

**FinSure: A Data-Driven Microinsurance Model  
for PM2.5-Income Protection in Thailand**

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## 1. Executive Summary

PM2.5 air pollution is a recurring seasonal crisis in Thailand, especially during the winter months. Government-enforced stop-work orders aim to protect public health but leave millions of daily wage workers—such as construction crews, delivery riders, and street vendors—suddenly without income. These informal workers often lack financial safety nets, insurance access, or even bank accounts.

**FinSure: PM2.5 Income Shield** was created to close this gap. It is a microinsurance platform that delivers **income protection** during pollution-related work stoppages. The system uses **real-time air quality data** and an **AI-powered dynamic pricing model** to calculate fair premiums based on individual risk factors like occupation, location, and pollution exposure.

Accessibility is core to the solution. FinSure partners with **village health volunteers (Aor Sor Mor)** to support outreach, onboarding, and claims, ensuring that even those with limited digital literacy or no formal identification can join. Compensation is disbursed via **government welfare cards**, removing banking barriers and streamlining access.

More than an insurance product, FinSure is a platform for **inclusive finance and environmental resilience**. It brings together local trust networks, public infrastructure, and adaptive pricing technology to serve Thailand's most vulnerable workers. Designed to be scalable and replicable, the model has potential to expand across Southeast Asia and beyond.

**Stay Protected, Pay Smarter – Dynamic Pricing for Everyday Risks.**



## 2. Problem Statement

PM2.5 air pollution is not just a public health issue—it creates **severe economic vulnerability** for millions of informal and daily wage workers in Thailand. Construction workers, street vendors, and delivery riders rely on daily earnings and often lack financial protection when outdoor work is suspended due to hazardous air quality.

These government-mandated work stoppages trigger **instant income loss** for workers who cannot afford to take time off. With few alternative job options and no formal benefits, most turn to borrowing, deepening household debt during pollution seasons.

This vulnerability is compounded by **three systemic barriers** to traditional insurance:

1. **Literacy complexity** – Insurance products are difficult to understand, especially for first-time users with low formal education or digital experience.
2. **Lack of trust** – Many see insurance as distant or unreliable, due to limited awareness and negative past experiences.
3. **Affordability** – Fixed premiums and long-term commitments make insurance inaccessible for those with irregular or low incomes.

There is currently **no insurance product** tailored to this context—one that is simple, trusted, and priced fairly for PM2.5-related risks.

**FinSure: PM2.5 Income Shield** is designed to break this cycle. By combining real-time AQI triggers, community-based outreach, and **AI-powered dynamic pricing**, it offers a low-barrier, context-aware microinsurance model. This solution provides immediate support during work stoppages and introduces vulnerable workers to income protection—building a bridge toward broader financial inclusion and long-term resilience.

### 3. Market Opportunity and Competitor Analysis

#### 3.1 Market Opportunity

The rise of PM2.5 air pollution in Thailand presents a seasonal but intensifying risk—disrupting income for millions of informal workers with no financial fallback. This environmental crisis opens a significant opportunity for microinsurance models built around **real-time risk**, **community engagement**, and **low-cost digital delivery**.

- FinSure is positioned to lead in this underserved space by addressing three interconnected market gaps:
- **Recurring Environmental Risk:** PM2.5 levels spike every winter, and projections suggest worsening conditions due to climate change. This drives long-term demand for pollution-responsive financial safety nets.
- **Underserved Labor Market:** Around **13.07 million low-income citizens** are registered in the national welfare programme. Among them, **5 million** are estimated to be **urban informal workers** in PM2.5-affected areas who are digitally reachable and economically vulnerable.
- **Untapped Channel for Insurers:** Reaching this market profitably has long been a challenge for insurers. FinSure lowers distribution costs by leveraging **AI-powered dynamic pricing**, **government-linked disbursement**, and **trusted local agents** like Aor Sor Mor.

#### TAM–SAM–SOM Summary:

- **TAM (Total Addressable Market):** 13.07 million welfare-registered low-income individuals.
  - **SAM (Serviceable Available Market):** ~5 million urban informal workers in PM2.5-affected zones.
  - **SOM (Serviceable Obtainable Market – Year 1):** ~300,000 workers in Bangkok under FinSure's MVP rollout.
  - This layered targeting strategy ensures both social relevance and commercial viability.
- Summary:** FinSure transforms a recurring environmental crisis into a channel for financial inclusion—offering low-income workers a fair, real-time income safety net while creating a scalable platform for insurers.

### 3.2 Competitor Analysis

- **Direct Competitors**
- **Traditional Microinsurance** (e.g. Thai Life, Muang Thai Life): Offer basic health/accident coverage but lack air-quality-based triggers or community-based enrolment.
- **Digital Platforms** (e.g. Roojai, Sunday): Provide flexible plans via apps, but don't address income loss from PM2.5 or integrate trusted local networks.
- **Indirect Competitors**
- **State Welfare**: Emergency aid via welfare cards offers general relief but lacks targeted coverage tied to pollution-related income loss.
- **Informal Lending**: Microloans fill immediate gaps but deepen debt and delay financial recovery.
- **NGOs & Foundations**: Offer irregular, unsustainable short-term support.
- **FinSure's Differentiation**: Combines **dynamic pricing**, **AI-triggered eligibility**, and **hyperlocal distribution** to deliver precise, trusted protection—where competitors rely on generic products or ad hoc interventions.

### 3.3 Key Competitive Strengths

- **Dynamic pricing powered by AI** – Uses real-time AQI, income, location, and occupation to tailor premiums.
- **User-first design** – Simple onboarding, low documentation, and minimal literacy required.
- **Community-driven distribution** – Via Aor Sor Mor for trust, education, and cost efficiency.
- **Government-aligned payouts** – Uses PromptPay and welfare cards to reach even unbanked users.
- **Multi-insurer ecosystem** – Supports pricing flexibility, risk segmentation, and competitive product bundling.

### 3.4 SWOT Analysis

#### SWOT Matrix

	Positive	Negative
Internal	<b>Strengths</b> <ul style="list-style-type: none"> <li>• Real-time AQI + AI for dynamic, fair pricing</li> <li>• Designed specifically for daily wage earners</li> <li>• Community-based onboarding via Aor Sor Mor</li> <li>• Linked to state welfare cards for easy payments</li> <li>• Multi-insurer partnerships for flexible, low-cost plans</li> </ul>	<b>Weaknesses</b> <ul style="list-style-type: none"> <li>• Low insurance literacy in target groups</li> <li>• Dependence on external data (e.g., AQI, state systems)</li> <li>• Scaling difficult in areas without Aor Sor Mor</li> </ul>
External	<b>Opportunities</b> <ul style="list-style-type: none"> <li>• PM2.5 is a seasonal, ongoing crisis</li> <li>• Policy momentum toward inclusive social protection</li> <li>• Expandable to other climate-related risks</li> <li>• Fintech tools enable scale and efficiency</li> </ul>	<b>Threats</b> <ul style="list-style-type: none"> <li>• Policy inconsistency on work suspension orders</li> <li>• Potential competition from larger insurers</li> <li>• Misunderstanding of payout conditions</li> <li>• Data privacy and legal compliance risks</li> <li>• Low tech skills among rural or older users</li> </ul>

#### Strengths

- AQI-based pricing logic
- Trusted grassroots agents
- Mobile-first architecture
- Government payout rails
- Co-designed with insurers

#### Weaknesses

- Low insurance literacy
- Reliance on AQI/government data
- Limited Aor Sor Mor coverage in some zones

#### Opportunities

- Expand to floods, heatwaves
- Employer-based adoption
- Fintech integrations (e-wallets, e-KYC)
- State-supported subsidies

#### Threats

- Policy inconsistency
- Competitor imitation
- User confusion around conditional payouts
- Tech literacy & access gaps

FinSure doesn't just compete on price or coverage—it **competes on accessibility**, turning social barriers into strategic strengths.

## 4. Vision, Mission, and Strategic Objectives

### 4.1 Vision

To become Thailand's most trusted and accessible microinsurance provider, delivering financial stability to underserved workers and communities vulnerable to environmental and economic shocks.

### 4.2 Mission

To offer affordable, easy-to-understand income protection that fits the realities of daily wage earners—building trust through local networks, reducing financial uncertainty, and strengthening household resilience.

### 4.3 Strategy

FinSure's strategy is built around one core principle: **accessibility at scale**. By making insurance easy to understand, easy to access, and easy to trust, FinSure unlocks high-volume adoption among underserved workers—creating value for both users and insurers.

Accessibility isn't just a feature—it's the engine. It drives:

- **Volume:** Reaching the millions of daily wage earners traditionally excluded from insurance.
- **Growth:** Opening new customer segments for insurers, enabling profitable expansion.
- **Efficiency:** Lowering distribution costs through trusted community channels.
- **Trust:** Simplifying the user experience to encourage first-time adoption.
- **Policy Innovation:** Generating real-world data to support more inclusive insurance design.

## 4.4 Strategic Objectives

- **Maximise customer reach through radical accessibility**  
Deliver ultra-affordable, relevant products via mobile and community channels—making protection available to those historically left behind.
- **Use personalised pricing to match real customer capacity**  
Adjust premiums based on income, job type, and environmental exposure, ensuring affordability without compromising sustainability.
- **Scale cost-effective distribution through local networks**  
Leverage Aor Sor Mor and other grassroots partners to reach hard-to-access communities with minimal acquisition costs.
- **Simplify onboarding to convert awareness into action**  
Strip away insurance jargon and technical complexity—build intuitive flows that support low-literacy and first-time users.
- **Build insurer confidence through volume and data**  
Provide insurers with a scalable, low-cost channel backed by behavioural and environmental risk data to improve pricing and product design.
- **Lay groundwork for public-private collaboration**  
Align with welfare systems for seamless eligibility checks and payouts—setting the stage for long-term policy integration.

## 5. Business Model

FinSure is not just a microinsurance platform—it is a risk protection ecosystem that blends real-time data, community trust, and government alignment to deliver accessible financial resilience for workers left behind by traditional insurance.

By starting with **air pollution-related income loss**, FinSure tackles one of the most visible, seasonal, and urgent risks faced by Thailand’s informal workforce—earning trust, building digital habits, and paving the way for broader protection in the future.

The business model is structured around nine key components:

### 5.1 Customer Segments

- Informal and daily wage workers in construction, agriculture, delivery, and street vending.
- Welfare card holders and other low-income populations identified by government data.
- Urban workers in high-risk PM2.5 zones, especially those excluded from formal benefits.

### 5.2 Value Proposition

- **Income protection triggered by verified work stoppages due to hazardous air quality.**
- **Dynamic premiums** personalised by AI using location, job type, income, and local AQI levels.
- Simple, low-barrier enrolment via community agents (Aor Sor Mor).
- **Digital payout system** via PromptPay or welfare card—no bank account required.
- Builds awareness and trust in insurance through localised, human support.

### 5.3 Channels

- Community distribution through trained Aor Sor Mor (village health volunteers).
- Mobile-optimised web and app interfaces for low-tech users.
- Collaboration with government agencies, cooperatives, and NGOs for last-mile reach.

### 5.4 Customer Relationships

- High-touch, **community-anchored onboarding and support.**
- Central helpdesk for claims, technical issues, and general enquiries.

- Built-in feedback loop to improve the product based on real user experience.



## 5.5 Revenue Streams

- **Insurance premiums** collected via digital and welfare-linked platforms.
- **Advertising revenue** from ethical, relevant sponsors (e.g. health services, safety gear), integrated into the platform experience as usage grows.

## 5.6 Key Resources

- **AI/ML risk engine** for dynamic premium calculation and claim validation.
- **Community agent network** (Aor Sor Mor) for outreach, education, and local onboarding.
- Strategic partnerships with insurers, regulators, and NGOs.
- Scalable digital infrastructure for policy, claim, and data governance.

## 5.7 Key Activities

- Develop, test, and update dynamic pricing models based on AQI and personal risk.
- Recruit and train Aor Sor Mor and partner agents for field operations.
- Operate real-time eligibility and claims processing system.
- Coordinate with insurers and government systems to validate entitlements and disbursements.

## 5.8 Key Partners

- **Insurance firms** co-developing modular, risk-adjusted products.
- **Government bodies** (Ministry of Public Health, Department of Health, NHSO) for welfare and data integration.
- **NGOs and civil society organisations** supporting access and inclusion.
- **Fintech providers** for e-KYC, mobile wallet integration, and secure digital payments.

## 5.9 Cost Structure

- Technology development and maintenance (AI tools, platform infrastructure).
- Agent training, incentives, and community engagement programmes.
- Awareness campaigns in high-risk zones.

- Operational costs for data validation, compliance, and partner coordination.

FinSure's model is designed to be **scalable, inclusive, and financially sustainable**. By solving a real, recurring problem with the right mix of technology, trust, and timing, it creates shared value for low-income users, insurers, and the public sector.

## 6. Data Strategy Framework

A strong data foundation is essential for FinSure’s ability to deliver **personalised, fair, and trusted microinsurance**. From dynamic pricing to AI-triggered claims and PDPA compliance, FinSure’s success depends on transparent, high-integrity data that serves both users and regulators.

This framework outlines how FinSure classifies, governs, and improves its data assets—ensuring that **inclusion, accuracy, and explainability** are built into every part of the system.

### 6.1 Identify Data Assets

FinSure categorises its data assets into six groups, each tied to real-world use cases—from onboarding to claims processing.

Group	Data Type	Examples	Used For
1. Personal Data	Full Name, National ID, Phone, DOB, Address	User input during registration	Identity verification, AQI station matching
2. Health Data	Chronic disease history, medical certificates	Hospital & user-submitted	Risk evaluation and claim validation
3. Income Data	Daily income, occupation, welfare card status	User + government sources	Dynamic pricing and eligibility
4. Environmental Data	GPS, AQI, work suspension alerts	Govt. APIs, sensors, models	Claim triggers and real-time risk scoring
5. Insurance Data	Claim type, submission date, payment status	System-generated	SLA monitoring and payout validation
6. AI Model Data	Risk score, premium amount, model version	AI engine logs	Model auditing and premium explainability

Each dataset is documented with origin, purpose, and cross-system relationships—forming the foundation of FinSure’s metadata governance.

## 6.2 Data Roles and Responsibilities

To ensure **data serves the user and not the system**, FinSure links every governance role to both compliance and **accessibility outcomes**.

Role	Responsibilities	Accessibility Link
<b>Data Governance Council</b>	Approves inclusive data policies, oversees legal and ethical alignment	Prioritises fixes in identity/income barriers, allocates budget to user-first tools
<b>Chief Data Officer (CDO)</b>	Aligns strategy with product relevance, oversees transparency	Ensures premium logic is explainable to users, reports accessibility KPIs
<b>Data Owners</b>	Manage accuracy and relevance of domain-specific data (health, income, GPS, etc.)	Avoids exclusion by adapting logic to informal job titles, rural data gaps
<b>Data Stewards</b>	Enforce quality rules and data formatting standards	Maintain clear, user-friendly data flows (e.g., AQI → Eligibility → Claim)

### Scalable Functions Under the CDO Office

As FinSure matures, additional governance capabilities will be developed within the CDO's office to support scale, risk management, and AI transparency:

- **Data governance function** – Oversees classification, retention, consent, and metadata lineage. Currently handled by the CDO and technical stewards.
- **Data quality function** – Focused on accuracy scoring, root cause analysis, and inclusive data validation. Currently embedded in steward and analytics roles.

These functions will evolve into dedicated teams as FinSure grows in complexity, transaction volume, and regulatory obligations.

### 6.3 Data Policies and Quality Standards

#### 6.3.1 Key Data Policies

1. **Data Classification**

Ranks data by sensitivity, with strict handling of PII and medical records (e.g., masking, consent, encryption).

2. **Access Control**

Role-based access (RBAC) enforced with audit trails. AI systems never see raw PII—only encrypted scores.

3. **Retention & Disposal**

Clear rules for retention (2–5 years) and cryptographic deletion of expired records.

4. **Consent Framework**

General consent for profile data; explicit, informed consent for sensitive or AI-processed fields.

5. **Incident Response**

Breaches trigger a 24-hour internal alert, 72-hour external notification, and 7-day mitigation report.

#### 6.3.2 Four Dimensions of Data Quality

Dimension	What It Ensures	Example
Intrinsic	Accuracy and trustworthiness	AQI matches public source, premiums use correct formula
Contextual	Fit for purpose	Only PM-related data used in PM-triggered plans
Representational	Clear and standardised	“Claim Type” always follows dropdown format
Accessibility	Usable and secure	Stewards can access relevant data with proper logging

#### 6.3.3 Tools for Data Quality Control

- **Profiling Tools** – Catch nulls, outliers, and duplicates.
- **Quality Dashboards** – Visual KPIs by data domain.
- **Root Cause Analysis** – Trace why data failed (e.g., poor form design).

- **Validation Rules** – E.g., income must be positive, GPS must match known regions.

## 6.4 Data Governance Processes

FinSure follows a structured, 8-step governance lifecycle:

1. **Define Scope** – Map all critical data types (health, income, AQI, claims).
2. **Readiness Assessment** – Assess teams, metadata tools, legal understanding.
3. **Framework Design** – Define hierarchy: Council → CDO → Owner → Steward.
4. **Policy & Glossary Management** – Version-controlled business glossary and metadata catalog.
5. **Issue & Risk Management** – Classify data issues and conduct root cause analysis.
6. **Compliance Monitoring** – Audit logs for PDPA, AI fairness, and consent compliance.
7. **Tool Enablement** – Dashboards (Power BI), version control (Git), open-source metadata tools (e.g., DataHub).
8. **Continuous Improvement** – Monthly data quality reviews and quarterly retrospectives.

## 6.5 Metadata Catalog and Data Discoverability

Metadata governance isn't just about documentation—it's about **ensuring the system is explainable, auditable, and discoverable**, even for non-technical users.

### Metadata Types Tracked

- **Descriptive** – Name, type, format (e.g., risk\_score: float)
- **Business** – Glossary terms (e.g., “eligibility” = income < 300 THB/day)
- **Lineage** – Flow of data (e.g., AQI → model → premium → claim)
- **Provenance** – Who or what generated the data (e.g., Aor Sor Mor app, AI engine)

### Catalog Features

- Search by keyword (“AQI” returns all linked fields)
- Auto-alerts when metadata lacks ownership
- Version control for every data policy and model field
- Audit trail for every create/edit/delete action

## 6.6 Why This Matters

FinSure doesn't just use data—it **earns trust through it**.

This framework ensures that every premium is explainable, every claim is justifiable, and every user interaction is built on privacy and fairness.

By embedding governance into the product, FinSure makes AI **accountable**, policy **inclusive**, and data **human-serving**.

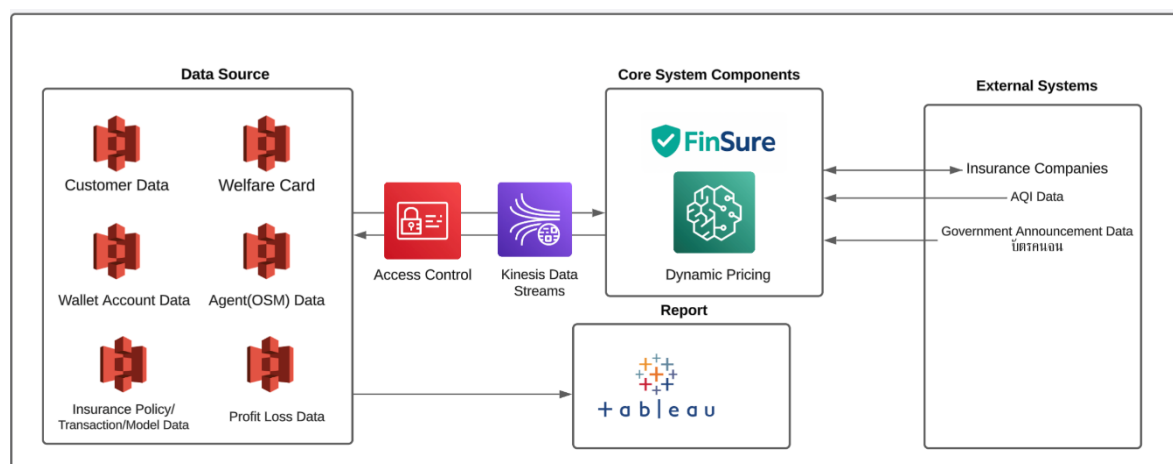
## 7. Data Architecture and Workflow

FinSure's data architecture is designed to power real-time decision-making for income protection, ensure compliance with privacy regulations, and support long-term financial inclusion through AI-enabled risk analysis.

The system integrates user data, government signals, environmental streams, and partner infrastructure into a hybrid, scalable framework that prioritises **security**, **accessibility**, and **resilience**.

### 7.1 Data Architecture

#### 7.1.1 Data Sources



FinSure ingests data from multiple trusted sources:

- **Customer Data** – Personal, occupational, and income data submitted via mobile/web onboarding.
- **Welfare Card Data** – Synced with government databases to verify eligibility and support payout.
- **Wallet Account Data** – Enables seamless claim disbursements via PromptPay or digital wallets.



- **Field Agent Data (e.g., Aor Sor Mor)** – Submitted by trained community agents who assist in registration and claims.
- **Insurance Policy, Transaction, and Model Data** – Records of pricing, policy issuance, and AI decisions.
- **Internal Risk and Performance Data (incl. P&L)** – Used to evaluate model effectiveness, pricing sustainability, and financial risk-sharing with insurer partners.

*Note: Environmental data sources (e.g., AQI) are modular and can expand to support future risks such as heat, flood, or drought.*

### 7.1.2 Access Control

Role-Based Access Control (RBAC) ensures that only authorised users or systems can access data relevant to their role. All sensitive fields—particularly PII, income, and health—are masked or encrypted and governed by audit logs in compliance with Thailand’s PDPA framework.

### 7.1.3 Real-Time Data Streaming (Kinesis)

Amazon Kinesis orchestrates real-time workflows, enabling immediate reaction to time-sensitive events such as:

- AQI-triggered claims (e.g., PM2.5 exceeding health thresholds)
- Continuous environmental monitoring from public APIs
- Live tracking of field agent activity and user submissions

### 7.1.4 Core System Components

- **FinSure Platform** – Centralised system for managing user profiles, policy issuance, and claims.
- **Dynamic Pricing Engine** – Calculates personalised premiums based on occupation, income, location, and AQI exposure.
- **Tableau Reporting Layer** – Supports internal dashboards, risk heatmaps, and policy design analytics for partners and internal teams.

### 7.1.5 External Systems

FinSure integrates with external partners and open data sources to enable accurate, real-time decision-making:

- **Partner Insurance Firms** – Co-design flexible microinsurance products and provide underwriting capacity.
- **AQI Data Providers** – Stream air pollution levels hourly from the Pollution Control Department.
- **Government Notification Systems** – Automatically sync official work suspension notices to activate income protection triggers.

## 7.2 Data Strategy: Aligned with Business Pillars

FinSure's data strategy is intentionally designed to deliver on three core business pillars:

**Accessibility, Trust, and Affordability.** The system ensures that technology doesn't just automate processes—but actively removes barriers for informal workers to participate in financial protection.

- **Accessibility**

FinSure's architecture enables mobile-first onboarding, agent-assisted workflows, and real-time decisions triggered by verified events (e.g., AQI alerts, welfare card data). This removes the need for users to navigate complex insurance logic or submit manual paperwork.

- **Trust**

Every claim, premium, and decision is traceable through secure audit trails, metadata lineage, and AI versioning. Field agents, customer service teams, and government partners can explain outcomes clearly—building confidence among low-literacy or first-time insurance users.

- **Affordability (Fair Pricing)**

AI-powered pricing adjusts to each user's income, occupation, and exposure risk. Dynamic models ensure that users pay only what's fair—no more, no less—making protection accessible without requiring long-term financial commitment.

### 7.2.1 Data Storage Design

Data Type	Storage Model	Justification
Customer PII	On-Premise Data Center	Ensures maximum control and PDPA compliance
Health & Income Data	Cloud Data Lake	Supports flexible analytics and AI/ML workflows
Environmental Data (e.g., AQI)	Cloud Object Store + Kinesis	Enables real-time ingestion and rule-based triggers
Claim Logs & Payment History	Cloud Data Warehouse	Enables SLA tracking, auditability, and analytics
AI Model Logs	Cloud Data Lake	Allows model versioning, auditing, and transparency

### 7.2.2 Data Pipelines and Processing Workflow

FinSure uses a hybrid approach to data pipeline management:

- **ETL (Extract-Transform-Load)**  
For structured datasets like onboarding forms, claims, and medical documents—transformed before loading into analytics systems.
- **ELT (Extract-Load-Transform)**  
For semi-structured streams like AQI, behavioural logs, and GPS. Data is loaded in raw form and transformed as needed for analytics.
- **Real-Time Streaming via Amazon Kinesis**  
Used to support:
  - AQI-triggered payout engine
  - PM2.5 sensor-driven alerts
  - Health and geolocation-based activity tracking

### 7.2.3 Summary: End-to-End Data Strategy

Component	FinSure Implementation
Architecture	Hybrid Cloud (PII on-prem / Analytics in cloud)
Data Pipeline	ETL for structured data, ELT for sensor streams, Kinesis for real-time
Metadata	Lineage-tracked repository with documented APIs
Data Quality	Governance-defined KPIs for completeness, accuracy, and relevance
Security	RBAC, audit logs, MFA, and PDPA-compliant consent tracking
Governance	Role-based oversight with scalable data quality functions under the CDO office

## 8. Insurance Model & Dynamic Pricing

### Overview

The FinSure project introduces a pioneering microinsurance solution designed to protect Thailand's low-income and informal workforce from income loss due to severe air pollution, specifically high PM2.5 levels. By combining real-time air quality monitoring, AI-driven dynamic pricing, and mobile-first delivery, FinSure creates an inclusive and responsive safety net tailored for Thailand's most vulnerable populations.

This section outlines the insurance structure, classification of beneficiaries, the pricing framework, and the data-driven mechanisms that power real-time protection and equitable coverage.

### 8.1 Target Group Classification System

FinSure adopts a data-centric classification framework to ensure insurance coverage reaches those who are most vulnerable and underserved.

#### 8.1.1 Occupational Segmentation

- **Construction Workers** – Highly impacted by government-issued stop-work orders during high PM2.5 periods.
- **Agricultural Laborers** – Representing over 11.6 million individuals; lack formal protections.
- **Informal Sector Workers** – Street vendors, delivery drivers, factory workers, gig workers.

#### 8.1.2 Social Protection Status

- **Welfare Card Holders** – Registered under the national poverty support programme (~13.07 million people).

#### 8.1.3 Financial Vulnerability

- Daily income below 300 THB.
- Unstable, seasonal, or weather-dependent income with no contractual protections or paid leave.

Eligibility is determined through AI-powered screening, mobile onboarding, and local agent support.

## 8.2 Insurance Product Structure and Dynamic Pricing

### 8.2.1 Coverage Overview

FinSure offers four tiered microinsurance plans that provide:

- **Income compensation** (up to 7 days per year)
- **Medical coverage** (up to 15 visits per year)
- **Death benefit** for fatalities caused by PM2.5-linked illnesses

Covered conditions include:

- Acute bronchitis and bronchiolitis
- Chronic bronchitis, emphysema, and COPD
- Cancers of the lung, trachea, or bronchi
- Acute myocardial infarction

Note: Coverage begins after a 30-day waiting period.

### 8.2.2 Insurance Premium Calculation Framework

The insurance pricing methodology is adapted from Jotima Puasiri (2018) and follows standard non-life actuarial models. The formulas used are:

1. **Average Claim Frequency** = Number of Incurred Claims ÷ Unit of Earned Exposure
2. **Average Loss Severity** = Incurred Losses ÷ Incurred Claims
3. **Loss Cost** = Average Claim Frequency × Average Loss Severity
4. **Gross Premium** = Loss Cost ÷ (1 – Commission – Expense – Profit Margin)
5. **Stamp Duty** = Gross Premium × 0.004
6. **Value-Added Tax (VAT)** = (Gross Premium + Stamp Duty) × 0.07
7. **Net Premium** = Gross Premium + Stamp Duty + VAT

### 8.2.3 Data Sources

The premium model is based on 2023 inpatient data from the National Statistical Office of Thailand, covering four air-pollution-related disease categories (ICD-10). Relevant patient data was extracted from both the Universal Coverage Scheme and Civil Servant Medical Benefit Scheme.

### 8.2.4 Premium Modelling: Step-by-Step Examples

**Total population:** 65,083,836

**Total relevant patients:** 572,365

**Average Claim Frequency** =  $572,365 \div 65,083,836 \approx 0.008794$

For a Sum Insured of 10,000 THB

- Loss Cost =  $0.008794 \times 10,000 = 87.94$  THB
- Gross Premium =  $87.94 \div 0.5 = 175.88$  THB
- Stamp Duty =  $175.88 \times 0.004 = 0.70$  THB
- VAT =  $(175.88 + 0.70) \times 0.07 = 12.36$  THB
- Net Premium =  $175.88 + 0.70 + 12.36 = 188.95$  THB  $\approx 190$  THB

For a Sum Insured of 20,000 THB

- Loss Cost = 175.88
- Gross Premium =  $175.88 \div 0.5 = 351.77$
- Stamp Duty =  $351.77 \times 0.004 = 1.41$
- VAT =  $(351.77 + 1.41) \times 0.07 = 24.72$
- Net Premium =  $377.90 \approx 390$  THB

For a Sum Insured of 30,000 THB

- Loss Cost = 263.83
- Gross Premium =  $263.83 \div 0.5 = 527.66$
- Stamp Duty = 2.11
- VAT = 37.08
- Net Premium =  $566.85 \approx 590$  THB

For a Sum Insured of 50,000 THB

- Loss Cost = 439.71
- Gross Premium =  $439.71 \div 0.5 = 879.43$
- Stamp Duty = 3.52
- VAT = 61.81
- Net Premium =  $944.76 \approx 990$  THB

These correspond to FinSure's current four product tiers.

### 8.2.5 Tiered Dynamic Pricing Model

FinSure adjusts premiums based on AQI forecasts, seasonal risk, and regional demand patterns.

Factor	Adjustment
AQI 201–300 (Very Unhealthy)	+7%
High-pollution season (Dec–Mar)	+2–5%
Demand surge	+2–5%
AQI 0–50 (Good)	–5%

#### **Premium Example**

A worker applying in January (peak season) selects the Standard Plan at 390 THB. AQI forecast is 220 (+7%), high season adds 3%, and demand surge adds 2%.

**Adjusted Premium =  $390 \times (1 + 0.07 + 0.03 + 0.02) = 432.90$  THB**

## 8.3 Claims Workflow and AI-Enabled Operations

### 8.3.1 Trigger Events

- PM2.5 emergency alerts or official stop-work orders
- Diagnosis of eligible respiratory illness

### 8.3.2 Claims Process

1. Submit via FinSure app or local agent
2. System auto-checks AQI and validates documents using AI



3. Payout processed within 48 hours via PromptPay or mobile wallet

### **8.3.3 Required Documents**

- **Medical Claim:** ID, doctor's certificate, receipts
- **Income Loss:** Proof of work stoppage (e.g. photo, announcement)

### **8.4 Distribution and Commission Model**

- Community-based agents (e.g., Aor Sor Mor) facilitate onboarding, education, and claims
- Real-time mobile dashboard tracks agent performance and commissions

**Commission per policy:** 10%

**Projected Year 1 revenue:** 5 million THB from ~263,000 policies ( $\approx 1.88\%$  of Welfare Card holders)

### **8.5 Representative Personas**

**Somchai (38)** – Construction worker in Bangkok, no formal benefits

**Nuan (47)** – Street vendor in Asok, income halts on smog days

**Damrong (52)** – Organic farmer, suffers seasonal respiratory problems

### **8.6 Strategic Impact**

FinSure's model is designed for long-term public value:

- Enhances income stability for informal workers
- Reduces burden on national healthcare via early access
- Provides inclusive coverage through mobile tech and local agents
- Pioneers a scalable model for environment-linked microinsurance

## 9. Monitoring and Evaluation

A data-driven insurance model must not only operate effectively but continuously prove its relevance, fairness, and responsiveness to users. FinSure's monitoring and evaluation framework provides the tools to measure, assess, and improve performance at every stage of deployment. This section outlines KPIs, OKRs, and an iterative improvement cycle tied directly to the realities of serving low-income, informal workers exposed to PM2.5 risks.

### 9.1 Key Performance Indicators (KPIs)

KPIs provide a focused set of metrics to evaluate FinSure's performance in terms of customer satisfaction, claims responsiveness, and system reliability. They support ongoing refinement and build trust with users, regulators, and insurers.

#### 9.1.1 Customer Experience

- **Customer Satisfaction Rate**

Target:  $\geq 65\%$  satisfaction, measured via post-claim survey (1–5 scale)

Method: Surveys through mobile app or SMS

Use: Identifies service gaps and UX pain points

- **Customer Retention Rate**

Target:  $\geq 65\%$  of users renew policies after one cycle

Method: Renewal data tracked through app and partner dashboards

Use: Indicates long-term perceived value and affordability

#### 9.1.2 Claims Performance

- **Claim Processing Time**

Target:  $\leq 48$  hours from submission to disbursement

Method: Automated timestamp tracking across claim lifecycle

Use: Validates speed and operational readiness

- **Payout Accuracy Rate**

Target:  $\geq 90\%$  of claims processed according to policy terms

Method: Sample-based audit of claim outcomes

Use: Ensures fairness and reliability

#### 9.1.3 Fraud Detection

- **Fraud Detection Rate**

Target:  $\geq 85\%$  of fraudulent claims flagged and reviewed

Method: Combination of AI screening and manual investigation

Use: Maintains insurer trust and user confidence in system integrity

## 9.2 Objectives and Key Results (OKRs)

The following OKRs are designed to reinforce FinSure's core pillars—**accessibility**, **trust**, and **affordability**—through measurable, achievable goals.

### 9.2.1 Increase Customer Satisfaction

- Achieve  $\geq 60\%$  positive feedback on post-claim surveys
- Reduce complaints by 10% in 6 months
- Decrease policy cancellations by 5% over 12 months  
**Approach:** Track complaints, simplify UX, offer retention incentives

### 9.2.2 Improve Claims Efficiency

- Reduce average claim time from 72 to 60 hours
- Complete 80% of claims within 48 hours
- Reduce error rate in processing by 3% year-over-year  
**Approach:** Monitor delays, implement auto-verification, support staff escalation

### 9.2.3 Enhance Payout Accuracy

- Maintain  $\geq 85\%$  accuracy in payout amounts
- Lower payout-related disputes by 5%
- Increase automated validation checks by 15%  
**Approach:** Strengthen AI decision logic and staff training

### 9.2.4 Prevent Fraud

- Detect  $\geq 80\%$  of fraudulent submissions
- Reduce false claims by 10%
- Expand AI-based detection to 20% of claims  
**Approach:** Integrate real-time checks and reinforce fraud flagging processes

## 9.3 Continuous Improvement Strategy

FinSure incorporates continuous feedback loops into all stages of its Go-to-Market strategy. Each launch phase includes data capture, system learning, and refinement to improve performance over time.

### 9.3.1 Pre-Launch Phase (Months 1–2)

FinSure will conduct beta testing **in Bangkok**, targeting delivery workers and site labourers—groups with high PM2.5 exposure and digital access. Feedback from this MVP group will help refine the enrolment experience, claims interface, and AQI-linked payout triggers. Training for community agents (Aor Sor Mor) will be adjusted based on hands-on testing.

### 9.3.2 Soft Launch (Months 3–4)

Initial rollout will focus on select Bangkok districts, supported by digital awareness campaigns (e.g., TikTok, Facebook), influencer partnerships, and UGC engagement. Real-time claims data and campaign metrics will inform operational adjustments. A backend claims dashboard will be trialled internally and optimised based on live usage.

### 9.3.3 Full Launch (Months 5–6)

FinSure will expand to 3–5 high-risk provinces identified via AQI and worker density. Local partnerships (e.g., municipalities, health offices) will support marketing and user onboarding. A partner dashboard for insurers will be deployed, capturing feedback on claim turnaround and system usability.

### 9.3.4 Scale-Up Phase (Months 7–12)

The expansion phase will focus on diversifying the offering:

- Add flexible premium models (monthly, daily)
- Launch loyalty and referral schemes
- Introduce employer-based signups for construction/logistics sectors
- Explore additional health add-ons based on real claim patterns

Impact reports and case studies will be generated quarterly to inform public-sector dialogue and long-term scalability planning.

## Summary

Monitoring and evaluation in FinSure are not standalone compliance activities—they are embedded in the product's DNA. The KPI–OKR–feedback loop structure ensures that every improvement is traceable, every risk measurable, and every policyholder experience refinable. This system enables

FinSure to evolve with its users and environment, balancing affordability, reliability, and inclusion at scale.

## 10. Financial Projection & ROI

This section presents FinSure’s financial model, cost structure, revenue assumptions, and projected return on investment (ROI) over a five-year period. The model follows a **low-margin, high-volume strategy** typical of microinsurance products, with breakeven expected by Year 3 and significant profitability from Year 4 onward.

### 10.1 Project Budget Breakdown

The total project budget is set at **THB 3.7 million**, allocated across eight key operational areas:

Category	Amount (THB)	Description	Responsible Unit
System Development	1,500,000	Web, mobile, backend, and AI engine development	IT Development
Cloud & Infrastructure	300,000	Hosting, security, server maintenance	IT Infrastructure
Data & Licensing	200,000	Real-time AQI and health data acquisition	Data Management
Marketing & Commissions	1,000,000	Media, awareness campaigns, Aor Sor Mor commissions	Marketing
Training & Field Activities	200,000	Community onboarding and outreach sessions	Public Relations
Legal & Consulting	200,000	Regulatory compliance and contract review	Legal/Fraud
Emergency Reserve	200,000	Buffer for unexpected development costs	Strategy Team
Audit & Compliance	100,000	Data lineage, internal control, ethics audits	Audit & Compliance

**Total Budget:** THB 3,700,000

This allocation supports the MVP rollout in Bangkok, ensuring functionality across both digital channels and on-the-ground delivery through trained local agents.

## 10.2 ROI Projection Model

The revenue model combines:

1. **Insurance commission income** (10% of collected premiums)
2. **Advertising revenue** from sponsored placement on the mobile/web app

Operating costs scale primarily through **cloud infrastructure and service delivery**, projected over five years with an annual increase.

### 10.2.1 Assumptions

- **Average plan selected:** Standard plan at 390 THB
- **Commission share (revenue to FinSure):** 10% of premiums
- **Initial investment:** 3.7M THB
- **Cloud and infrastructure costs:**
  - Year 1 = 30% of budget = 1.11M THB
  - Subsequent years increase by 10% annually

### 10.2.2 Revenue Projections

**Insurance Commission Revenue (10% of Premiums):**

Year	Insurance Revenue (THB)
Year 1	1,131,000
Year 2	2,226,300
Year 3	4,446,000
Year 4	7,020,000
Year 5	7,800,000

**Advertising Revenue (Sponsor-based):**

Year	Advertising Revenue (THB)
Year 1	2,400,000 (2 sponsors)

Year 2	3,600,000 (3 sponsors)
Year 3–5	4,800,000 (4 sponsors)

### 10.2.3 Total Revenue and Investment

Year	Total Revenue (THB)	Cloud Cost (THB)	Total Operating Cost (THB)
Year 1	3,531,000	1,110,000	4,810,000
Year 2	5,826,300	1,221,000	4,921,000
Year 3	9,246,000	1,343,100	5,043,100
Year 4	11,820,000	1,477,410	5,177,410
Year 5	12,600,000	1,625,151	5,325,151

### 10.2.4 ROI Results

Year	ROI (%)	Notes
Year 1	–26.6%	High initial cost, low penetration
Year 2	18.4%	Positive ROI begins
Year 3	83.4%	Breakeven achieved
Year 4	128.4%	Surplus stage reached
Year 5	136.6%	High profitability sustained

**Break-even point:** Year 3

**Total ROI growth:** Rapid acceleration from Year 2 onwards

### 10.2.5 Benchmark Insight

FinSure’s trajectory aligns with success cases such as the **Tata-AIG microinsurance model in India**, which also achieved breakeven within 3–4 years under a high-volume, low-margin strategy. This model was validated by experts such as Lisa Morgan (Milliman, ILO), who confirm that properly structured microinsurance targeting low-income segments can reach **financial sustainability by Year 3** if persistency and enrolment grow steadily.





## **11. Risk Mitigation & Issue Management**

Effective risk management is essential to delivering FinSure’s promise of accessible, trusted, and fair insurance protection for vulnerable workers. This section outlines anticipated risks across five domains—data and technology, operations, finance, compliance, and partnerships—alongside structured mitigation plans.

### **11.1 Data & Technology Risks**

#### **11.1.1 Data Quality & Accuracy**

- **Risk:** PM2.5 data is outdated or limited
- **Impact:** Misaligned payouts; user distrust
- **Mitigation:** Multiple data sources (e.g., PCD, sensors), automatic validation, fallback models

#### **11.1.2 Data Privacy & Security**

- **Risk:** Exposure of personal data (health, income)
- **Impact:** PDPA violations, legal risk, loss of trust
- **Mitigation:** Data encryption, role-based access, agent training, incident response protocols

#### **11.1.3 System Failure or Downtime**

- **Risk:** Downtime in AI engines, app crashes
- **Impact:** Delayed claims, operational disruptions
- **Mitigation:** Redundant infrastructure, anomaly alerts, manual fallback systems

### **11.2 Operational Risks**

#### **11.2.1 Claims Verification Errors**

- **Risk:** Forged or misclassified documents
- **Impact:** Fraud or rejection
- **Mitigation:** AI + OCR verification, human review, policy-linked validation

### **11.2.2 Agent Capacity & Support**

- **Risk:** Community agents lack product/system understanding
- **Impact:** Onboarding errors, low uptake
- **Mitigation:** Simple UX, modular training, live support, performance monitoring

### **11.2.3 Accessibility for Target Group**

- **Risk:** Daily wage earners lack insurance awareness or access
- **Impact:** Under-enrolment
- **Mitigation:** Use Aor Sor Mor network, plain-language content, local outreach partnerships

## **11.3 Financial & Business Risks**

### **11.3.1 Revenue Sustainability**

- **Risk:** Commission income insufficient
- **Impact:** Cash flow stress, model breakdown
- **Mitigation:** Conservative budgeting, supplementary revenue (ads, data services), efficient acquisition strategies

### **11.3.2 Pollution Volatility**

- **Risk:** Claims surge during extreme AQI periods
- **Impact:** Payout pressure, insurer hesitation
- **Mitigation:** Dynamic pricing, reinsurance, payout caps, reserve buffers

### **11.3.3 Market Competition**

- **Risk:** Larger firms replicate model
- **Impact:** Loss of user base, pricing pressure
- **Mitigation:** Proprietary pricing AI, brand loyalty programs, continuous service innovation

## **11.4 Regulatory & Compliance Risks**

### **11.4.1 Insurance Regulation Compliance**

- **Risk:** Breach of OIC regulations
- **Impact:** Fines, suspension
- **Mitigation:** Ongoing legal oversight, compliance reporting, relationship management

### **11.4.2 PDPA & Privacy**

- **Risk:** Improper handling of sensitive data
- **Impact:** Legal sanctions, loss of trust
- **Mitigation:** Consent-first architecture, DPO appointment, regular privacy audits

### **11.4.3 Government Policy Shifts**

- **Risk:** Changes to PM2.5 or microinsurance policy
- **Impact:** Product modification needs, operational delay
- **Mitigation:** Flexible system design, policy monitoring, proactive engagement

## **11.5 Partnership & Collaboration Risks**

### **11.5.1 Insurance Partner Dependency**

- **Risk:** Withdrawal or change of insurer terms
- **Impact:** Service disruption, trust erosion
- **Mitigation:** Multi-insurer MOUs, co-developed value propositions, contingency planning

### **11.5.2 Government Data Reliance**

- **Risk:** Inconsistent access to AQI or work stoppage data
- **Impact:** Trigger failure or claim delay
- **Mitigation:** Backup data pipelines, research partnerships, adaptable claim logic

### 11.5.3 Community Agent Turnover

- **Risk:** Loss of engagement, poor retention
- **Impact:** Channel disruption
- **Mitigation:** Incentive design, recognition programs, regular feedback and retraining

11.6 Summary Table: Consolidated Risk Overview

Risk Category	Examples	Impact	Likelihood	Key Mitigation
Tech & Data	Data gaps, breaches	High	Medium	Redundancy, encryption, fallback systems
Operations	Agent gaps, verification errors	Medium–High	Medium	AI+human review, modular training
Financial	Revenue shortfall, claim spikes	High	Medium	Cost control, reinsurance, reserves
Regulation	Legal/policy misalignment	High	Low–Medium	Compliance audits, advisory input
Partnerships	Agent/insurer withdrawal	Medium–High	Medium	Incentives, backup MOUs, value alignment

This comprehensive risk framework ensures that FinSure can scale responsibly, protect user confidence, and maintain operational continuity—even in unpredictable conditions. The mitigation strategies are designed to reinforce trust, sustain affordability, and uphold accessibility for underserved populations.

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