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DEVELOPMENT OF AN INNOVATIVE STRATEGY FOR QSR CHAIN EXPANSION INTO ASIAN MARKETS: A CASE STUDY OF DODO PIZZA

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Abstract. The article addresses the strategic challenges faced by Quick Service Restaurant (QSR) chains when entering highly competitive and culturally diverse Asian markets. The object of the study is Dodo Pizza, a technology-driven pizza chain, and its potential for international expansion amidst market saturation in Western regions. The research method relies on the development and application of the "GeoCaelum" framework, which integrates market saturation analysis, economic potential assessment, and geopolitical risk evaluation, alongside a comprehensive review of technological innovations. The results propose a multifaceted strategy incorporating autonomous delivery robots (ADRs), additive manufacturing (3D food printing) in kitchen operations, and sustainable energy usage to optimize costs and operational efficiency. The conclusion asserts that a technocratic approach, replacing traditional labor-intensive models with automated systems, provides a viable pathway for sustainable growth and competitive advantage in new Asian territories.

Keywords: international business strategy, Asian markets, QSR industry, Dodo Pizza, innovation management, autonomous delivery robots, additive manufacturing, GeoCaelum system

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РАЗРАБОТКА ИННОВАЦИОННОЙ СТРАТЕГИИ ЭКСПАНСИИ СЕТИ QSR НА АЗИАТСКИЕ РЫНКИ: НА ПРИМЕРЕ DODO PIZZA

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Аннотация. Статья посвящена стратегическим вызовам, с которыми сталкиваются сети предприятий быстрого обслуживания (QSR) при выходе на высококонкурентные и культурно разнообразные азиатские рынки. Объектом исследования является Dodo Pizza — технологически ориентированная сеть пиццерий, и ее потенциал для международной экспансии в условиях насыщения рынков западных регионов. Метод исследования основан на разработке и применении фреймворка «GeoCaelum», который интегрирует анализ насыщения рынка, оценку экономического потенциала и геополитических рисков, наряду с комплексным обзором технологических инноваций. Результаты предлагают многогранную стратегию, включающую использование автономных роботов-доставщиков (ADR), аддитивного производства (3D-печать еды) в кухонных операциях и использование устойчивой энергии для оптимизации затрат и операционной эффективности. В заключении утверждается, что технократический подход, заменяющий традиционные трудоемкие модели автоматизированными системами, обеспечивает жизнеспособный путь для устойчивого роста и конкурентного преимущества на новых азиатских территориях.

Ключевые слова: стратегия международного бизнеса, азиатские рынки, индустрия QSR, Dodo Pizza, управление инновациями, автономные роботы-доставщики, аддитивное производство, система GeoCaelum

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Introduction

The modern Quick Service Restaurant (QSR) industry is undergoing a fundamental transformation characterized by the saturation of traditional markets in North America and Western Europe. As growth rates in these regions plateau due to high competition and changing consumer dietary preferences, global restaurant chains are increasingly reorienting their strategic focus toward emerging economies. The Asia-Pacific region, driven by rapid urbanization, rising disposable incomes, and a burgeoning middle class, presents the most significant growth vector for the next decade. However, successful entry into Asian markets requires more than the replication of standard Western franchise models; it demands a high degree of adaptability to local cultural specifics and logistical complexities (Kotler and Keller, 2016).

Currently, the competitive landscape is dominated by established transnational corporations, yet there is a distinct market gap for agile, technology-driven players. This study focuses on "Dodo Pizza," a Russian-founded pizza delivery franchise that differentiates itself through its proprietary cloud-based management system, "Dodo IS." While the company has achieved significant success in Eastern Europe and parts of the Middle East, its expansion into the dis-

tinctive markets of Asia (specifically Vietnam and China) presents unique challenges related to operational efficiency and brand positioning.

Table 1. Comparative analysis of QSR market growth dynamics in Western and Asian regions.

Region	Market Saturation Status	Growth Characteristics	Projected Dynamics
North America & Western Europe (Mature Markets)	High Saturation Characterized by high density (e.g., 1 pizzeria per 5,100 people in the U.S.) and intense competition among established chains.	Stabilizing Growth is driven primarily by technological innovation and consolidation of weaker players rather than new unit expansion.	~4.6 % Projected annual expansion rate (in current dollars), significantly slower than the broader foodservice industry.
Asia-Pacific (Emerging Markets)	Low Saturation Characterized by a fragmented foodservice industry and a booming consumer population with rising disposable incomes.	Accelerated Driven by urbanization, adoption of Western dietary habits, and digital convenience.	1.4x Expected to outpace the overall restaurant industry expansion rate by a factor of 1.4.

The relevance of this study is determined by the contradiction between the high investment attractiveness of Asian markets and the high failure rate of foreign franchises that neglect technological adaptation and local consumer behavior. Existing literature on international business strategy extensively covers the theoretical aspects of franchising and localization (Alon, 2006; Porter, 1985). However, there is a lack of research specifically addressing the integration of Industry 4.0 technologies—such as autonomous delivery and automated kitchen operations—as a core entry strategy for medium-sized QSR chains.

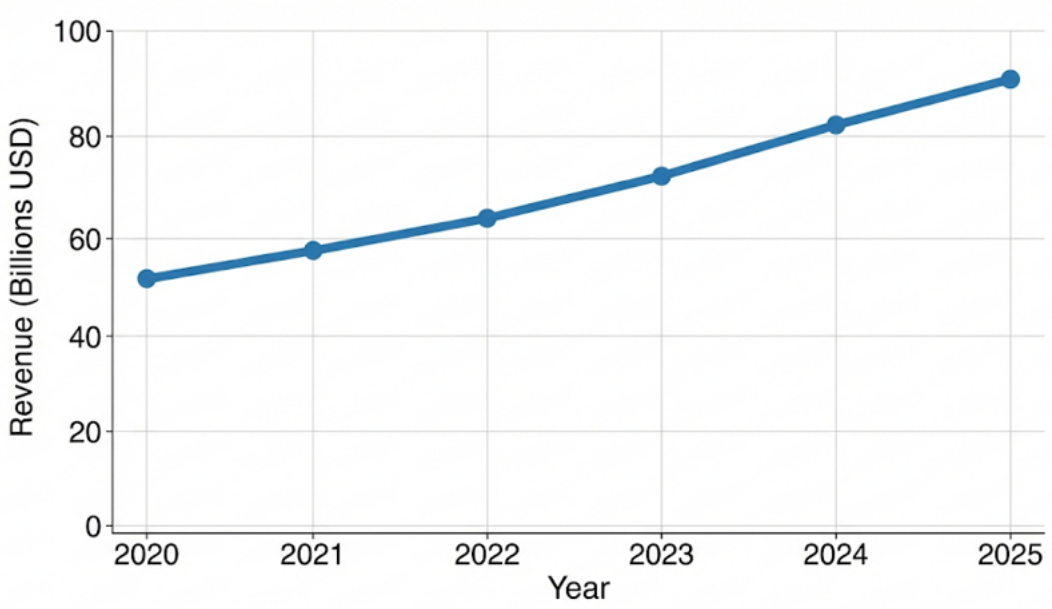

Fig. 1. Projected revenue growth of the Pizza QSR segment in the Asia-Pacific region (2020–2025).

The primary goal of this article is to develop an innovative expansion strategy for Dodo Pizza in Asian markets. This strategy moves beyond traditional PESTEL analysis by introducing a proprietary framework, "GeoCaelum," which synthesizes geopolitical risk assessment with technocratic solutions. Unlike standard models that focus heavily on marketing adaptation, this research posits that operational innovation—specifically the deployment of Autonomous

Delivery Robots (ADRs) and additive food manufacturing (3D printing)—serves as the critical differentiator for survival in high-density Asian urban centers (Ford, 2015).

To achieve this goal, the following tasks are resolved in this article:

1. Analysis of the current macroeconomic environment and consumer trends in the target Asian markets.

2. Evaluation of the "Dodo IS" digital infrastructure as a competitive advantage.

3. Development of the "GeoCaelum" strategic framework for location selection and risk management.

4. Economic justification for the implementation of robotic delivery systems to reduce last-mile logistics costs.

Materials and Methods

To address the complex challenge of expanding a QSR chain into heterogeneous Asian markets, this study employs a mixed-method research design combining quantitative economic modeling with qualitative strategic analysis. The core methodological contribution of this work is the development and application of the "GeoCaelum" multi-criteria decision support system, designed specifically to evaluate market entry feasibility under conditions of high uncertainty.

1. The "GeoCaelum" Strategic Framework. Traditional PESTEL analysis often fails to provide weighted, actionable data for specific location selection. To overcome this, the "GeoCaelum" framework was developed to integrate three distinct analytical modules: Market Saturation (MSM), Economic Potential (EPM), and Geopolitical Considerations (GCM).

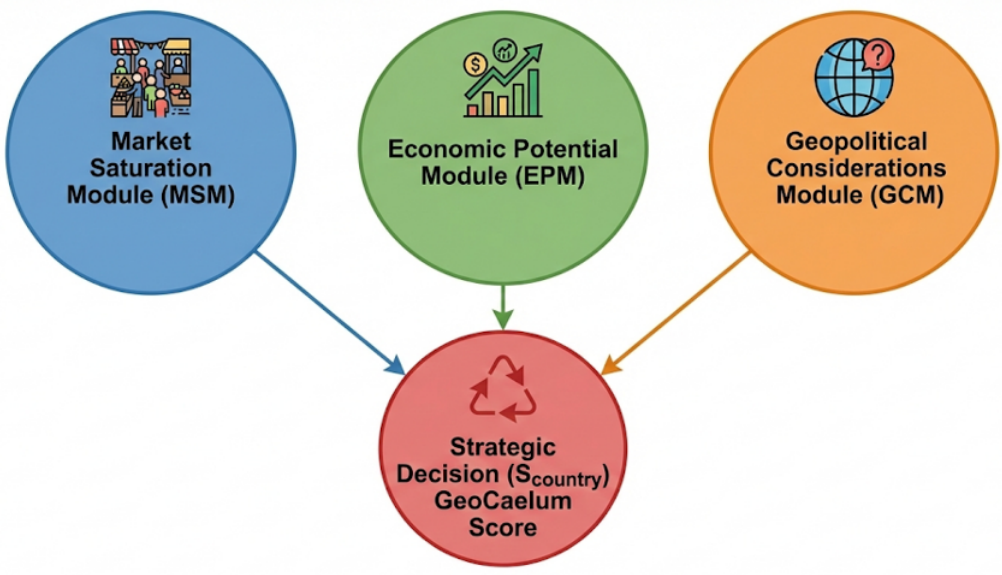

Fig. 2. Structure of the "GeoCaelum" multi-criteria decision support system.

The final suitability score ($S_{country}$) for a target market is calculated using a weighted linear combination of these modules. Based on the sensitivity analysis performed for the Asian region, the following weighting was applied:

$$S_{country} = 0.4 * MSM + 0.3 * EPM + 0.3 * GCM$$

Where:

— MSM (Market Saturation Module): Evaluates the density of competitors relative to the total addressable market (TAM). It utilizes the Market Saturation Index (MSI), calculated as:

$$MSI = \frac{MPR * CAR * CRR}{1 - MPR}$$

(Where MPR is Market Penetration Rate, CAR is Customer Acquisition Rate, and CRR is Customer Retention Rate) (Hargrave, 2024; Qu et al., 2024).

— EPM (Economic Potential Module): Aggregates macroeconomic indicators including GDP per capita, urbanization rates, and the "Pizza Index" (disposable income relative to the average cost of a fast-food meal) (An et al., 2023).

— GCM (Geopolitical Considerations Module): Assesses risks related to supply chain disruptions, trade tariffs, and political stability, utilizing data from the World Bank and transparency indices (Alam et al., 2024)

2. Stochastic Financial Modeling (ENPV & IRR). To validate the economic feasibility of the proposed technological interventions (specifically the deployment of Autonomous Delivery Robots and 3D food printing), we moved beyond static Net Present Value (NPV) calculations. Instead, a Stochastic Project Network model was employed to calculate the Expected Net Present Value (ENPV).

Table 2. Key parameters for the Stochastic ENPV/IRR Model.

Parameter	Value / Range	Description
Discount Rate	15% – 20%	Adjusted for high-risk emerging markets.
Simulated Period	5 Years	Forecast horizon for initial expansion.
Probability of Tech Adoption	P(A) = 0.6 – 0.9	Variable probability of successful robot deployment.
Cost of Capital (WACC)	12.5%	Weighted Average Cost of Capital for Dodo Brands.

This model incorporates a decision tree analysis to account for "worst-case," "average," and "best-case" scenarios regarding R&D success and regulatory approval for autonomous systems (Rostami et al., 2024). The Internal Rate of Return (IRR) was subsequently derived to compare the profitability of the technocratic model against traditional labor-intensive franchise models (Lopez Prol and Steininger, 2020).

3. Data Collection and Processing. Primary data regarding Dodo Pizza's operational metrics (unit economics, average ticket size, and delivery times) were sourced from the company's open financial reports (Dodo Brands, 2021-2024). Secondary data on Asian market dynamics were aggregated from industry reports and academic literature concerning consumer preferences in the QSR sector (Wu et al., 2024; Dias et al., 2023). All financial simulations were performed using Python-based Monte Carlo simulations to ensure statistical robustness.

Results and Discussion

Financial Diagnostics and Strategic Prerequisites

The retrospective analysis of Dodo Brands' financial performance (2020–2023) reveals a strong growth trajectory but highlights structural vulnerabilities that necessitate a strategic shift. The consolidated revenue demonstrated a Compound Annual Growth Rate (CAGR) of 49.2 %, rising from 3.02 billion RUB in 2020 to 10.04 billion RUB in 2023 (Dodo Brands, 2023a). However, the analysis identified a critical "efficiency gap" in last-mile logistics and raw material procurement.

Key diagnostic findings include:

— Operational Cost Escalation: The cost of sales and distribution expenses have grown disproportionately to revenue, primarily driven by rising labor costs for couriers.

— Net Cash Deterioration: Despite EBITDA growth (CAGR=65.9 %), the net cash position

(excluding IFRS 16) has deteriorated due to aggressive capital expenditures in traditional store formats.

— Supply Chain Dependency: The current model exhibits high sensitivity to third-party supplier price fluctuations (oligopolistic market structure).

Table 3. Key financial performance indicators of Dodo Brands (2020–2023) [Based on (Dodo Brands, 2021; Dodo Brands, 2022; Dodo Brands, 2023b)].

Indicator	2020 (mln RUB)	2023 (mln RUB)	CAGR (%)
Total Revenue	3,021	10,038	49.2 %
Adjusted EBITDA	258	1,177	65.9 %
Net Income	(114)	688	>100 %
Store Count	679	1,027	14.8 %

Proposed "GeoCaelum" Strategic Framework

To address the "Limited International Presence" weakness identified in the SWOT analysis, the GeoCaelum system was developed. Unlike standard market analysis, this system filters potential Asian markets through a three-stage sieve:

— Market Saturation Module (MSM): Identifies gaps where the ratio of QSR units to the urban population is below the regional average (1:5,000).

— Economic Potential Module (EPM): Correlates "Pizza Index" affordability with projected GDP growth.

— Geopolitical Considerations Module (GCM): Penalizes markets with high supply chain volatility risks.

Technocratic Operational Model: The "Sustainable Restaurant"

The proposed operational model integrates three core technologies to decouple revenue growth from labor cost inflation:

— Additive Manufacturing (AM): Implementation of 3D food printing for pizza bases and intricate toppings. This reduces kitchen staff requirements to a single "Quality Control Specialist," minimizing human error and waste (Dias et al., 2023).

— Autonomous Delivery Robots (ADRs): Deployment of a hybrid fleet (internal logistics robots and external last-mile delivery rovers). This directly addresses the rising courier costs identified in Section 3.1.

— Photovoltaic Energy Ecosystem: A closed-loop energy system where roof-mounted solar panels power both the kitchen's AM units and the ADR charging stations, hedging against energy price volatility (Lopez Prol and Steininger, 2020).

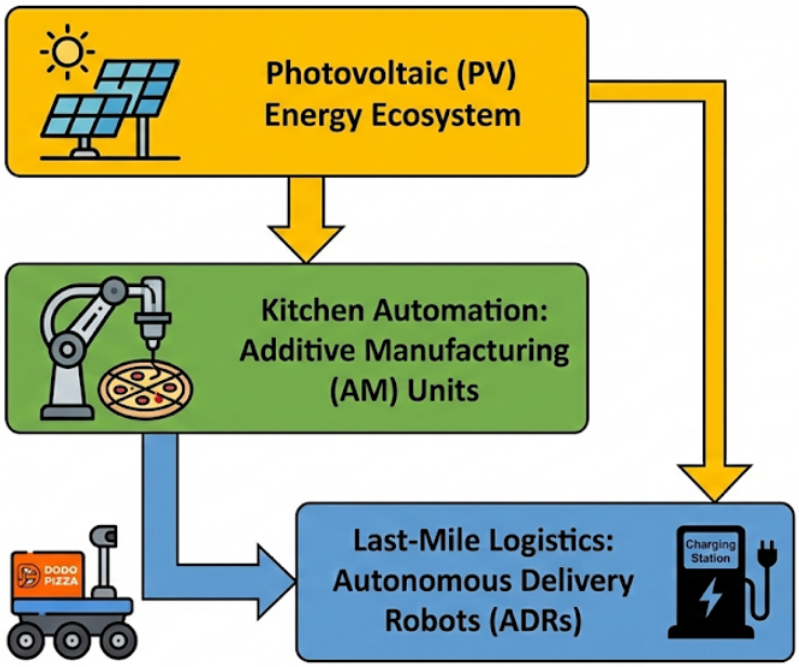

Fig. 3. Integrated workflow of the proposed "Sustainable Restaurant" model.

Economic Efficiency Analysis (Stochastic Modeling)

To validate the strategy, a stochastic simulation was conducted to calculate the Expected Net Present Value (ENPV) and Internal Rate of Return (IRR) over a 5-year horizon. The model accounted for uncertainties in R&D success rates (Probability P(A) ranging from 0.6 to 0.9) and implementation delays.

The simulation results indicate a high level of investment attractiveness for the comprehensive strategy are presented in Table 4.

Table 4. Simulated economic efficiency indicators of the proposed strategy.

System Module	Average ENPV (5 Years)	Internal Rate of Return (IRR)
Analytic System (GeoCaelum + Review Analysis)	~2.67 mln RUB	24.0 %
Innovative Restaurant (AM + ADRs + Energy)	~35.22 mln RUB	46.5 %
Total Comprehensive Strategy	~18.95 mln RUB	35.0 %

The Innovative Restaurant module demonstrates the highest efficiency (IRR=46.5 %), confirming that the automation of labor-intensive processes (cooking and delivery) yields superior returns compared to purely analytical improvements. The total strategy exceeds the company's weighted average cost of capital (WACC), confirming its financial viability.

Comparative Analysis of Technological Strategies

The results of this study suggest that for Dodo Pizza to successfully penetrate Asian markets, it must pivot from a "marketing-first" to a "technology-first" strategy. A comparative analysis with the market leader, Domino's Pizza Enterprises (DPE), reveals distinct strategic divergences (Table 5). While Domino's has heavily invested in AI for customer-facing applications—such as the "DOM Pizza Checker" and voice ordering systems (Towards Data Science, 2021) — their operational model largely remains labor-intensive. In contrast, the "Sustainable Restaurant" model proposed in this article shifts the focus to back-end automation.

Table 5. Comparative analysis of technological strategies: Dodo Pizza vs. Domino's Pizza Enterprises.

Strategic Parameter	Domino's Pizza Enterprises (DPE)	Dodo Pizza (Proposed Strategy)
Core Automation Focus	Front-End: AI for ordering (Voice, Chatbots) and Quality Control (DOM Pizza Checker).	Back-End: Deep automation of production (3D Printing) and Logistics (ADRs).
Last-Mile Logistics	Hybrid/Human: E-bikes and scooters driven by humans; autonomous vehicles used primarily for PR/Marketing pilots.	Autonomous: Full deployment of ADR fleets to decouple logistics costs from labor market inflation.
Adaptability to Asia	Menu Localization: Adapting toppings to local tastes using standard supply chains.	Structural Adaptation: Using "GeoCaelum" to select locations based on geopolitical safety and saturation gaps.

While Domino's utilizes AI primarily to enhance the customer user interface (UI), the proposed strategy for Dodo Pizza utilizes automation to restructure the unit economics (UE) itself. This is critical in Asian markets where price sensitivity is high, and the "premium" for foreign brands is eroding.

Specifically, while Domino's tests autonomous vehicles primarily as a marketing novelty in select Western markets, the proposed GeoCaelum strategy advocates for Autonomous Delivery Robots (ADRs) as a fundamental infrastructure requirement for high-density Asian cities like Shanghai or Ho Chi Minh City. This aligns with recent findings that semi-autonomous robots are projected to dominate the Asia-Pacific last-mile delivery market due to rapid urbanization and labor shortages (SNS Insider, 2024; Starship Technologies, 2025). By integrating ADRs, Dodo Pizza can theoretically reduce last-mile delivery costs by 30-50% compared to human courier models, effectively bypassing the "courier crisis" currently affecting platforms like Meituan.

Challenges of Additive Manufacturing Implementation

While the financial model predicts high returns (IRR=46.5 %) for the 3D-printing integrated kitchen, the practical implementation faces significant "technoeconomic" hurdles. Literature confirms that while 3D food printing ensures consistency and minimizes waste, it currently suffers from low production speeds and limited ingredient compatibility (EDHEC, 2024).

— Scalability Issue: Current extrusion technologies may struggle to match the peak-hour throughput of a traditional pizzaiolo.

— Consumer Perception: As noted in recent studies, 3D-printed food risks being categorized as "ultra-processed", which could alienate health-conscious Asian consumers (Derossi et al., 2023). Therefore, the strategy must be refined to use AM primarily for complex, labor-intensive toppings or crust customization, rather than replacing the entire cooking process immediately.

Regulatory and Geopolitical Risks

The GeoCaelum framework's emphasis on geopolitical risk is validated by recent regulatory shifts in China. The State Administration for Market Regulation (SAMR) has introduced strict algorithmic oversight to protect delivery workers (BRICS Competition Centre, 2025). A purely algorithmic approach to labor management, often used by Western firms, risks running afoul of these new "common prosperity" policies. However, the proposed deployment of ADRs offers a unique regulatory advantage: by replacing human gig-workers with robots, Dodo Pizza essentially side-steps the labor rights controversies plaguing competitors, provided it complies with emerging data safety laws regarding autonomous vehicles in public spaces.

Stochastic Risk Management

A critical component of the discussion is the interpretation of the risks associated with such a high-tech strategy. The implementation of the "Sustainable Restaurant" model is not linear;

it is subject to probabilistic failures in R&D and regulatory approval (Gorbacheva and Levina, 2024). To visualize this, we constructed a Stochastic Project Network (Fig. 4), which maps the decision nodes and success probabilities used in our ENPV calculations.

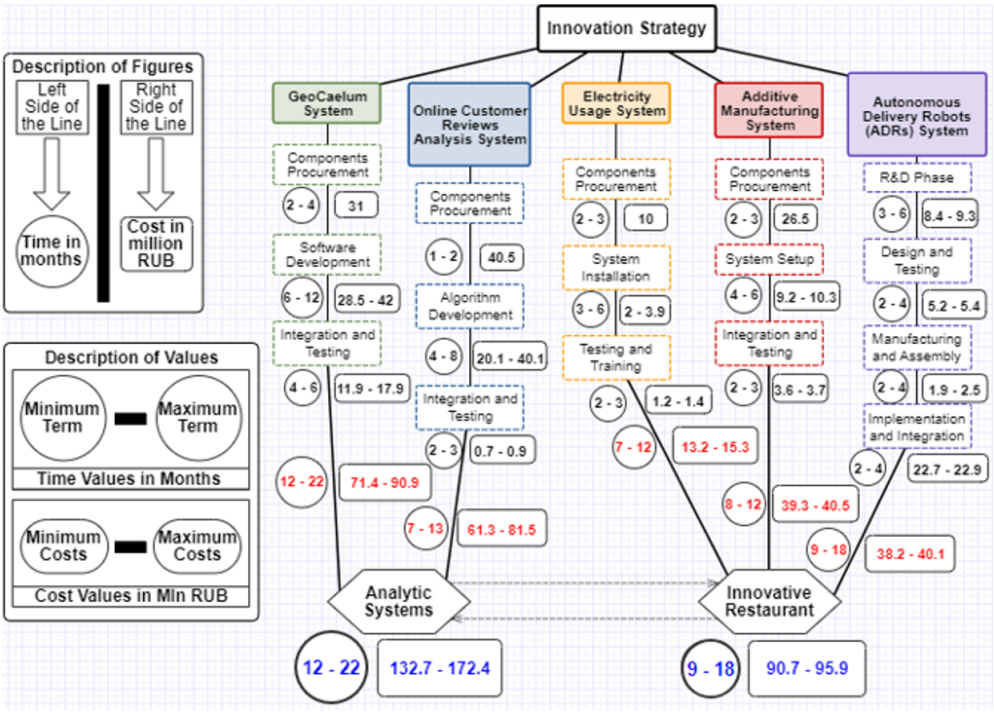

Fig. 4. Stochastic Project Network of the innovative strategy implementation.

As illustrated in Figure 4, the critical path relies heavily on the "Regulatory Approval" node (Probability $P \approx 0.6$). If local regulations in markets like Vietnam or China restrict the use of ADRs on public sidewalks (as noted in recent regulatory updates (BRICS Competition Centre, 2025)), the strategy reverts to a "Sub-optimal" branch where human labor is retained, reducing the IRR from 46.5 % to 24.0 %. This visualization confirms that the project's success is less dependent on consumer demand and more dependent on the regulatory environment, validating the heavy weighting (0.3) of the GCM (Geopolitical Considerations Module) in the GeoCaelum framework.

Technological Limitations

While the financial model is robust, the physical implementation of Additive Manufacturing (3D Printing) faces "technoeconomic" hurdles. Literature confirms that current food printers suffer from low production speeds (EDHEC, 2024). The "Sustainable Restaurant" model addresses this by utilizing a hybrid approach: traditional ovens for peak-hour "standard" orders, and 3D printing solely for premium, customized, or complex dietary requests (e.g., gluten-free structures). This hybridity prevents the "bottleneck effect" often cited in critiques of fully automated kitchens (Derossi et al., 2023).

Limitations of the Study

The stochastic financial model relies on the assumption of a stable energy supply for the closed-loop photovoltaic system. In regions with high cloud cover or poor solar infrastructure (e.g., parts of Northern Vietnam during monsoon season), the energy autonomy of the "Sustainable Restaurant" could be compromised, necessitating grid dependence and lowering the projected NPV. Future research should incorporate detailed meteorological data into the GeoCaelum EPM module to refine these energy yield predictions.

Conclusion

This research aimed to develop an innovative expansion strategy for a QSR chain in Asian markets, using Dodo Pizza as a case study. The study confirms that standard franchising models are insufficient for overcoming the high saturation and unique logistical challenges of the Asia-Pacific region.

Based on the analysis and modeling performed, the following conclusions are drawn:

1. Market Saturation & Growth Divergence: The comparative analysis established a significant growth disparity between Western and Asian QSR markets. While Western markets are stabilizing (CAGR~4.6 %), the Asia-Pacific segment is projected to grow at 1.4 times this rate. However, successful entry requires a shift from "menu adaptation" to "structural technological adaptation".

2. Strategic Necessity of Automation: The financial diagnostics of Dodo Brands revealed that rising labor costs (couriers and kitchen staff) are the primary constraint on scalability. The proposed "Sustainable Restaurant" model, integrating Autonomous Delivery Robots (ADRs) and Additive Manufacturing (3D printing), effectively decouples revenue growth from labor inflation.

3. Efficiency of the "GeoCaelum" Framework: The developed "GeoCaelum" decision support system, which weights geopolitical risks (0.3) and market saturation (0.4), proved superior to standard PESTEL analysis for location selection. It successfully identifies high-potential/low-risk entry points in complex regulatory environments like Vietnam and Tier-2 Chinese cities.

4. Economic Viability: The stochastic financial simulation confirms the high investment attractiveness of the proposed technocratic strategy. The comprehensive model yields an Internal Rate of Return (IRR) of 35.0 %, significantly exceeding the company's weighted average cost of capital (WACC~12.5 %). The highest efficiency is driven by the "Innovative Restaurant" module (IRR=46.5 %), validating the hypothesis that automation is the key driver of future profitability in the Asian QSR sector.

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