

COEPD CAPSTONE PROJECT

Online Agriculture Products Store

Q1. Identify Business Process Model for Online Agriculture Store – (Goal, Inputs, Resources, Outputs, Activities, Value created to the end Customer)

Ans.

GOAL :- To build a medium of online communication for farmers and agriculture product manufacturers such that even farmers located in remote villages can easily buy the products required for their farming from the convenience of their home

INPUTS :-

New user registration (for farmers, manufacturing companies)

Farmer Login (username, location, purchase history(if any))

Agriculture products catalog (Fertilizers, seeds and pesticides types along with their prices)

Orders (order Id, price, status of order)

RESOURCES :-

Database, server, software development team, budget, time

OUTPUT :-

Confirmed orders, delivery receipts, sales and inventory reports for manufacturers, farmer feedback and ratings, transaction logs

ACTIVITIES :-

1. Manufacturer registers and uploads products' details
2. Farmer registers and logs in
3. Farmer views product details like fertilizers, pesticides etc.
4. Farmer selects the products required and places an order by making the payment
5. Order confirmed, packed and shipped
6. Farmer receives the order and delivery is completed
7. Farmer's rating/ feedback, returns or replacements
8. Reports or analytics for manufacturers and admin

VALUE CREATED TO END CUSTOMER :-

- Easier access to quality products for farmers
- Better pricing / choice / product information
- Doorstep delivery (time and travel saved for farmers)

Q2. Mr Karthik is doing SWOT analysis before he accepts this project. What Aspects he Should consider as Strengths, as Weaknesses, as Opportunity and as Threats.

Ans.

SWOT Analysis:

Strengths :- skilled team, clear budget, sponsor support

Weakness :- limited domain knowledge, rural connectivity issues

Opportunities :- big farmer market, CSR branding, partnerships

Threats :- competitors, regulation changes, fake products, delivery failures

Q3. Mr Karthik is trying to do feasibility study on doing this project in Technology (Java), Please help him with points (HW SW Trained Resources Budget Time frame) to consider in feasibility Study.

Ans.

Hardware:- laptops, servers, test mobiles

Software:- Java, Springboot, React, PostgreSQL, testing tools

Resources:- Project Manager, Business Analyst, Devs, Testers, DB Admins, Network admin

Budget:- 2 Cr (development, infrastructure, QA, support, training)

Time Frame:- 18 months

Q4. Mr Karthik must submit Gap Analysis to Mr. Henry to convince to initiate the project. What points (compare AS-IS existing process with TO-BE future process) to showcase in the GAP analysis.

Ans.

AS-IS:

- Farmers need to travel far places to buy products
- They have no knowledge about what all products are available and have to choose the closest option available
- Some stores in rural areas accept only cash which might become difficult for farmers
- As there is no source for farmers to verify the genuinity of the products, there is a risk of buying fake products or low quality products and it can tamper the quality of produce

TO-BE:

- Make a catalog of all the available products with details as accurate as possible so that the customers (farmers) are aware of what sort of products they are buying
- Multiple payment options like COD, online payment, card payment, UPI, EMI should be available for the ease of customer
- Farmers should be able to track where their order is and should be able to connect to the team for any queries related to their order
- Quality checks of the source should be made from time to time so that farmers keep receiving high quality products
- The look and feel of the website should be easy to use and simple to understand as the end users are farmers who might not have enough technical knowledge

GAP:

- There is a huge gap between manufacturers and farmers due to location constraint. Farmers can only access supplies from manufacturers who are nearby their location which hinders their choice of product.
- A lot of manufacturers still accept cash as mode of payment from farmers and have not yet converted to online mode which makes it difficult for farmers to buy products as they can't carry huge amounts of cash with them.
- There is no option to track orders in the current system. Farmers order and they have to manually keep track of the orders either by calling the store to get updates or by physically going to the store till they are able to collect their order.

Q5. List down different risk factors that maybe involved (BA risks and process/project risks)

Ans.

Top Risks:

1. Ambiguous / Incomplete Requirements
 - Likelihood : Medium, Impact : High
 - Mitigation : Conduct detailed workshops with farmer-stakeholders (Peter/Kevin/Ben), produce use cases, user stories and sign-off(BA/SRS)
2. Scope Creep
 - Likelihood : High, Impact : Medium – High
 - Mitigation : strong change-control process, baseline scope, prioritized backlog, change requests reviewed by committee
3. Low Farmer Adoption / Usability Issues
 - Likelihood : Medium, Impact : High
 - Mitigation : prototype and usability testing with farmers; multi-lingual UI; agent/phone ordering; training programs
4. Logistics / Last Mile Failures
 - Likelihood : Medium, Impact : High

- Mitigation : contract multiple logistics partners, SLAs, drop shipping model, local hub
- 5. Regulatory Compliance (pesticide/seed rules)
 - Likelihood : Medium, Impact : High (medium)
 - Mitigation : legal review, compliance checklists, product approval gate
- 6. Quality / Counterfeit products
 - Likelihood : Low-Medium, Impact : High (Reputation)
 - Mitigation : Strict manufacturer onboarding, timely inspections, returns process and audits
- 7. Payment Fraud / Financial Risk
 - Likelihood : High, Impact : High
 - Mitigation : PCI - compliance gateway, transaction monitoring, KYC for high value transactions
- 8. Infrastructure Downtime / Scaling Issues
 - Likelihood : Medium-High, Impact: High
 - Mitigation : Cloud hosting, auto-scaling, redundancy, backup and disaster recovery
- 9. Skill Gaps
 - Likelihood : Medium, Impact : Medium
 - Mitigation : knowledge transfer, documentation, bench resources, cross-training
- 10. Data Privacy / Legal and Social Risks
 - Likelihood : Medium, Impact : High
 - Mitigation : data protection policy, encryption, minimal PII collection, consent flows

BA-specific risks :

- Misinterpreting farmers needs – mitigate by frequent field visits, prototypes and UAT with target users.
- Late stakeholder sign-offs – mitigate via milestone approvals and escalation paths

Q6. Perform stakeholder analysis (RACI Matrix) to find out the key stakeholders who can take decisions and who are the influencers

Ans. Key Stakeholders:

1. Mr. Henry – Sponsor, accountable for project success, strategic decisions
2. Mr. Pandu – Finance Head, accountable for budget approvals
3. Mr. Dooku – Project Coordinator, consulted, stakeholder liason
4. Mr. Karthik – Delivery Head at APT, overall accounrability for delivery
5. Mr. Vandanam – Project Manager, responsible for day-to-day delivery
6. You (BA) - responsible for requirements, UAT coordination, stakeholder commiunication
7. Dev Team (Juhi, Teyson, Lucie, Tucker, Bravo) - responsible for development
8. DB Admin (John), NW Admin (Mike) - responsible for infra setup

9. Testers (Jason, Alekya) - responsible for QA, testing
10. Peter, Kevin, Ben – farmer stakeholders, user representatives
11. Manufacturing Companies - suppliers, consulted on onboarding
12. Logistics partners - responsible for delivery

Deliverable	Sponsor (Henry)	Finance (Pandu)	Delivery (Karthik)	PM (Vandanam)	BA	Devs	QA	DB A/NW	Farmers
Business case	A	C	C	R	R	I	I	I	C
Requirements document	I	I	C	R	A/R	C	I	I	C
Design	I	I	C	R	A	R	I	C	C
Development	I	I	C	R	C	A/R	I	C	I
Test Plans	I	I	C	R	C	C	A/R	I	C
UAT	I	I	C	R	A/R	C	C	I	C
Deployment	I	I	C	R	C	R	R	A/R	I
Budget Approval	A	A/R	C	C	I	I	I	I	I

- Decision makers : Mr. Henry (strategic), Mr. Pandu (financial approval), Mr. Karthik (go/no-go on delivery commitments), PM for operational decisions
- Influencers : farmer representatives (feature acceptance), manufacturers (product onboarding), logistic partners (practical feasibility)

Q7. Help Mr. Karthik prepare a business document.

Ans. Business Case Document

1. Executive Summary:

Creating an online marketplace connecting manufacturers and farmers for seeds, fertilizers and pesticides to reduce procurement friction for remote farmers.
Funded as CSR with budget 2 Cr and 18-month timeline.
2. Problem Statment:

Farmers face access issues to quality inputs – travel cost/time, intermittent local supply, lack of verified products.
3. Objectives:
 - a. Enable online ordering and delivery for 10k+ farmers for year 1 (pilot region)
 - b. Reduce procurement time and improve product traceability
 - c. Create sustainable marketplace with manufacturer marketship
4. Recommended solution:

Build a web + mobile marketplace with manufacturer onboarding, product verification, payment and logistics integrations. Use Java backend, React frontend, mobile PWA / React native
5. Benefits:

- a. Time saving for farmers, improved product availability
 - b. CSR and branding for sponsor
 - c. Revenue streams: commission on sales (5-12%), paid manufacturer for listing, logistics fees
 - d. Social impact: improved yields (indirect), better farming guidance
6. Costs & ROI:
- a. Initial project: 2 Cr
 - b. Annual OPEX (support, infra, marketing): estimate 30-50 lakh
 - c. Revenue target: depends on adoption; structure break-even analysis after pilot
7. Timeline: 18 months (pilot in 6-7 months, full roll-out by month 18)
8. Risks and Mitigation:
- a. Ambiguous/ incomplete requirements
 - Conduct detailed workshops with farmer stakeholders
 - b. Scope creep
 - Strong change controlled process
 - c. Low Farmer Adoption / usability issues
 - Prototype and usability testing issues
 - d. Logistics/ last – mile failures
 - Contract multiple logistics partners, drop shipping model
 - e. Regulatory compliance
 - Legal review, compliance checklists, product approval gate
 - f. Quality / Compliance
 - Strict manufacturer onboarding, provenance verification, returns process and audits
 - g. Payment fraud / Financial risk
 - PCI compliant gateway, transaction monitoring, KYC for high-value monitoring
 - h. Infrastructure downtime / Scaling issues
 - Cloud hosting, auto-scaling
 - i. Skill gaps
 - Knowledge transfer, documentation, bench resources
9. Governance and KPIs:
- a. Steering and committee: Mr. Henry, Mr. Pandu, Mr. Dooku, Delivery head
 - b. KPI examples: monthly active farmers, orders/month, on-time delivery %, customer satisfaction score, Gross Merchandise Value (GMI), commission revenue
10. Recommendation and next steps:
- a. Approve budget, form PMO, start requirements and manufacturer onboarding immediately

Q8. Four SDLC methodologies

Ans.

1. Waterfall
 - Linear, stage-by-stage (requirement -> design -> build -> test -> deploy)

- Good when requirements are stable and well understood
 - Pros: simple, clear milestones.
 - Cons: inflexible to change
2. Iterative
 - Built in repeated cycles, each iteration produces an improved version
 - Good when partial increments exist and can be refined
 - Pros: early prototypes, improved requirements
 - Cons: needs good iterative planning
 3. Incremental
 - Deliver a working prototype quickly and evolve it by adding capabilities
 - Useful when the product is novel and feedback is required
 - Pros: quick user feedback
 - Cons: needs strict control to avoid architectural debt
 4. Agile
 - Incremental delivery in sprints, continuous stakeholder feedback
 - Good when requirements will evolve and frequent releases help validate assumptions
 - Pros: flexible, rapid feedback
 - Cons: needs active stakeholder involvement and disciplined backlog management

Which to choose?

For this project, if the farmer needs and last-mile, logistics are uncertain, iterative/agile process reduces the risk

If legal and testing for safety-critical modules are paramount, v-mode/structured approaches are needed

Q9. They discussed models in SDLC like waterfall, RUP, spiral and scrum. You put forth your understanding on these models.

When the APT IT SOLUTIONS company got the project to make this online agriculture product store, there is a difference of opinion between a couple of SMEs and the project team regarding which methodology would be more suitable for this project. SMEs are stressing on using the V model and the project team is leaning more onto the side of waterfall model. As a business analyst, which methodology do you think would be better for this project?

Ans.

1. Waterfall model:

The waterfall model is a traditional, linear and sequential approach to software development. Progress flows steadily downwards through distinct phases, much like a cascading waterfall.

Key characteristics:

- Sequential phases: each phase i.e., requirements analysis, design, implementation/coding, testing, deployment, maintenance must be completed entirely before the next one begins
- Document driven: heavy emphasis on thorough documentation at each stage, with clear, predefined requirements
- Rigid and inflexible: it is difficult and costly to go back and make changes once a phase is completed

Best suited for: projects with well-defined, stable, clear requirements where uncertainty is low

2. Rational Unified Process (RUP):

RUP is a comprehensive, adaptable framework that is an iterative and incremental approach to software development.

Key characteristics:

- Iterative and incremental: the development process is broken down into a series of iterations, with each iteration building upon the last
- Phased approach: it organizes development into four major phases: inception, elaboration, construction and transition
- Focus on documentation and architecture: while iterative, RUP still involves a more formal definition of scope and detailed documentation/modelling compared to purely agile methods
- Adaptable: the process can be tailored to the specific needs and risks of a project

Best suited for: large-scale enterprise-level systems that require a structured approach but also need flexibility to manage evolving requirements and risks

3. Spiral model:

The spiral model is a risk-driven software development process model that combines elements of both the waterfall and prototyping model. It is represented as a spiral with multiple loops, where each loop or phase represents a full development cycle

Key characteristics:

- Risk management: its primary focus is on identifying and mitigating risks early in each phase through prototyping and analysis
- Iterative and evolutionary: the project is delivered in loops, with each loop producing a more complex version of the software

- Four quadrants per loop: each loop typically involves four phases: objectives definition, risk analysis and resolving, development and testing, review and planning for the next phase

Best suited for: large, complex and high-risk projects with unclear or frequently changing requirements where risk mitigation is a top priority

4. Scrum:

Scrum is an agile framework for managing and organizing complex work, particularly software development. It is highly flexible and adaptive, focusing on rapid delivery of functional increments

Key characteristics:

- Iterative sprints: work is broken into short, time-boxed iterations called sprints, typically 1-4 weeks long
- Cross-functional and self-organizing teams: small teams, usually consisting of 5-9 members, work collaboratively without a traditional project manager
- Key roles, events and artifacts:
 - Roles: product owner, scrum master, development team
 - Events: daily stand-ups/daily scrum, sprint planning, review and retrospective
 - Artifacts: product backlog, sprint backlog, increment
- Customer feedback: encourages continuous feedback and adaptation to change throughout the project

Best suited for: dynamic projects with evolving requirements, a need for continuous delivery of value, and environments that embrace flexibility and collaboration

Which method would I choose?

- Hybrid approach :- combine v model/RUP for core backend and compliance-critical components like payment, product verification, pesticide compliance and iterative/agile for the customer facing UI/mobile features and pilot rollouts
- Reason: project has regulatory testing needs favoring verification heavy approach but also needs rapid validation with farmers and iterative UX work. Hybrid lets us get robust verification for crucial flows while iterating UI/UX and logistics features with pilot feedback
- If forced to chose one: V-model as it adds explicit verification and validation which is crucial for project as it highly relies on testing

Q10. Write down the differences between waterfall model and V model.

Ans.

Waterfall model:

1. Definition:

In the waterfall model, an application is developed first after which it is tested using different testing techniques. The complete process is divided into several phases among which one phase should be completed in order to reach the next phase and testing is almost at the end phase of the development

2. Type:

It is linear sequential approach as each phase should be completed in order to reach the next phase. Type of this model is continuous in nature

3. Testing and validation:

Testing occurs after development is completed and thus if any missing validation is identified to be implemented then first that phase of development needs to be recognized and then the validation gets implemented

4. Cost and complexity:

Due to linear development, only one phase of development is operational and hence cost and complexity is low as compared to that of V-model

5. Defects:

The probability of total number of defects in the development of application is high as testing is done post development

V-Model:

1. Definition:

V-model is a development model in which each model is divided into various sub-development phases where the corresponding testing phase for each development phase is practiced.

1. Type/nature:

The execution of the phases i.e., development and testing happens in a sequential manner so type of V-model is sequential/ parallel in nature

2. Testing and validation:

Each development phase gets tested at its own level and hence no pending testing occurs in this model also if any validation requires to be implemented then it could be implemented at that phase

3. Cost and complexity:

As sequential phases need to be functional in case of V-model hence the cost higher as compared to the waterfall model also the complexity is more than the waterfall

4. Defects:

The probability of total number of defects in the development of application is low as testing is done in parallel to the development

Q11. As a BA, state your reason for choosing one model for this project

Ans.

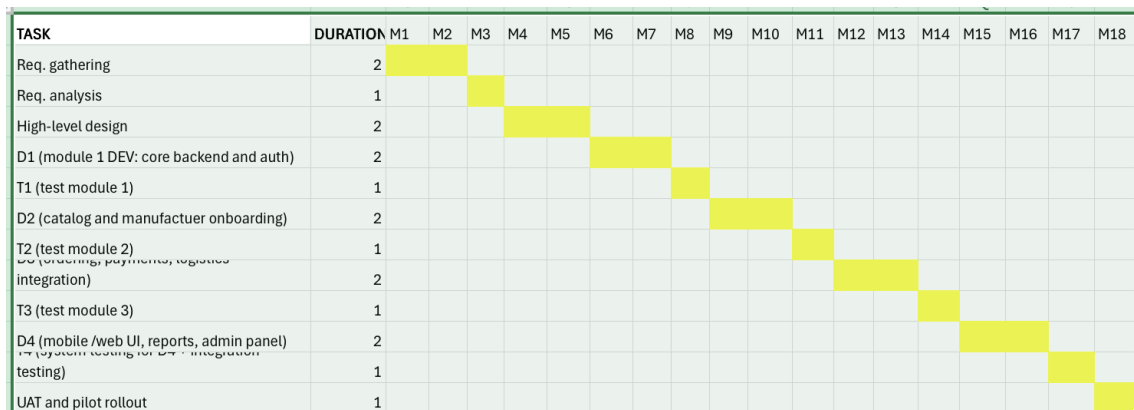
As a BA, I choose V-model because:

- The app handles regulated products (pesticides/seeds) where verification and validation must be traceable – V-model enforces a clear mapping between requirements and tests
- QA and compliance must be formal and early-planned (reduces legal/ regulatory risk)
- Adding agile for UI allows iterative farmer feedback to improve usability without compromising backend verification

Q12. The Committee of Mr. Henry, Mr Pandu, and Mr Dooku discussed with Mr Karthik and finalised on the V Model approach (RG, RA, Design, D1, T1, D2, T2, D3, T3, D4, T4 and UAT)

Mr Vandanam is mapped as a PM to this project. He studies this Project and Prepares a Gantt chart with V Model (RG, RA, Design, D1, T1, D2, T2, D3, T3, D4, T4 and UAT) as development process and the Resources are PM, BA, Java Developers, testers, DB Admin, NW Admin.

Ans. Gantt chart:



Q13. Explain the difference between fixed bid and billing projects

Ans.

Fixed-bid projects:

- Scope and requirements: the scope of work must be clearly defined, detailed and locked in upfront before development begins.
- Flexibility: the project is rigid. Any change requests after the initial agreement require formal renegotiations and a change control process, which can be time-consuming and costly
- Risk management: vendor assumes most of the cost. If the project takes longer or requires more resources than initially estimated, the vendor absorbs the extra cost. To mitigate this, the vendors often build a buffer into their initial price
- Client involvement: it is typically minimal after the initial planning phase, primarily limited to milestone reviews and final acceptance testing

- Suitability: best for small, well-defined projects, where the requirements are unlikely to change

Billing projects:

- Requirements: initial requirements are general, allowing for a quicker start of the project. BA works in an iterative manner, refining and adding details to requirements as the project progresses
- Scope management: the scope is flexible and expected to evolve. Changes, new features and feedback can be incorporated easily without formal contract negotiations. The BA helps manage the evolving backlog and re-prioritize tasks based on ongoing client feedback and the market needs.
- Documentation: it is incremental, focusing on detailing requirements for upcoming sprints rather than the entire project upfront
- Risk and responsibility: the risk of cost overruns is shared between the client and the vendor, as the client pays for actual time and materials used. The BA ensures transparency in the process and helps track cost to avoid runaway budgets
- Client involvement: ongoing, active client involvement and collaboration are standard. Regular check-ins and feedback

Q14. Prepare timesheets for BA in various stages of SDLC

- Design timesheet of BA
- Development timesheet of BA
- Testing timesheet of BA
- UAT timesheet of BA
- Deployment and implementation timesheet of BA

Ans.

Here are weekly timesheets for the various stages:

- Design timesheet of BA

A	B	C
DAY	ACTIVITY	HOURS
MON	draft high-level design review; attend architecture walkthrough	8
TUE	create use cases and user flows for admin and farmer portals	8
WED	Define acceptance criteria & review API contracts with Devs	8
THU	Create UI/UX stories & wireframe review with UX	8
FRI	Hold design sign-off meeting with PM & stakeholders; update docs	8
Total: 40 hours		

- Development timesheet of BA

DAY	ACTIVITY	HOURS
MON	Clarify user stories for Dev team; groom backlog	8
TUE	Attend daily standups; answer dev queries; update requirements	8
WED	Prepare sample data & acceptance testcases; update SRS	8
THU	Review progress demo; prioritize bug/feature fixes	8
FRI	Sync with DBA/Network for environment needs; stakeholder update	8
Total: 40 hours		

- Testing timesheet of BA

DAY	ACTIVITY	HOURS
MON	Review test cases prepared by QA; add acceptance tests	8
TUE	Execute acceptance tests, functional scenarios	8
WED	Log defects, reproduce issues, discuss with devs	8
THU	Re-test fixes & close defects; update traceability matrix	8
FRI	Prepare release checklist & sign-off recommendations	8
Total: 40 hours		

- UAT timesheet of BA

DAY	ACTIVITY	HOURS
MON	Plan UAT sessions with farmer stakeholders; arrange logistics	8
TUE	Facilitate UAT (day 1) — walk-through, collect feedback	8
WED	Facilitate UAT (day 2); capture change requests	8
THU	Prioritize UAT defects with PM & devs; document workarounds	8
FRI	Prepare final UAT report & obtain stakeholder sign-off	8
Total: 40 hours		

- Deployment and implementation timesheet of BA

DAY	ACTIVITY	HOURS
MON	Prepare deployment checklist; coordinate with DevOps & DBA	8
TUE	Coordinate stakeholder communications & go-live plan	8
WED	Assist with production launch; monitor initial telemetry	8
THU	Support post-deployment incidents & user issues	8
FRI	Collect initial feedback; update SOPs & training materials	8
Total: 40 hours		