EXISTING SYSTEM

**I. Brief Presentation of the project theme**

Cameroon’s cooking gas market has recently undergone a significant transformation. Seven brands of domestic gas are now available, each vying for market share through persuasive ads in newspapers, on radio and TV, and on billboards. Despite these changes, the market still faces several challenges, particularly affecting domestic vendors and clients.

To address these challenges, we propose a project titled: **"COMPUTERISED MANAGEMENT OF A GAS RETAIL BUSINESS."** This project aims to develop a Mobile Application. It aims to automate, streamline, and monitor the gas distribution process, ensuring robustness, security, efficiency, and integrity in the gas market sector, especially benefiting buyers and vendors of domestic gas.

**II. STUDY OF THE EXISTING SYSTEM**

1. **Local Payment of Gas:**

* **Cash Transactions:** Most gas transactions are done in cash, which can be inconvenient and insecure.
* **Lack of Digital Payment Options:** Limited or no use of digital payment methods, leading to inefficiencies and lack of transaction records.
* **Price Manipulation:** Vulnerability to price fraud, where vendors may overcharge customers.

**2. Manual Monitoring of Gas Bottles by Customers:**

* **Inaccurate Monitoring:** Customers manually check gas levels, often leading to inaccurate assessments and unexpected shortages.
* **Inconvenience:** Regular physical checks are inconvenient and time-consuming.
* **No Real-Time Data:** Lack of real-time information on gas levels makes it difficult to plan for refills.

**3. Manual Verification of Gas Filling by Suppliers:**

* **Inconsistent Verification:** Suppliers manually verify gas bottle weights, which can lead to inconsistencies and errors.
* **Potential for Fraud:** Opportunities for weight fraud, where bottles are underfilled but charged at full price.
* **Lack of Accountability:** Minimal tracking and accountability for gas filling processes, making it hard to identify and address issues.

**III. CRITICISM OF THE EXISTING SYSTEM**

***Table 3:Criticism of the existing system***

|  |  |  |
| --- | --- | --- |
| **Limitation** | **Consequence** | **Proposed Solution** |
| * 1. Gas Bottle Weight Fraud | Economic losses and decreased trust among customers due to paying for underfilled gas bottles, along with safety risks from potentially hazardous underfilled bottles not meeting regulatory standards. | implementing IoT-enabled weighing scales and a centralized verification system to ensure accurate filling and tamper-evident seals for security. |
| 1. Gas Bottle Price Fraud | Overpayment by customers due to inflated prices set by unscrupulous vendors, contributing to market instability and unfair competition, and reducing accessibility to gas due to higher prices. | introducing transparent pricing mechanisms and e-payment options through a mobile application to enhance accountability and affordability. |
| 1. Inability to Locate Gas Supply Stores | Inconvenience for customers in finding reliable gas supply points, leading to wasted time and effort, delays in obtaining gas refills, and inefficient distribution affecting gas accessibility. | developing a GPS-integrated mobile application to help users locate nearby suppliers, streamline delivery services, and improve overall distribution efficiency. |

**IV. PROBLEMATICS**

Amidst the burgeoning transformation of Cameroon's cooking gas market, characterized by the emergence of seven domestic gas brands and vigorous advertising campaigns, **persistent challenges** still afflict both vendors and consumers. Notably, **fraudulent practices such as gas bottle weight manipulation persist, eroding customer trust and posing safety risks**. Additionally, **irregular pricing practices lead to overpayments and market instability, exacerbating affordability concerns**. Moreover, the **difficulty in locating reliable gas supply points complicates access for consumers, resulting in inconvenience and inefficiencies in distribution**. This prompts the fundamental question: **How can we develop a Digital Smart Domestic Gas system with a Monitoring and E-Payment Mobile Application to automate verification processes, enhance pricing transparency, and improve supply chain logistics?**

V. PROPOSED SOLUTION

To address these challenges, we propose the development of a Digital Smart Domestic Gas system with a Monitoring and E-Payment Mobile Application. This solution aims to:

* **Automate Verification Processes:** Implement IoT-enabled weighing scales and a centralized verification system to ensure accurate gas bottle filling, with tamper-evident seals to enhance security.
* **Enhance Pricing Transparency:** Introduce transparent pricing mechanisms and e-payment options within the mobile application to standardize transactions, ensuring customers are charged fair prices and reducing opportunities for price fraud.
* **Improve Supply Chain Logistics:** Develop a GPS-integrated mobile application to help users locate nearby gas supply stores and stations, facilitate order tracking, and streamline delivery services to enhance overall distribution efficiency.
* **Provide Real-Time Gas Cylinder Level Monitoring:** Equip gas bottles with IoT sensors to allow customers to view gas levels in real-time via the mobile application, helping them manage their gas usage more effectively and plan for timely refills.

SPECIFICATION DOCUMENT

I. CONTEXT AND JUSTIFICATION OF STUDIES

In less than a year, Cameroon's cooking gas market has experienced a significant transformation with the introduction of seven domestic gas brands, intensifying competition through extensive advertising in newspapers, on radio, TV, and billboards. Historically dominated by Total, Agil, and Mobil, the market has seen SCTM rapidly capture nearly 50% of market share. Despite these changes, substantial challenges persist: insufficient supply meeting only 65% of national demand, limited geographical coverage of less than 16% of the country, and the inability for consumers to exchange gas bottles between different brands. Additionally, state efforts to curb bottle manipulation and clandestine refilling have proven ineffective, leading to artificial scarcity and potential price hikes. Fraudsters frequently tamper with gas bottles to reduce the quantity of liquid and maximize profits, which has prompted frequent police raids.

Consumers have shown enthusiasm for new entrants like OiLibya and Tradex, particularly due to Tradex’s innovation of including a device in their bottles that indicates the quantity of gas and monitors usage. This feature is crucial in a country where the average daily household income is 2,000 francs CFA, allowing consumers to better regulate their consumption. Although the official price of cooking gas in major cities like Yaoundé and Douala remains at 6,000 francs CFA, there is an emerging demand for more competitive pricing, which could only be realized through a price war, ultimately benefiting consumers.

**Justification:** The existing challenges in Cameroon’s cooking gas market underscore the need for a comprehensive solution that addresses supply insufficiencies, brand-specific bottle exchanges, fraudulent practices, and pricing inconsistencies. Our proposed project, **"CONCEPTION AND DEVELOPMENT OF A DIGITAL SMART DOMESTIC GAS WITH A MONITORING AND E-PAYMENT MOBILE APPLICATION,"** aims to tackle these issues head-on. By developing a digital smart gas system with integrated monitoring and e-payment capabilities, we can:

* **Enhance Supply Chain Transparency:** Automate the verification process and ensure accurate gas bottle filling, reducing fraudulent practices and maximizing consumer trust.
* **Improve Consumer Access:** Enable real-time gas level monitoring, helping consumers manage their gas usage more effectively and plan for timely refills.
* **Standardize Pricing:** Implement transparent pricing mechanisms and secure e-payment options, reducing the risk of price fraud and providing consumers with fair and consistent pricing.
* **Increase Market Coverage:** Utilize a GPS-integrated mobile application to help consumers locate nearby gas supply points, facilitating easier access and efficient distribution.

OBJECTIVES OF THE PROJECT

1. **General objectives**

The general objective of these project, "CONCEPTION AND DEVELOPMENT OF A DIGITAL SMART DOMESTIC GAS WITH A MONITORING AND E-PAYMENT MOBILE APPLICATION," is to enhance the efficiency, transparency, and integrity of Cameroon's cooking gas market by implementing a comprehensive digital solution.

1. **Specific Objectives**

Consumers:

1. **Integrate Real-Time Gas Level Monitoring:**
   * Equip gas bottles with IoT sensors that continuously monitor and report gas levels.
   * Allow customers to view their gas consumption in real-time through a mobile application.
2. **Develop Secure E-Payment Options:**
   * Integrate secure e-payment systems within the mobile application for seamless transactions.
3. **Create a GPS-Integrated Mobile Application:**
   * Develop a mobile application with GPS capabilities to help consumers locate nearby gas supply stores and stations.
   * Enable order tracking and ensure timely deliveries.
4. **Enhance Consumer and Vendor Interaction:**
   * Provide features within the mobile application for consumers to rate and review gas suppliers.

#### Vendors:

1. **Implement IoT-Enabled Weighing Scales:**
   * Develop and deploy smart weighing scales integrated with IoT technology to accurately measure and verify the weight of gas bottles before market entry.
2. **Design and Implement Transparent Pricing Mechanisms:**
   * Introduce standardized pricing models within the mobile application to ensure fair and transparent gas pricing.
3. **Develop a Centralized Verification System:**
   * Create a centralized database and verification system to log and monitor the weights of all gas bottles.
   * Ensure compliance with legal standards and prevent fraudulent practices.

#### Administrators:

1. **Ensure Regulatory Compliance:**
   * Implement features within the system to ensure all gas bottles meet regulatory standards for weight and safety.
2. **Facilitate Market Analytics and Reporting:**
   * Develop analytics and reporting tools within the system to provide insights into market trends, consumer behaviour, and supply chain efficiency.

**EXPRESSION OF NEEDS**

In this section we are going to outline the specific needs or requirements that the software project is intended to meet. It is a bridge between the problem and the solution detailing the

‘what’ and not the ‘how’. And this need is going to be divided into functional and non-functional needs.

**Functional needs**

#### Here, we are talking about **what** the system is supposed to do for the user of the application, and these features are.

#### Consumers:

1. **Real-Time Gas Level Monitoring:**
   * IoT sensors in gas bottles to monitor gas levels.
   * Mobile application interface for viewing real-time gas levels.
2. **Secure E-Payment Options:**
   * Integration of multiple e-payment methods (mobile money, credit/debit cards, etc.).
   * Secure transaction processing and receipt generation.
3. **GPS-Integrated Store Locator:**
   * GPS-enabled map to locate nearby gas supply stores and stations.
   * Order tracking and delivery notifications.
4. **Consumer Feedback System:**
   * Features for rating and reviewing gas suppliers within the mobile application.

#### For Vendors:

1. **IoT-Enabled Weighing Scales:**
   * Smart weighing scales to accurately measure and verify gas bottle weight.
   * Integration with the centralized verification system for real-time data logging.
2. **Centralized Verification System:**
   * Database for logging and monitoring the weights of gas bottles.
   * Alerts for discrepancies or tampering attempts.
3. **Pricing Mechanisms:**
   * Standardized pricing models within the mobile application.
   * Automated price updates and transaction recording.

#### For Administrators:

1. **Regulatory Compliance Monitoring:**
   * System features to ensure gas bottles meet regulatory standards for weight and safety.
   * Automated compliance checks and reporting.
2. **Market Analytics and Reporting:**
   * Tools for analyzing market trends, consumer behavior, and supply chain efficiency.
   * Generation of detailed reports and insights for decision-making.

**NON-FUNCTIONAL NEEDS**

The non-functional need we are referring to here, is the ‘quality attributes’ of the software, that is, how the software should behave in order to increase user expectations and satisfaction and just below we are going to see the non-functional need that our application needs to have.

* **Security:** User personal data should be securely stored and transmitted in order to respect user privacy.
* **Performance:** The application should be able to load quickly and operate smoothly to ensure maximum user satisfaction
* **Usability:** it must be easy to use and navigate in order to avoid making the app seems complicate to use by the user
* **Reliability:** it must be reliable in order to meet up market expectation and to promote the needs of the application