Executive Summary

This section should include a brief overview of the project, highlight key project performance ratings and highlights, summarize the key lessons learned, and next steps or remaining actions.

Letter of transmittal

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Dear Mr. Hoang:

Within the attached report and document, you will find information about SmartAgri application and its components.

This document is a summary of the Smart Agriculture application, a project that helps the farmers to obtain better information about their farms and market states. Using mobile applications as our main platform, we aim for a large number of farmers to join the Smart Agriculture network to strengthen the Vietnamese farmers community. The attached documents detail how our application works and its efficiency. Such advancements that our application provides will help increase the quality of agricultural products in Vietnam.

Thank you for reading this letter. We appreciate your consideration and look forward to working with you. Please review the official report and documents and respond with your thoughts.

Sincerely,

Nguyen Vi Khang

A. Project introduction

I. Problems

Agriculture is one of the **main economic activities of Vietnam**, and **improving its outcome is an important task**. Although agriculture contributes about 15% of GDP to the country, we are **behind other countries like the USA or Japan**, because of the **lack of high technology applications**. Furthermore, missing high technology operations, Vietnamese agriculture always puts itself at risk, such as **natural disasters like drought, flood, storm,... or failed crops due to wrong farming methods**. Therefore, the Dolphin decides to create Smart Agri, a project that improves the agriculture of Vietnam. We will try our best **to help increase farming products** and **build a connection between customers**, **farmers and companies** to strengthen agriculture.

II. Proposed solution and goals

Create an automatic farming digital tool that gives the most appropriate control activities for cultivation, to lighten the burden on farmers and optimize productivity and yields.

Smart Agri - a hybrid app for farmers to control their agricultural works as well as their productivity. Aim to help the farmers grow agricultural products with high productivity, controllability, and quality assurance according to the wishes of farmers and market demand. With accurate data analysis, Smart Agri evaluates environmental indicators and gives the appropriate activities for the best cultivation.

B. Project scope

I. Goals

Very few smart agricultural products can help farmers grow hydroponic plants, monitor irrigation, control themselves overtime → optimize productivity and yields.
Agricultural technology products with low prices → wide range of customers.
Industrialization of agricultural technology → synchronizing products.
Farmers need not spend a significant amount of time acquiring farm data.
Farmers have access to more accurate natural disaster alerts and weather information.
Keywords: Productive, Popular, Pleasant - **3P**

II. Deliverables

Dolphin Team expect to create a technical blueprint of the app's functions such as:
Allow the user to keep an eye on their farm by showing weather states, temperature, moisture,...
Collects data about the farm, market demands and other elements and analyzes them for the farmers' needs.
Warns the farmers if there are any threats such as storms, droughts, insect seasonality,....
Allows the user to input their own data about their farm, so that the app can give better advice to them.
The output of this project will include the technical design paper, UI/UX design and prototyping of Smart Agri.

III. Exclusions

The Dolphin team will not perform the program implementation (outsource) directly, it will be technical implementation by a third-party service, Dolphin owns the copyright on Trademark, Industrial Design, Layout Diagram, Integrated Circuit Layout. And the commercial part of the product will be done by a team of dolphin partners.

C. Project implementation

I. Personnel lineup:

- ❖ Đăng Lộc - Project manager
- ❖ Phước Tùng - Product manager, Strategist
- ❖ Vĩ Khang - Technical Architecture
- ❖ Thanh Hải - Tester, QA Specialist
- ❖ Thu Trang - Business Analyst, Financial Manager

Keywords: Productive, Popular, Pleasant
Smart Agri - a hybrid app for farmers to control their agricultural works as well as their productivity.

II. Research report

In the development of Smart Agriculture, the whole group always shares new and different thoughts for the app. Because of the potential of high technology applications in agriculture, group members' ideas are always diverse in many aspects. In order to approach smart agriculture, all members of the Dolphin try to find solutions and methods in Vietnam and other countries. For example, the application of high technology devices, such as drones or sensors, collecting data and using AI to analyze the database, or using a greenhouse as an environment for farming,...

However, the use of high technology methods to the farm is quite hard in practice, because there are many obstacles that prevent us from bringing our high technology model to the farmers. Among them, there are two notable reasons. First, we find it difficult to introduce and instruct farmers to use high technology devices and techniques. Second, we can't find a reliable source for the outcomes of farms. Moreover, because of the Covid 19 pandemic, we can't do much research about the farming condition of neighboring areas, so we are lacking in real numbers. We know that it is very risky if we continue following the old path, so Dolphins come to a decision: Keep following the high technology plan as before, but we will make Smart Agriculture a slow and steady app so that users will be able to keep track of what they are doing, and from that, we will make advancement for our project.

At that time, the hardest question Dolphin had to solve was: "How to make Smart Agri a modern-looking app, but still keep the simple and convenient part ?". Every member

contributed to the UI and UX of the app, and this was a difficult task for all of us. Missing experiences from making apps, we found it hard to build a proper Smart Agri platform. In that situation, the project leader and technical architect propose a suggestion: "Make a basic platform but still meet the requirements and the needs of users". That suggestion was agreed by the whole team, and Smart Agri was built based on that idea.

1. Market needed:

The smart agriculture market is expected to witness a marginal dip in 2021 due to the COVID-19 pandemic, as the movement restriction and lockdowns have resulted in disruptions in the supply chain. However, remote monitoring technology and farm management software tools could lead to higher adoption during the post-COVID-19 period. COVID-19 has disrupted the supply chain of different verticals of the smart agriculture market, including precision farming, livestock monitoring, aquaculture, greenhouse, and forestry. The companies are exploring new opportunities to interact with growers and farmers by leveraging advanced technologies.

1. **Agriculture is becoming more technologically advanced.**
   1.1. Helping agricultural production save revenue, boost productivity, decrease prices, and enhance agrarian product quality following international standards while preserving the environment.
   1.2. Aid farmers in being proactive in their output, overcoming seasonal calculations, reducing reliance on weather, climate, and the status of recovered agricultural land, and meeting market demand for product quality.
2. **Developing CNC services for agriculture, as well as creating and growing agricultural industries in using CNC.**
   2.1. Building a complete lifecycle from seed to consumption for each product; product branding.
   2.2. Taking advantage of and effectively using home resources.

2. Analysis

In order to improve our business situation in the right direction and build solid development foundations, we use the SWOT model to analyze the project.

Strength	Weaknesses

+ Agricultural is the key(fundamental,...) economic sector of Viet Nam + Tools for data collection, synthesis, analysis, and statistics, as well as an extensive collection of industry documentation	+ The need for supply chain partners for buying and selling products comes from high-tech farms. + The high-tech farm can be pretty expensive.
Opportunities	**Threats**
+ Because the government promotes technology in agriculture, Smart Agri will likely make a significant investment. + People tend to buy clean, safe products from food chains, which is an advantage for expanding smart agriculture.	+ Because Vietnam has such a diverse range of plants, it might be challenging to cover them all. + Agriculture's Aging Population + If we don't have any safeguards, rivals can easily take information and data from consumers and suppliers.

III. Business Plan

1. Business Strategy.

- Build a fast market penetration strategy
- Develop cross-platform applications and services
- Offer a variety of price incentives
- Brand positioning suitable for target customers
- Adjust to fit the local culture

2. Lucrative Model.

- E-com
  - o Commission from merchant, shipper.
  - o Pre-money whenever a farm, merchant is listing on the market.
- Investment
  - o Cost per exchange, whenever investor want to invest or withdraw the money will always attach with 5-10% fee.

o A farm want to IPO on securities market

IV. Competitor

1. Direct competitor:

2. Indirect competitor:

Delivery: Grab, GoJek, Be.
- It has high standard of service because only experience and verified shipper can get license bike/car from the company.
- Required customers pay directly to the driver.
- The operational cost from customer to shipper are low.
- The details of drivers and estimated charges will be shown on screen after booking.
- More than enough drivers, which is 200 thousands, and above.

Forum: AgriViet.com
- Lots of source about agriculture.

D. Project timeframe

[Active view of project task management](#)

Milestone	Description	Assignee	Begin Date	Target End Date	Completed Date
Phase 1: Kick-start	Research, strategize & plan; Develop ideas	All members	05/11/2021	05/12/2021	05/12/2021
	Assumption of risk	Tùng, Khang, Trang	05/11/2021	05/12/2021	05/12/2021
	Project introduction	All members	05/11/2021	05/12/2021	05/12/2021
	Project proposal	All members	05/13/2021	05/19/2021	05/19/2021
Phase 2: Run-up	Industry, Market & Business research	All member	05/25/2021	06/06/2021	06/12/2021
	App feature description	Tùng	06/15/2021	06/23/2021	06/20/2021
	Contents	Khang, Trang, Hải	06/22/2021	06/27/2021	06/26/2021
	Target audience	Trang, Hải	06/22/2021	06/25/2021	06/25/2021
	Technical design	Khang	06/27/2021	07/17/2021	07/13/2021
	Visualization UI/UX design & app prototype	Lộc, Tùng	06/27/2021	07/18/2021	07/19/2021
Phase 3: Closure	Completing paperwork, documentations	Lộc, Tùng, Khang	07/10/2021	07/20/2021	07/20/2021

Self-assessment of project	Lộc, Trang	07/11/2021	07/18/2021	07/17/2021
Takeaway experiences	All members	07/18/2021	07/21/2021	07/20/2021

E. Product

I. Introduction

Smart Agri is an investment and delivery service app that offers these services:
  + Online Grocery delivery
  + Farm investment service
  + News
  + Farms map
  + Knowledge

Pick up your phone and open Smart Agri, and get several helpful investment services on every farm. Get your picked grocery delivered right at your doorstep, using cashless payment. Feel free to explore, because Smart Agri is always here at your service.

Become a Customer with Smart Agri

Download the app.

Signup/Login up with valid details and start investing, exploring food, grocery, finding farms etc.

II. Customer App Features

1. Registration: A new user can register themselves with their valid details such as First Name, Second Name, Email ID, etc, more required things.

2. Login: A user can log in with their mail id, apple iCloud, Facebook and generate a password.

3. Home Screen Service: A user can search required services, view service details and view the category and sub-category of the services.

4. Investment:

a. Portfolio

That can see the whole dashboard where customers can view total cost value, total market value, total investment, total profit/loss, etc. With some graphics presentation.

b. Price Board

The price board brings you the whole scene of the farm market, with different categories from popular to long-term or even short-term. Besides it, the price board's sub-feature

includes a piece of data of a specific farm that you can count on to decide whether to invest or not.

5. E-com service

You can buy any fresh produce like fruit, vegetables, or even rice, which are supplied from a reputation farm. With E-com service, you have lots of offers, sub-service:

a. Apply Offer/Discount/Coupon: The customer has an option to apply an available coupon,   offer and discount to get a discount.

b. Payment Method: Customers can pay according to their suitability.

c. GPS Tracking: The customer has a real-time tracking system where users can track their exact location of delivery.

d. Rewards: Grab offers reward features to their customers with exclusive things.

6. Forum/Knowledge

Bring awareness to farmers about the importance of implementing knowledge

SmartAgri also provides knowledge about agribusiness, supply chain management & experiences in applying 4.0 technology to agricultural production.

Guide them chronologically on what to do during a growing season.

Recommendations of processes of crop production such as:

+ Soil management
+ Water management.
+ Cropping system management
+ Fertilization
+ Planting/sowing
+ Crop maintenance
+ Protection management
+ Harvesting
+ Storage

7. Map

Find a farm near you, easy to track, and have a whole scenario of the farm before deciding to invest.

8. News

Daily updates of social, economic, and commercial news, especially in the field of agriculture. There is also news about legislation, politics that directly affect agribusiness.

III. Technical Stack

1. Operating systems: iOS

iOS mobile app development is in such high demand because these applications always perform extremely well. This platform is fast, reliable, and easy to use, with few bugs remaining in the final build of any app.

2. Servers and load balancing: Amazon Web Services

Amazon Web Services(AWS) offers reliable, scalable, and inexpensive cloud computing services.

3. Data storage and querying: PostgreSQL

PostgreSQL is used as the primary data store or data warehouse for many webs, mobile, geospatial, and analytics applications.

4. Backend Frameworks: Spring Boot (Spring Security JWT, Spring Security O2, Spring cloud Consul, Spring Data JPA, WebFlux)

Spring Boot helps you to create stand-alone, production-grade Spring-based Applications that you can run. We take an opinionated view of the Spring platform and third-party libraries so that you can get started with minimum fuss. Most Spring Boot applications need very little Spring configuration.

Spring boot goals are:

+   Provide a radically faster and widely accessible getting-started experience for all Spring development.
+   Be opinionated out of the box but get out of the way quickly as requirements start to diverge from the defaults.
+   Provide a range of non-functional features that are common to large classes of projects (such as embedded servers, security, metrics, health checks, and externalized configuration).
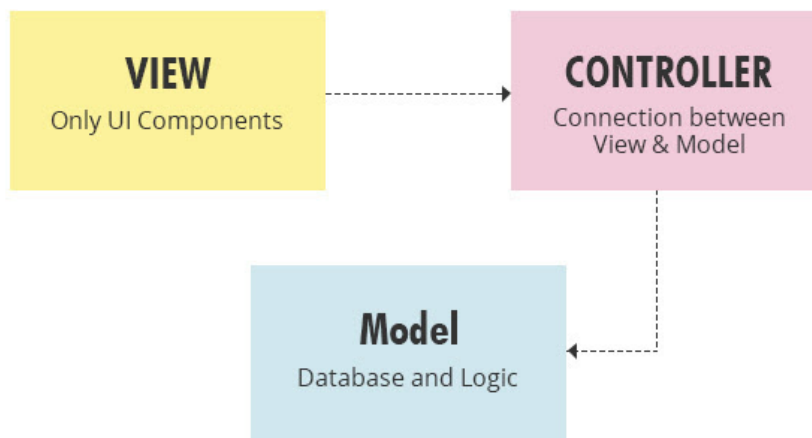+   Absolutely no code generation and no requirement for XML configuration.

5. Frontend Frameworks: Angular

Angular ensures easy development as it eliminates the need for unnecessary code. It has a simplified MVC architecture, which makes writing getters and setters needless. Directives can be managed by some other team, as these **are not part of the app code.**

MVC Architecture (basic)

VIEW	CONTROLLER
Only UI Components	Connection between View & Model

Model
Database and Logic

6. API services: Google Apigee

Deployment flexibility with Apigee hybrid
AI-powered API monitoring
Monetize your digital assets with APIs
Manage microservices as APIs

7. Monitoring and performance tools: Datadog

Datadog is a monitoring service for cloud-scale applications,
providing monitoring of servers, databases, tools, and services,
through a SaaS-based data analytics platform.

8. Message Broker: Message RabbitMQ

A message broker acts as a middleman for various services (e.g. a web application, as in this
example). They can be used to reduce loads and delivery times of web application servers
by delegating tasks that would normally
take up a lot of time or resources to a
third party that has no other job.

9. AI service: OpenCV

OpenCV is the huge open-source library for computer vision, machine learning, and image processing and now it plays a major role in real-time operation which is very important in today's systems. By using it, one can process images and videos to identify objects.

10. Version control: Github

Offers the distributed version control and source code management functionality of Git, plus its own features.

IV. Restriction and Potentially

- **Restriction:**
  - o **Smart Agri lacks actual data.** We tried to find many ways to collect information but none of these was successful, mostly because of Covid-19 pandemic. **Because the app has a little data, we can make a mistake if the terrain, climate and soil unmatch the information we collected.**
  - o User experience is also a minus point to Smart Agri. **We don't have many reviews from actual customers, so our app can be uncomfortable for users**. Our main customers mostly are middle-aged people and a small number of

young people, **(Our customers are varied in ages and purposes) hence creating an UX for different types of users is really challenging.**

- o **Although we create Smart Agri on basic and simple terms, there may be a chance that users misunderstand our features, or use it incorrectly.** We want users to have their best experience using our app, but this may ruin our target. We have some solutions for this, but all of them are interrupted because of Covid-19.

- **Potentiality:**
  - o As in the report ideas, we decided to temporarily stop the implementation of IoT because of objective reasons. **That is, if we have enough data from the users, our Smart Agri can be expanded to other high technology applications such as using sensors, drones or weather indicators**, thus, increasing the quality and quantity of farm products.
  - o Ecom, or Electronic Commerce, is a creative point in our app. We have thought about an idea many times: **"What if users can build and grow their own plants ?"**, and we have come up with a conclusion, an Ecom. In short words**, Ecom allows the users to invest in their favorite farms, and gain benefits from them, such as discounts or shares, and even plant their own seeds and take care of them, just by using phones.** This allows users to have more interaction with farms, and the farms will get more investment to grow.
  - o AI was also a topic when we implemented the project. The group didn't talk about it much, but everyone thought it was a good idea. We can use **AI in recognizing plants through pictures, or analyzing database for a better suggestion for users,...** The Dolphin believes in AI's potential, and if we have enough time and investment, AI will sure be **an important feature of Smart Agri**
  - o User's interaction was also a great idea when we talked about Smart Agri's potential in the future. The technical architecture had suggested this idea, when **users can have real-time contact with the farms, such as watching the growing state of the plants, or collecting information about the current weather conditions.** We found this idea very interesting and creative, and it's in our checklist for future features.

F. Finance

- Manage work (sharing work, track time, contribute information,..): ClickUp --> Free

- Sketch the idea of the app: Milanote --> Free
- Design UX/UI: Figma --> Free
- Saving data, information: Google Drive --> Free
- Conduct a meeting: Google Meet --> Free
- Means of communication: Zalo, Messenger, Gmail --> Free
- Resources, data researching: Google --> Free

G. Assessment

1. About project:

- Task management: Reasonable time for completing tasks, and every task was completed on time (95%)
- Work sharing: The amount of work is shared equally between members' abilities, and each person in the team usually helps the others complete tasks. (80%)

2. About manpower:

- Communication: Not really effective, sometimes members didn't keep up with the conversation and the project leader had to explain twice. (70%)
- Leadership: The leader project works effectively, and everyone always feels motivated doing group tasks.
- Problem solving: Everyone is supportive and ready to help the others when they need (70%)

3. About product:

- Product goal: We achieved our main goals we proposed before, with some adjustments in working.
    - Analysis: The limitations of our project was unclear at first, but after some meeting and conversation, we found the same voice.
    - Design: Detailed and creative. The design followed the blueprint we created, with some adjustments to improve UI/UX
    - Implementation: Following the design but flexible, the technical architecture had some minor changes to make Smart Agri looks better.
    - Evaluation: The group was quite cohesive, but sometimes we lack of communication.