine learning techniques and examines student records from Central Indian universities from 2019 to 2024, focusing on the relationship between courses and student performance, and graduation time. We found important patterns, like which skills are becoming more important and where the current curriculum is lacking, by using clustering, classification, and predictive modeling. To confirm these findings, we conducted simulations and experimental studies, demonstrating that the revised curriculum can enhance academic performance and better prepare graduates for employment.

This study shows how evidence-based educational reform can be guided by intelligent computing. Higher education institutions can create more adaptable, industry-ready, and future-ready curricula by incorporating AI and ML into the curriculum design process. In addition to providing useful insights for academic leaders and policymakers, this research advances the trend toward smarter, adaptive educational systems.

Keywords: Data mining, machine learning, smart education, computer science, intelligent computing, and curriculum redesign

SIGNSPEAK: A SIGN LANGUAGE TRANSLATION SOFTWARE FOR ARABIC SIGN LANGUAGE

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ABSTRACT

SignSpeak is a sign language translation software developed in Kuwait to enhance communication between Arabic Sign Language (ArSL) users and individuals who do not understand sign language. The project targets the communication barriers faced by deaf and mute communities by providing a real-time system that converts hand gestures into both text and speech. Leveraging computer vision and machine learning, SignSpeak accurately detects and translates hand gestures, promoting inclusivity and accessibility. Tailored for Kuwait's linguistic and cultural context, SignSpeak provides a practical and localized solution for inclusive communication. Developed in Python and optimized for camera-enabled devices, the software aims to support educational, social, and professional engagement for Arabic Sign Language users across the country. The software is designed not only for individuals with hearing or speech impairments but also for non-sign language users, including family members, educators, medical staff, and service providers, which enables effective communication without the need for an interpreter. A built-in recording feature allows users to save translated interactions for review or learning. Future updates will include video-based modules to support Arabic Sign Language education through a structured curriculum, starting from the basic alphabet to the more advanced words and sentences. The educational system will teach the user (ArSL) from the ground up to fluency, evaluate the user's performance of the signs, and give feedback.

4-DIMENSIONAL FUZZY STOCHASTIC MULTI-OBJECTIVE TRANSPORTATION PROBLEM AND ITS SOLUTION BY RANDOM LOOP-BASED NON-DOMINATED SORTING EVOLUTIONARY ALGORITHM

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ABSTRACT

This paper proposes a 4-Dimensional Fuzzy Stochastic Multi-objective Transportation Problem (4DFSMOTP) and Its Solutions by developed Random Loop-based Non-dominated Sorting Evolutionary Algorithm (RLNSEA). The main goal of this paper is to solve fuzzy stochastic multi-objective transportation problems, which provide the Pareto-optimal front in the shortest period of time in a fuzzy stochastic environment, which is used to transport goods from different sources to various destinations. The RLNSEA, uses concepts of random loop, non-domination and crowding distance to improve efficiency in afuzzy stochastic environment. This paper includes a Numerical Illustration for the transportation of transporting costs and late transportation time. The comparison of Non-dominated sorting genetic algorithm II and Non-dominated sorting genetic algorithm III shows that RLNSEA gives superior performance by providing precise Pareto-optimal solutions in a shorter amount of time.

GREEN COMPUTING: TOWARD AN ENERGY-EFFICIENT DIGITAL FUTURE

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ABSTRACT

Green computing has become an essential strategy to reduce the environmental consequences of our digital infrastructures, most notably with respect to cloud computing, data centers, as well as end-user devices. This provides a thorough Insight into current strategies designed to improve energy efficiency and reduce carbon footprints in these areas. Three important areas of focus are: cooling and infrastructure approaches, carbon-aware workload scheduling, and green software development. In the first part, we analyze and compare different cooling techniques, including air, liquid, and immersion cooling, while considering the associated energy consumption, cost, and water use. The second part looks at the promising area of dynamic scheduling approaches that match machine learning workloads to low-carbon intensity time periods, considering whether cloud, hybrid edge, or on-premises approaches are the most beneficial. Finally, the role of green software approaches is reviewed, especially the implications of careful coding, lightweight applications, and serverless systems in reducing the lifecycle carbon footprint of digital services. This provides a guide for meaningful action by those wishing to support a sustainable digital future by synthesizing a diverse range of literature and industry reports. The results call for strategies that directly link improving hardware efficiency with smart scheduling and efficiency on the software side, as the path to a serious benefit to the environment.

BRIDGING QUANTUM PHYSICS AND AI: A HYBRID FRAMEWORK FOR SCALABLE SIMULATION & TOMOGRAPHY

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ABSTRACT

The past few years have witnessed a remarkable convergence between artificial intelligence and quantum/computational physics, reshaping how complex physical systems are explored and optimized. Classical machine learning approaches are now being employed to reconstruct quantum states, accelerate many-body simulations, and enhance noise suppression in real experiments. Parallel to this, hybrid quantum-classical learning architectures and quantum machine learning algorithms are emerging as potential routes toward data-efficient and hardware-adaptive computation. This paper synthesizes the major advances reported between 2021 and 2025, highlighting the strengths of symmetry-guided, physics-constrained learning strategies. Building upon these insights, we introduce a novel research framework termed Physics-Aware Hybrid Intelligence (PAHI)—a unified approach that integrates physical symmetries, neural architectures, and quantum circuit modules to deliver verifiable and scalable results. The study also discusses ongoing challenges such as reproducibility, error correction, and resource scalability, proposing a roadmap to transform AI-enhanced quantum computation into a reliable tool for scientific discovery.

Keywords: Quantum Machine Learning, Physics-Aware AI, Computational Physics, Hybrid Quantum-Classical Models, Quantum Simulation, Noise Mitigation.

EXPLORING ISSUES AND CHALLENGES IN ADOPTION OF E-GOVERNMENT SERVICES: A CASE STUDY OF DIGILOCKER

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ABSTRACT

DigiLocker, a free document storage and sharing cloud-based platform, is an e-governance project of the Indian government under its Digital India initiative. Though the government has been working to make this initiative successful, a considerable portion of the population is unaware of the service. The few who are aware of this initiative and registered, are not making effective use of making society paperless.
This paper attempts to identify the issues and challenges that affect the adoption and use of these services. The proposed framework of the study is based on the theoretical underpinning of the Technology Adoption Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Unified Model of Electronic Government Adoption (UMEGA). The study analysed the data using PLS-SEM, including the moderation impact of select variables.
The study identifies various factors that act as motivators and deterrents in adopting and using DigiLocker and provides strong empirical support to frame suitable strategic interventions to sensitize people to improve further usage and adoption.

Keywords: DigiLocker, Adoption, TAM, Intention.

INTERRELATIONS OF TECHNOLOGICAL ADVANCEMENT, SOCIAL ENVIRONMENT, AND MENTAL HEALTH IN SMART CITIES

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ABSTRACT

In the modern era, the concept of "Smart Cities" goes far beyond physical infrastructure and technological innovation, it represents a transformative shift in how individuals interact, communicate, and experience well-being in an increasingly digitized society. Rapid technological progress through artificial intelligence, digital communication systems, smart healthcare, and data-driven urban governance has undoubtedly enhanced convenience and efficiency. However, it has also introduced new challenges that affect social cohesion, interpersonal relationships, and mental health dynamics within urban populations.

This research aims to explore and analyse the complex interrelationships between technological advancement, social environment, and mental health in smart cities. The study seeks to understand how digital technologies influence everyday life, family interactions, social connectedness, and psychological balance. It will also examine whether the proliferation of technological tools contributes to mental health disparities, loneliness, or digital fatigue or whether it creates new pathways for empowerment, resilience, and community participation.

A mixed-method approach (qualitative and quantitative) will be adopted, involving surveys, interviews, and observational data to ensure a comprehensive understanding of these dimensions. The findings of this study are expected to offer valuable insights for policymakers, urban planners, and mental health professionals in shaping inclusive and psychologically sustainable smart city frameworks.

ANALYSIS OF PARALLEL ALGORITHMS FOR THE GENERATION OF PRIMITIVE POLYNOMIALS FOR LINEAR FEEDBACK SHIFT REGISTERS BASED ENCRYPTION

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ABSTRACT

The application of linear feedback shift registers in encryption continues to interest research community. Linear feedback shift registers are easily implementable in hardware and software and to generate higher-order algorithms requires understanding of primitive polynomials in Galois field modulus two (2). This paper presents the construction of higher-degree primitive polynomials and ultimately higher-order linear feedback shift registers using parallel algorithms on commodity systems. Benchmark results for a variety of algorithms for primitive polynomials show that synthetic algorithms that cumulate from cyclotomic sets are computationally superior.

A STUDY ON ASSESSMENT OF LEVEL OF SATISFACTION AMONG BENEFICIARIES GETTING TELECONSULTATION OPD SERVICES IN HEALTH AND WELLNESS CENTRE IN GURUGRAM DISTRICT, HARYANA

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ABSTRACT

Background: Telemedicine has become a vital tool in improving healthcare access, especially in developing countries like India where disparities persist. The Government of India's e-Sanjeevani platform has revolutionized teleconsultation by connecting patients with healthcare providers remotely. Evaluating user satisfaction is essential to enhance service quality and accessibility.

Objectives: To assess the utilization and satisfaction levels of beneficiaries availing e-Sanjeevani teleconsultation services in selected Health and Wellness Centres (HWCs) of Gurugram District, Haryana, and to identify factors influencing satisfaction

Methodology: A descriptive cross-sectional study was conducted among 100 beneficiaries selected through multistage random sampling from two Sub-Centre HWCs (Sarhaul and Wazirabad) and two Primary Health Centres (PHC Gurugram and PHC Wazirabad). Data were collected through semi-structured interviews and a five-point Likert scale and analyzed using MS Excel and SPSS. Ethical approval was obtained from the Institutional Review Board of NIHFW, New Delhi.

Results: Most users (25%) were aged 21–30 years. Accessibility and affordability ("nearby location" and "free drugs") were key reasons for selecting facilities (43% each). Fever (31%) and cold (21%) were the most common ailments. While 94% communicated effectively with doctors, 64% reported connectivity issues. Satisfaction was significantly associated with specialist availability ($p = 0.003$) and type of facility ($p = 0.009$).

Conclusion: The study found high satisfaction among e-Sanjeevani users, particularly regarding doctor interaction and medicine availability. However, technical and specialist-related gaps remain. Strengthening infrastructure, improving connectivity, and expanding specialist access can enhance the efficiency and sustainability of telemedicine in primary healthcare.

Keywords: Telemedicine, e-Sanjeevani, Patient Satisfaction, Teleconsultation, Primary Health Care, Haryana.

SMART CITY TRAJECTORIES IN RUSSIA: DIGITAL TRANSFORMATION AND URBAN GOVERNANCE IN THE 2020S

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ABSTRACT

The 2020s have witnessed a profound acceleration of smart city programs across Russia, reflecting the country's ambition to digitalize urban governance, enhance sustainability, and improve citizen well-being. This paper offers an in-depth assessment of Russia's smart city trajectories, examining how digital technologies, policy frameworks, and public-private collaboration are transforming the urban landscape. Drawing upon the national "Smart City" initiative, piloted in 94 municipalities across 49 regions, the analysis tracks the integration of Internet of Things (IoT), big data analytics, and artificial intelligence into public services, urban infrastructure, and environmental monitoring.Community participation is expanding with widespread adoption of city apps and e-services, while intelligent transport, green zones, and data-driven public safety mechanisms yield measurable enhancements in urban quality of life.

Despite progress, the paper identifies challenges including resource imbalances, regional disparities, and the need for deep institutional reform. Moscow and Kazan are showcased as leaders—deploying advanced platforms for mobility, healthcare, and participatory governance—but insights from pilot projects in secondary cities reveal the critical importance of tailored strategies that address local infrastructure and digital literacy. Finally, the study explores future prospects for Russia's smart cities, emphasizing adaptive policymaking, investment in scalable technologies, and the cultivation of international partnerships to foster knowledge exchange and urban innovation. By analyzing these multidimensional trends, the paper contributes to a nuanced understanding of Russia's evolving digital urban agenda.

A STUDY TO ASSESS THE SKILLS OF MID-LEVEL HEALTH CARE PROVIDERS (MLHPS)/COMMUNITY HEALTH OFFICERS (CHOS) IN DELIVERING PRIMARY HEALTH CARE SERVICES IN SELECTED DISTRICTS OF ANDHRA PRADESH AND HARYANA

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ABSTRACT

Background: To achieve Universal Health Coverage and the Sustainable Development Goals (SDGs), the Government of India introduced a new cadre of Community Health Officers (CHOs)/Mid-Level Health Providers (MLHPs) under the Ayushman Bharat initiative. These frontline health professionals deliver comprehensive primary health care (CPHC) services at Ayushman Arogya Mandirs (formerly Health and Wellness Centres).

Methods: A descriptive cross-sectional study was conducted among 366 CHOs—225 from Andhra Pradesh and 141 from Haryana—selected through multistage random sampling. Core clinical competencies were evaluated using an Objective Structured Clinical Examination (OSCE) and categorized as inadequate (≤50%), moderately adequate (50–75%), or adequate (>75%).

Results:Among participants, 79.2% were female and 61% aged 21–30 years; 68.8% held a B.Sc. Nursing qualification. More MLHPs in Haryana (68%) had over one year of experience compared to Andhra Pradesh (36%). Most demonstrated adequate skills in blood pressure measurement (88%) and urine testing (71%). Blood sugar assessment using a glucometer was accurately performed by 74% in Andhra Pradesh and 96% in Haryana. However, neonatal resuscitation skills were inadequate in 63% of MLHPs from Haryana and 20% from Andhra Pradesh. Only 22% could correctly plot a partograph, with 69% scoring below 50%. Geriatric assessment skills were adequate in 51% overall. Overall performance showed MLHPs in Andhra Pradesh performed better than those in Haryana.

Conclusion: Except for basic procedures such as blood pressure measurement, urine testing, and glucose monitoring, MLHPs exhibited significant skill gaps in neonatal resuscitation, partograph plotting, geriatric assessment, and cancer screening. Targeted continuing education and skill enhancement programs are essential to strengthen MLHPs competencies and improve the quality of primary health care services.

KNOWLEDGE GRAPH DRIVEN LINK PREDICTION FOR AYURVEDIC DRUG DEVELOPMENT

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ABSTRACT

Ayurveda research explores plant-based therapies that are considered safer alternatives to modern synthetic drugs, which may cause adverse effects. However, validating these herbal compounds through laboratory studies demands significant time, infras- tructure, and cost. To address this, we constructed a knowledge graph that integrates key Ayurvedic herbs and their phytochemicals—extracted inspired by recent research via NLP-assisted literature mining and mapped them to protein targets using curated resources such as IMPPAT and STRING.

Standard identifiers like KEGG and UniProt were used to unify biological entities. We leveraged Graph Neural Networks (GCN, GraphSAGE, and GAT) and centrality based heuristics to capture topological patterns and predict missing herb–protein associations using both global link prediction and localized one-hop subgraph classification. The best model demonstrated strong predictive capability (accuracy: 0.8680, precision: 0.9409, recall: 0.9409, ROC AUC: 0.9985), illustrating the potential of graph-based AI for accelerating Ayurveda focused drug discovery.

ANTIMICROBIAL AND WOUND–HEALING POTENTIAL OF IPOMOEA OBSCURA: A PHYTOCHEMICAL AND BIOACTIVITY STUDY

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ABSTRACT

Ipomoea obscura (obscure morning glory) is a medicinal herb traditionally used for treating infections and wound-related disorders. This study investigated the phytochemical composition and antimicrobial properties of extracts to validate the ethnomedicinal claims. Leaves, Stems, and Seeds were dried, powdered, and extracted using aqueous and ethanolic solvents. Phytochemical screening revealed the presence of alkaloids, tannins, phenolic compounds, cardiac glycosides, steroids, terpenoids, carbohydrates, and proteins, while anthraquinones and flavonoids were absent. Antimicrobial activity was tested by agar disc diffusion against Escherichia coli, Salmonella typhi, Klebsiella pneumoniae, and Enterobacter sp. Staphylococcus aureus and Proteus mirabilis. The extracts showed concentration-dependent antibacterial effects, with sensitive zones ranging from 0.5 to 1.7 cm, with K. pneumoniae being the most sensitive and S. typhi showing moderate sensitivity. Additional assays, including TLC, MTT, and Wound healing studies, confirmed the bioactivity and therapeutic potential of this plant. The results validate the traditional use of I. obscura as a natural antimicrobial agent. We suggest that this compound potential role in developing plant-based therapies. Further research is recommended to isolate active compounds and evaluate their clinical applications.

Keywords: Ipomoea obscura, Ethanol and Methanol Extract, Anti- microbial activity, TLC, MTT assay.

QUALITY OF SERVICE THAT AFFECTS THE SATISFACTION OF USING THE SERVICES OF THE DIGITAL COMMUNITY CENTER

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ABSTRACT

The study on service quality that affects service satisfaction, community digital center aims to study 1) to study service quality, 2) to study service satisfaction, community digital center 3) to compare service satisfaction, classified by personal information 4) To study the quality of service that affects service satisfaction, the Digital Community Center selected 30 samples as research tools using data analysis statistics: percentage, average, t-test, F-test (One-Way ANOVA), and Multiple Regression Analysis. The study found that the majority of respondents were female, under 20 years of age, career, student, undergraduate, and monthly average income below 20. 001 baht status, single status, service quality, concrete quality, reliability, responsiveness to subscribers, confidence to subscribers, awareness and understanding of subscribers. Overall, the average was very significant. The overall satisfaction level of the digital community center was very satisfactory. The results of the presumptive testing of the personal database, gender, occupation, education level, average monthly income and status difference had a statistically significant difference in satisfaction with the use of the digital community center at 0. 05 Quality of service in response to subscribers has a statistically significant influence on the satisfaction of services provided by the Digital Community Center at the level. 05
Recommendations from the results of the study, executives of Digital Community Centers should focus on developing digital community centers, providing computers, high-speed Internet access, providing service providers with secure, on-time services, convenient and easy-to-access communication channels. Communicate with subscribers in easy-to-understand, simple, clear language, and provide them with a gentle, humble and attentive manner.

Keywords: Service Quality; Customer Satisfaction; Digital Community Center

1. INTRODUCTION

Digital Community Centers: While the concept of a smart city aims to develop cities that are compatible with technology for sustainable urban communities and encourage private investment from both domestic and international sources, Digital Community Centers represent a contrasting need. (Tanasic, & Casaretto, 2017) These centers prioritize quality service that improves customer satisfaction, provides access to knowledge via the Internet for people in remote areas, and fosters online employment. (Vukmir, 2006) Despite widespread Internet access in Thailand for over a decade, following the official launch of 3G in 2008, and with Internet coverage reaching 99% across the country (3G, 4G, and 5G), 1% of the population still lacks Internet access. Improving the quality of life and reducing inequality through access to modern technology and knowledge via the Internet remains a crucial mission for agencies within the Ministry of Digital Economy and Society (DES). Therefore, developing strategies to bridge these two demographics is essential for creating effective Digital Community Centers. (Ezhilarasan, &

Dinakaran, 2017) These centers provide communities with access to computers and the Internet to improve their quality of life. (Aggarwal, Et al 2020) Most of these centers were located in easily accessible locations, such as temples, mosques, village offices, cooperatives, local administrative organizations, schools, libraries, and military camps, to ensure equitable access to public service es for all. (Nussbaum, M., & Sen, 1993) In 2016, the National Digital Economy and Society Commission (NDESC) was established to draft national policies and plans for the digital economy and society's development. (Bakumenko, & Minina, 2020) This led to a shift in the role of Community ICT Learning Centers to Community Digital Centers, primarily focusing on areas lacking Internet access. From the perspective of the NDESC, an agency under the Ministry of Digital Economy and Society, Community Digital Centers are integrated community service centers that collaborate with central and local government agencies. They offer comprehensive services to the public, serving as service points, providing equipment for those without Internet access, and facilitating access to government services. Furthermore, they provide business and vocational training through online community systems and community spaces to support economic and social activities.

The project focuses on services in education, agriculture, healthcare, trade, tourism, and social rights and welfare, in line with Strategic Goal 3: Creating an inclusive and equitable quality society through digital technology. (Torres, & Momsen, 2011) Currently, the Community Digital Center project consists of two main parts: Part 1: The project to upgrade Community ICT Learning Centers to Community Digital Centers, running from 2021 to 2024, funded by the national budget. It has already served 500 centers across all 77 provinces, with facilities installed in educational institutions, local administrative organizations and religious institutions. For the existing Community ICT Learning Centers, (Sompong, & Rampai, 2015) 250 centers now have assigned caretakers, replacing the previous system in which local volunteers provided support. Funding has been requested for the remaining 250 centers without caregivers. The advantages of having dedicated caretakers include scheduling access for local residents, providing basic guidance and support, and organizing group activities to promote Internet access within the area. (Secretary-General of the National Digital Economy and Society Commission) Part 2: The project to develop a sustainable Community Digital Center ecosystem. Under the 5th Strategic Action Plan of the 2nd Universal Service for Telecommunications and Social Services Plan (2017-2021), funding is sourced from the Broadcasting, Television, and Telecommunications Research and Development Fund for Public Benefit (BTTRDF), (Ulrich, & Lehrmann, 2008).with a total budget of 5,530 million baht, covering the period 2023-2027. It comprises two key activities: establishing 1,722 community digital centers, leasing equipment, and employing personnel in these centers, covering all 77 provinces. The sizes of the centers and equipment required for their operation were categorized accordingly. According to the number of people's needs in the area, which is divided into three types: (1) Centers established in schools or educational institutions, 1,066 locations, All-in-One computers for processing work, 12 units per location; (2) Centers established in schools under the Ministry of Education, 500 locations, divided into large schools, 77 locations, All-in-One computers for processing work, 31 units per location, and small schools, 423 locations, All-in-One computers for processing work, 12 units per location; (3) Centers established in schools under the Border Patrol Police, 156 locations, divided into large Border Patrol Police schools, 5 locations, All-in-One computers for processing work, 31 units per location, and small Border Patrol Police schools, 151 locations, All-in-One computers for processing work, 12 units per location.

To establish 1,722 new community digital centers, we selected school locations to ensure continuous use. The first group to access the Internet will be students, and schools will be required to share their spaces with the community when they are not using them. Equipment installation includes additional features for online sales. Local residents can use cameras to record short videos and computers to edit them. The

Secretary-General of the Community Digital Center also received an award in the Ethical Dimensions of the Information Society category.

2. RESEARCH OBJECTIVES:

1. To study the quality of services provided by community digital centers.
2. To study user satisfaction with the services of community digital centers.

3. METHODOLOGY

This study was conducted using the following step-by-step methodology: Research Design: Quantitative research design. Population and Sample: The population consisted of users of the community digital center. The sample consisted of users of the community digital center. The sample size calculation was based on Taro Yamane's (1967:56) method, using a 95% confidence level, resulting in 32 individuals. The formula used was n = N / (1 + Ne2). n = Sample size N = Population size used in the study e = Acceptable error (set at 0.05) Substituting the values: n = 32 / (1 + 32 (0.052)) n = 29.6 The calculation yielded a sample size of 29.6 individuals. However, owing to the small population size, the researcher used a sample size of 30 individuals.

Research Results

Presenting the analysis results on the impact of service quality on customer satisfaction with the community digital center's service quality.

Quality Service	B	Std. Error	Beta	t	Sig.	Test
(Constant)	-.218	.288		-.759	.455	
tangible aspects of the service.	069.	134.	072.	518.	*609.*	no
reliability and trustworthiness	152.	195.	166.	.781	**442.	no
responsiveness to customers.	355.	166.	313.	2.142	043.**	yes
Building trust with customers.	246.	264.	244.	.935	**359.	no
understanding the customers.	202.	.157	.216	1.286	211.**	no

*Statistically significant at the 0.01 level. This indicates that service quality affects service satisfaction. The study found that the tangible aspects of service quality, reliability, responsiveness to users, user confidence, and customer understanding significantly influenced service satisfaction at the .01 level.

4. DISCUSSION

From the research results, the findings can be discussed as follows: The quality of service that affects satisfaction with the use of community digital centers can be summarized in two parts from the data analysis: 1) General information, categorized by personal information, shows that the majority of the respondents are female, under 20 years old, students, with an education level below a bachelor's degree, an average monthly income below 20,001 baht, and single. 2) The overall quality of service has an average score at a high level of importance. When considering each aspect, all aspects are at a high level of importance, ranking from highest to lowest as follows: tangibility of service, reliability and trustworthiness, responsiveness to users, instilling confidence in users, and knowing and understanding users. The study found that the quality of service at community digital centers in terms of responsiveness to users, instilling confidence in users, knowing and understanding users, tangibility of service, and reliability and trustworthiness was generally high. The quality of service at the Don Wai Municipal Waterworks is also generally at a high level, and the quality of service at the Bo Yai Sub-district Health

Promotion Hospital, Borabue District, Maha Sarakham Province, is also generally at a high level of public opinion. The study found that the overall quality of service provided by the Kaen Fang Subdistrict Municipality, Ban Fang District, Khon Kaen Province, was high in all aspects. Regarding satisfaction with the community digital center's services, the study revealed that equitable, timely, sufficient, continuous, and progressive services were all at a high level of satisfaction. In Khon Kaen Province, the overall satisfaction with the services of the Kaen Fang Subdistrict Municipality, Ban Fang District, Khon Kaen Province was found to be high. Comparing satisfaction with the quality of community digital center services categorized by personal information, the study found that differences in educational level and occupation did not result in significant differences in satisfaction with the services of the Don Sai Subdistrict Municipality. Quality of service influences satisfaction with the use of community digital center services. Responsiveness to users significantly influenced satisfaction with the community digital center's services at the .05 statistical significance level. The study found that the quality of service in terms of user responsiveness significantly impacts satisfaction with the services at the .05 statistical significance level.

5. SUMMARY AND RECOMMENDATIONS

This research concludes that the quality of service affecting user satisfaction with community digital centers can be summarized in two parts: 1) General information, categorized by personal data, shows that the majority of users are female, under 20 years old, students, with an education level below a bachelor's degree, an average monthly income below 20,001 baht, and single. 2) Overall service quality is considered highly important, and when considering individual aspects, all are highly important. These aspects can be ranked from most to least important as follows: tangibility of service, reliability, responsiveness to users, assurance to users, and understanding of users. Regarding user satisfaction with community digital center services, the study found that adequate, equitable, timely, continuous, and progressive services were all at a high level of satisfaction. Comparing satisfaction with the quality of community digital center services categorized by personal data, the results showed that differences in age, occupation, education level, average monthly income, and marital status resulted in different levels of satisfaction with the services. Statistically significant at the 0.05 level, the following recommendations are suggested as guidelines for improvement: 1) Concreteness of services: Community digital center managers should prioritize modernizing the centers, providing sufficient 5G internet equipment and computers for users, ensuring that center staff are ready and willing to serve the public, and clearly displaying service locations (e.g., in front of the school, in front of the digital room). 2) Reliability and trustworthiness: Service staff should perform their duties on time, ensure the security of the community digital center, provide standard and modern equipment, resolve problems quickly, maintain a standardized service system, accurately answer customer questions, and provide advice. 3) Responsiveness to users: Convenient and easily accessible contact channels should be available (e.g., telephone, email, LINE, or social media), simple and easy-to-understand language should be used, user problems should be listened to attentively, and effective solutions should be found. Center staff should be able to quickly find the necessary information to assist users. 4) Building user confidence: Community digital center managers should continuously improve their skills to provide secure services. Accurate and clear information should always be provided to users, including the advantages and disadvantages of products or services. The online website system is both accurate and reliable. The center's administrators were trustworthy. The community digital center operates on a scheduled opening and closing time. 5) Understanding and Knowing the Customers: Center administrators should communicate with users using simple and clear language, provide courteous and humble service, show attentiveness, and create a friendly atmosphere so that users feel comfortable using the service.

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MARKETING MIX FACTORS INFLUENCING THE DECISION TO PURCHASE HEALTH SUPPLEMENTS

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ABSTRACT

Marketing mix factors influencing the decision to purchase health supplements can be summarized as follows: Consumers consider the product's quality, efficacy, variety, formulation, packaging, labeling, and brand reputation. Price factors include affordability, perceived value, and promotional offers. Place or distribution emphasizes product availability across various channels and geographic reach. Promotion involves advertising, social media and influencer marketing, sales promotions, and personal selling. These elements collectively shape consumer preferences and purchasing behavior, with additional influences from health consciousness, peer recommendations, and regulatory frameworks.

Keyword: Marketing Mix, Decision, Supplements,

INTRODUCTION

The consumption of health supplements has become highly popular today. Among the supplements that consumers value is "Nutrilite dietary supplements," Zhou, 2014)a product of Amway Co., Ltd., (Samundeeswari, Et al 2024) produced by the Nutrilite factory. Nutrilite is one of the world's largest manufacturers of tablet supplements, vitamins, and minerals. It is the only brand that cultivates, harvests, and processes its own certified organic farms.

Currently, with society changing rapidly into a consumerist culture, people's lifestyles have shifted. (Featherstone, 1987) Life has become more rushed, with people working against the clock, relying on fast food and ready-to-eat meals that are high in carbohydrates and fats. (Rolls, 1995) Combined with a decrease in physical activity and exercise, this has led to weight problems or obesity, as well as concerns about body image. Especially for those who are overweight or obese, this is seen as an undesirable state in society. (Milanović, Et al 2013) Modern societal values emphasize having a fit figure, which is associated with beauty, good health, and a positive personality. As a result, those who are overweight are categorized as having health issues that need to be treated, and this can lead to mental disorders such as anorexia nervosa—a condition stemming from distorted beliefs and values about body shape and weight. Individuals desire to eat but are afraid of gaining weight, causing anxiety. Currently, patients with this condition are found at a rate between 0.2-11.3% of the population, with 5-10 new cases per 100,000 people. Women are far more likely to be affected than men This emphasis on having a slim or fit body is what drives people to accept and seek out methods for controlling their weight.(Wanless, 2004).

In big cities like Bangkok, people are increasingly prioritizing their health, as seen by the ongoing popularity of the health trend. Especially among working-age consumers with hectic lifestyles—working

against time, staying up late, waking up early, and having little time to rest—there is a growing focus on health by taking dietary supplements to help fulfill the nutritional requirements that the body needs each day. The trend of consuming health-related dietary supplements is rising in popularity. Nowadays, Thais are increasingly concerned about health—eating healthy foods, exercising, and consuming dietary supplements. This has made supplements in Thailand more popular and driven up demand, due to increased health awareness, the desire for a better body shape, enhanced immunity, and beauty. Dietary supplements can be categorized into several types: health supplements, beauty supplements, weight-loss supplements, and brain-boosting supplements. From the aforementioned data, the researcher is therefore interested in studying the marketing mix factors affecting the decision to purchase health supplements, in order to use the findings to improve health supplement distribution to better match consumer needs.

Objectives of the study

To examine the marketing mix factors involved in purchasing health supplements
To study the decision-making process in purchasing health supplements

Scope of Study

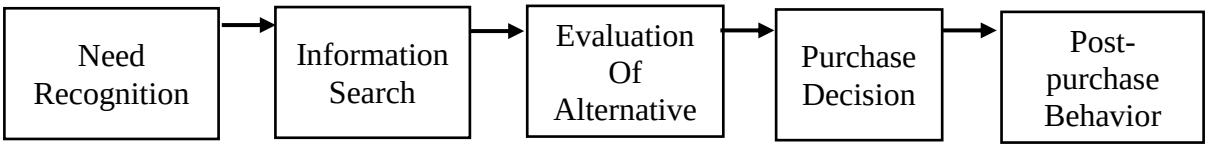
In terms of content, this study examines the factors influencing consumers' decisions to purchase health supplements, based on Philip Kotler's marketing mix theory, which includes Product, Price, Place, Promotion, as well as Philip Kotler's decision-making theory, consisting of problem recognition, information search, evaluation of alternatives, purchase decision, and post-purchase behavior. The population and sample group in this study are individuals who have previously purchased health supplements, with a sample size of 400 people.(Kotler, & Keller, 2014).
This study on the marketing mix factors affecting the decision to purchase health supplements involved the researcher reviewing related documents, concepts, theories, and research in order to establish a conceptual framework and guidelines for the study as follows:

LITERATURE REVIEW

(dos Santos, & Razzolini 2021). stated that the marketing mix refers to the variables or marketing tools that businesses use to achieve the marketing objectives of their target group in order to satisfy customer needs. Originally, the marketing mix consisted of only four variables (the 4Ps): Product, Price, Place, and Promotion. (dos Santos, & Razzolini Filho,2021)

Decision Theory

The act of purchasing is a process of selecting and comparing desired options from among many alternatives, considering them rationally in order to achieve one's objectives. It is a process by which consumers decide whether to purchase a particular product or service, influenced by factors such as product information, social and peer groups, consumer attitudes, timing, and opportunities. This process of purchasing decision-making involves five stages, which can be explained through decision theory. (Parmigiani, & Inoue, 2009)



The decision-making process steps

Kotler (2014) describes the consumer purchasing decision-making theory, which describes the process

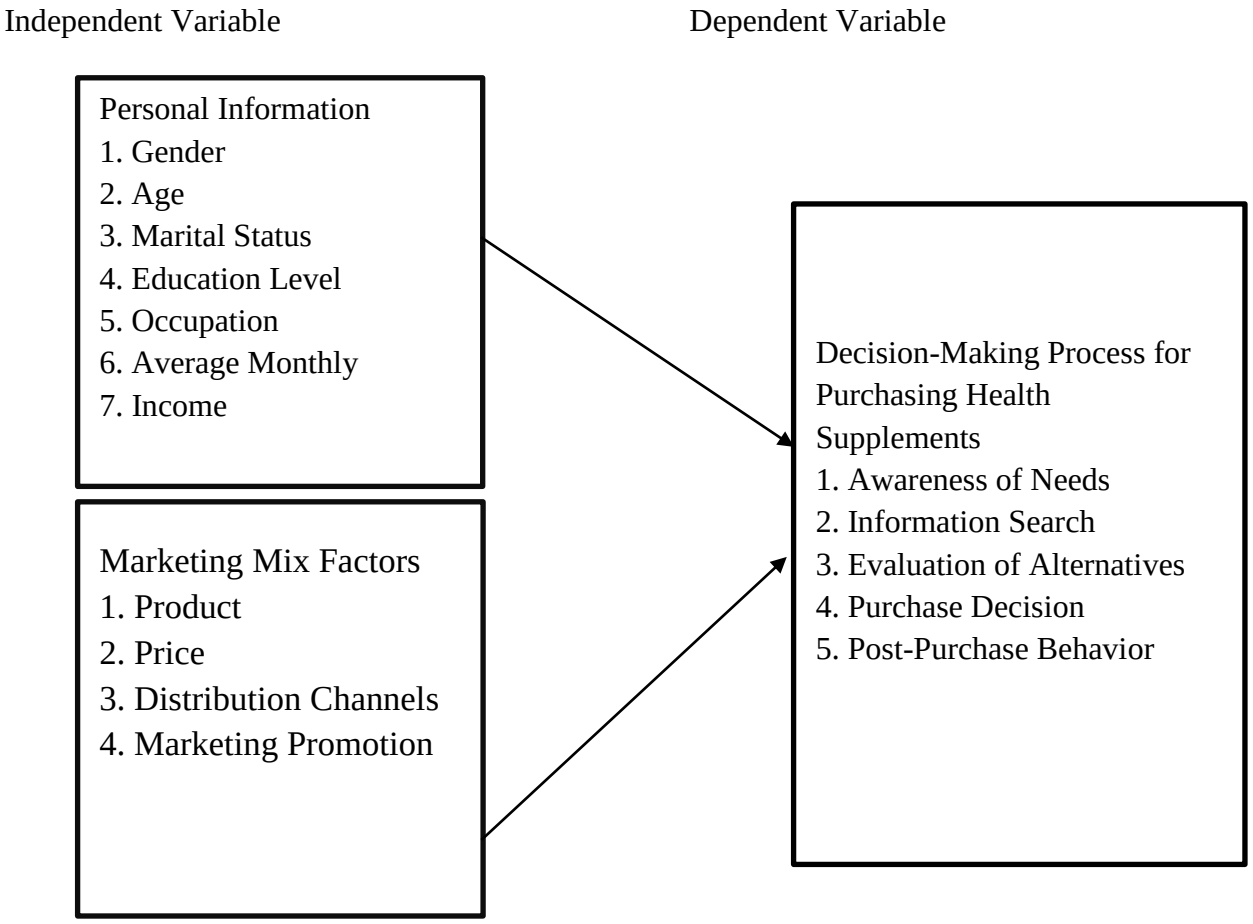
consumers go through when deciding to buy a product. This process can be divided into five stages: starting from events that occur before the actual purchase, and continuing to events that occur after the purchase. The five steps in the decision-making process are as follows:
Need Recognition (recognition of a need), Information Search, Evaluation of Alternatives, Purchase Decision. After evaluating the alternatives, consumers move to the purchase decision stage, which involves various factors.
Post Purchase Behavior

After consumers purchase a product or service, experts need to examine the satisfaction that may or may not follow the purchase. Satisfaction arises from the evaluation and comparison between what consumers actually receive and their expectations prior to the purchase decision. If the value of the product or service received matches or exceeds their expectations, customers will be satisfied. However, if the value actually received falls below their expectations, customers will experience dissatisfaction.

In summary, the decision to use a service refers to the process of defining each stage of decision-making from the first to the final step, using reasoning and sets of criteria as tools to help arrive at a decision. In this study, the decision-making process for using a service is defined as Need Recognition (Problem Recognition), Information Search, Evaluation of Alternatives, Purchase Decision, and Post-Purchase Behavior.

Conceptual Framework

Based on the above research, the researcher utilized the marketing mix theory (4P's) and service usage decision-making, summarizing and integrating them as a conceptual framework for studying the marketing mix factors that influence the decision to purchase health supplements as follows:



RESEARCH METHODOLOGY

The study of marketing mix factors influencing the decision to purchase health supplements aims to examine the marketing mix factors involved in buying health supplements, the decision-making process for purchasing health supplements, compare the decision-making of elderly consumers in purchasing health supplements based on personal information, and investigate which marketing mix factors influence the decision to purchase health supplements among the elderly. The methodology for this study is as follows:

Population and Sample Used in the Study

The population used in this study consists of consumers making decisions to purchase health supplements. A sample of 400 participants was selected. For this research, the sample size was calculated using W.G. Cochran's formula for an unknown population at a 95% confidence level as follows:

n= (.5)(.5)(3.8416)/.0025
n= .9604/.0025
n= 384.16

From the calculation, the sample size should be 385 participants. However, to prevent any potential errors or incomplete responses in the questionnaires, the researchers decided to use a sample size of 400 participants

RESULT

A study on the marketing mix factors influencing the decision to purchase health supplement products among consumers. The sample group consisted of 400 individuals who had previously purchased health supplement products for consumers during the years 2023-2024. A total of 400 questionnaires were used as the data collection tool, and all 400 were returned, accounting for a 100% response rate. The study results are divided into six sections as follows:
Results of the analysis of marketing mix factors influencing the decision to purchase health supplement products for consumers

Marketing mix	B	Std . Error	Beta	t	Sig	Test
(Constants)	-.149	.182		-.819	.413	
Product	.323	0.76	.254	4.251	.000*	มี
Price	.177	0.77	.141	2.300	.022*	มี
Distribution	.189	06.9	.154	2.740	00.6*	มี
Promotion	.345	0.67	2.92	5.173	000.*	มี

*Statistically significant at the .05 level Figel 1 shows the results of the analysis of marketing mix factors influencing consumers' decisions to purchase health supplement products. It was found that product, price, distribution channels, and marketing promotion all have a statistically significant influence on the decision to purchase health supplement products at the .05 level.

CONCLUSION

The study on marketing mix factors influencing consumer decisions to purchase health supplement products aimed to examine the marketing mix factors involved in purchasing health supplement products, consumers' decision-making in purchasing these products, and to compare purchase decisions based on demographic information and the marketing mix factors affecting consumer choices. The study population consisted of individuals who had previously purchased health supplements, using 400 questionnaires as the data collection tool. Statistical analysis used included percentage, mean, One-Way ANOVA, and Multiple Regression Analysis. The findings can be summarized as follows:

Personal Information

The study on marketing mix factors influencing consumer decisions to purchase health foods found that most respondents were female, aged between 51–60 years old, held a bachelor's degree, worked in their own business or as business owners, and had an average monthly income of 40,001–50,000 baht.

Information related to the marketing mix factors in purchasing health supplement products

From the study of the importance level of marketing mix factors influencing consumer decisions to purchase health supplements, it was found that product, price, distribution channels, and marketing promotion were all rated as highly important overall. The details are as follows:

Product: The overall study found this factor to be of high importance, with five highly rated items: value for money, correctness/completeness/clarity of product labels, presence of organic extracts, product variety, and product quality as per specifications.

Price: This factor was also found to be of high importance, with five highly rated items: price appropriateness for quality, product pricing relative to quality, clear price tagging, prices being reasonable compared to competitors in the same market, and pricing appropriate to the package quantity.

Distribution Channels: This factor was rated as highly important overall, with five top items: ease and convenience of ordering, ability to communicate with sellers at any time, widespread distribution network covering all areas, variety of ordering channels, and accurate and fast product delivery.

Marketing Promotion: This factor was also highly important overall, with five significant items: after-sales guarantee, regular sales promotion activities (e.g., discounts, freebies), continuous and attractive promotional campaigns, enthusiastic sales staff willing to provide product information and advice, and accessible advertising via social media.

Information on the Level of Decision-Making in Purchasing Health Supplements From the analysis of consumer opinions regarding decisions to purchase health supplements, it was found that the areas of purchase decision, recognition of need, evaluation of alternatives, post-purchase behavior, and information seeking were all rated at a high level of agreement. Details are as follows:

Recognition of Need: The overall results showed a high level of agreement in four areas—helps reduce frequent urination, alleviates numbness in hands and feet, dizziness, and blurred vision, supports deep and restful sleep without fatigue upon waking, and helps regulate blood sugar levels.

Information Seeking: The overall results showed a high level of agreement in four areas—inquiring from close acquaintances, searching for information via social media (such as Facebook, Shopee, TikTok), seeking detailed and clear product data from stores through Facebook, and consulting sellers or product experts.

Evaluation of Alternatives: The overall results indicated a high level of agreement across five areas—product effectiveness in addressing current health problems, brand reputation, clear product certification,

potential side effects/risks, and an appropriate correlation between duration of use and observed benefits.
Purchase Decision: The overall results showed a high level of agreement in three areas—making purchases based on perceived benefits, comparing product composition and nutritional value among brands, and purchasing based on review recommendations.
Post-Purchase Behavior: The overall results showed a high level of agreement in three areas—continued use of the supplement if physical health improves, recommending supplements to friends and family, and purchasing health supplements in increased quantities for health benefits.

Comparison of Consumers' Decisions to Purchase Health Supplement Products Classified by Personal Information

Different personal information factors affect consumers' decisions to purchase health supplement products. The study found that gender, age, education level, occupation, and average monthly income have a statistically significant influence on purchasing decisions at the 0.05 level. Marketing Mix Factors Influencing the Decision to Purchase Health Supplement Products
Marketing mix factors influence consumers' decisions to purchase health supplement products. The study indicated that the marketing mix factors—product, price, distribution channels, and promotion—have a statistically significant impact on purchasing decisions at the 0.05 level.

Discussion of Results and Recommendations from the Study

From the study on marketing mix factors influencing the purchase decision for Derai Thai health supplement brand, the researcher has the following points for discussion:The researcher also has the following recommendations derived from the study for consumers purchasing health supplement products, which could be beneficial:

Product: Entrepreneurs should regularly conduct market research to identify consumer needs and develop products that meet these needs. Additionally, maintaining product quality to ensure standards and safety for consumption is vital.

Price: Entrepreneurs should set prices appropriate to the product's attributes and compare with competitors' products. This ensures consumers feel the product is worth the price they pay for the supplement.

Distribution Channels: The study found that ease and convenience of ordering, the ability to always communicate with sellers, and comprehensive availability of distributors in all areas were important. Distribution channels influence purchasing decisions, and the diversity of service channels is increasing.

Promotion: The study showed that entrepreneurs should offer product guarantees after sales, consistently engage in promotional activities such as discounts and free gifts, organize continuous and attractive promotions, and ensure sales staff are enthusiastic in providing product information and recommendations. Studying and following rapidly changing consumer behaviors will enable entrepreneurs to respond quickly to consumer needs, making purchasing more convenient and building confidence in buying genuine products verified by the product owners.

Recommendations for Future Studies

Further studies should consider additional factors beyond those covered in this research to make the

research more comprehensive and complete. For example, studying factors affecting repeat purchases among health supplement product consumers.

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MARKETING MIX FACTORS INFLUENCING THE DECISION TO USE AUTOGUZ CASH AUTO REPAIR SHOP SERVICES

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ABSTRACT

This study analyzes the impact of the marketing mix (4Ps) on customers' decisions to utilize the services of Autoguz Cash auto repair shop. The factors examined include Product, focusing on service quality, variety, and technician expertise; Price, emphasizing competitive pricing, convenient cash payment policies, and attractive promotions; Place, considering the accessibility and readiness of the repair shop's location; and Promotion, involving communication channels, customer relationship management, and leveraging customer reviews for credibility. The integrated application of these marketing mix elements effectively enhances customer motivation and decision-making in selecting Autoguz Cash for auto repair services.

Keyword: Marketing Factor Shop Service

INTRODUCTION

Cars have become an extremely important factor in today's world, serving various purposes that make travel more convenient for people, whether for personal use, business, work, or leisure. (Sperling, & Gordon, 2009) The main purpose of having a car, apart from commuting for work or personal errands, is for travel which is another popular activity for relaxation. (Wiersma, 2020) For most people, using a car to travel to work is the primary reason for ownership. However, choosing the right car for convenience requires taking on debt and carefully calculating the associated expenses. With a monthly salary of around 20,000 baht and owning a car, you might end up with nothing left to save because of numerous bills and hidden debts that come with it these costs really add up. Therefore, it's important to think and plan thoroughly.

A survey of the modes of transportation used by people in Bangkok revealed that the majority, 59.09%, reported using private cars. This was followed by 23.60% who used public buses or songthaews, 22.33% who used personal motorcycles, 11% who used taxis, 9.73% who took BTS/Airport Rail Link, 6.06% who used motorcycle taxis, 3.75% who rode the MRT subway, 3.11% who utilized public vans, 1.20% who commuted via boat, and 0.32% who used other means such as company-provided cars or bicycles. (Zhao, Et al 2024)

Bangkok is famously known for its heavy traffic congestion. If you travel on a weekday, you'll see the roads packed with all kinds of vehicles. On certain days—like Fridays, month-end, or rainy days—drivers must be prepared to spend long hours on the road, often parking more than actually moving. Fuel costs add up quickly even if you manage to move just a little. (Pianuan, Et al, 1994) Therefore, when looking for a vehicle that best suits urban life, many factors need to be considered. One popular choice is selecting a small, well-equipped car suitable for city driving, such as a compact or ECO car, which is specifically designed to meet the needs of urban drivers

Servicing or tuning vehicles is a maintenance step carried out at specific intervals or after a vehicle has traveled a certain distance, with the schedule set by the manufacturer and listed in the service manual. Some modern cars even display the service due date electronically on the dashboard. (Bonnick, & Newbold, 2011) Once service is completed, it is usually recorded in a service booklet, and a complete service history often increases the car's resale value. The actual maintenance schedule varies depending on the year, brand, model, driving conditions, and driving habits. Regular maintenance during servicing typically includes oil changes, oil filter replacements, and inspecting or replacing timing belts or chains as necessary. (Soliman, 2020)

In the past, car repair shops had limitations in terms of repair capabilities, equipment, and varying standards across shops, which could make drivers uneasy when seeking service. Many preferred to use authorized service centers, knowing they would get genuine parts and standardized service, even if it meant a longer wait. However, with today's higher competition, repair shops have improved their service quality and management, upgraded their repair capabilities, and acquired standard tools. They can now handle a broader range of repairs, such as body work, glass repairs, and engine work with skilled technicians—whose skills today are nearly on par with those at service centers.

Due to the COVID-19 pandemic, people tended to avoid public transportation to reduce the risk of infection, resulting in increased use of private cars and a greater demand for vehicle check-ups as people prepared to use their own cars instead of public transit in the long term. At the same time, there are now many car repair shops to choose from, such as Autoguz cash. (Alvarez, & Argente, 2022)

Based on this information, the researcher is interested in studying the factors that influence the decision to use Autoguz cash car repair shops, with the aim of developing and improving their service, increasing customer satisfaction, and ultimately attracting more customers.

Objectives of the Research

To study the marketing mix factors influencing the use of Autoguz Cash car repair services.
To compare the decision to use Autoguz Cash car repair services, categorized by personal information.

Literature Review

Kotler, P. (2012). stated that the Marketing Mix refers to the variables or marketing tools that can be controlled. Companies usually utilize them in combination to satisfy and fulfill the needs of their target customers. Initially, the marketing mix comprised only four variables (4Ps): Product, Price, Place (distribution channels), and Promotion. Later, three more variables were added: People, Physical Evidence, and Process, to align with important modern marketing concepts, especially in the service business. Thus, it is collectively referred to as the 7Ps Marketing Mix.

RESEARCH METHODOLOGY

The study on "Marketing Mix Factors Influencing the Decision to Use Autoguz Cash Auto Repair Shop Services" aims to examine the marketing mix factors affecting the use of auto repair services at Autoguz Cash, to analyze decisions regarding the use of these services, and to compare service usage decisions based on personal information as well as marketing mix factors influencing the use of Autoguz Cash's services. The findings from this study can be used as guidelines to improve and further develop the quality of services provided by auto repair shops. The following study procedures were defined:

Data Collection Methods

To ensure the study's completeness, the following data collection methods were employed: - Data was gathered through research from various sources, including textbooks, documents, and other relevant research studies. - Data was also collected through questionnaires distributed to the target group and returned in person. The questionnaires were then checked for completeness and accuracy to ensure they were fully filled out and could be used for further data analysis.

Research Results

The study on the marketing mix factors influencing the decision to use the services of Autoguz cash repair shops was conducted using a quantitative research approach. The sample group consisted of 400 individuals who had used Autoguz cash auto repair services within the past six months. Data was collected using questionnaires. The research results are presented as follows:

Summary, Discussion of Findings, and Research Recommendations

This study on the marketing mix factors influencing the decision to use Autoguz Cash car repair shop services aimed to investigate the marketing mix factors of those utilizing Autoguz Cash, to examine the decision-making process of these customers, to compare decision-making based on personal information, and to study the marketing mix factors influencing the decision to use Autoguz Cash. The data was collected through questionnaires with a sample group of 400 people who used Autoguz Cash's services, and statistical analysis methods included percentage, mean, t-test, F-test (One-Way ANOVA), and Multiple Regression Analysis. The results of the data analysis are summarized, discussed, and recommendations are offered as follows.

Summary of Findings

General information: The study found that most respondents were male, aged 60 years and above, held a Bachelor's degree, worked as private company employees, and had an average monthly income of 40,001 – 60,000 baht. The most commonly used car brand was Toyota, and most vehicles were between 6 – 10 years old.Opinions on marketing mix factors affecting the use of Autoguz Cash repair shop: The study found that overall, the marketing mix factors were considered highly important. Respondents placed the highest importance on the 'Process' aspect, followed by Product, Price, Physical Evidence, Promotion, and lastly, Place and People (equally). Detailed findings are as follows:

Product: Overall, this aspect was rated as highly important. The five main areas of importance were:

Autoguz Cash offers a variety of services; Autoguz Cash is certified for its service standards; Autoguz Cash can deliver results as agreed; services are performed by experts; and Autoguz Cash provides clear details about the products and services used.

Price: This aspect was also rated as highly important. The five main areas were: Autoguz Cash clearly displays prices; their prices are lower compared to other garages offering the same services; pricing is reasonable in relation to materials used; there are a variety of pricing options; and pricing reflects the value delivered.

Place (Distribution Channels): Overall, this aspect was moderately important. The key highlight was the suitable location of Autoguz Cash. Other moderately important areas included having well-organized service zones, online communication channels, various contact channels, and convenient and safe service entrances.

Promotion: Overall moderate importance. The most important factor was the provision of gifts/promotions during certain periods. Other moderately important areas were a membership system with privileges, special service discounts at certain times, effective advertising to foster understanding, and warranties for appropriate parts of the service

People: Moderately important overall. The two most important factors were having sufficient staff and staff who assist in service choices. Other moderately important areas included staff courtesy, proper conduct, comprehensive service knowledge, and the ability to clearly explain promotion and warranty terms.

Process: This aspect was rated as highly important. The five most important factors were: fast and accurate issue response, efficient facilitation of service delivery as scheduled, clear demonstration of service support, multiple payment options, and fast and accurate delivery as per orders.

Physical Evidence: Rated as highly important, with the following details: clear signage indicating service zones, solid and safe service facilities, sufficient parking, well-designed service areas with a good atmosphere, and cleanliness inside the garage.

Opinions on the decision-making process for choosing Autoguz Cash: The findings show a high level of agreement overall. The highest agreement was for Problem Recognition, followed by Information Search, Post-Purchase Behavior, Purchase Decision, and finally, Evaluation of Alternatives. Detailed aspects are as follows:

Problem Recognition: High agreement in these five factors: seeking a garage that can solve car problems; seeking a reputable and trustworthy garage; seeking a garage offering attractive pricing; seeking a garage certified for safety; and seeking a garage recognized for service standards.

Information Search: Moderate overall agreement. The five most prominent means were: researching garages from advertisements, from close acquaintances, from experienced users, from reviews by influencers, and directly from garage personnel.

Evaluation of Alternatives: Moderate overall agreement. The most significant factor was comparison based on post-service warranty terms, followed by comparing results with current needs, price value,

value from marketing promotions, and reliability of sources.

Purchase Decision: Moderate agreement across five areas: decisions based on the garage's ability to deliver results that meet current needs, value-driven marketing promotions, the most suitable post-service warranty, the best value for price, and garages with the most reliable information.

Post-Purchase Behavior: Moderate agreement overall. Three key areas were: reviewing services on one's own media channels, giving feedback to the garage on satisfaction or improvement areas, and comparing results to the agreement. Moderately important additional behaviors included keeping service records to compare with other garages in the future, and sharing experiences with others who inquire.

Discussion of Study Results

Based on the study of marketing mix factors influencing the decision to use Autoguz Cash auto repair shop services, the researcher has the following discussion points:

Recommendations from the Study

The research findings indicate that currently, the service formats offered by auto repair shops are quite similar, making the most significant focus fall on the service process in order to create optimal results and satisfaction. This enables the presentation of marketing mix elements—product, price, distribution channel, and promotion—to stand out. Therefore, auto repair shop owners should study and understand both the issues and the strengths in their own service processes and develop these as key strengths to be effectively presented to customers.

Recommendations for future research: At present, the marketing mix factors can be extended to other marketing components, using the marketing mix to build customer relationships from before the sale to after the sale. This can be adapted and utilized in the service business sector for in-depth studies or further expanded into new dimensions in the future.

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ADAPTIVE INTELLIGENCE: HOW GENERATIVE AI IS POWERING BUSINESS RESILIENCE, STRATEGIC AGILITY, AND NEW MODELS OF VALUE CREATION

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ABSTRACT

Organizations are increasingly operating in environments characterized by persistent disruption, accelerated technological change, and uncertain competitive boundaries. While Generative Artificial Intelligence (GenAI) is widely adopted, it is often implemented as a productivity tool rather than a strategic capability. This paper investigates how GenAI can enable "adaptive intelligence," defined as an organizational capability to sense change, learn quickly, experiment safely, and reconfigure resources to sustain performance under disruption. Drawing on dynamic capabilities theory, organizational resilience research, and socio-technical perspectives, the study examines the mechanism through which GenAI contributes to resilience and value creation. A mixed-method design is used, combining semi-structured interviews with a survey of 247 managers and executives from mid-sized organizations across professional services, technology/IT services, manufacturing/industrial services, retail/consumer services, and healthcare services (non-clinical functions). Quantitative analysis indicates that GenAI capability is positively associated with strategic agility and business model innovation, and that agility plays a mediating role in explaining resilience outcomes. The findings suggest that resilience emerges less from automation itself and more from the organizational learning and experimentation that GenAI enables when supported by leadership intent, learning culture, and ethical governance. Based on results, the paper proposes an AI-Enabled Adaptive Intelligence Framework and offers managerial recommendations for aligning GenAI investments with resilience and innovation objectives.

Keywords: Generative Ai, Adaptive Intelligence, Strategic Agility, Business Resilience, Business Model Innovation, Value Creation

1. INTRODUCTION

Organizations are no longer responding to occasional shocks; they are operating in a condition of continuous disruption. Digital shocks, supply chain instability, geopolitical tensions, and climate-related uncertainty are reshaping strategic decision-making and compressing the time available to sense and respond (Duchek, 2020). In parallel, Generative Artificial Intelligence (GenAI) has entered mainstream business practice. Firms are deploying large language models and generative systems for customer engagement, software development, knowledge work support, and internal decision assistance. Yet, the dominant narrative in many organizations still frames AI primarily as automation and efficiency.

This narrow framing risks missing a more consequential strategic opportunity. While automation may reduce cost and cycle time, resilience in a volatile environment depends on an organization's ability to learn, adapt, and reconfigure business models. Resilience research increasingly emphasizes adaptive capacity and renewal rather than mere recovery (Lengnick-Hall & Beck, 2016; Duchek, 2020). Similarly, dynamic capabilities theory highlights sensing, seizing, and transforming as essential for sustained advantage in changing environments (Teece, 2007).

This paper addresses the gap between rapid GenAI adoption and limited understanding of its strategic

contribution. Specifically, the paper investigates how GenAI can enable *adaptive intelligence*, a capability that strengthens strategic agility and supports business model innovation, which together contribute to value creation and organizational resilience. The study is guided by the following research objectives: (i) to examine how GenAI capability relates to strategic agility, (ii) to test how agility connects GenAI to resilience and value creation, and (iii) to propose an integrated framework that explains these relationships in mid-sized firms.

2. LITERATURE REVIEW

Research on AI in organizations has traditionally emphasized efficiency, automation, and decision support. Davenport and Ronanki (2018) note that many early business applications focus on improving operational performance through targeted use cases. Brynjolfsson and McAfee (2017) similarly describe how digital technologies can raise productivity, but they also imply that complementary organizational changes are required to translate technology into sustained advantage. As the field has matured, research has increasingly examined how AI augments managerial decision-making and analytical capability (Ransbotham et al., 2020; Shrestha et al., 2019). However, GenAI introduces distinctive features, including interactive knowledge generation, rapid scenario creation, and language-based synthesis across domains. These features suggest GenAI may shape organizational learning and strategy formation more directly than earlier forms of AI.

Recent scholarship argues that the impact of AI depends on how it is integrated into work systems and how humans and technology co-produce outcomes (Raisch & Krakowski, 2021). This socio-technical lens is particularly relevant for GenAI because outputs can appear plausible even when incorrect, and because the value often lies in iterative human-AI collaboration rather than automation alone. Emerging discussions also highlight governance and ethical challenges associated with AI deployment at scale (Floridi et al., 2018; Dwivedi et al., 2023). Despite these contributions, the literature remains fragmented when explaining how GenAI contributes to resilience and business model adaptation.

Resilience scholarship has also evolved. Earlier work framed resilience through risk mitigation, redundancy, and recovery after disruption (Sheffi & Rice, 2005). While robustness remains relevant, contemporary work emphasizes resilience as adaptive capacity, learning, and renewal under conditions of uncertainty (Lengnick-Hall & Beck, 2016; Duchek, 2020). This emerging view aligns strongly with dynamic capabilities theory, which argues that firms achieve sustained performance by sensing environmental change, seizing opportunities through timely strategic decisions, and transforming resources and structures accordingly (Teece, 2007; Teece, Peteraf, & Leih, 2016).

Business model innovation is an important bridge between these literatures. Chesbrough (2010) argues that innovation increasingly requires firms to redesign how value is created and captured, not simply improve products. In disruption-prone environments, business model adaptation becomes central to resilience because it enables organizations to adjust value propositions, operations, and ecosystem partnerships. Yet, empirical work that directly links GenAI capability to agility-driven business model innovation and resilience outcomes remains limited, particularly in mid-sized firms with constrained resources.

This paper responds to the gap by examining GenAI as a capability that supports strategic agility and business model innovation, and by proposing a unifying framework grounded in empirical evidence.

3. RESEARCH METHODOLOGY

This study employed a mixed-method research design to capture both explanatory depth and empirical generalizability. The qualitative component explored managerial interpretations of Generative AI use in strategic and adaptive contexts, while the quantitative component tested relationships among GenAI

capability, strategic agility, business model innovation, and resilience outcomes.

3.1 Sample and Data Collection

Survey data were collected from **247 managers and executives** working in mid-sized organizations that had adopted Generative AI in at least one business function. All respondents reported direct involvement in AI-related initiatives, digital transformation programs, or strategic decision-making processes, ensuring informed and contextually grounded responses.

The sample deliberately focused on sectors where Generative AI adoption is emerging but not yet fully institutionalized, making them particularly suitable for examining both opportunities and challenges associated with adaptive use. The primary sectors represented in the study included:

- **Professional Services** (consulting, marketing, accounting, legal services), where GenAI is widely used for knowledge work, content generation, and decision support.
- **Technology and IT Services**, where GenAI supports software development, customer support, internal analytics, and process optimization.
- **Manufacturing and Industrial Services**, where firms apply GenAI to demand forecasting, scenario planning, and operational coordination amid supply chain disruptions.
- **Retail and Consumer Services**, where GenAI is used for customer engagement, personalization, pricing experimentation, and demand sensing in volatile markets.
- **Healthcare Services (Non-clinical Functions)**, including administrative operations, patient communication, and capacity planning, where governance and ethical constraints strongly shape AI adoption.

To complement the survey data, semi-structured interviews were conducted with a subset of senior leaders and digital transformation managers across these sectors. The interviews provided qualitative insights into leadership intent, cultural readiness, governance practices, and the organizational conditions that influence how GenAI contributes to learning, experimentation, and adaptation.

3.2 Measures and Analysis

GenAI capability was measured through items assessing the extent to which GenAI supported knowledge creation, scenario generation, decision augmentation, and cross-functional synthesis. Strategic agility captured environmental sensing, decision speed, experimentation, and the ability to reconfigure resources. Business model innovation reflected changes in value propositions, customer engagement models, and operational configurations. Organizational resilience and value creation were measured through adaptability and sustained performance indicators.

Quantitative analysis included descriptive statistics, reliability testing using Cronbach’s alpha, and exploratory factor analysis to assess construct validity. Multiple regression analysis was used to estimate relationships among key variables, and mediation analysis examined whether strategic agility explained the link between GenAI capability and resilience outcomes.

4. FINDINGS AND DISCUSSION

The findings reveal a clear and consistent pattern regarding how GenAI contributes to organizational outcomes. A strong positive relationship was observed between GenAI capability and strategic agility, indicating that organizations using GenAI beyond routine automation are better able to sense environmental changes, respond quickly, and reconfigure resources. Firms that deployed GenAI primarily for efficiency and task automation reported only modest improvements in resilience, often limited to

operational continuity rather than strategic renewal. In contrast, organizations that leveraged GenAI for learning, experimentation, and strategic sense-making demonstrated significantly higher levels of agility and adaptability.

The mediation analysis provides important insight into the underlying mechanism driving these outcomes. While GenAI capability alone showed a positive association with resilience, its direct effect was weaker than its indirect effect through strategic agility. This suggests that GenAI does not inherently make organizations resilient by stabilizing existing processes. Instead, resilience emerges when GenAI enhances the organization's capacity to learn, experiment, and adapt in real time. This finding aligns closely with dynamic capabilities theory, which emphasizes that sustained performance under uncertainty depends on the ability to sense opportunities and threats, seize emerging options, and transform organizational resources accordingly (Teece, 2007).

Business model innovation emerged as a central outcome of this adaptive process. The data indicate that GenAI significantly reduces the cost, time, and cognitive burden associated with early-stage experimentation. Through rapid drafting, simulation, and synthesis of strategic alternatives, organizations were able to explore new value propositions, redesign customer engagement models, and adjust operational configurations more frequently and with lower risk. Firms that treated GenAI as a learning capability rather than a productivity tool were more likely to engage in ongoing business model reconfiguration, supporting arguments that adaptability at the business model level is critical for resilience in disruption-prone environments (Chesbrough, 2010).

Leadership orientation and governance practices played a decisive role in shaping the strategic impact of GenAI. Interview evidence indicated that when leaders framed GenAI as a strategic asset and explicitly encouraged experimentation, employees reported greater trust in AI-supported decisions and a higher willingness to engage in adaptive behaviors. Conversely, in organizations where GenAI was introduced solely as an efficiency mandate, employees expressed skepticism and reluctance to rely on AI-generated insights. These findings reinforce socio-technical perspectives that emphasize the need for alignment between technology, human agency, and organizational structures (Pasmore et al., 2019). Ethical governance mechanisms further amplified positive outcomes by clarifying accountability, mitigating bias concerns, and sustaining organizational trust.

Taken together, the findings suggest that GenAI's strategic value lies not in automation itself, but in its ability to reshape how organizations think, learn, and adapt. Strategic agility functions as the critical bridge connecting GenAI capability to business model innovation and resilience outcomes.

5. CONCLUSION

This study examined how GenAI contributes to business resilience in an era characterized by continuous disruption rather than episodic shocks. The findings challenge the dominant view of GenAI as primarily an automation or productivity-enhancing technology. Instead, the evidence positions GenAI as a catalyst for *adaptive intelligence*, an organizational capability that enables continuous learning, experimentation, and strategic reconfiguration.

Organizations that restrict GenAI use to efficiency gains experience limited resilience benefits, largely confined to operational stability. In contrast, organizations that deploy GenAI to support learning, experimentation, and strategic sense-making develop higher levels of strategic agility and business model adaptability. These capabilities, in turn, enable sustained value creation and resilience in volatile environments. Importantly, resilience is not observed as a direct or immediate outcome of GenAI adoption, but rather as an emergent property of ongoing adaptation.

The **AI-Enabled Adaptive Intelligence Framework** proposed in this study integrates these insights by explaining how GenAI capability strengthens strategic agility, which then drives business model innovation and long-term value creation. The framework reframes resilience as a dynamic outcome of continuous adaptation rather than a defensive response to disruption. Leadership orientation, learning culture, and ethical AI governance operate as cross-cutting enablers that shape how effectively GenAI contributes at each stage of the process.

From a theoretical perspective, this research contributes to the literature by bridging AI adoption studies with dynamic capabilities and organizational resilience theory. It advances understanding of GenAI as an enabler of higher-order organizational capabilities rather than a standalone technological resource. By empirically demonstrating the mediating role of strategic agility, the study clarifies how digital technologies translate into resilience outcomes.

While the study is limited by its cross-sectional design and focus on mid-sized firms, it provides a strong foundation for future research. Longitudinal studies could examine how adaptive intelligence develops over time, while sector-specific analyses could explore contextual differences in AI-enabled resilience. As Generative AI continues to evolve, its strategic value will increasingly depend not on what it automates, but on how it expands an organization's capacity to learn, adapt, and create value under sustained uncertainty.

From a managerial perspective, the findings underscore the importance of aligning GenAI initiatives with strategic learning objectives rather than isolated productivity metrics. Managers who view GenAI as a partner in sense-making and experimentation, rather than as a substitute for human judgment, are better positioned to build resilient and innovative organizations. Practical implications include investing in leadership development, fostering a culture of experimentation, and establishing ethical governance frameworks early in the AI adoption process.

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MARKETING MIX FACTORS INFLUENCING THE PURCHASING DECISIONS OF CHINESE CONSUMERS FOR PROCESSED FRUITS

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ABSTRACT

To compare the purchasing decisions of Chinese consumers regarding processed fruits based on their personal information Methodology Population and Sample The population used in this study consists of service users, with a sample size of 400 participants Result A comparison of the marketing mix factors influencing Chinese consumers' decisions to purchase processed fruit revealed that the product, price, and promotion aspects of the marketing mix have a statistically significant influence on the decision to purchase processed fruit at the .05 level. Suggestions for Future Studies The study of satisfaction in purchasing processed fruit products online and the repurchase decisions of Chinese consumers

Keyword: Marketing Mix, Chinese, Consumers

INTRODUCTION

Processing agricultural products helps prevent problems such as market oversupply or produce not meeting customer size or grade requirements. This can help raise the price level of agricultural outputs and add greater value to farm products. Turning agricultural produce into food products or food ingredients also allows for market expansion into other countries, thus significantly increasing national income. There are various methods for processing food; some are simple enough to be done at the household level, while others must be performed industrially. Some processed foods can be stored for several days, some for months, and some for years, all while still meeting consumer acceptance. (Lyimo, Nyagwegwe, & Mnkeni, 1991)

Processing agricultural products means taking farm outputs and transforming them through certain processes into food products that are suitable, convenient, and safe to match consumer demand, while also extending shelf life. (Fu, Et al 2020) This leads to the creation of diverse new products, giving consumers more choices and adding value to agricultural produce. Processing can reduce problems of market surplus, help maintain price levels for agricultural goods, and provide additional job opportunities. (Balogh, & Jámbor, 2020)

China's snack food market has been expanding rapidly, especially processed fruit products, which are very popular among Chinese consumers. (Wang, & Somogyi, 2018). Examples include dried mango, freeze-dried durian, dried longan, and stuffed jujube, most of which have a sweet and sour taste and are highly nutritious. (Teshome, Et al 2023) Such attributes have led to widespread acceptance among

Chinese consumers. With the improvement of quality of life and a greater focus on health, Chinese consumers are increasingly demanding high-quality, premium, and innovative processed fruits. (Wang, & Gao, 2024) Given the vast number of consumers in the Chinese market and their diverse preferences, and considering that Thai processed fruits are already favored by Chinese consumers, Thai entrepreneurs must closely study the consumption behavior of Chinese consumers to stay current. This is especially important given the modern Chinese consumers' growing health consciousness, which has increased market interest in high-quality processed fruits with low sugar and strong nutritional values. (Fahlevi, Dandi, Matroji, & Asetya, 2024)

Furthermore, it is found that young Chinese people tend to consume processed fruit following social trends and enjoy sharing photos through social media platforms such as Weibo, Wechat Moments, and Redbook. (Poulova, Haider & Sham, 2022). Entrepreneurs should plan marketing strategies both online and offline, distribute products through various channels to reach as many consumers as possible, and design attractive, convenient, modern, and portable packaging. (Migkos, Giannakopoulos, & Sakas, 2025) It is anticipated that in the future, China will continue to increase imports of processed fruits from Thailand

Based on the above information, the researcher is therefore interested in studying the marketing mix factors that influence the purchase decisions of Chinese consumers for processed fruits. The results of the study can serve as guidelines for improving and developing processed fruit products to better align with consumer needs, as well as increase the customer base and sales volume.

Objective of the Study

To compare the purchasing decisions of Chinese consumers regarding processed fruits based on their personal information

LITERATURE REVIEW

Several scholars have defined the term “marketing mix” for service businesses as follows: Kotler (1997) stated that the marketing mix refers to the controllable variables or marketing tools that a company typically uses together in order to satisfy the needs and desires of its target customers. Originally, the marketing mix consisted of only four variables (the 4Ps): Product, Price, Place (or distribution channels), and Promotion. Later, three more variables were added: People, Physical Evidence, and Process, to align with important concepts in modern marketing, especially for service businesses. Therefore, this is collectively known as the 7Ps marketing mix.(Darmawan, & Grenier, 2021)

Decision theory

Kotler)2014)

METHODOLOGY

The study of marketing mix factors influencing Chinese consumers' decisions to purchase processed fruit aims to examine the marketing mix factors of processed fruit for Chinese consumers, their purchasing decisions regarding processed fruit, and to compare these decisions based on personal information. The study also seeks to identify which marketing mix factors affect Chinese consumers' purchasing decisions regarding processed fruit. The findings from this study are intended to serve as a guideline for improving and developing processed fruit products to better meet consumer needs, as well as to increase the number of customers and boost sales. The research methodology is defined as follows:

Population and Sample The population used in this study consists of service users, with a sample size of 400 participants. This study employs W.G. Cochran’s sample size calculation method for an unknown population at a 95% confidence level, as follows:

n = (.50)(1-.50)(1.962)/(.052)
n = (.5)(.5)(3.8416)/.0025
n = .9604/.0025
n = 384.16

In the calculation, a sample size of 385 participants was obtained. However, to prevent potential errors in questionnaire responses and incomplete data, the researcher decided to use a sample size of 400 participants.

RESULTS

The study on marketing mix factors influencing the purchase decisions of Chinese consumers regarding processed fruits involved a sample group of 400 people. Questionnaires were used as the data collection tool, with all 400 questionnaires returned, accounting for 100 percent of the total. Statistical methods used for data analysis included percentage, mean, t-test, one-way ANOVA, correlation, and multiple regression. The data analysis results can be divided into four sections as follows:

Comparison of Marketing Mix Factors Influencing the Purchase Decisions of Chinese Consumers for Processed Fruits

ปัจจัยส่วนประสมทางการตลาด	B	Std. Eror	Beta	T	Sig.	Test
)Constant)	3.032	128.		23.766	*000.	yes
product	038.	047.	058.	802.	*000.	yes
Price	006.	048.	012.	130.	*000.	yes
Distribution channels	069.	047.	151.	1.463	144.	no
Promotion	172.	035.	325.	4.934	*000.	yes

*Statistically significant at the .05 level

A comparison of the marketing mix factors influencing Chinese consumers' decisions to purchase processed fruit revealed that the product, price, and promotion aspects of the marketing mix have a statistically significant influence on the decision to purchase processed fruit at the .05 level.

Summary

The study titled "Marketing Mix Factors Influencing the Purchase Decision of Processed Fruits among Chinese Consumers" aimed to examine the marketing mix factors in the purchase of processed fruits by Chinese consumers, to analyze the purchase decision of processed fruits among Chinese consumers, to compare the purchase decisions of Chinese consumers towards processed fruits based on personal information, and to identify the marketing mix factors influencing the purchase decision of processed fruits among Chinese consumers. A total of 400 sets of questionnaires were used as a data collection tool, and the data were analyzed using statistics such as percentage, mean, t-test, One-Way ANOVA, and Multiple Regression Analysis. The results of the data analysis can be summarized as follows:

Personal Information

From the study on "Marketing Mix Factors Influencing the Purchase Decision of Processed Fruit among Chinese Consumers," it was found that most respondents were female, aged between 20-30 years old, held a bachelor's degree, worked as private company employees, and had an average monthly income of 20,001-25,000 baht.

Information on the Importance Level of Marketing Mix Factors Influencing the Purchase Decision of Processed Fruit among Chinese Consumers The study of the importance level of marketing mix factors influencing the purchase decision of processed fruit among Chinese consumers found that, overall, the product, price, distribution channels, and marketing promotion aspects were all rated as highly important, as detailed below:

Product: The study revealed that the product aspect was of high importance, including the identification of nutritional value, clear weight labeling, certification marks for safety, cleanliness, and hygiene, absence of toxic substances, a variety of processed fruit types, and identification of sources or production locations.

Price: The study found that price was of high importance, including the availability of various price ranges, pricing in line with market rates, affordable prices compared to product quality, and clear price tags.

Distribution Channels: This aspect was considered highly important, including the ability to order online, proper product placement and area arrangement, and convenient store locations.

Marketing Promotion: This aspect was also rated as highly important, including advertising through various media such as online platforms, delivery services, festival discounts, product displays or tastings at the point of sale, advertising materials for providing information, and special promotional giveaways. Information on the Level of Opinions Regarding the Purchase Decision of Processed Fruit among Chinese Consumers

From the study on the level of opinions regarding the purchase decision of processed fruit among Chinese consumers, it was found that, overall, the aspects of need recognition, information search, evaluation of alternatives, purchase decision, and post-purchase behavior were all strongly agreed upon, as detailed below:

Need Recognition: The respondents strongly agreed, including that processed fruit is clean, safe, free from chemical contamination, consists of high-quality fruit with a long shelf life, and tastes better than regular fruit.

Information Search: Respondents strongly agreed, including gathering information from family and friends, previous consumers, sales staff, and advertising media before buying processed fruit.

Evaluation of Alternatives: Strong agreement was found, including considering the prices and packaging of different processed fruit brands as well as their marketing promotions.

Purchase Decision: Strong agreement was found, including the influence of advertising and publicity, good product quality leading to repeat purchases, and recommendations from others who have consumed the product.

Post-Purchase Behavior: Strong agreement was found, including satisfaction with the quality of processed fruit, consistently choosing processed fruit as the first option, recommending others to purchase processed fruit, and being satisfied with its taste.

Suggestions from the Study

This research has revealed the marketing mix factors that influence Chinese consumers' decisions to purchase processed fruits. These findings serve as guidelines for entrepreneurs to develop their products and services. The researcher offers the following suggestions for practical benefit:
In terms of product, entrepreneurs should clearly specify the source or place of production so that consumers are informed about the product's background. Processed fruits must be clean, hygienic, and free from harmful substances to ensure safety and build consumer trust, encouraging repeat purchases.

Regarding price, processed fruit entrepreneurs should display clear price labels so that consumers are aware of the cost and can make informed purchasing decisions. Prices should be appropriate relative to the quality of the product.
For distribution channels, stores should be conveniently located for consumers to purchase processed fruits, and the store layout should be organized so that products are easy for customers to browse and select comfortably.

In terms of marketing promotion, business owners should organize special promotions and free giveaways to attract consumers' interest in purchasing more processed fruits. Product demonstrations and tasting opportunities at the point of sale could also be provided, allowing consumers to sample the products and support their purchasing decisions.

Suggestions for Future Studies

The study of satisfaction in purchasing processed fruit products online and the repurchase decisions of Chinese consumers

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GUIDELINES FOR REDUCING LOSSES AND INCREASING EFFICIENCY IN THE FILM STRIP MANUFACTURING PROCESS,BY TETRA PAK (THAILAND) CO., LTD.

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ABSTRACT

This document presents comprehensive guidelines aimed at reducing losses and enhancing efficiency in the film strip manufacturing process at Tetra Pak (Thailand) Co., Ltd. Key strategies include optimizing raw material quality and usage, standardizing and controlling production processes through SOPs and real-time monitoring, minimizing waste with early defect detection and recycling, and improving operational efficiency via reduced machine downtime and balanced production lines. Additionally, energy and resource management, continuous improvement driven by data analysis and KPIs, supplier collaboration for material consistency, and strict adherence to safety and compliance standards are emphasized. Systematic implementation of these guidelines is intended to improve yield, reduce costs, and ensure sustainable, high-quality production.

Keyword: Document Guidelines Management

INTRODUCTION

Background and Significance of the Study In today's increasingly competitive manufacturing industry,businesses need to adapt to maintain their competitive edge. This involves focusing on producing high-quality goods (kumvilai Et al 2025) and delivering them on time to meet customer demands and gain a competitive advantage. Achieving this goal requires efficient resource management, including raw materials, labor, machinery, and factory facilities. (Nayyar, & Kumar, 2019)

If any of these components are deficient or do not meet the planned targets, it directly impacts product quality and the ability to deliver on target. However, the manufacturing industry currently faces several significant problems, including rising production costs due to fluctuating raw material prices, increased market competition, and quality issues in which products do not meet established standards. These circumstances force factories to adapt quickly to maintain production standards and meet customer demands by seeking ways to reduce waste during the production process. (Graz, 2019)

This research focuses on a case study of Tetra Pak Thailand, established in 1975, which provides integrated services in the production, packaging, and processing of food and beverage products. Currently, Tetra Pak (Thailand) Co., Ltd. has its headquarters in Bangkok and operates factories that produce plastic straws, plastic film strips, and beverage carton caps, as well as a regional technical training center in the Eastern Seaboard Industrial Estate, Rayong Province. This study focused solely on

plastic film strips. (Baudin, & Netland, 2022). This company has clearly demonstrated its commitment to promoting access to quality nutrition and food safety for hundreds of millions of people worldwide while considering the sustainability of natural resources and the environment. This mission is a cornerstone of the organization's founding and remains a core principle to date. Every strategic decision-making process within an organization is based on a commitment to conserving and promoting the public good. In this organizational context, commitment encompasses three main dimensions: maintaining food quality and safety, promoting human well-being, and conserving natural resources and ecosystems. Of these three main dimensions, maintaining food quality and safety is a key focus for the company in its production processes. This is because the company's products are directly related to the security and quality of packaged food, which directly impacts consumer health and brand trust. Therefore, producing high-quality, defect-free strip films is crucial for supporting the organization's core mission. The application of Lean concepts to improve the production process will focus on analyzing the root causes of film wrinkling problems. To design effective preventive and corrective measures, reducing production losses and defects to target levels will directly contribute to increased production process efficiency, improved product quality, and on-time delivery to customers. This will lead to the creation of a sustainable competitive advantage in the packaging sealing film manufacturing industry.

Objectives of the Study:

To study the factors affecting waste in the film strip production process; to analyze the causes and approaches to reducing waste generated in the film strip production process.

Scope of the Study:

Content: The study examines the seven types of waste, quality control, seven problem-solving tools, costs, efficiency, and basic information about the film strip production process. Data Collection Period: January to December 2023. Study and Improvement Period: January to March 2024. Population and Sample: The population and sample used in this study consisted of department heads, factory staff, and technical staff involved in the film strip production process, totaling 15 people. The sample size was calculated using Taro Yamane's (1967:56) method with a 95% confidence level, based on the determination of the population size.

LITERATURE REVIEW

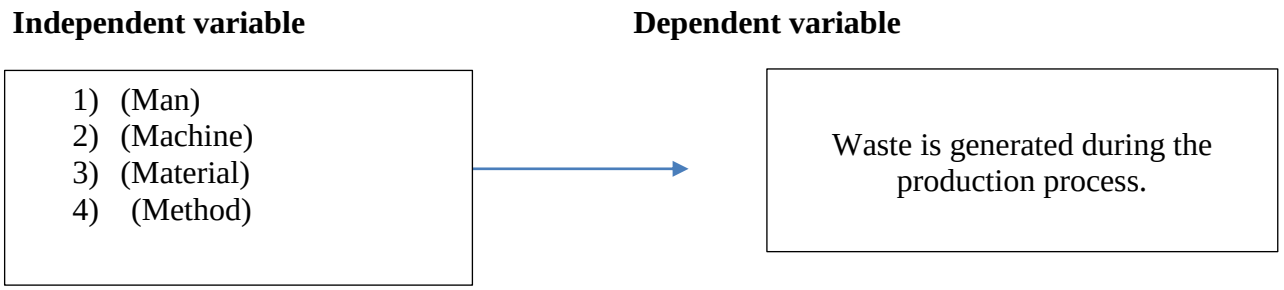
Waste Reduction and Efficiency Improvement in Film Strip Manufacturing: A Case Study of Tetra Pak (Thailand) Co., Ltd. This study refers to the following related concepts, theories, and research: Eliminating the Seven Types of Waste (LOE) is a key factor in Lean Manufacturing. Lean Manufacturing is a system for eliminating waste and continuously improving quality in manufacturing processes, thereby increasing efficiency in activities or tasks. The disadvantages of using the Seven Types of Waste include long production times, low product quality and high costs. [1]The Seven Types of Waste are defined as various losses that cause the efficiency and effectiveness of the manufacturing process to be lower than intended, such as long production times, low product quality, and high production costs. They are defined as various losses inherent in the manufacturing process that lead to higher production costs than they should be and cause production delays owing to the time operators spend fixing problems resulting from these losses. Waste due to the manufacturing process arises from repetitive tasks involving many

[1] Cheremisinoff, P. N., & Ferrante, L. M. (2013). *Waste reduction for pollution prevention*. Butterworth-Heinemann.

unnecessary steps that do not add value to the product. This also includes tasks in the manufacturing process that do not improve product accuracy or quality, such as product quality inspection. This process does not add value to the product. Therefore, this process should be integrated into the production process so that employees can check it while working or waiting for machinery to operate. The problem of losses due to the production process.

Conceptual Framework

Based on the above research, the author utilizes lean manufacturing improvement theory, summarizing and integrating it into a conceptual framework for studying process improvement to increase production efficiency as follows:



METHODOLOGY

This study aimed to investigate the factors affecting waste in the film strip production process of Tetra Pack Co., Ltd. and analyze the causes and methods for reducing waste generated from this process. The population and sample used in this study were determined as follows: The population consisted of 15 department heads, factory staff, and technical staff involved in the film strip production process. The sample size was calculated using Taro Yamane's (1967:56) method with a 95% confidence level as follows:

n = N /(+ 1Ne(^{2}
n = (15+1)/(15(^{2}(0.05)
n = (15+1)/(15((0.0025)
n = 15/1.01
n = 14.85
The calculation will yield a sample size of 15 individuals.

Research Results

This study, titled "Reducing Waste and Improving Efficiency in the Film Strip Production Process," was conducted at Tetra Pak (Thailand) Co., Ltd. The sample group consisted of 15 department heads and employees from the factory and technical departments involved in the film strip production process. The results are divided into five sections. Based on a background study of the company's current situation, it was found that the amount of wrinkled film strip waste in production originated from lamination activity. The departments involved in this production process are the factory and technical departments of the company. This study specifically focused on analyzing the problem of wrinkled films. This is because the analysis of the seven types of waste according to the Lean concept in the previous section revealed that

waste from defective production exceeded the target of 0.45% compared to a target of 0.35%. Wrinkled films were the main component of this waste, accounting for 0.18% of the total production, or almost 40% of all waste. Other types of waste, including black spots, clear marks, circular shiny marks, substandard sizes, torn films, scratches, and non-adhesive films, accounted for only 0.28% of the total production. There are several key reasons for prioritizing the study of wrinkled films. First, the wrinkled film is the largest contributor to waste. Reducing this problem would significantly impact the achievement of overall waste reduction goals. Second, preliminary studies indicate that most wrinkled films are caused by controllable factors in the production process, such as machine setup, maintenance, and raw material management, making corrective actions highly feasible. Third, wrinkled films affect not only production costs but also the quality of the final product delivered to customers, aligning with the organization's mission to maintain food quality and safety. Finally, studying and resolving wrinkled films will serve as a model for applying lean principles to address other types of waste in the future. Furthermore, additional analysis revealed that the wrinkled film is linked to other types of waste in several ways. Wrinkled films are often accompanied by black spots because the wrinkling creates uneven pressure, leading to the accumulation of dirt and the formation of black spots. Uneven lamination caused by a wrinkled film can result in clear streaks from incomplete coating. Moreover, wrinkled films occurring early in the production process often affect the quality in subsequent stages, such as non-standard cutting and adhesive failure. The goal of this study is to reduce the film wrinkling problem from 0.18% to no more than 0.07%, which will result in a reduction of overall production losses from 0.45% to 0.35%, in line with the organization's target. Furthermore, addressing the film wrinkling problem is expected to have a positive impact on reducing other related types of waste

The data pertained to the film strip manufacturing process, which generated waste from a production volume of 9,216,560.00 kg from January to December 2023. A review of past data revealed that 16,397.48 kg of waste was due to wrinkled film. These data show that the waste volume varies each month owing to the differing monthly production volumes. Discussion of Research Findings and Recommendations This study on reducing losses and improving efficiency in the film strip manufacturing process at Tetra Pack Co., Ltd. aimed to: 1) identify factors contributing to waste in the film strip manufacturing process and 2) analyze the causes and strategies for reducing waste in this process. Data on waste-causing factors were collected using questionnaires administered to employees involved in the production process, specifically those in the factory and technical department. QC tools were used to monitor and evaluate the results, which were then incorporated into the brainstorming sessions. The findings are summarized as follows.

Discussion of the Research Findings:

The research findings indicate that applying the seven waste reduction concepts to solve the problem of film wrinkling is effective, especially when using production defects as the main indicator for identifying the target problem. This differs from the research of Soonsaeng (2014), who found black spots to be the main problem in the plastic injection molding process. In contrast, this study found that film wrinkling is the main problem in the film strip production process, demonstrating that the lean concept can be applied in various ways depending on the characteristics of the production process. Interestingly, the study showed that focusing only on the film wrinkling problem from the eight types of waste can significantly reduce losses by 76.47%, which contradicts the traditional Pareto principle, which expects to solve 80% of the problems to achieve significant results. However, these results are consistent with the Modified Pareto Analysis concept, which emphasizes prioritizing and considering the feasibility of solutions rather than strictly adhering to the 80% figure.

The following recommendations are made based on the findings of A successful problem-solving approach should be applied to address other types of defects, such as black spots, clear spots, and circular shine marks. The use of the seven QC Tools should be expanded to other production processes within the company. A continuous improvement tracking system should be established to assess the sustainability of these solutions. An online quality monitoring system should be developed to prevent problems before defects are detected. Training on the seven QC Tools should be provided to employees at all levels. A Quality Improvement Team should be created for continuous improvement. Collaboration among the factory, technical, and quality control departments should be strengthened, and regular follow-up meetings on improvement progress should be held.

Recommendations for future studies include the following: In-depth studies should be conducted on other types of defects to examine the causes and solutions for black spots, clear spots, and circular shine marks. The connections between different types of defects should be analyzed to identify integrated solutions. An economic impact study should be conducted to evaluate the return on investment (ROI) of production process improvements. The impact on production costs and competitiveness should be further studied. The application of digital technology should be studied, focusing on the use of artificial intelligence (AI) and machine learning to predict and prevent defects in the future. A Digital Twin system should be developed to simulate production processes and test improvements. A comparative study should be conducted in the future. This study compares the effectiveness of lean concepts with other improvement concepts, such as Six Sigma or Total Quality Management, examines the results of improvements in companies with similar production characteristics, and conducts a long-term study, tracking the results of improvements over a period of at least one year to assess their sustainability. It also investigates the factors contributing to the long-term success of these improvements.

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WAREHOUSE MANAGEMENT EFFICIENCY OF MEGACHEM (THAILAND) PUBLIC COMPANY. LTD

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ABSTRACT

This study examines the warehouse management efficiency of Megachem (Thailand) Public Company Limited, focusing on evaluating current warehouse operations, identifying factors affecting efficiency, and providing recommendations for improvement. Recognizing the critical role of warehouse management in logistics and business competitiveness, the research highlights the importance of accurate performance measurement to optimize inventory control, space utilization, and operational processes. Megachem's strategic growth, commitment to quality service, and expansion of warehouse facilities underline the need for efficient warehouse management to support fast delivery, precise management, and customer satisfaction. The findings aim to serve as a guideline for enhancing warehouse efficiency, contributing to Megachem's goal of maintaining industry leadership in chemical distribution.

Keyword: Warehouse Management Efficiency

INTRODUCTION

Background and Significance of the Study Currently, businesses recognize the importance of managing logistics costs, which are embedded in every business activity and industry. (Harrison, Van Hoek, Skipworth, & Aitken, 2019) This has resulted in increasingly sophisticated and evolving logistics operations, which serve as strategic drivers of business competitiveness. Consequently, the use of third-party logistics providers, who specialize in comprehensive logistics services, is growing. (Dey, LaGuardia & Srinivasan,2011) This has also led to a trend towards utilizing warehouse services, specifically rental warehouses designed and constructed to support integrated logistics systems. Furthermore, some large retail businesses with the capability to operate comprehensive logistics have expanded their operations to construct their own warehouses. (Yang, Et al 2017) This has resulted in a gradual transformation of the Thai warehouse business structure, leading to continuous warehouse operations and intense competition in the management. This includes the need to develop and modernize processes by eliminating non-value-added steps to satisfy customer needs. Warehouse management is a crucial tool for achieving business goals. Therefore, accurate and precise warehouse performance measurements benefit warehouse management by allowing warehouse managers to identify the variables affecting warehouse efficiency. A key aspect of inventory management that every company should consider is minimizing raw material inventory. (Lubis, Nguyen, & Zelinskaya, 2019) The inventory must be sufficient to meet production or export demands and be readily available for use at all times. Inventory

management encompasses the procurement process. Warehouse planning and management are crucial for business success and competitiveness. Warehouses are the most important components of logistics systems, and effective warehouse management involves several key elements. The complexity of warehouse management requires efficient systems and professional personnel to ensure systematic and efficient operation. (Erkan,2014)Therefore, efficient and accurate warehouse management benefits overall warehouse operations because warehouse managers can identify the variables affecting warehouse efficiency. Warehouse planning and management are essential for business success and competitiveness in the logistics industry. (Harrison, Et al 2019) The company was listed on the Stock Exchange of Thailand (SET) in 2017 on the Market for Alternative Investment (MAI). We are committed to expanding our growth across diverse industries to become a leading chemical distributor in the country and a specialist in industrial chemical distribution. In keeping with evolving needs, Megachem (Thailand) continuously develops and serves its business partners to achieve its goals with the highest quality services in the chemical industry. Megachem (Thailand) is committed to delivering outstanding value through diverse services and building trust with its partners. The company distributes over 1,000 products and provides an excellent shopping experience by curating and integrating a wide range of products to perfectly meet customer needs. MGT emphasizes building strong relationships, satisfaction, and trust with its clients. Our work culture is focused on fast delivery, precise strategic management, and flexible decision-making. Especially in the business sector, Based on the above information, the researcher is interested in studying the warehouse management efficiency of Megachem (Thailand) Public Company Limited to use the results of the study as a guideline for improving warehouse management efficiency for Megachem (Thailand) Public Company Limited.

Study Objectives:

To study the warehouse management of Megachem (Thailand) Public Company Limited, a chemical distributor.

To study the efficiency of warehouse management of Megachem (Thailand) Public Company Limited.

Scope of the Study

Content Scope: This study examines the warehouse management efficiency of Megachem (Thailand) Public Company Limited, utilizing warehouse management concepts encompassing receiving, storage, maintenance, and delivery processes. Efficiency theory includes aspects of work quality, quantity, time, and cost. Population and Sample: The population and sample used in this study are the 60 users of Megachem (Thailand) Public Company Limited warehouse services.

LITERATURE REVIEW

The Meaning of Warehouse Management: (Faber, De Koster, & Smidts, 2013). A warehouse refers to a planned space designed for efficient use and movement of goods and raw materials. Warehouses serve to store goods during the transportation process, supporting production and distribution. (Jones, & Spencer, 1989) Goods stored in a warehouse can be divided into two types: raw materials (in the form of raw materials, components, and parts and finished goods (including work-in-process, as well as discarded goods and recyclable materials. defined warehousing and storage as activities encompassing warehouse structure planning or selection, storage design, internal space allocation, and necessary equipment for warehouse activities. Efficient warehouse planning and management facilitates operations and can add value to products. (Salgueiro, L., Martins, & Correia, 2010)

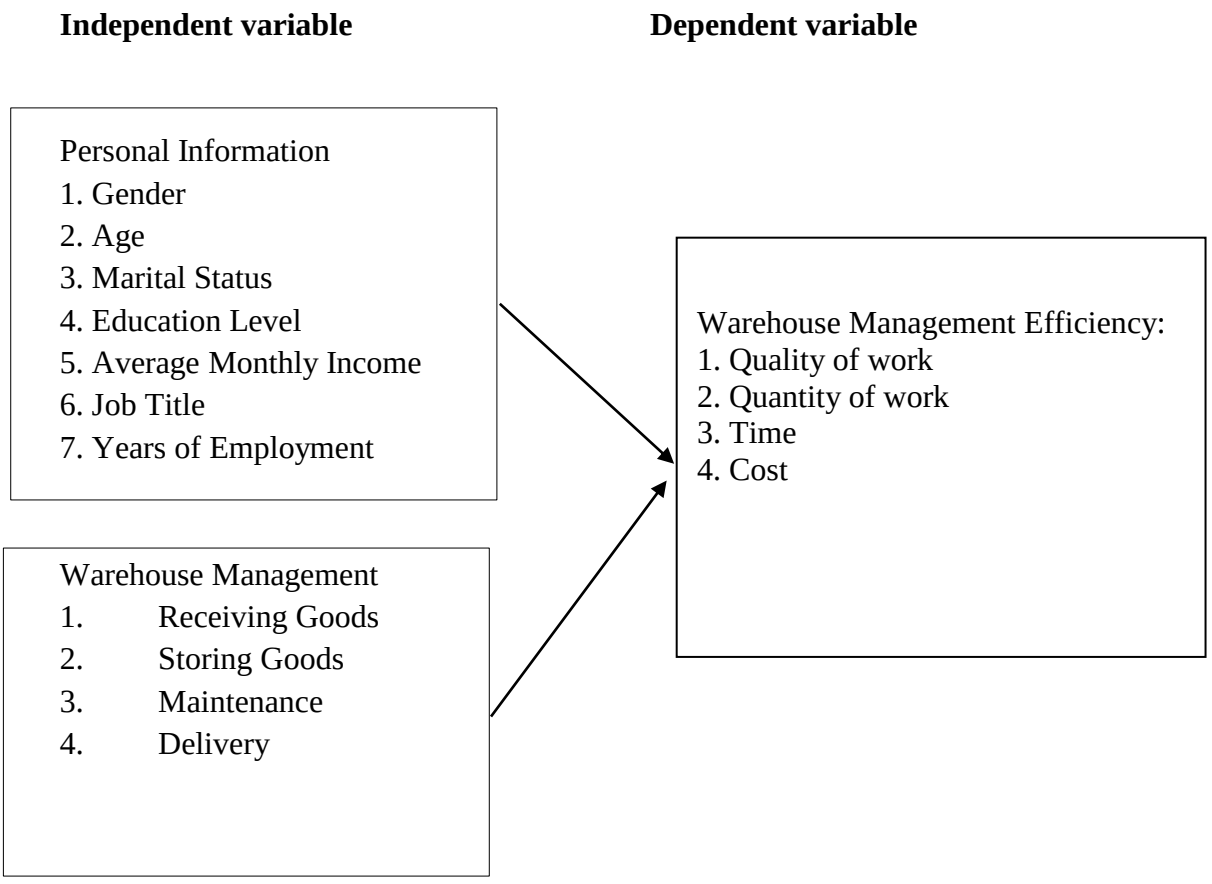
The main goal of warehouse management is to create a systematic operation that is cost-effective, controls the quality of storage and picking, and prevents and reduces losses from operations. To minimize

operating costs and maximize space utilization, most warehouses share similar basic processes: receiving, storing, picking, and delivering. Each process is detailed in warehouse management as follows (Žunić, Delalić, Hodžić, Beširević, & Hindija, 2018,)

Receiving Goods: The receiving process involves activities to receive goods from suppliers. This requires counting the quantity, characteristics, and quality of the goods to ensure they match the order. The received goods must have the correct quantity, correct condition, and correct delivery time, as per the supplier's order. For large deliveries, a common method of random counting is to randomly sample %10 of the incoming boxes or pallets to check their quantity and quality, and to verify that they match the purchase order and delivery notes. The percentage of random sampling depends on the business's trust in the supplier. For new suppliers, the business should count all delivered goods to ensure complete delivery. This also helps assess the supplier's quality for future purchasing decisions. Currently, barcode or RFID technology is used for inventory counting. By attaching barcodes to boxes or pallets, businesses can conveniently scan them using portable devices. RFID technology, on the other hand, uses radio frequency identification (RFID) readers to instantly read data as goods move past the reader. This makes inventory counting much faster and more convenient. However, while using instruments to count goods expedites the process, human inspection of the received goods still remains.

Conceptual Framework for the Study

This study examines the warehouse management efficiency of Megachem (Thailand) Public Company Limited.The researcher utilized warehouse management concepts and efficiency theory to summarize and integrate them into the following conceptual framework:



METHODOLOGY

This study on the warehouse management efficiency of Megachem (Thailand) Public Company Limited aims to examine the warehouse management of Megachem (Thailand) Public Company Limited, compare the warehouse management efficiency of Megachem (Thailand) Public Company Limited categorized by personal data, and investigate the factors affecting warehouse management efficiency at Megachem (Thailand) Public Company Limited. The study methodology is as follows:

Research

This study examines the warehouse management efficiency of MegaChem (Thailand) Public Company Limited. The sample group consisted of 60 employees of MegaChem (Thailand) Public Company Limited who utilize the company's warehouse services, representing 100% of the questionnaire respondents. The study investigates the influence of warehouse management practices on the efficiency of MegaChem (Thailand) Public Company Limited.

Warehouse management information.	B	Std. Error	Beta	T	Sig.	Test
(Constant)	0.046	0.373		0.124	0.902	
Regarding the receiving of goods.	0.432	0.179	0.401	2.417	0.021*	yes
Regarding warehousing.	0.104	0.207	0.099	0.501	0.619	no
In terms of care and maintenance.	0.112	0.160	0.111	.697	0.490	no
Regarding product delivery.	0.530	0.178	0.453	2.971	0.014*	yes

* Statistically significant at the .05 level.

An analysis of the warehouse management factors influencing the warehouse management efficiency of Megachem (Thailand) Public Company Limited revealed that the receiving and delivery aspects significantly impacted the company's warehouse management efficiency at the .05 statistical significance level.

Summary of Results, Discussion, and Recommendations Summary

This study on warehouse management at Megachem (Thailand) Public Company Limited aimed to examine warehouse management and its efficiency by comparing the efficiency of warehouse management categorized by personal data and the impact of warehouse management on the efficiency of Megachem (Thailand) Public Company Limited. A questionnaire with 60 questions was used to collect data. Statistical analyses included percentages, means, t-tests, one-way ANOVA, and multiple regression analysis. The results of the data analysis are summarized as follows: Personal Data The study found that the majority of respondents were male, aged 21-30, single, held a bachelor's degree, had an average monthly income of 25,001-35,000 baht, held a staff position, and had 6-10 years of work experience.

Information Regarding Warehouse Management at Megachem (Thailand) Public Company

Limited A study of the importance of information related to warehouse management at Megachem (Thailand) Public Company Limited revealed that the aspects of Goods Receiving, Put Away,

Preservation, and Goods Issuing are, overall, at the highest level of importance. Details are as follows: Goods Receiving: The study found that the overall average importance of the receiving aspect of warehouse management was at the highest level. When considering the level of importance, the five items are as follows: fast and accurate receiving of goods; checking the condition of goods for accuracy and completeness; ensuring that boxes are not damaged or torn; having a well-organized receiving system; having concise, accurate, and clear reports (= 4.83); and accurately counting the quantity of goods according to the sequence. Put Away: The study found that the overall average importance of the put-away aspect of warehouse management was at the highest level. When considering the level of importance... The five most important items in terms of warehouse management are sufficient and readily available storage facilities, storage considering the frequent movement of goods, the First In First Out (FIFO) method of sorting and retrieving goods, storage separated by type and category, and sufficient and readily available storage shelves/spaces. Regarding Preservation, the study found that the overall average importance of preservation in warehouse management was at the highest level. When considering individual importance, the five most important items were frequency of inventory counts, safety measures for storing goods, modern material handling equipment and tools for pest and ant control, and proper procedures and services for storing goods. Regarding Goods Issuing, the study found that the overall average importance of goods was at the highest level. When considering individual importance, the five most important items were grouping goods for distribution by area (Export, Domestic), having a definite time and location for goods distribution, appropriate packaging materials for the type of goods, and using materials to prevent goods from falling off pallets during transportation. Product identification documents are distributed to each customer in sequence. Warehouse Management Performance Data, Megachem (Thailand) Public Company Limited A study of the importance of warehouse management at Megachem (Thailand) Public Company Limited found that the aspects of work quality (Quality), work quantity (Quality), time (Time), and costs (Costs) were the most important, with details as follows: Work Quality (Quality): The overall study results showed the highest importance level, with the following five items being the most important: correct and complete receiving of goods, sufficient stock to meet customer demand, goods stored are arranged according to expiration dates, goods stored do not deteriorate from long-term storage, and goods delivered are in perfect condition. Work Quantity (Quality): The overall study results showed the highest importance level, with the following five items being the most important: effective inventory control to reduce inventory levels; on-time delivery every time; correct and complete quantity of goods delivered every time; confidence in product quality; and a positive delivery image without damage. Time (Time): The overall study results showed the highest importance level, with the following items being at the most important level: The five most important items are: using technology for quick inventory recording, using technology for quick goods handling, short storage times, fast and on-time delivery to customers, and accurate delivery of goods according to orders. Regarding costs, the study results ranked them as the most important, with the five most important items being reducing unnecessary inventory, efficient use of storage space, reduced carrying costs, reduced value of damaged goods during transit, and reduced transportation costs.

Discussion of Results Recommendations from the Study The researchers recommend the following improvements to the warehouse management efficiency of Megachem (Thailand) Public Company Limited based on the study results: Regarding Receiving, management should implement a barcode system for receiving goods by attaching barcodes to each product. This will enhance the efficiency of inventory counting, save time, reduce errors and costs, and improve data accuracy. For returned goods from customers, the company should provide a document for receiving returned goods, with company employees and customers jointly verifying the accuracy of the goods before accepting them back into the company. Regarding Goods Issuing, management should implement a GPS system for goods delivery. Installing GPS on delivery vehicles improves efficiency, allows for vehicle status tracking, facilitates

internal coordination, saves time, reduces errors and costs, and improves data accuracy. For delivered goods, the company should provide a document for delivering goods from customers, with company employees and customers jointly verifying the accuracy of the goods before accepting them back into the company. Regarding Putaway, management should provide sufficient space and facilities for storing goods and ensuring their readiness for use. Implement a first-in, first-out (FIFO) storage system to minimize product damage from expiration and prioritize ease of product handling. Regarding preservation, management should prioritize safety measures during storage, including modern pest and ant control equipment, and frequent inventory counts. Suggestions for Future Research Future studies should utilize in-depth interviews to obtain more detailed information on warehouse management and understand customer needs for development purposes. The scope of this study should be expanded to include a wider population for comparative analysis and to obtain more accurate and precise data.

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MARKETING MIX FACTORS INFLUENCING THE DECISION TO USE THE SERVICES OF A COMMUNITY SHOPPING CENTER ON SRINAKARIN ROAD

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ABSTRACT

The objective of this study is to analyze the impact of marketing mix factors on the decision to use the services of a community shopping center located on Srinakarin Road. The study methodology involved selecting a sample of 400 individuals who are users of this community shopping center. The sample size was determined using a calculation method for cases where the exact population size is unknown, with the target group set at 384 participants. The results indicate that the analysis of marketing mix factors affecting the decision to use the services of the community shopping center on Srinakarin Road revealed that product, distribution channels, process, and physical characteristics significantly influence the decision to use the services of this shopping center, with statistical significance at the .05 level.

Keywords: Decision-Making, Service, Community

INTRODUCTION

The expansion of communities and the changing lifestyles of people in Bangkok have shifted significantly from the past, resulting in changes in consumer spending behavior.The traditional model of shopping center development can no longer address issues related to location, being in the city center, and time lost traveling. To better meet the needs of residents in nearby communities, most community shopping centers feature partially open-air spaces, focus on the convenience of access, and are developed to specifically match community needs. In addition to developing shopping centers to respond to user behavior, employing effective management strategies after development is crucial for the success of shopping centers. These strategies include property management, marketing, and space leasing. (Sutherland, 2006)

The development of community malls, particularly in the outer areas of Bangkok, is often undertaken by new investors entering the community mall industry. Beyond project development, (Cavaye, 2006) it is vital for developers to study strategies for managing shopping centers, including marketing management, tenant mix management, and a deep understanding of consumer behavior. Owing to the high investment and intense competition, community shopping centers need efficient and effective strategies that benefit users while also supporting tenants within the centers to survive. The study of community shopping center management reveals that many factors, once a project has been developed, are difficult or impossible to change later. However, management strategies can be adapted by project executives to suit changing circumstances. (Deepak,& Jeyakumar, 2019).

One such community mall is located on Srinakarin Road, (Baoqi, & Renfa, 1990) a prime location in the city. This community shopping center has a project value of 2.5 billion baht and has been operating since May, 2012. It is the first of its kind in Thailand, under the "Green Concept," which emphasizes energy saving and environmental friendliness. From the open construction layout, with over 50% green space, architecture that highlights natural elements, computer-controlled electrical systems, use of solar energy, water recycling, to marketing formats and activities encouraging customers to join in environmental conservation, the center is designed to meet the needs of consumers of all genders and ages, with a strong focus on providing high-quality services to retain customers. Based on the above information, the researcher is interested in studying the marketing mix factors that influence the decision to use community shopping centers. The findings from this study can serve as guidelines to help improve and develop services to better meet the needs of users to increase the number of new customers and retain existing clientele.

Objectives of the Study

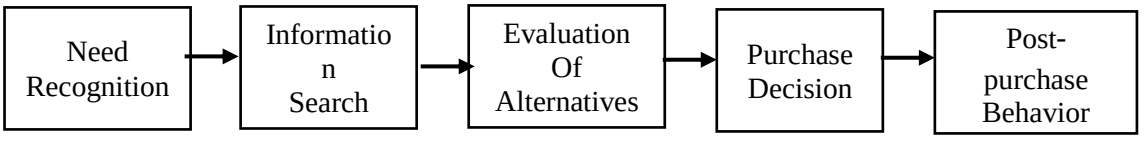
To examine the results of the analysis of marketing mix factors affecting the decision to use the services of a community shopping center located on Srinakarin Road.

LITERATURE REVIEW

A study on the marketing mix factors influencing the decision to use the services of a community shopping center on Srinakarin Road. The researcher has reviewed documents, concepts, theories, and related research to establish a conceptual framework and approach for the study as follows: Marketing mix theory, the definition of marketing mix—many scholars have defined the term “marketing mix” for service businesses as follows.

Kotler, P. (2012) defined the marketing mix as a set of variables or marketing tools that can be controlled. Companies commonly utilize these in combination to satisfy and meet the needs of their target customers. Initially, the marketing mix consisted of only four variables (4Ps): Product, Price, Place (distribution channels), and Promotion. Later, three more variables were added: People, Physical Evidence, and Process, to better align with key concepts in modern marketing, especially in the service sector. Therefore, this is collectively known as the 7Ps marketing mix

Theories of Decision-Making



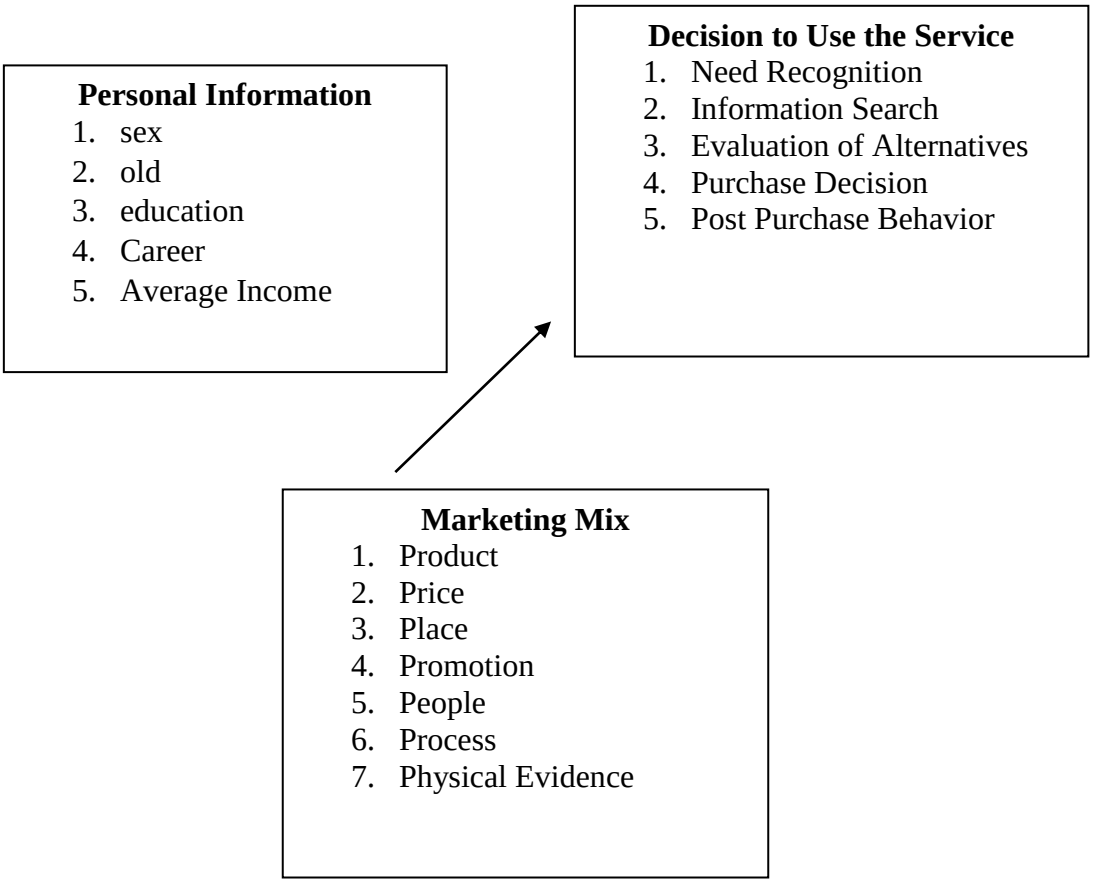
Armstrong, Adam,Denize,& Kotler,(2014).

Conceptual Framework

Based on the aforementioned research, the researcher utilizes the 7P’s marketing mix theory and service usage decision-making. These are summarized and integrated to form the conceptual framework for

studying the marketing mix factors that influence the decision to use the services of a particular community mall located along Srinakarin Road

Independent variable **Dependen variable**



METHODOLOGY

The study of marketing mix factors influencing the decision to use the services of a community shopping center on Srinakarin Road aims to examine the marketing mix factors involved in choosing the services of a community shopping center on Srinakarin Road, and the decision-making process regarding the use of such services. It also aims to compare these decisions among users based on personal demographic data and the marketing mix factors affecting the decision to use the services of this community shopping center. The study's results are intended to be used for planning and providing services that meet the needs of users, in order to increase the number of people utilizing the services of the community shopping center on Srinakarin Road. Study methods have been specified accordingly.

Population and Sample Used in the Study

The population in this study consisted of individuals who utilized the services of a community shopping center located on Srinakarin Road. A sample of 400 people was selected. This study used W.G. Cochran's (1954)formula for calculating sample size when the exact population number is unknown, with a

confidence level of 95%, as follows:

n 5.) =0(05^2.)/(1.96^2)(50.-1)(
n 0025./(3.8416)(5.)(5.) =
n 0025./9604. =
n 384.16 =

In the calculation, the sample group consisted of 385 people. However, to prevent any potential errors from incomplete or inaccurate questionnaire responses, the researcher decided to use a sample group of 400 people.

Results

This study examines the marketing mix factors influencing the decision to use the services of a community shopping center located on Srinakarin Road. The sample group comprised the general public and individuals who used the services of this community shopping center. Data were collected using 400 questionnaires, all of which were returned, representing a 100% response rate. The data were analyzed using statistical methods to compare the marketing mix factors affecting the decision to use the services of the community shopping center on Srinakarin Road. The results of the comparative data analysis can be summarized as follows: Results of the analysis of the marketing mix factors influencing the decision to use the services of the community shopping center on Srinakarin Road.

analysis of marketing mix factors affecting the decision to use the services of a community shopping center located on Srinakarin Road.	B	Std . Error	Beta	t	Sig	Test
(Constants)	.538	.113		4.770	.000	yes
Product	.139	.045	.149	3.132	.002*	yes
Price	.044	.049	.049	.894	.372*	no
distribution channels	.131	.045	.144	2.888	.004	yes
Marketing Promotion	.057	.049	.066	1.169	.243*	no
People	.020	.052	.022	.379	.705	no
Process	.170	.055	.196	3.113	.002	yes
Physical Characteristics	.297	.048	.338	6.130	0.00*	yes

* Statistically significant at the .05 level

The results of the analysis of marketing mix factors influencing the decision to use the services of a community shopping center on Srinakarin Road found that the product, distribution channel, process, and physical characteristics significantly affect the decision to use the services of the community shopping center on Srinakarin Road at the .05 statistical significance level.

Summary

The study on marketing mix factors affecting the decision to use services at a community shopping center on Srinakarin Road aimed to examine these factors in relation to service usage at the shopping center, analyze the decision-making surrounding its usage, compare decision-making among users, and identify which elements of the marketing mix influence their decision to use the center's services.

A questionnaire of 400 sets was used as the data collection tool. Statistical methods applied included percentage, mean, One-Way ANOVA hypothesis testing, and Multiple Regression Analysis. The results can be summarized as follows:

Personal information A study of the marketing mix factors affecting the decision to use the community shopping center on Srinakarin Road found that most respondents were female, aged between 31-40 years, working as private company employees, with a bachelor's degree, and an average monthly income of 30,000-40,000 baht.

Information regarding the marketing mix factors in using services at the community shopping center on Srinakarin Road Overall, the respondents' opinions regarding product, price, distribution channels, promotion, people, process, and physical evidence factors were at a high level. The details are as follows:

Product For the product aspect, results showed an overall high level of importance. Five items were rated as highly important: the overall image of the shopping center, the variety of products and services available within the center, the reputation of the center, having trendy and modern products, and unique, contemporary designs that set it apart from other shopping centers.

Price For pricing, the overall importance was also high. The five most significant items were: the availability of multiple payment methods for goods and services, prices being appropriate to the quantity of products, product prices being reasonable in relation to quality compared with other shopping venues, a diverse price range to choose from, and the appropriateness of other service charges (such as food prices, parking fees, etc.) within the shopping center.

Place (Distribution Channels) For distribution channels, the importance was again high. The five most important aspects were: convenient walk-in access, sufficient parking, clear service operating hours, spaciousness, and clearly displayed prices at sales points. Other notable factors included location, travel convenience, adequate parking, and connection to public transportation.

Promotion The overall importance of promotion was high. The five key items were: most stores frequently offer product discounts, comprehensive marketing activities in collaboration with credit cards, banks, or mobile phone networks, appropriate advertising and public relations, accumulation of purchase points at stores and the center, and regular opportunities for minimum purchases to get gift cards or redeem prizes.

People For the people factor, the overall importance was high. The top five aspects were: staff dress appropriately and neatly; staff serve willingly and with friendliness; staff are knowledgeable and capable; staff provide attentive service; and staff give suitable advice.

Process For service processes, the overall importance was high. The most significant items were: security systems, quick parking services, attentive customer care, staff's welcoming approach, and the center's

well-organized categorization of shops.

Physical Evidence The overall importance of physical evidence was high. The top five aspects were: comprehensive security, a suitable external environment and atmosphere of the center, appropriate allocation of service areas, attractive interior decoration, and up-to-date, well-designed website or Facebook page.

Information regarding the decision to use a community shopping center on Srinakarin Road reveals that, overall, respondents had a high level of agreement concerning the decision to use the community shopping center in this area. The details are as follows:

In terms of needs recognition, the study found that the level of agreement regarding the decision based on needs recognition was at a high level of importance. When considering the specific aspects, there were five highly important factors: the need for safety, the desire for high-quality products at reasonable prices, the need for quick service, convenience in shopping, and a wide variety of products to choose from, respectively.

Regarding information search, the level of agreement on decision-making based on information search was also at a high level of importance (average = 3.91). The five most important sources were: searching for information from websites and online media, receiving helpful recommendations from service providers, inquiring information from friends, acquaintances, and relatives who had previously used the service, gathering information from various advertisements and public relations channels, and consulting with trustworthy individuals, respectively.

For evaluating alternatives, the study found that the level of agreement in decision-making through evaluating options was also at a high level. The five most important factors were: comparing promotions of each shopping center, comparing the quality of service among different shopping centers, comparing product prices at various shopping centers, comparing service standards of the centers, and comparing the reputation, credibility, and reviews of each shopping center, in order.

In terms of purchase decision, the study found that the overall level of agreement regarding purchase decision-making was very high. The five most important reasons were: deciding to use the service because products are of better quality than elsewhere, choosing the center because it is well-known and trustworthy, using the service due to positive past experiences, using the service because the products are inexpensive, and choosing based on recommendations from friends, family, and acquaintances, respectively.

Regarding post-purchase behavior, the study showed a high level of agreement concerning post-purchase decision-making. The five most important behaviors were: continuing to use the service, frequenting the same shopping center, recalling the shopping center they had used before, recommending the center to friends and acquaintances, providing feedback to the center when experiencing issues to help improve service efficiency, and reviewing their service experience on social media, respectively.

Comparison of Decision-Making in Using a Community Shopping Center on Srinakarin Road Classified by Personal Information

Differences in personal information affect the decision to use a community shopping center on Srinakarin Road in different ways. It was found that gender and age do not significantly influence the decision to use

this community shopping center. However, differences in occupation, educational level, and average monthly income significantly affect the decision to use the community shopping center on Srinakarin Road at a statistical significance level of .05.

Marketing mix factors influence the decision to use a community shopping center on Srinakarin Road.

The study found that marketing mix factors have an influence on the decision to use a community shopping center on Srinakarin Road. Specifically, product, distribution, process, and physical characteristics significantly affect the decision to use the community shopping center on Srinakarin Road at a statistical significance level of .05.

Discussion of Results

The marketing mix factors affecting the decision to use the services of a community shopping center on Srinakarin Road revealed that the marketing mix factors, including product, price, distribution channel, marketing promotion, people, service process, and physical characteristics, all had an average rating at a high level of importance.

The marketing mix factor—product—had an average rating at a high level of importance regarding the decision to use the services of the community shopping center on Srinakarin Road.

The marketing mix factor—price—also had an average rating at a high level of importance in the decision to use the community shopping center on Srinakarin Road.

The marketing mix factor—distribution channel—was found to have an average rating at a high level of importance for the decision to use the community shopping center on Srinakarin Road.
The marketing mix factor—marketing promotion—likewise showed an average rating at a high level of importance in the decision-making process for using the community shopping center on Srinakarin Road.
The marketing mix factor—people—had an average rating at a high level of importance concerning the decision to use the services of the community shopping center on Srinakarin Road.
The marketing mix factor—process—was also rated at a high level of importance for the decision to use the community shopping center on Srinakarin Road.
The marketing mix factor—physical characteristics—received an average rating at a high level of importance concerning the decision to use the services of the community shopping center on Srinakarin Road. At Central Plaza Pinklao Shopping Center, the physical characteristics were also found to be highly important factors influencing the decision to use the services.

Overall, the decision to use the services of the community shopping center on Srinakarin Road was rated at a high level of importance.

Differences in personal information, such as occupation and average monthly income, were found to affect the decision to use the services of the community shopping center on Srinakarin Road differently. The marketing mix factors of product, distribution channel, process, and physical characteristics were found to influence the decision to use the services of the community shopping center on Srinakarin Road.

Suggestions

Researchers can use the 7P framework as a tool to analyze consumer behavior in other service businesses,

such as healthcare facilities, hotels, or co-working spaces. It is recommended to conduct comparative studies on the importance of each factor among different demographic groups, such as adolescents, working adults, and the elderly, in order to develop appropriate strategies. It is also advisable to include intervening variables, such as satisfaction, trust, brand image, or user experience, to add depth to the analysis. Furthermore, the use of qualitative research methods, such as in-depth interviews or focus groups, is encouraged to gain a deeper understanding of consumers' motivations and perspectives.

Suggestions for Future Studies

1. Future research should focus on the service usage decisions of specific customer groups, such as teenagers, the elderly, or families, segmented by demographics, in order to analyze their service selection behaviors in detail.
2. A comparison of community mall shopping centers in various locations—such as Srinakarin Road versus Sukhumvit or Ramkhamhaeng—should be conducted to analyze consumer behavior differences according to each community context.

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A STUDY OF FACTORS INFLUENCING PURCHASING DECISIONS AT TRADITIONAL RETAIL STORES IN BAN KHAI DISTRICT, RAYONG PROVINCE

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ABSTRACT

A study of factors influencing purchasing decisions at traditional retail stores. Ban Khai District, Rayong Province, aims to study 1) marketing mix factors in the use of traditional retail stores. Ban Khai District, Rayong Province 2) Deciding to use traditional retail stores. Ban Khai District, Rayong Province 3) To compare the decision to use traditional retail stores. Ban Khai District, Rayong Province, according to personal information 4 marketing mix factors that affect the decision to use traditional retail stores Ban Khai District Rayong Province selected a sample of 400 people using a questionnaire as a tool for the study. And the collected data were processed using percentage statistics and mean t-test. ANOVA analysis used F-test, (One-way ANOVA), Correlation and Multiple Regression Analysis.

The results of the study found that the majority of respondents were female, aged 18-30 years, with a high school education or a vocational certificate. Income 10,001-20,000 baht and working as a student or university student. Marketing mix factors in using traditional retail stores. Ban Khai District, Rayong Province, importance is at a high level. Hypothesis testing results Personal factors such as gender, age, education level Different occupations and average monthly incomes have different decisions to use services.

Suggestions from the results of the study that traditional grocery store operators should provide products necessary for their livelihood. Products that local people want Products that are popular during each period are sold in the store. Arrange products into categories for users to purchase easily and conveniently. Choose a location in a dense community. Organize promotional activities during various festivals. Attentive to customers Provide service with honesty Service to receive orders and deliver to residences Learn and apply modern financial technology to provide convenience to service users.

Keywords: marketing mix factors (7Ps), decision making, traditional retail stores (grocery stores)

INTRODUCTION

The transformation of the global and Thai retail business landscape from the traditional retail system to the model of large-scale trade, utilizing branch systems to enhance commercial advantages and better respond to consumers, has significantly affected small businesses that are unable to adapt to increased competition. (Feeny, Vongpatanasin, T., & Soonsatham, 1996) Changes in consumer behavior have resulted in these small businesses having lower competitiveness and, in many cases, being unable to compete at all—leading to a large number of closures. The traditional retail stores that persist today are unable to develop into modern retail outlets. The development of retail businesses cannot be halted, (Vaja, 2015) especially given the intensely competitive and rapidly evolving nature of today's trade environment. Businesses now constantly need to adapt to shifting consumer demands, which reflect the emergence of new social norms. As a result, enterprises unable to adjust must exit the market. Modern retail businesses now employ a variety of management strategies—leveraging economies of scale,

combining forces to create advantages in both marketing and cost management, using superior technology, and benefiting from greater bargaining power.

Retail businesses can be divided into two main groups. The first group is traditional trade, where shops do not focus much on interior design, foster close relationships with their customers, place goods according to preference, and are managed by individuals—such as weekend market stalls, street vendors, and the most widely known, the traditional grocery store. (Vaja, 2015) The second group is modern trade. Stores in this group invest in decor, systematically organize and sell products, have greater bargaining power, and are able to sell larger volumes of goods. Store formats across locations are generally similar, such as department stores and various convenience stores. Modern retail also covers online businesses. Retail forms a significant part of daily life for many people. In 2017, Thailand's retail business value was 3.5 trillion baht, accounting for 23% of GDP. Convenience stores and discount stores generate revenues in the hundreds of billions of baht, surpassing other retail groups due to their broader customer base. For example, 7-Eleven serves over 12.8 million customers daily, and Tesco Lotus serves more than 2.1 million per day. Between 2015 and 2017, the retail industry saw investments totaling over 130.2 billion baht, averaging 43.4 billion baht per year Modern retail businesses are continuously expanding new branches, covering vast areas—even reaching residential communities. Consumers now demand convenience from easily accessible neighborhood stores. (Masruroh, 2017,)

In contrast, traditional retail businesses sell essential goods, maintain friendly, empathetic relationships with customers, and are on familiar and personable terms with them. Business is conducted through both cash and credit sales, with flexibility regarding product selection, pricing, and location. Most traditional retail businesses use the owner's residence as the shop. Presently, traditional retail must confront sweeping changes, causing declines in revenue and profit, as modern retail outlets and online shopping options encroach upon traditional sales channels. Consumers now have more options, which simultaneously leads to greater competition. Some traditional retailers have suffered losses and have been forced to close down. Therefore, the researcher is interested in studying the factors affecting purchasing behaviors at traditional retail stores, with the aim of utilizing these insights to improve traditional retail businesses and help them succeed, grow, and achieve better profitability.
Based on the above information, the researcher is interested in studying the factors influencing consumers' purchasing decisions at traditional retail stores in Ban Khai District, Rayong Province. The findings will serve as a guideline for improving the distribution of products through traditional retail stores in Ban Khai District, Rayong Province, to better meet consumer needs.

OBJECTIVE

Different personal information affects the decision to use traditional retail stores in Ban Khai District, Rayong Province.

Marketing mix factors influence the decision to use traditional retail stores in Ban Khai District, Rayong Province.

LETERATURE REVIEW

In terms of content, this study examines the factors influencing purchasing decisions at traditional retail stores in Ban Khai District, Rayong Province. It is based on the concept of the marketing mix, which includes product, price, place, promotion, people, process, and physical evidence. Additionally, it applies

the decision-making theory, which consists of problem recognition, information search, evaluation of alternatives, purchase decision, and post-purchase behavior.

Marketing Mix Theory

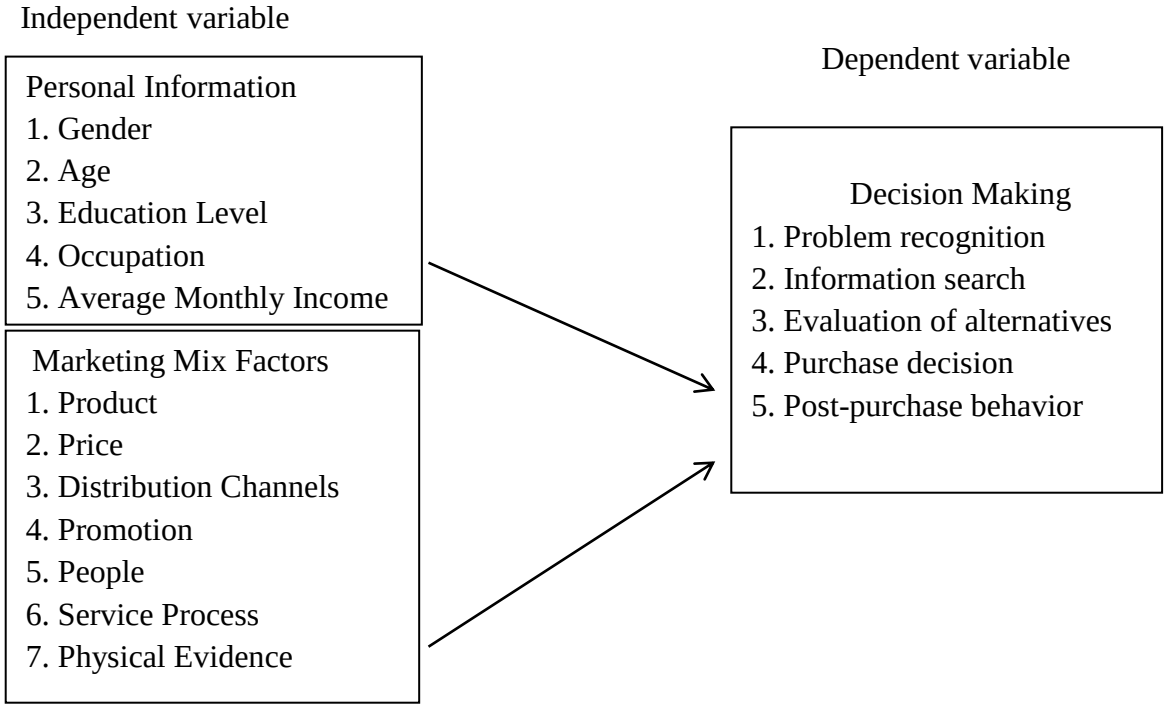
The Meaning of the Marketing Mix Many scholars have defined the term "marketing mix" for service businesses as follows: Philip Kotler (1997) stated that the marketing mix refers to marketing variables or tools that can be controlled. Companies typically use these in combination to satisfy and meet the needs of their target customers. Originally, the marketing mix consisted of only four variables (the 4Ps): Product, Price, Place (channels of distribution), and Promotion. Later, three additional variables were introduced: People, Physical Evidence, and Process, to align with important modern marketing concepts—particularly those relevant to service businesses. Therefore, this is collectively referred to as the 7Ps of the marketing mix. (Kotler, 1997)

Decision-Making Theory

From studying the concepts of decision-making theory, it has been found that there are various definitions of decision-making. For example, Schiffman & Kanuk (1994) defined the consumer buying decision process as the process in which buyers make decisions and have multiple options to choose from. They compare these options before making a purchase decision in order to achieve their goals. The first step is problem recognition, where consumers perceive a difference between what they currently have and what they want. This recognition may occur on its own, or be triggered by internal or external stimuli, including physical needs and psychological needs. Once these needs reach a certain level, they become motivators, prompting individuals to learn how to manage these stimuli based on past experiences. This enables them to know how to respond to future stimuli. (Edwards,1954)

CONCEPTURAL FRAMWORK

Based on the aforementioned research, the researcher has utilized the 7Ps marketing mix theory to summarize and integrate a conceptual framework for studying the marketing mix factors that influence consumers' purchasing decisions at traditional retail stores in Ban Khai District, Rayong Province, as follows:



METHODOLOGY

The study on factors influencing the decision to purchase goods from traditional retail stores in Ban Khai District, Rayong Province, aims to examine the marketing mix factors involved in choosing to use traditional retail stores in Ban Khai District, Rayong Province; the decision-making process in choosing to use traditional retail stores in Ban Khai District, Rayong Province; a comparison of decision-making in choosing to use traditional retail stores in Ban Khai District, Rayong Province, based on personal information; and the marketing mix factors affecting the decision to use traditional retail stores in Ban Khai District, Rayong Province. Data from this study can be used as a guideline for planning, improving, and developing distribution and services to increase sales for traditional retail stores in Ban Khai District, Rayong Province. The study methodology is defined as follows: Population and sample used in the study

n = (.50)(1.-50)(1.96.)/(^{2}05(^{2}

n = (.5) (.5) (3.8416)/.0025

n = .9604/.0025

n = 384. 16

Study Results

The study on "Factors Influencing the Decision to Purchase Products from Traditional Retail Stores in Ban Khai District, Rayong Province" focused on a sample group of people who use the services of traditional retail stores in Ban Khai District, Rayong Province. A total of 400 questionnaires were used as the data collection tool, all of which were returned, representing a 100% response rate. The study results are divided into six sections as follows:

Analysis of Marketing Mix Factors Influencing the Decision to Purchase Products from Traditional Retail Stores in Ban Khai District, Rayong Province

marketing mix	Std.			ผลการ	
	B	Error	Beta	t	Sig.	Test
Constant	.275	. 080		3.453	.001	
Product	.132	.030	.1 65	4.335	.000*	yes
Price	.089	.043	.100	2.083	.038*	yes
distribution channels.	.062	.042	.0661	. 448 .	148	no
promotion	.107	.028	.3	122.	807 .000*	yes
personal	.300.	037	.321	8.084	.000*	yes
process	.0	32.0	36.032	.884	.377	no
physical	.214	.037	.225	5.785	.000*	yes

** Statistically significant at the .05 level (2-tailed)

A comparison of marketing mix factors influencing the decision to purchase products from traditional retail stores. The results of the hypothesis test showed that product, price, promotion, personnel, and physical characteristics significantly influence the decision to purchase products from traditional retail stores at the .05 statistical significance level.

SUMMERY

The study on factors influencing the decision to purchase products from traditional retail stores in Ban Khai District, Rayong Province aimed to examine the marketing mix factors affecting the use of traditional retail stores in Ban Khai District, Rayong Province; to study the decision-making process in using traditional retail stores in Ban Khai District, Rayong Province; and to compare the decisions to use traditional retail stores in Ban Khai District, Rayong Province based on personal data, as well as to analyze the marketing mix factors that influence the decision to use traditional retail stores in Ban Khai District, Rayong Province. This quantitative research used 400 questionnaires as the tool for data collection, and statistical analyses including t-test, ANOVA using F-test (One-way ANOVA), and Multiple Regression Analysis. The results of the data analysis can be summarized as follows:

According to the study, there were a total of 400 respondents, the majority of whom were female, aged 18-30 years old, with education at the upper secondary or vocational certificate level, an income of 10,001-20,000 baht, and were students in schools or universities. In summary, the key marketing mix factors influencing the use of traditional retail stores in Ban Khai District, Rayong Province, indicate that the overall average opinions on the marketing mix factors (7Ps) were at a highly significant level. The aspects ranked by significance are as follows: product, people, place, price, process, promotion, and physical evidence, respectively. The details are as follows:

Product: The study found that the marketing mix factor concerning products for the use of traditional retail stores in Ban Khai District, Rayong Province, is considered highly important overall. This includes having a complete range of products to meet customer needs, products that meet acceptable standards and are safe, merchandise that is hygienic and clean, availability of products in various sizes such as large, medium, and small, and products that are modern and currently popular, in that order.

Price: The marketing mix factor concerning price when using traditional retail stores in Ban Khai District, Rayong Province, is also considered highly important overall. This includes clear price labeling of products, negotiable prices, prices that are reasonable for the quality, a variety of prices according to product quality, and prices that are not higher than those in modern retail stores, in that order.
Place (Distribution Channel): The marketing mix factor concerning place when using traditional retail stores in Ban Khai District, Rayong Province, is rated as highly important overall. This consists of stores being located in convenient community areas, well-ventilated and safe store designs, well-organized product placement for easy access, multiple and accurate payment counters, and stores with parking spaces, in that order.

Promotion: The marketing mix factor concerning promotion for traditional retail stores in Ban Khai District, Rayong Province, is rated as highly important overall. This includes discounts for bulk purchases as specified, advertising through various media channels, ongoing sales promotions such as attractive discounts, exchanges, giveaways, pre-order options via online channels, and appropriate product exchange/return policies, in that order.

People: The marketing mix factor concerning personnel in traditional retail stores in Ban Khai District, Rayong Province, is also highly important overall. This includes sellers with knowledge who can advise or recommend products, politeness and pleasant communication from sellers, honesty towards customers, having good interpersonal skills, willingness to provide service, and a familiar and friendly service approach, in that order.

Process: The marketing mix factor concerning service processes in traditional retail stores in Ban Khai District, Rayong Province, is rated as highly important overall. The details, in order of significance, include providing prompt and convenient service such as assisting customers in picking up products when needed or when products cannot be found, fast and accurate payment processes, customers being able to pick up products themselves, home delivery services, and product inspection before packaging for customers, in that order.

Physical Evidence: The marketing mix factor concerning physical evidence in traditional retail stores in Ban Khai District, Rayong Province, is also rated as highly important overall. This includes a store layout that is organized and categorized, a pleasant and spacious in-store atmosphere with good lighting, modern store decoration that invites customers in, cleanliness and aesthetic appeal, and the store's status as a traditional shop with unique community characteristics, in that order.

In terms of evaluating alternative choices for purchasing products from traditional retail stores in Ban Khai District, Rayong Province, the overall level of agreement was very high. This evaluation included comparing the service standards of each retail store, comparing the services provided by different stores, and comparing prices among them, respectively.

Regarding the decision to purchase, the overall level of agreement was also very high. Key factors included: the stores are ones where customers regularly shop, prices are lower than those of other retailers, and purchases are made at these traditional grocery stores due to daily necessities.
In terms of post-purchase behavior, the overall level of agreement was again very high. Contributing factors included satisfaction with various conveniences, the ability to exchange products if defects are found, recommending the stores to others, and returning to shop at these stores again.

A comparison of decisions to use traditional grocery stores in Chumphon Province, categorized by personal information, found that gender, age, education level, average monthly income, and occupation did not lead to significant differences in the decision to use traditional retail stores in Ban Khai District, Rayong Province. However, differences in education level did result in differing decisions regarding the use of traditional retail stores in Ban Khai District, Rayong Province.

As for marketing mix factors influencing the decision to use traditional retail stores in Ban Khai District, Rayong Province, it was found that product, price, marketing promotion, personnel, and physical characteristics had an influence on purchase decisions at traditional retail stores. On the other hand, distribution channels and service process did not significantly influence the decision to purchase from traditional retail stores at a statistical significance level of .05. Discussion of Results Based on the study of marketing mix factors in the use of traditional retail stores in Ban Khai District, Rayong Province, the researcher has the following points to discuss:

Recommendations
The researcher has the following recommendations from the study:
Product: Traditional grocery store operators should stock essential daily necessities, products in demand by the local community, and popular items for each period. Products should be available in various sizes to suit different needs. Items should be arranged in categories to make it easy and convenient for customers to shop.

Price: Traditional grocery store operators should set product prices that are appropriate for the quality and close to those of modern retailers. Price tags should be clearly displayed. Customers should be allowed to negotiate prices, and a variety of price points should be available based on product quality.

Promotion: Traditional grocery store operators should offer discounts for purchases that meet specified quantities and conduct ongoing, attractive sales promotions. Products should be eligible for returns within a reasonable timeframe.

People: Traditional grocery store operators should provide honest service, pay attention to customers, remember regular customers, and show goodwill by offering appropriate discounts to make a positive impression. They should offer order-taking and home delivery services, maintain records of loyal customers to regularly inquire about their needs, especially for elderly customers, and learn to adopt modern financial technologies to facilitate customers.

Physical Evidence: Traditional grocery store operators should make the stores modern yet consistent with the community's character, keep them clean and attractive to encourage patronage, and organize products neatly by categories.

Suggestions for Future Studies Future studies should focus on factors affecting customer loyalty toward traditional retail stores in Ban Khai District, Rayong Province, in order to support the long-term sustainability of these businesses.

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IMPACT OF DIVESTITURE ANNOUNCEMENTS ON SHAREHOLDER WEALTH: EVIDENCE FROM INDIAN LISTED FIRMS (2010–2023)

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ABSTRACT

This study investigates the short-term stock market reaction to divestiture announcements by Indian listed firms over the period 2010–2023. The primary objective is to assess whether such restructuring actions generate shareholder wealth and to examine the timing of market responses. Using a multi-window event-study methodology, the analysis is based on a sample of 203 divestiture transactions obtained from the CMIE Prowess IQ database and verified through public disclosures. Expected returns are estimated using the market model with the Nifty 500 index as a benchmark. The findings reveal statistically significant positive abnormal returns concentrated around the announcement period, particularly within the (–1, +1) and (–2, +2) event windows. These results suggest that investors perceive divestitures as value-enhancing strategic decisions. Overall, the study provides evidence that divestitures serve as an effective mechanism for shareholder wealth creation in the Indian capital market.

Keywords: Divestiture, Corporate Restructuring, Event Study, Shareholder Wealth, Indian Capital Market

INTRODUCTION

Corporate restructuring has emerged as a critical strategic mechanism through which firms realign their operational focus, improve efficiency, and enhance shareholder value. Among the various forms of restructuring—such as mergers, acquisitions, spin-offs, and equity carve-outs—divestitures have gained prominence as an effective tool for strategic transformation. A divestiture involves the sale, demerger, or spin-off of business units, enabling firms to concentrate on core competencies and allocate resources more efficiently. The fundamental rationale underlying such decisions is that shedding non-core or underperforming assets allows firms to maximise shareholder wealth by redirecting capital toward higher-value opportunities (John & Ofek, 1995; Feldman, 2021).

At a global level, divestitures constitute a substantial proportion of corporate restructuring activity and are often associated with stronger value creation than expansionary strategies such as acquisitions (Daley, Mehrotra, & Sivakumar, 1997; Schlingemann, Stulz, & Walkling, 2002). The theoretical foundations of divestiture decisions are primarily explained through three perspectives. The corporate-focus hypothesis suggests that divestitures enhance efficiency by reducing diversification and improving managerial attention. The signalling hypothesis posits that such actions convey credible information about management's commitment to value creation. The agency-cost hypothesis argues that divestitures mitigate managerial opportunism and align managerial actions with shareholder interests (Desai & Jain, 1999; Veld & Veld-Merkoulova, 2004; Jensen & Meckling, 1976).

Empirical evidence from developed markets consistently supports the value-enhancing nature of divestitures. Studies have documented positive abnormal returns in the range of 1–4 per cent around announcement dates, reflecting favourable investor perceptions (Miles & Rosenfeld, 1983; Hite et al., 1987; Schipper & Smith, 1983). Similar findings have been reported in European markets, further reinforcing the robustness of these results across institutional contexts (Afshar et al., 1992; Clubb & Stouraitis, 2002).

However, the applicability of these findings to emerging markets such as India remains less certain due to distinctive institutional characteristics, including concentrated ownership structures, relatively weaker market for corporate control, and evolving governance mechanisms (Khanna & Palepu, 2000; Sarkar & Sarkar, 2012). While prior research in India has largely focused on mergers and acquisitions, systematic evidence on the wealth effects of divestitures remains fragmented and limited.Against this backdrop, the present study aims to examine the short-term stock market reaction to divestiture announcements by Indian listed firms over the period 2010–2023. Using a multi-window event-study methodology, the study evaluates abnormal returns around announcement dates to assess whether such restructuring actions generate shareholder wealth. By analysing a comprehensive sample of 203 transactions, the study contributes to the literature by providing updated and broad-based evidence from an emerging market context. The central research question addressed is whether divestiture announcements create short-term shareholder wealth and how these effects are distributed across different event windows.

LITERATURE REVIEW

The literature on corporate divestitures has extensively examined their impact on shareholder wealth, with a predominant focus on short-term announcement effects. Early studies such as Miles and Rosenfeld (1983) analysed the effect of voluntary spin-off announcements and found significant positive abnormal returns, indicating that investors perceive restructuring decisions favourably. Similarly, Hite, Owers, and Rogers (1987) investigated asset sales and documented statistically significant gains around announcement dates, highlighting the value-enhancing nature of divestitures. Schipper and Smith (1983) further reinforced these findings by demonstrating that spin-offs generate positive market reactions due to improved corporate focus and efficiency.

Subsequent research expanded the analysis to broader restructuring contexts. Daley, Mehrotra, and Sivakumar (1997) examined the relationship between corporate focus and value creation, concluding that focus-increasing divestitures yield higher abnormal returns. Desai and Jain (1999) analysed long-run performance following spin-offs and provided evidence supporting both the corporate-focus and signalling hypotheses. In the European context, Veld and Veld-Merkoulova (2004) studied spin-offs and found consistent positive announcement effects, suggesting that the benefits of divestitures are not confined to a specific market environment.

Further studies have explored the determinants of divestiture performance. Afshar, Taffler, and Sudarsanam (1992) investigated sell-offs in the UK and reported positive wealth effects linked to profitability and strategic alignment. Clubb and Stouraitis (2002) analysed the role of divestiture profitability in shaping market reactions, emphasising the importance of transaction-specific characteristics. These studies collectively indicate that divestitures are generally perceived as value-enhancing, particularly when they improve operational focus and financial discipline.

In the context of emerging markets, the evidence remains relatively limited. Khanna and Palepu (2000) examined diversified business groups in India and highlighted the role of institutional factors in shaping

firm performance. Sarkar and Sarkar (2012) further discussed the evolution of corporate governance in India, suggesting that governance quality significantly influences investor response to restructuring decisions.

Recent Indian studies provide some evidence on the wealth effects of divestitures. Vyas, Pathak, and Saraf (2015) analysed demerger announcements and reported significant positive abnormal returns on the announcement day, indicating favourable investor perception. Banerjee and Rakshit (2022) examined corporate restructuring and found that transactions improving transparency and efficiency are associated with positive market reactions. Nazir and Chisti (2025) extended this analysis to spin-offs and confirmed the presence of value creation consistent with global findings.

Despite these contributions, existing studies in the Indian context are often limited in scope, focusing on specific types of divestitures or short time periods. There remains a lack of comprehensive, multi-year analyses that capture diverse forms of divestiture transactions within a unified framework. Furthermore, variations in methodology and sample selection across studies limit the comparability of findings.
Accordingly, the present study addresses this gap by employing a multi-window event-study approach on a large sample of divestiture announcements spanning 2010–2023. By integrating multiple event windows and a broad dataset, the study provides a more comprehensive assessment of short-term shareholder wealth effects in the Indian capital market.

METHODOLOGY

Data and Sample Selection

The study covers divestiture announcements made by Indian firms between January 2010 and December 2023. Using the CMIE Prowess IQ database, an initial set of 752 transactions was identified. To ensure precision in measuring the effects of announcements, the sample was restricted to firms listed on Indian stock exchanges whose announcement dates could be precisely verified through public news sources. This process involved cross-checking multiple outlets—financial dailies, press releases, and exchange filings—to identify the earliest date when information about the divestiture first became publicly available.

Transactions were included only if (a) the divesting entity's stock-price data were available for at least 250 trading days prior to the announcement, and (b) the divestiture received sufficient media visibility to ensure that the identified date represented a true information event. Applying these criteria resulted in a final sample of 203 transactions, ensuring both data completeness and accurate event dates.

Event-Study Design

The event-study methodology was used to capture abnormal stock-price behaviour surrounding the announcement date. The event date (t = 0) was defined as the first public disclosure of the divestiture decision. The study utilised the market model to estimate expected (normal) returns, which represent returns in the absence of any event-related information.
The expected return for firm *i* on day *t* was modeled as:

$$E(R_{it}) = \alpha_i + \beta_i R_{mt}$$

where $R_{mt}$is the return on the Nifty 500 Index, representing overall market performance. Parameters $\alpha_i$and $\beta_i$were estimated over a 240-day estimation window (–250 to –11) prior to the event.
Actual returns were computed as the logarithmic change in share prices:

$$R_{it} = \ln(\frac{P_{it}}{P_{it-1}})$$

The abnormal return (AR) was defined as the difference between the actual and expected returns:

$$AR_{it} = R_{it} - E(R_{it})$$

Average Abnormal Returns (AAR) were then calculated by averaging individual abnormal returns across all firms for each day *t*:

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{it}$$

To evaluate the cumulative effect across multiple days, Cumulative Average Abnormal Returns (CAAR) were computed for various event windows as:

$$CAAR_{(t_1,t_2)} = \sum_{t=t_1}^{t_2} AAR_t$$

Event Windows and Significance Testing

Eleven event windows were examined to test for the concentration and persistence of abnormal returns: (0), (–1,+1), (–2,+2), (–3,+3), (–4,+4), (–5,+5), (–6,+6), (–7,+7), (–8,+8), (–9,+9), and (–10,+10).

The significance of AARs and CAARs was tested using a *t*-statistic based on the standard deviation of abnormal returns in the estimation window:

$$t = \frac{CAAR_{(t_1,t_2)}}{S(CAAR_{(t_1,t_2)})}$$

where $S(CAAR)$is the standard error of cumulative abnormal returns. AAR and CAAR significance levels were tested at 1%, 5%, and 10% levels.

FINDINGS AND DISCUSSION

Daily Abnormal Returns and Information Leakage

The day-wise pattern of AAR and CAAR for the 203 firms is summarised in Table 1.

Table 1: Day-wise Average Abnormal Returns (AAR) and Cumulative Average Abnormal Returns (CAAR) for 203 Companies (2010–2023)

Day	AAR (%)	CAAR (%)	*t*-stat
–3	0.27	1.43	2.015*
–2	0.28	1.71	2.276*
–1	0.60	2.31	2.914**
0	0.28	2.59	3.110**
+1	0.59	3.18	3.655***
+2	–0.51	2.67	2.947**
+3	–0.41	2.25	2.400*
+4	–0.04	2.21	2.275*

Note. AAR = Average Abnormal Return; CAAR = Cumulative Average Abnormal Return; $p < .05$ (), $p < .01$ (), $p < .001$ ().

As seen in Table 1, positive abnormal returns begin appearing two to three days before the announcement date. Specifically, from Day –3 onward, AARs rise steadily and become statistically significant at the 5%

level. This pattern suggests information leakage or anticipatory trading, indicating that investors may have partially anticipated divestiture news before its official disclosure. Such phenomena are common in emerging markets, where insider communication channels and pre-announcement speculation can influence trading patterns.

On the announcement day (Day 0), the market reaction remains positive, with an AAR of 0.28% and a cumulative gain of 2.59% over the prior days, significant at the 1% level. The strongest effect occurs on Day +1, where AAR reaches 0.59% and CAAR peaks at 3.18% (t = 3.65), indicating an immediate and robust investor endorsement of divestiture actions. This sharp upward movement around the event day demonstrates that Indian capital markets interpret divestiture announcements as credible signals of managerial intent to enhance focus and efficiency.

Following the announcement, abnormal returns begin to taper. Days +2 to +4 record mild negative AARs, and CAAR gradually declines to 2.21% by Day +4. This post-announcement drift indicates a partial correction as the market reassesses the long-term strategic and financial implications of the divestiture. By Day +10 (not shown in the table), CAAR stabilises around 1%, suggesting that short-term gains are not fully sustained over longer windows.

These results align with findings from Hite et al. (1987) and Daley et al. (1997), who reported immediate positive market reactions to divestiture announcements, followed by modest reversals. The pre-announcement increase and quick post-announcement adjustment together reflect a semi-strong-form efficient market response—information is rapidly incorporated into prices, and excess gains dissipate soon thereafter.

Event-Window Results

Table 2 presents CAAR values across selected symmetric event windows.

Table 2: Statistically Significant Cumulative Average Abnormal Returns (CAAR) for Selected Event Windows (203 Companies, 2010–2023)

Event Window	CAAR (%)	*t*-stat
(–1,+1)	1.46	3.368***
(–2,+2)	1.24	2.203*

Note. Event windows represent the number of days before and after the event date (Day 0). $p < .05$ (), $p < .01$ (), $p < .001$ ().

The (–1,+1) window exhibits the most substantial effect, with a CAAR of 1.46% significant at the 0.1% level. The (–2,+2) window also records a significant positive CAAR of 1.24%. Broader windows, extending beyond ±5 days, show positive but statistically weaker effects, suggesting that market reactions are concentrated in narrow timeframes surrounding the announcement. This concentration of reaction mirrors earlier results from developed markets, where divestiture effects tend to be front-loaded and short-lived (Miles & Rosenfeld, 1983; Schipper & Smith, 1983).

These results suggest that investors in India respond almost instantaneously to divestiture news, assimilating the information within one or two trading sessions. The absence of prolonged adjustment periods underscores the efficiency of contemporary Indian capital markets in processing firm-specific information.

DISCUSSION

The positive short-term abnormal returns confirm that divestitures are perceived as value-enhancing events. Investors appear to reward firms that engage in strategic realignment and operational streamlining.

These findings lend strong support to the corporate-focus hypothesis, which posits that divesting non-core assets enables management to concentrate on core competencies, improve resource allocation, and thereby increase shareholder value (John & Ofek, 1995; Daley et al., 1997).

Simultaneously, the observed patterns also validate the signalling hypothesis, as divestiture announcements serve as credible signals of management's proactive intent to enhance efficiency. Firms that announce divestitures communicate not only a recognition of strategic misalignment but also a willingness to restructure decisively. This "self-selection" by managers indicates competence and accountability, eliciting investor optimism.

The brief negative drift observed in days following the announcement might represent profit-taking behaviour by early investors or reassessment of transaction specifics, such as buyer identity or sale proceeds. Nonetheless, the persistence of positive CAARs up to Day +10 shows that markets overall interpret such announcements as constructive.

The Indian evidence closely parallels results from Western contexts, yet several distinguishing features emerge. The pre-announcement rise in AARs suggests partial information diffusion before formal disclosure, reflecting a mild inefficiency rooted in the market's structural characteristics. Additionally, the short-lived nature of the effect may stem from high institutional participation and algorithmic trading, which allow rapid arbitrage of information asymmetries.

In terms of behavioural finance, the initial surge may also capture an overreaction effect—a tendency of investors to over-value strategic announcements due to optimism bias—followed by mild corrections as rational expectations prevail. Nonetheless, the net positive impact within the short event window underscores that divestitures retain their reputation as value-creating corporate actions in the Indian setting.

The study's findings are consistent with a large body of global evidence. Hite, Owers, and Rogers (1987) found significant gains in U.S. asset sales, with CAARs exceeding 2 per cent within a three-day window. Similarly, Daley et al. (1997) reported average announcement gains of 3–4 per cent for focus-increasing divestitures. In Europe, Veld and Veld-Merkoulova (2004) observed that spin-offs generated 2–3 per cent positive returns around the announcement day. The present Indian evidence falls squarely within this global range.

In the Indian context, Vyas, Pathak, and Saraf (2015) documented average abnormal returns of 2.5 per cent on the announcement day for demergers. Banerjee and Rakshit (2022) reported comparable gains for restructuring events improving efficiency, while Nazir and Chisti (2025) confirmed similar wealth effects for spin-offs. Hence, this study extends and consolidates these isolated findings over a broader temporal horizon (2010–2023) and a more diverse sample encompassing sell-offs, demergers, and asset disposals.
However, subtle differences also emerge. Unlike developed markets, where focus-increasing divestitures are systematically rewarded, the Indian market's reaction appears to be driven by *transaction credibility and perceived financial discipline*, irrespective of the specific divestiture type. The results, therefore, reinforce the argument by Khanna and Palepu (2000) that firm-specific governance and ownership structures play an overriding role in shaping market interpretation in emerging economies.

The results contribute to existing theory in several ways. First, they reaffirm that divestitures serve as effective mechanisms for shareholder value creation, validating the corporate focus and signalling

hypotheses in an emerging-market context. Second, they provide empirical evidence that supports the semi-strong form of market efficiency in Indian equity markets, as abnormal returns materialise quickly and dissipate soon after disclosure. Third, the study nuances global findings by highlighting that, in India, positive market reactions may

CONCLUSIONS

This study provides comprehensive evidence of short-term market reactions to divestiture announcements in India. Using a robust event-study framework across multiple windows, the analysis demonstrates statistically significant positive cumulative abnormal returns, peaking in the narrow (–1,+1) window. The results indicate that investors in India interpret divestitures as credible, value-enhancing strategic moves. The strongest reaction occurs within one trading day before and after the announcement, followed by a gradual stabilisation—consistent with efficient market behaviour.

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