**Problem Statement Slide**

**Short version for the slide itself:**  
Small-scale rural vendors struggle to participate in digital marketplaces due to low literacy, language barriers, and unfamiliarity with technology. Existing catalog systems rely on text input and complex interfaces, creating high entry barriers.

**Extra text for napkin.ai diagram generation:**  
Vendors in rural areas face multiple obstacles:

* Low literacy makes text entry difficult.
* Regional dialects are often unsupported.
* Noisy market environments reduce voice recognition accuracy.
* Complex app interfaces require training.
* Limited internet connectivity hinders consistent usage.  
  These factors combine to exclude vendors from the digital economy and limit their earning potential.

**Aim and Scope**

**Aim:**  
To develop an AI-powered Voice-to-Catalog Agent that enables small-scale vendors and informal sellers in rural and underserved regions to create structured, customer-friendly product listings through intuitive voice interactions, overcoming literacy, language, and technical barriers to participate effectively in the digital economy.

**Scope:**  
Low literacy rates make text-based systems inaccessible. This is addressed by voice-based catalog creation using regional languages.

Vendors operate in noisy market environments. This is addressed by implementing noise-resistant voice recognition for reliable input capture.

Regional vendors use varied product descriptions that don’t fit standard catalogs or customer expectations. This is solved by using NLP to extract key details and generate structured, customer-friendly listings.

Vendors lack expertise in optimizing product listings. This is addressed by providing automatic category tagging and suggesting pricing modifications to improve sales.

Rural vendors are unfamiliar with digital platforms. This is solved by providing a simple interface focused on voice-based listing and multilingual catalog display.

As a potential future feature, offline capability is being explored to address the problem that rural areas often lack reliable internet access.

**Block Diagram / Process Flow Slide Content**

**Paragraph for slide text (basic process flow):**  
The system begins by capturing the vendor’s voice input through a mobile device or low-cost terminal. The voice recognition component transcribes spoken content, including regional languages and dialects. Natural language processing modules then extract key product details and generate structured listings. A suggestion engine offers category recommendations and pricing adjustments. Finally, the listings are saved locally or synced with digital marketplaces when connectivity is available.

**Paragraph for napkin.ai diagram generation:**  
Process flow:

1. Vendor speaks product information into the app.
2. Voice Capture Module records audio.
3. Speech Recognition Engine converts speech to text.
4. NLP Extraction Module identifies product name, price, quantity, and description.
5. Suggestion Engine proposes categories and pricing modifications.
6. Structured Data Formatter prepares the catalog entry.
7. Listing Storage saves data locally and syncs to online platforms when possible.  
   This workflow supports multilingual input, offline storage, and simple voice-first interaction.

**Implementation Setup (Presentation Text)**

We propose the following phased implementation to deliver a reliable, focused solution that addresses the challenges faced by rural vendors while maintaining simplicity and accuracy:

1. **Voice Capture and Input Handling**  
   The solution will start with a lightweight Android mobile app designed for efficient multilingual voice capture. Vendor speech will be recorded directly on the device using Android Speech API or Google Cloud Speech-to-Text. Recordings can be saved locally to accommodate areas with unreliable internet connectivity.
2. **Data Extraction and Processing**  
   Once voice input is collected, audio data will be securely queued for processing. External AI services, such as Google Cloud Natural Language API or AWS Comprehend, will extract key product details including name, price, and attributes. This structured information will be generated in the vendor’s original language to maintain clarity and accuracy.
3. **Storage and Listing Preparation**  
   Structured listings will be stored locally using lightweight storage solutions such as Room Database or SQLite, supporting offline creation and editing. When connectivity becomes available, the app will synchronize stored records for backup and broader access. Data formats will be designed to remain compatible with future publishing workflows without requiring additional reformatting.
4. **Multilingual Display and Optional Extensions**  
   Product descriptions will be displayed to customers with on-demand translation services, enabling multilingual browsing while preserving the original language internally. Over time, optional capabilities—such as publishing listings to marketplace platforms—can be activated to extend reach without disrupting the core experience.

**Implementation Setup (Napkin.ai Diagram Prompt Text)**

Process Flow for Voice-to-Catalog Mobile App:

* **Voice Capture**  
  Vendors record product information in their regional language using the mobile app. Audio is stored locally when offline.
* **Transcription and Extraction**  
  When connectivity is available, audio is sent to external AI services (Speech-to-Text and Natural Language Processing) to transcribe speech and extract structured product data: title, price, quantity, and description.
* **Local Storage and Synchronization**  
  Structured data is saved in a lightweight database on the device. The app periodically syncs records to cloud storage or server endpoints for backup and future access.
* **Multilingual Display Layer**  
  Listings remain stored in the vendor’s original language. When customers browse products, dynamic translation services generate display text in the viewer’s preferred language.
* **Future Integrations**  
  Data formats are prepared to support optional marketplace publishing and catalog export without modifying the core workflow.