Project Design Phase
Problem – Solution Fit Template

Date	24 June 2025
Team ID	LTVIP2025TMID43572
Project Name	Pollen's Profiling: Automated Classification of Pollen Grains
Maximum Marks	2 Marks

Problem – Solution Fit Template:

The Problem–Solution Fit in this context means that we've identified a critical issue faced by farmers, vendors, and supply chain managers — difficulty in accurately and quickly identifying rotten fruits and vegetables — and developed an AI-based solution that uses transfer learning to automate spoilage detection, reducing waste, saving time, and improving efficiency.

Purpose:

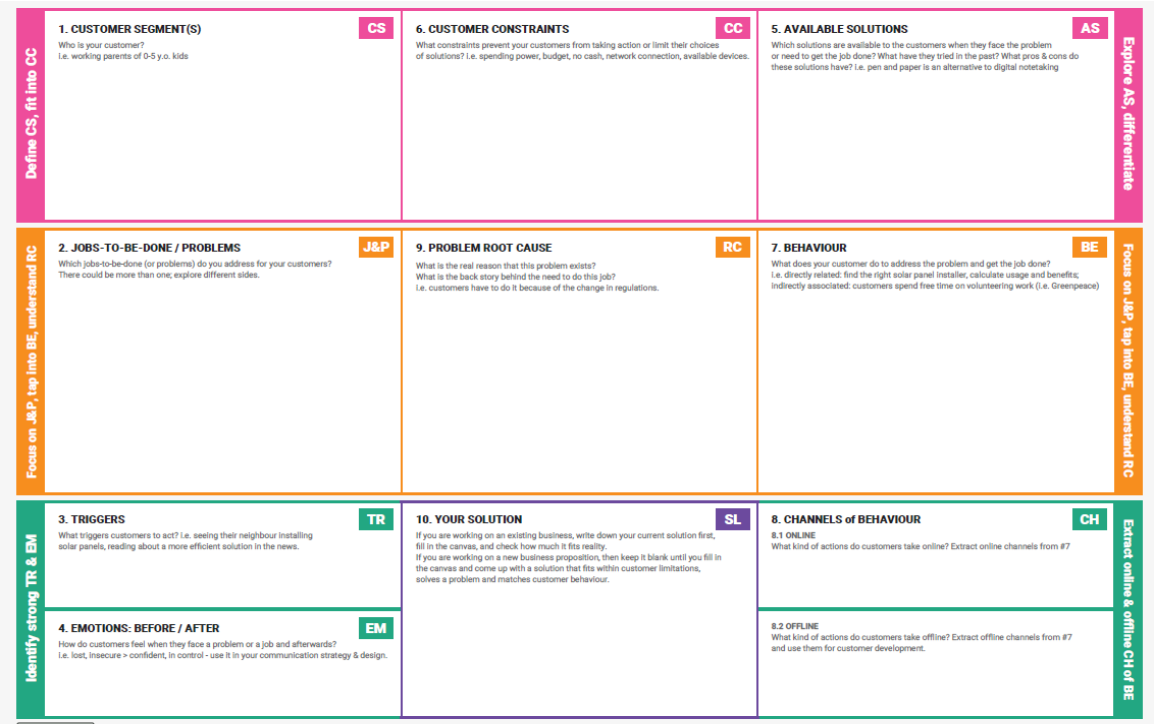
1. Solve a Complex Problem in Research Efficiency
   Help researchers, palynologists, and students automate the tedious and error-prone process of manually classifying pollen grains — increasing both speed and accuracy.

2. Accelerate Scientific Outcomes
   By automating classification, researchers can analyze larger datasets faster, publish results sooner, and conduct deeper ecological or climate studies with confidence.

3. Improve Solution Adoption with Technology
   Leverage machine learning and computer vision (e.g., VGG16 with fine-tuning) to make pollen analysis accessible, even to non-experts, by embedding the tool in familiar research workflows.

4. Sharpen Communication & Positioning
   Position the solution as a "time-saving, expert-assisting" tool rather than a replacement — reinforcing trust with the target audience and encouraging adoption.

Template:



Box	Content
1. Customer Segments (CS)	Palynologists, environmental researchers, biology students, and lab technicians working on pollen analysis.
2. Jobs-to-be-Done / Problems (J&P)	- Need to classify pollen grains quickly and accurately for ecological or climate studies. - Manual identification is slow, error-prone, and needs expertise.
3. Triggers (TR)	- Urgency to publish research. - Influx of large sample volumes from fieldwork. - Pressure to improve efficiency and accuracy in labs.
4. Emotions: Before / After (EM)	**Before:** Overwhelmed, frustrated, time-constrained. **After:** Relieved, empowered, confident in data quality.
5. Available Solutions (AS)	- Manual microscope-based identification. - Semi-automated systems (limited availability). - Outsourcing to expert labs (costly, slow).
6. Customer Constraints (CC)	- Limited time, funding, and expert staff. - Difficulty accessing large datasets for ML model training. - Lack of tech-savvy tools in traditional research environments.
7. Behaviour (BE)	- Most researchers currently classify manually using microscope slides. - Some use open-source image libraries, but few use AI tools. - They maintain records in Excel or research software.
8. Channels of Behaviour (CH)	**Online:** ResearchGate, academic forums, GitHub, conferences (e.g., INQUA, Palynology Society) **Offline:** University labs, workshops, field expeditions, conferences
9. Problem Root Cause (RC)	- Manual classification depends on years of training. - Variation in morphology makes it hard for humans to be consistent. - Lack of AI-ready datasets in public repositories.
10. Your Solution (SL)	- AI-powered classification system using CNNs + transfer learning (e.g., VGG16). - Web-based or offline tool to upload and classify pollen images. - High accuracy (>94%) and consistent labeling support for research labs. - Fast, accessible, reproducible, and scalable.

References:

1. https://www.ideahackers.network/problem-solution-fit-canvas/
2. https://medium.com/@epicantus/problem-solution-fit-canvas-aa3dd59cb4fe