# GAME BUILT AROUND BUSINESS SIMULATION

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***Abstract*—This research explores the design and development of a gaming application that simulates a business environment to facilitate experiential learning and decision-making among participants. The application introduces real-life business scenarios where players, in the role of entrepreneurs, make strategic decisions and experience their outcomes. The app provides immediate feedback on the outcomes of decisions, helping players understand the short- and long-term implications of their choices. This research aims to demonstrate how such gamified simulations can be effectively employed in educational settings, professional training, and research to enhance understanding of business dynamics and human decision-making processes.**

**Keywords— Business Simulation, ReactJS Development, NPM Server Hosting, SQLite Database Integration, Customer Management System, Real-Time Data Management, Loan and Financial Planning, Web Application Hosting.**

## I. BACKGROUND

Technological advancements have revolutionized the way businesses operate and learn, driving efficiency, innovation, and competitiveness. The integration of technology into business operations has not only streamlined processes but has also enhanced decision-making through tools like analytics, artificial intelligence, and machine learning. Similarly, educational and training practices have seen significant transformation with the advent of digital platforms, including simulations, that enable practical, experiential learning in a risk-free environment.

Business simulation games are an exemplary application of technology in education and professional training. These simulations recreate real-world business scenarios, offering participants the opportunity to assume managerial roles and make decisions in dynamic environments. Unlike traditional learning methods, these tools provide an interactive and engaging approach, enabling learners to understand complex business concepts through active participation rather than passive observation.

Participants can experiment with various strategies, such as pricing models, product development, and market entry, without the fear of actual financial loss or reputational damage. These tools help learners develop critical thinking, strategic planning, and risk management skills by challenging them to analyze situations, weigh alternatives, and predict outcomes. By immersing users in decision-making scenarios that replicate real-life complexities, these applications not only enhance understanding of business strategies but also foster the development of skills crucial for organizational success.

## II. INTRODUCTION

Business simulation games have emerged as powerful tools for experiential learning in the fields of management and business education. These applications recreate dynamic, real-world business environments, offering participants an engaging and practical platform to hone their decision-making and strategic thinking skills. This project focuses on developing a gaming application that immerses users in a simulated business ecosystem where they compete and interact with other participants.

The application incorporates real-life scenarios, fostering critical thinking as players navigate challenges and make decisions with tangible consequences. By integrating the responses of other contestants, the game offers a comparative learning experience, highlighting diverse approaches to similar problems. Furthermore, the simulation evaluates participants' risk tolerance and expansion strategies, providing valuable insights into their managerial styles and decision-making frameworks.

**1.Gamification in Business Learning**

Gamification has revolutionized the way people learn by integrating gaming elements into educational experiences. Features such as rewards, leaderboards, and interactive challenges motivate participants to stay engaged while fostering healthy competition. The psychological principles behind gamification, including intrinsic and extrinsic motivation, make it a powerful tool for teaching complex concepts. By creating a sense of achievement and offering real-time feedback, this simulation game combines entertainment with impactful learning. Examining the success of similar business simulation games provides insights into their effectiveness, further highlighting the role of gamification in education.

**2.Impact on Real-World Skills**

The game not only teaches theoretical concepts but also enhances transferable skills essential for business success. Participants develop problem-solving abilities, critical thinking, leadership, and financial acumen through hands-on practice. These real-world skills are directly applicable in professional settings, making the simulation an invaluable resource for aspiring managers and entrepreneurs. The game also encourages strategic foresight, a skill crucial for navigating the complexities of today's dynamic business environment.

**3.Integration with Educational Curricula**

The simulation game can be seamlessly integrated into business education programs and corporate training modules. By aligning with specific course objectives, the game complements traditional learning methods, offering a practical application of theoretical concepts. Educators can use the game to engage students in interactive learning, while organizations can leverage it for employee training and talent development.

**4.Playing Again and Improving**

One of the most valuable features of the simulation game is its replayability. After completing a session, players have the option to restart the game with fresh challenges and scenarios. These new situations may introduce different market conditions, competitive landscapes, or business problems, ensuring that no two playthroughs are the same. By replaying, participants can experiment with alternative strategies and decision-making approaches.

## III.METHODOLOGY

**Detailed Methodology for Developing a Business Simulation Game**

This section outlines the step-by-step methodology for creating a business simulation game that simulates managing a restaurant. The game, built using React and hosted on an npm server, is designed for mobile devices and provides an engaging environment where players make decisions and experience their consequences.

1. Defining the Objectives

The primary objective of the project is to create an educational and interactive game that simulates running a restaurant business. Players should be able to make strategic decisions, manage resources, and observe the outcomes of their choices. The game should provide an enjoyable user experience while being compatible with mobile devices for ease of access.

2. Research and Analysis

The research phase involves studying existing restaurant simulation games to identify popular features and potential gaps. It also includes gathering insights into real-world restaurant management practices to ensure realistic gameplay scenarios. Surveys and interviews with potential players help identify user preferences, such as desired difficulty levels, visual design, and engaging mechanics.

3. Design and Planning

The planning phase involves defining the core game mechanics and user interface. Gameplay elements such as customer generation, profit/loss calculations, and decision-making scenarios are outlined. The user interface is sketched to ensure intuitive navigation, with pages for equipment, staff, buildings, loans, and a central homepage for main gameplay. A timeline with milestones is established for efficient development, testing, and deployment.

4. Development Process

**a.** Setting Up the Environment

The development begins by initializing a React project and configuring the npm server. State management tools like Redux or Context API are used to handle dynamic game data, such as player balances, customer counts, and monthly updates.

**b.** Core Gameplay Components

Homepage: The homepage includes sections for displaying player details (name, balance, and month), a dynamic text area for updates, and buttons for accessing features like equipment, buildings, staff, and loans. A "Plus" button advances the game by one month, updating profits, losses, and balance in real time.

Customer Simulation: The game generates random customer counts each month, influenced by player decisions such as purchased equipment, hired staff, and ongoing marketing campaigns.

Profit and Loss Calculation: Monthly profits are calculated based on customer counts and random revenue per customer. Expenses, such as staff salaries, rent, and equipment maintenance, are deducted, and a monthly summary is displayed on the homepage.

**c.** Dynamic Updates

The game uses React's state and lifecycle methods to ensure real-time updates. Player balances, customer counts, and other variables are updated dynamically without requiring page refreshes. Visual indicators (e.g., green for profits and red for losses) enhance clarity.

**d.** Save and Load Functionality

Players can save their progress using localStorage or sessionStorage and resume the game later without losing data. This ensures a seamless experience.

**e.** Error Handling

Checks are implemented to prevent unrealistic scenarios, such as negative balances. Clear error messages guide players, ensuring a user-friendly experience.

5. Launch and Deployment

The game is hosted on an npm server, ensuring smooth performance on mobile browsers. A marketing campaign targets educational institutions, aspiring entrepreneurs, and gaming communities. The game is also packaged as a Progressive Web App (PWA) to enhance accessibility.

6. Post-Launch Enhancements

Post-launch, user feedback and analytics help identify areas for improvement. Regular updates introduce new features, refine existing mechanics, and add fresh content to keep players engaged. Examples include advanced equipment, additional random events, and new gameplay modes.

7. Sample Gameplay Walkthrough

The game begins with the player selecting their name, business name, and starting balance. In the first month, the player invests in basic equipment and hires a chef. Customers generate revenue, while expenses such as staff salaries and maintenance costs are deducted. As the game progresses, the player can expand the business, improve customer satisfaction, and handle challenges like competitor openings.

## IV.IMPLEMENTATION

The provided code implements a multi-screen application for a business simulation game. Each screen handles specific features, such as user registration, equipment management, loans, marketing, and dynamic gameplay updates. Here's a detailed explanation of the implementation process:

**1. Splash Screen (Splash.jsx)**

The Splash screen serves as the entry point to the application. It retrieves user data from an SQLite database (bsa.db) and decides whether to navigate the user to the RegisterForm for initial setup or the HomePage if data already exists.

*Key Features:*

The app connects to SQLite using the react-native-sqlite-storage library. The screen checks for the presence of the Users table and retrieves saved user information like playerName and businessName. Based on user data, it either opens the RegisterForm or resets the navigation stack to HomePage.

**2. Registration Screen (RegisterForm.jsx)**

The Registration screen captures essential user details such as name, business name, and initial balance. It initializes database tables and ensures valid data input.

*Key Features:*

Input fields validate the initial balance range (₹10,000–₹1,00,000) and ensure all fields are filled. Errors are displayed using react-native-toast-message. A Users table is created in the database with fields for user details and gameplay progress. On form submission, values are inserted into the database, and gameplay data (e.g., buildings, equipment, loans) is preloaded. After successful registration, the user is directed to the HomePage.

**3. Home Page (HomePage.jsx)**

The HomePage serves as the central gameplay interface. It displays user statistics, such as profit, balance, and customer data, while providing options for managing equipment, buildings, loans, marketing, and staff.

*Key Features:*

Monthly gameplay updates are triggered via a "Next Month" button. This calculates customer counts, profit/loss, and expenses based on purchased assets and strategies. Retrieves data from Users, Buildings, EquipmentItems, and other tables. Calculates metrics like ProfitPerMonth and NetProfitPerMonth. Provides navigation options to other feature-specific pages (e.g., Equipment, Staff). Allows users to reset gameplay data or edit account information.

**4. Equipment Page (EquipmentPage.jsx)**

The Equipment page allows users to purchase kitchen tools, which impact customer generation and revenue.

*Key Features:*

Fetches equipment details from the EquipmentItems table. Ensures sufficient balance and required staff levels before enabling purchases. Updates the quantity of owned equipment and deducts the cost from the user's balance.

**5. Buildings Page (BuildingsPage.jsx)**

This page manages restaurant space upgrades, which directly influence customer capacity.

*Key Features:*

Lists available buildings for rent with their monthly costs. Prevents multiple active rentals and checks for balance sufficiency. Marks selected buildings as "rented" and deducts rent from the user's balance.

**6. Loan and Marketing Page (LoanAndMarketingPage.jsx)**

This page allows users to apply for loans or initiate marketing campaigns, impacting the financial and customer generation aspects of the game.

*Key Features:*

Users can apply for loans, which add funds to their balance while scheduling monthly EMIs. EMIs are calculated using a slider for tenure selection and an EMI formula. Allows users to start campaigns that increase customer rates for a limited time. Deducts marketing costs directly from the balance. Prevents duplicate applications and ensures staff availability for campaigns.

**7. Database and Redux Integration**

Throughout the application, SQLite handles persistent storage of user and gameplay data. Redux state management ensures that balance, month, and gameplay progress are updated dynamically across screens.

*Key Operations:*

Redux updates reflect database changes, ensuring consistency between frontend state and backend storage. Monthly events like customer

count updates and profit calculations are managed using Redux actions and reducers.

**8. General UI/UX Design**

The app uses React Native components like ImageBackground, ScrollView, and TouchableOpacity for an interactive user interface. Styling is handled using StyleSheet to ensure a cohesive and visually appealing design.

*Enhancements:*

Toast notifications for real-time feedback for critical actions like resetting data and confirming purchases. Dynamic updates for balance, customer stats, and profitability.

## V.RESULTS

This business simulation game focuses on running a restaurant business and allows players to manage various aspects of the business, including space selection, equipment purchase, staff hiring, loans, marketing, and profit tracking. The project simulates the decision-making process in running a restaurant, providing valuable insights into business operations. Below is a detailed explanation of the features and results:

**Overview of Features**

*Registration Screen:*

Players input their name, business name, and initial balance to start the simulation. A "Load Game" option is available for saving progress and resuming later.


*Business Space Options:*

Players can choose from three types of spaces based on budget:
Small space in a local area (₹5,000/month).
Medium space in a busy area (₹10,000/month).
Large space in a prime area (₹15,000/month).

*Game Dashboard:*

Displays the player's financial metrics:

- Lifetime Profit
- Profit/Month
- Monthly Bill
- Net Profit/Month
- Total Months and Customers


*Loan and Marketing Options:*

Loan providers include options like:

- Swift Funds Finance (₹10,000)
- Iron Clad Capital (₹40,000)
- Golden Bridge Loans (₹50,000)

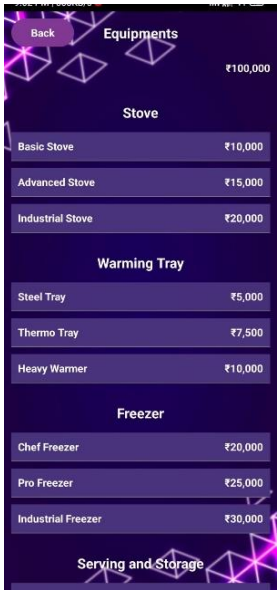
Marketing strategies like:

- Billboards and Posters (₹5,000/month)
- Social Media Integration (₹10,000/month)

*Equipment Purchase:*

Players can invest in kitchen equipment based on their business needs, including: Basic Stove, Advanced Stove, and Industrial Stove.nStorage equipment like Chef Freezer and Pro Freezer.

Equipment impacts the speed and quality of food preparation.




*Staff Management:*

Staff includes roles like Chef, Waiter, and Cleaner, with wages calculated monthly. Adequate staffing ensures efficient operations and improved customer satisfaction.

*Metrics and Profitability:*

As shown in the simulation output:

A significant profit can be achieved by balancing space rental, equipment investment, and marketing. Example:

Lifetime Profit: ₹976,200
Monthly Profit: ₹247,720
Net Profit after bills: ₹237,720
Total Customers: 440

**Key Observations**

**Initial Strategy:** Choosing an affordable space with sufficient footfall (e.g., medium or prime area) sets a solid foundation for profit growth.

**Marketing ROI:** Investment in marketing (e.g., billboards or social media) significantly boosts customer acquisition.

**Balancing Costs:** Hiring staff and purchasing equipment should align with expected customer volume to avoid unnecessary expenses.

**Loan Utilization:** Loans help in scaling the business initially, but high-interest loans may impact profitability if not managed efficiently.

**Practical Insights**

The game effectively demonstrates the importance of financial planning, resource allocation, and strategic decision-making in a business environment. It provides an engaging way to learn about entrepreneurship and resource management, particularly for aspiring restaurateurs. Players can experiment with various strategies to achieve profitability, gaining a clear understanding of the factors influencing business success.

## VI. CONCLUSION

The business simulation game, designed to replicate the experience of managing a restaurant business, offers a detailed and engaging learning experience for aspiring entrepreneurs and business enthusiasts. Developed using **React** and hosted via **npm**, this project successfully combines technical sophistication with practical educational value. Through its interactive gameplay and data-driven metrics, the game demonstrates the critical aspects of financial planning, resource management, and strategic decision-making in the restaurant industry. Below is a comprehensive conclusion discussing the project's impact, technical achievements, and educational value.

**1. Comprehensive Business Simulation**

The game stands out as an effective tool for simulating real-world business scenarios. Players are tasked with making critical decisions that directly impact the performance of their virtual restaurant. These decisions include: Selecting the appropriate business space based on affordability and expected returns. Investing in equipment to optimize food preparation and customer service. Hiring the right mix of staff to balance operational efficiency and costs. Implementing marketing strategies to boost customer acquisition and visibility.

By providing granular control over these aspects, the game creates a dynamic and immersive environment where players can explore various strategies and observe their outcomes. The integration of financial metrics, such as **profit per month, net profit, and lifetime profit**, gives players real-time feedback, enabling them to refine their strategies and improve their decision-making skills.

**2. Technical Sophistication**

The project demonstrates a high level of technical expertise in its development and deployment. Leveraging **React**, the game utilizes modern web development practices, including:

**Component-Based Architecture:** React's modular structure allows for the efficient reuse of UI components, such as input forms, dashboards,

and navigation elements. This reduces redundancy and simplifies the codebase.

**State Management:** The dynamic updating of metrics (e.g., profits, expenses, customer count) relies on React's state management, ensuring real-time responsiveness and an engaging user experience.

**User Interface (UI):** The game features a visually appealing interface with intuitive navigation, making it accessible even to users with limited technical knowledge.

Hosting the game on an **npm server** further underscores the project's technical soundness. This approach ensures easy deployment, scalability, and compatibility with modern development environments. The npm ecosystem also facilitates future enhancements by providing access to a vast library of dependencies and tools.

### 3. Educational Value

One of the most significant contributions of this project lies in its educational potential. The game serves as a practical learning platform for individuals interested in entrepreneurship or business management. Players gain firsthand experience in:

Choosing the right balance between expenses and investments, such as selecting affordable spaces or purchasing essential equipment. Analyzing financial metrics to identify profitable strategies while minimizing operational costs. Understanding the role of advertising in attracting customers and driving revenue growth.Managing loans effectively to scale operations without jeopardizing profitability.

Through trial and error, players can experiment with different approaches, fostering a deeper understanding of the complexities involved in running a business. This hands-on experience is invaluable for both students and professionals aiming to enhance their entrepreneurial skills.

The business simulation game is a remarkable achievement that combines technical excellence with practical relevance. By leveraging **React** and **npm**, the project delivers a polished and scalable application that provides a hands-on introduction to the challenges of managing a restaurant business. Its emphasis on strategic decision-making, financial planning, and customer acquisition makes it a powerful educational tool and an engaging gaming experience.

In conclusion, this project not only showcases the capabilities of modern web development technologies but also addresses a real-world need for accessible and interactive business education. It is a shining example of how technology can be harnessed to bridge the gap between learning and application, paving the way for future innovations in educational gaming.

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