

**Project Title:**  
Digital Solutions for Solving Ecosystem  
Problems, Tourism, and  
Marketplace: A Case Study of Vung  
Tau City, Vietnam



Alliance with  Education

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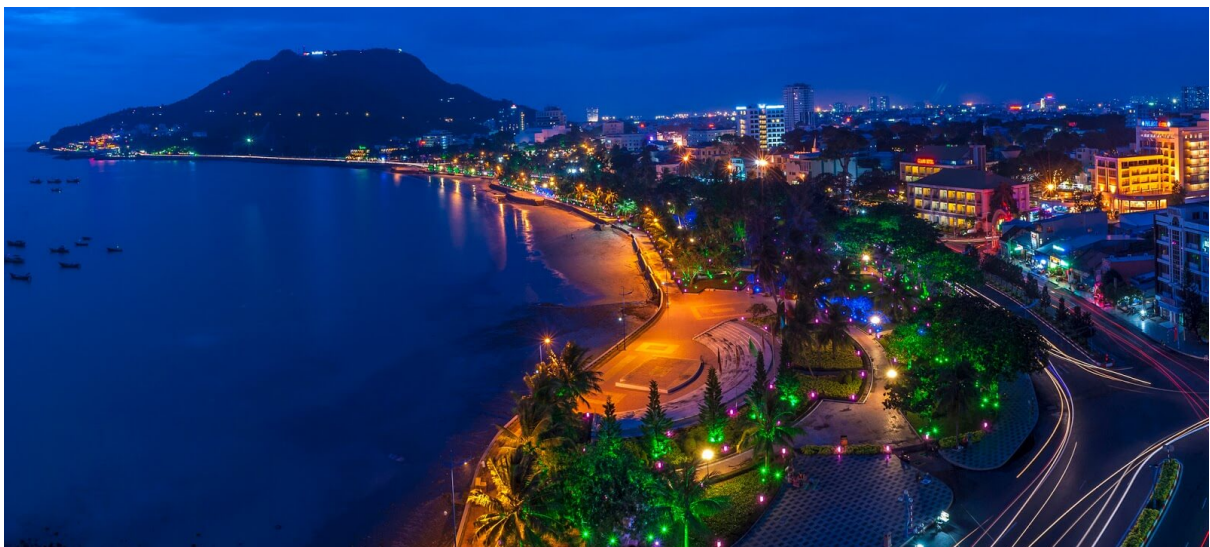
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# Project Overview



The aim of this project is to conduct a literature review on the current problems faced by Vung Tau City in Vietnam and propose suitable solutions to address these issues. The project will provide a comprehensive understanding of the environmental challenges, the impact of COVID-19, local solutions and ideas, recovery efforts, and other challenges faced by the city. The literature review will serve as a foundation for identifying potential strategies and recommendations to promote sustainable development in Vung Tau.

# Project requirement

- **Research:** Conduct thorough research to gather relevant literature and studies on the environmental problems, COVID-19 impact, local solutions, recovery efforts, and other challenges faced by Vung Tau City.
- **Literature Review:** Analyze and synthesize the collected information to create a comprehensive literature review. Ensure that the review provides a clear understanding of the background and current problems faced by Vung Tau, including the environmental issues and reduction of mangrove areas.
- **Local Solutions and Ideas:** Explore and document the local solutions proposed by Vung Tau City to protect the environment and promote sustainable tourism. Focus on initiatives such as sea tourism without plastic bags, tourism infrastructure improvements, eco garden development, and cultural promotion.
- **Recovery of Tourism Industry:** Examine the strategies implemented by Vung Tau to recover the tourism industry after the COVID-19 pandemic. Highlight initiatives such as promoting Vung Tau as a safe destination, investing in tourism infrastructure, developing new tourism products, and targeting international markets.
- **Other Challenges:** Identify and analyze additional challenges faced by Vung Tau, including environmental pollution, lack of skilled workers. Discuss the importance of addressing these challenges for the sustainable development of Vung Tau.

## Design concept

### Design idea 1 - Thanh Minh

#### Introduction

The city of Vung Tau in Vietnam faces several challenges related to its ecosystem, tourism, and marketplace. To address these issues effectively, we propose the use of digital solutions powered by NextJS ,Tailwind CSS, MySQL. This article presents our design ideas and concepts to tackle the identified learning issues and problems.

Vung Tau City suffers from significant ecosystem problems, including air pollution, water pollution, and deforestation. These issues have a detrimental impact on the city's natural environment. Our design ideas aim to mitigate these problems and contribute to the restoration and preservation of Vung Tau's ecosystem.

Tourism plays a vital role in Vung Tau's economy. To enhance the tourism experience and attract more visitors, our design ideas focus on leveraging digital solutions.

Efficient marketplace operations are crucial for the success of businesses in Vung Tau. Our design concepts aim to create a digital platform that connects local businesses with residents and tourists. This platform will provide a seamless and convenient way to discover and engage with various products and services. By fostering a thriving marketplace, we can boost economic growth and satisfaction for both businesses and consumers.

## Design outline

- **Homepage:** An engaging landing page that highlights the essence of Vung Tau and captures the attention of visitors.
- **Attractions Section:** A dedicated section showcasing the city's key attractions, including beaches, historical landmarks, and natural wonders. Detailed information, images, and visitor reviews will be provided to assist tourists in planning their itineraries.
- **Pollution section:** where all the compared will be show to the
- **Accommodation and Dining:** Information about hotels, resorts, and restaurants in Vung Tau, along with reviews and ratings.
- **Activities and Events:** A calendar of upcoming events, festivals, and recreational activities taking place in the city.
- **Local Insights:** Personalized recommendations from locals, highlighting hidden gems and lesser-known experiences.
- **Travel Tips:** Practical advice for visitors, including transportation options, safety guidelines, and cultural etiquette.

## Design Specifications

- **Tailwind CSS:** This styling framework will be employed to create visually appealing and responsive components, ensuring a seamless user experience. The reason Tailwind CSS can be used is because of its lightweight CSS framework, which will boost the performance of the websites. It also can be customizable, which I can create custom design, create the custom components reused across the website. I don't need to worry about BEM when collaborating with other developers.
- **NextJS:** We will leverage the power of NextJS for efficient website development, enabling faster page loading times and enhanced SEO capabilities. Due to the abilities of server-side rendering, the search engine crawlers can access the page content immediately which helps to improve the website's ranking in search results. It also can generate the static pages and all the page content is pre-rendered and stored on the server which can help to improve the website's performance and SEO, as the search engine

crawlers can access the page content without having to wait for the page to be rendered in the browser. Furthermore, NextJS provides several features for optimizing websites for SEO which add custom meta tags, Open Graph metadata. NextJS is a powerful framework where the image will be optimized by lazy loading and resizing it. It provides a powerful routing system so that if the project becomes larger, it can be operated quickly and more complex web applications. There are a number of ways to fetch data from the server (GraphQL, REST APIs, ...). Part of that, security is also a reason because NextJS provides security features like HSTS and CSP.

- **MySQL:** for storing the information of contacted applications. It is a very fast database; it can handle many concurrent connections and queries. It is also a scalable database, if the project grows bigger, it can be easily scaled to meet the needs of growing applications. Due to ease of use and widely supported, it is suitable for this project requirements.

## Design benefits

- **Access & Equity:** By providing an interactive website and online marketplace platform, our design ideas promote equal access to information and opportunities for all residents and businesses in Vung Tau. The platform ensures that even small-scale businesses can reach a wider audience and compete on a level playing field.
- **Appropriateness:** Our design ideas take into account the specific needs and characteristics of Vung Tau City. We tailor the digital solutions to suit the local context, ensuring that they are appropriate and relevant to the township's unique ecosystem, tourism, and marketplace requirements.
- **Affordability:** The digital solutions we propose aim to be cost-effective and accessible to businesses of all sizes in Vung Tau. By leveraging open-source technologies like NextJS and Tailwind CSS, we minimize development costs and provide affordable options for businesses to establish an online presence.
- **Environmental Health:** By addressing ecosystem problems and promoting sustainable practices, our design ideas contribute to the environmental health of Vung Tau. Through the eco-awareness campaign and virtual reality experiences, we raise awareness about the importance of preserving the natural environment and encourage responsible tourism practices.
- **Sustainable Livelihoods:** Our design concepts aim to create a thriving marketplace that benefits both businesses and residents. By connecting local businesses with a wider customer base and facilitating seamless transactions, we support the growth of sustainable livelihoods in Vung Tau. The marketplace platform provides opportunities for businesses to expand their reach and generate income, contributing to the economic development of the township.

## Design Constraints

- **Promoting the Website to a Worldwide Audience:** Expanding the reach of the website and ensuring its visibility on a global scale will require strategic marketing efforts and search engine optimization techniques.
- **Ensuring Scalability and Flexibility:** As the project expands and attracts more users, scalability and flexibility must be considered to accommodate increasing website traffic and evolving user demands which are already suitable for the technology of NextJS.

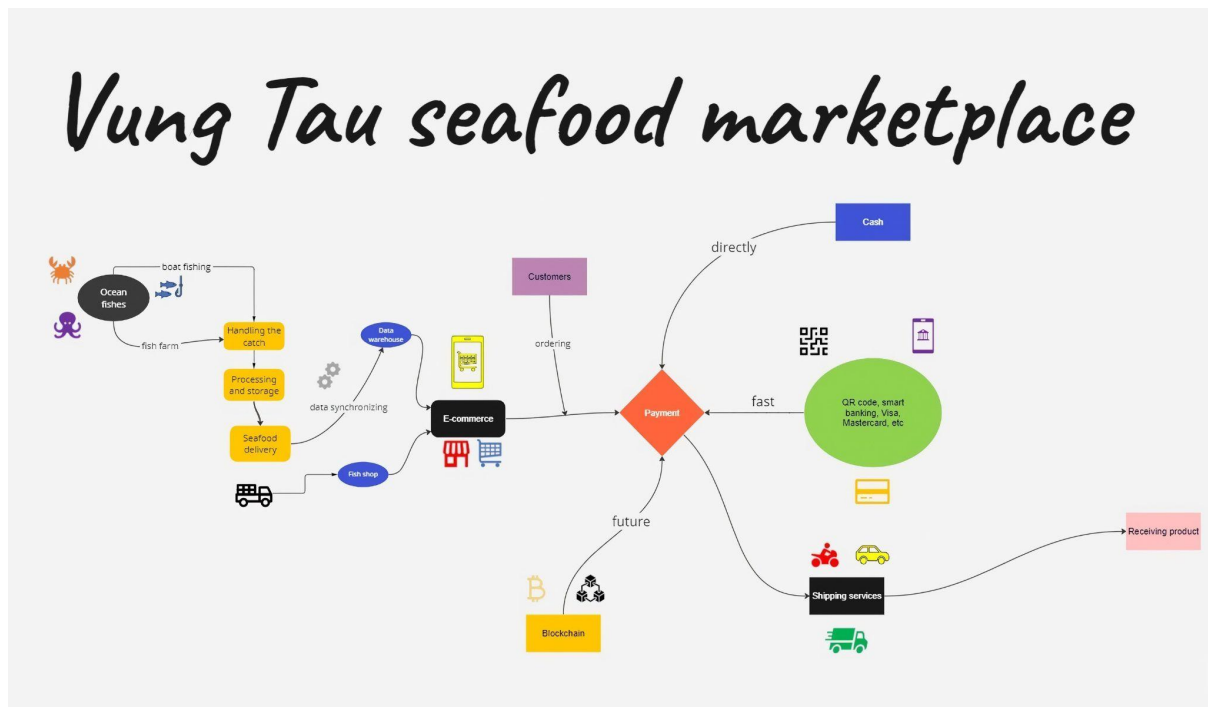
## Design idea 2 - Dang Vinh

### Introduction

Vung Tau is a city that has rich resources of ocean fishes, as well as favorable climatic conditions for aquaculture and fishing development. However, due to climate change as well as being affected by the COVID-19 pandemic, seafood consumption has been severely affected, many aquaculture households are at risk of bankruptcy, and the number of vessels fishing is effectively reduced. So, one of our design ideas is to build an e-commerce channel to sell seafood to consumers in the city and tourists.

Therefore, ensuring that when transporting seafood to the point of consumption is fresh and safe for health is an important step in creating a new seafood sales channel. To effectively deal with this problem, I suggest improving logistics with software such as SAP Extended Warehouse Management (SAP EWM), SAP Supply Chain Management (SAP SCM), SAP Business Network Global Track and Trace, and cooperation with apps used by many people for transportation such as Grab, Shopee, Lazada, etc.

## Design outline



- **Modern Warehouse and Storage Facilities:** Creating areas where the freshness and quality of seafood can be preserved and maintained, with additional space for the destruction and isolation of contaminated seafood.

-**Transportation and Fleet Management:** Developing a comprehensive transportation and management system to ensure the aquatic products reach the place of consumption in a way that is as fast as possible. In addition, it is extremely important to implement a tracking system to check the location and status of the vehicles over time. vehicles over time.

- **Collaboration and Partnerships:** Develop a strong transport network and create highly effective cooperation strategies in the transportation of seafood in Vung Tau City.

## Design Specifications

- **SAP EWM:** SAP Extended Warehouse Management (SAP EWM) is a software developed to optimize and improve warehouse management processes. It also can provide information to help make the right decisions. It includes some main functions: advanced warehouse management, labor and resource management, inventory reporting and analysis, and integration of automation technologies.

- **SAP SCM:** SAP Supply Chain Management (SCM) helps optimize supply chain operations. It provides everything across aspects of the supply chain, including



procurement, manufacturing, logistics, and demand planning. It can forecast customer demand accurately by analyzing historical data, market trends and other relevant factors. Therefore, this optimizes stock levels and can easily meet customer needs. SAP SCM supports transportation management by selecting routes and reviewing payloads. It is able to track shipments, ensure timely delivery. SAP SCM can also provide tools to evaluate, collaborate, and monitor seafood supplier performance. It provides the ability to analyze and report on supply chain performance, identify downsides, and get an overview of KPIs.

- **SAP Business Network Global Track and Trace:** SAP Business Network Global Track and Trace is used to trace the origin of goods as they move through the supply chain. Additionally, it can automatically trigger alerts and notifications for specific events, such as delays, route changes or exceptions, to ensure timely actions and improve guest service. Moreover, the software integrates with various systems and technologies, including transportation management systems, warehouse management systems and IoT devices, allowing data exchange and provision of information. Using its analytics capabilities, SAP Business Network Global Track and Trace can analyze past and present information to provide performance insights and predict possible problems. This has helped to reduce risks and optimize logistics operations. Moreover, SAP Business Network Global Track and Trace can improve the customer experience by providing accurate information on the shipment status, estimated arrival times, and potential problems.

## Design benefits

The design idea of implementing a new logistics system, Vung Tau City has some benefits connected with various telecommunication guidelines and has several benefits in terms of access and equity, health and safety, appropriateness, affordability, environmental health, and sustainable livelihoods

- **Access and Equity:** By creating an efficient logistics system, the design concept improves commercial opportunities for the fishing industry in Vung Tau. It ensures fair and equal access to shipping services, allowing fishermen and small companies to connect equally to national and international markets.

- **Health and Safety:** The logistics system prioritizes health and safety standards through real-time monitoring and control. For example, the use of sensors in shipping containers ensures that seafood products are stored and transported in good conditions to ensure food safety.

- **Appropriateness:** Design ideas can be changed to suit Vung Tau city seafood industry. Logistic processes can be changed to handle the special requirements of transporting seafood, such as the use of professional packaging, refrigeration and

handling techniques. This ensures that the logistics system is suitable with the specific needs of the industry in Vung Tau.

- **Affordability:** Logistics systems can offer cost-effective solutions, such as optimizing transportation routes and minimizing waste through efficient inventory management. This helps Vung Tau's seafood industry reduce operating costs and improve competitiveness in the market.

- **Environmental Health:** The design concept can incorporate other environmental protection solutions including the use of environmentally friendly packaging materials and waste management strategies. By reducing carbon emissions, minimizing waste and increasing sustainable resource use, the logistics system contributes to the environmental protection process of Vung Tau city.

- **Sustainable Livelihoods:** The development and launch of an effective logistics system has a positive impact on individuals and communities involved in the seafood production industry in Vung Tau. By facilitating efficient transportation and timely product delivery, it enhances economic opportunity, creates jobs and promotes sustainable growth in the region.

The development and launch of an effective logistics system has a positive impact on individuals and communities involved in the seafood production industry in Vung Tau. By facilitating efficient transportation and timely product delivery, it enhances economic opportunity, creates jobs and promotes sustainable growth in the region.

Overall, the design idea of a comprehensive logistics system in Vung Tau is suitable with telecommunication guidelines related to access and equity, health and safety, appropriateness, affordability, environmental health, and sustainable livelihoods. It aims to create a more efficient, and sustainable seafood industry ecosystem, benefiting all stakeholders involved in the value chain.

## Design Constraints

During the implementation and maintenance phase of the logistics system design idea, several potential challenges may arise. These challenges can impact the effectiveness and sustainability of the system. There are some problems which need to carefully consider:

- **Infrastructure Limitations:** In the implementation phase, inadequate infrastructure, as well as transportation networks, storage facilities, and vehicle transportation options, may pose challenges. In addition, limited cold storage facilities or reliable transfer services can prevent the flow of goods and increase logistics costs.

- **Technological Integration:** Ensuring communication and data exchange between different stakeholders, such as seafood processors, transport providers, and managers, may require in-depth technical expertise and compatibility between different hardware and software components.
- **Data Management and Security:** Order information and customers' personal information need to be kept confidential. Implementing resource protection as well as data backup is essential to avoid sensitive information disclosure and data breaches.

## Design idea 3 - Khải Hoàn

### Introduction

Since the unforeseeable COVID pandemics in 2019, the world tourism sector has probably been the most suffering yet yearning to change its fundamental method of how we conduct business along with preserving the current natural resources and landscape. With that strongly highlighted manner of saving many tourism attractions, I have decided to efficiently intertwine and rewind tourist experiences in our chosen indigenous area of Vũng Tàu with Virtual Gamification. Virtual gamification tourism is the use of digital technologies to create interactive and engaging experiences for tourists who want to explore a destination. It can involve elements such as 360° images, videos, games, quizzes, missions, rewards or challenges that enhance the tourist's learning and enjoyment.

As a coastal city in Vietnam that is best known for its beaches, seafood, historical sites and cultural attractions, Vũng Tàu is one of the most popular destinations for domestic and international tourists who want to relax and have fun. However, Vung Tau also faces some challenges such as environmental pollution, traffic congestion, seasonal fluctuations and competition from other international destinations.

Inspired by many popular reality entertaining yet adventurous game shows such as “2 days 1 night,” “Running Man,” “Survivor,” “The Challenge,” “The Amazing Race,” etc., virtual gamification of Vũng Tàu landscapes into mobile applications create incredibly promising opportunities for international nature-lovers, curious explorers, and peaceful yet meaningful site seekers to enjoy and indulge themselves in their unlimited imaginary delightful Vũng Tàu world. Thus, by offering them a unique and memorable way to discover the city, virtual gamification tourism can be a powerful tool for Vung Tau to improve its tourism industry and better attract international tourists. It can offer tourists a more immersive, informative and enjoyable way to experience Vung Tau's charm and richness. It can also help Vung Tau to differentiate itself from other destinations and create a positive image and reputation.

## **Design outline**

A mobile game application using Augmented Reality (AR) for the best visual qualities in making an online footprint from tourists on a specific locations they have explored and taken adventure on so far, Artificial Intelligence (AI) for the best learning model in figuring out in what ways can each sale retailers bootstrap their products and services by analyzing their preference over a large amount of online virtual choices and uses of their advertised products throughout the game adventure. More substantially, since game playing should always positively encourage the needs of socializing and making connections among not only the players but also the providers, this is an undeniable ideal opportunity for manufacturers and retailers to outperform what they are currently serving and setting much more realistic and constructive targets in a very short time cycle to immediately accomplish them in real life that significantly outdo their works by normal incompetent advertisements and seedings in social media.

In particular, the application works this way: First, potential tourists (not yet coming to visit Vŭng Tàu) are welcomed to their designed world in the game adventure and start building, exploring, learning, and solving problems given from indigenous people living in these Vung Tau's diverse and beautiful natural and cultural heritage such as Pineapple Beach, Christ The King, the Robert Taylor Museum Of Worldwide Arms, the Vung Tau Lighthouse or the Hon Ba Island, Vung Tau's historical and cultural sites, such as the Long Tan Battlefield, the Duc Me Bai Dau or the Ho May Park. Users are totally in charge of their own navigation and path planning to maximize their score and overall outcomes. This particular feature may come into light for applying Artificial Intelligence to learn from their behaviors for Vŭng Tàu business stakeholders to provision what their business might most likely take place and logically set up immediate actionable planning for taking big advantages in reactivating or remodeling their usual way of doing business. For example, giving users multiple directions to reach a destination in Vŭng Tàu like bikes and hired electric cars as their only means of transport, we can learn which one they prefer, in which path with separately different characteristics would they choose to go on to better implement their ideas in finding their fitting desired pathway or direction for traveling.

## **Design Specifications**

### **Hardware requirements:**

You need a smartphone that optimally supports AR experiences with high-resolution screens, and a powerful processor since tourists are to engage in very lively interactive yet dynamic game-on environments with other players or cooperators throughout the timing adventure tourists are heartfully chasing after. Tourists might also need to get equipped with a headset that is compatible with their phone and its size, such as Google Cardboard, Samsung Gear VR, or Oculus Go. Tourists may also need other accessories such as headphones, controllers, or trackers to

enhance their AR experience both in their phone screen or with aids from projectors and Head-Up Display (HUD).

### **Software requirements:**

C/C++ is the preferred programming language to have precise control over the hardware and graphics of the AR game mobile application, as well as optimize the application for performance and memory. Since C/C++ is one of the most powerful and versatile languages compatible with many game engines and frameworks, such as Unreal Engine, Unity3D, or Cocos2d-x. It also supports cross-platform development with Xamarin or .NET Core to helpfully return the needed data about tourists choices and preferences for later analysis, transformations, and more advanced business intelligence carried out. However, C/C++ C++ is a challenging language to learn and master, but it is also a rewarding and promising one that can open many opportunities for game and AR development. Having known for a steep learning curve and getting complex and error-prone to write and update, we are very much aware of applying some of the following best practices when programming such as: Use modularization and encapsulation to organize your code into classes, functions, namespaces, memory management techniques to allocate and deallocate memory for your objects and pointers, error handling and exception handling to deal with errors and unexpected situations, templates and generics to write generic and reusable code that can work with different types of data, OOP (Object-Oriented Programming) principles to write code that is based on objects and their behaviors and relationships, inheritance and polymorphism to create hierarchies of classes that share common attributes and methods, and lambda expressions or function objects to create anonymous functions that can be passed as arguments or returned from functions etc.

### **Design benefits**

- **Enhanced immersion:** This AR game mobile tourism application can provide a more immersive and realistic tourism experience than traditional tourism media. It can make users feel like they are part of the destination or attraction and interact with it in natural ways. It can also improve spatial awareness and cognitive skills by requiring users to explore and navigate their surroundings. It genuinely increases tourists' loyalty and word-of-mouth by rewarding them with badges, points or certificates that they can share on social media or use for discounts or benefits.
- **Encouraging physical activity:** The application can motivate users to move around and exercise while playing, which sometimes is a real challenge for most individual or family groups of visitors when all they ever think of (mostly the parents) is to take pictures and do some small exercises. In most cases, tourists may not get motivated enough to actively and willingly immerse themselves in the current place. It can make physical activity more fun and rewarding by adding game elements such as challenges, rewards, or social interactions. It can also promote health and wellness

by reducing stress and boredom, which is also a good indicator of overall health remedy alongside mental health relaxation.

- **Social interaction and networking:** The application can foster social interaction and networking among users. It can allow users to play with or against other players in real-time or asynchronously. It can also enable users to share their experiences and achievements with others through social media or other platforms. It can also create a sense of community and belonging among users who share similar interests or goals.
- **Educational opportunities:** The application can offer educational opportunities for users. It can teach users about various topics such as history, culture, science, or geography by providing relevant and contextual information. It can also stimulate curiosity and creativity by encouraging users to discover and learn new things. It can also enhance learning outcomes by providing feedback and reinforcement.
- **Customization and personalization:** The application can provide customization and personalization options for users. It can allow users to create their own avatars, characters, or items that reflect their personality and preferences. It can also adapt to the user's location, time, mood, or behavior by providing different content or scenarios. It can also offer different levels of difficulty or modes of play according to the user's skill or preference.
- **Increased engagement:** This application can increase engagement and retention among users. It can attract and retain users by providing novel and exciting gameplay that differs from traditional games. It can also create a sense of achievement and satisfaction by rewarding users for their efforts and progress. It can also generate loyalty and advocacy by creating emotional connections and positive associations with the destination or attraction. Thus, this allows extending tourists' stay and spending by encouraging them to visit more places and attractions in Vung Tau or nearby areas.
- **Reducing carbon footprint:** This application can reduce the carbon footprint of tourism by allowing tourists to experience virtual tours of destinations or attractions without physically traveling there. This can save fuel, energy, and emissions that would otherwise be generated by transportation, accommodation, or other tourism activities. It can also reduce the impact of mass tourism on the environment by alleviating overcrowding, congestion, pollution, or degradation of natural and cultural resources
- **Promoting environmental conservation:** This application can promote environmental conservation among users by providing incentives and rewards for engaging in pro-environmental behaviors or actions. For example, it can reward users for reducing their waste, recycling, donating, volunteering, or supporting

environmental causes or organizations. It can also create emotional connections and positive associations with the environment by making users feel part of it and responsible for it.

## **Design Constraints**

This method might get a fairly lower advantage over traditional marketing and seeding proposals, but the certainty and assurance in creating healthy yet memorable first impressions on Vũng Tàu for enticing tourists in coming for more engaging yet high quality experiences to their already-virtually explored adventures throughout games are very likely. However, this way of promoting upcoming tourists to Vũng Tàu may not be applicable to the older generation of people due to their lack of patience with modern technology. Hence, there must be a completely different custom program for such people to avoid most of these conflicts of knowledge when using mobile applications on their phones and to better engage them in a more interconnected group of like-minded same age people to create an inclusive community both online and offline for gathering them in real life to pay trips and visits as planned in their games to Vũng Tàu together.

## **Design idea 4 - Kim Thu**

### **Introduction**

In addition to the challenges regarding tourism and the ecosystem of Vung Tau mentioned in this article, Vung Tau is also facing challenges in terms of developing and fostering the potential of e-commerce. To address these issues, blockchain technology, specifically Corda, holds the potential to address and develop e-commerce issues, promising a positive impact on this field in the city of Vung Tau. The main obstacle hindering the development of e-commerce in Vung Tau is the lack of trust between buyers and sellers, particularly in online transactions. Additionally, customers have concerns about security and transparency related to fraud and the authentication and quality of products from suppliers. The lack of transparency can lead to customer dissatisfaction and impede their online purchasing. This factor can hamper the development of e-commerce activities in Vung Tau. In addition to the challenges of transparency and customer trust, another contributing factor is supply chain management, involving multiple stakeholders including manufacturers, distributors, and retailers. Inadequate and inefficient processes can lead to delays, errors, and inefficiencies. This will affect the profitability of businesses and the customer experience.

Corda is a distributed ledger technology aimed at enterprises and can be applied to the e-commerce sector in Vung Tau. It aims to address issues of trust, enhance supply chain management, increase transparency in transactions, reduce delays,

and the risk of counterfeit goods. It helps customers have confidence in their purchases and enhances activities on e-commerce platforms.

## Design outline

**User Interface and Experience:** The user interface design focuses on simplicity and ease of use to ensure a seamless process for both buyers and sellers.

**Product Listing and Search:** Sellers have the ability to create detailed product listings including images, descriptions, prices, and inventory information. This feature is accompanied by search filters to allow buyers to easily find suitable products.

**Smart Contracts:** Integrate Corda's smart contract features to support secure and automated transactions. Ensure transparency and reduce the risk of fraud and deception in online transactions.

**Supply Chain Management:** Integrate supply chain management features to assist businesses in managing the transportation of goods and displaying real-time information within the supply chain, enhancing transparency for all stakeholders.

**Online and Secure Payment Methods:** Allow users to choose from various payment methods, including traditional and digital currencies. This enables seamless, fast, and secure transactions for users.

**Rating and Review System:** Establish a rating and review system to provide and allow users to submit and view feedback and experiences regarding products or services. The reviews and ratings will be verified to enhance customer trust and avoid false information.

**Data Analysis:** Aggregate and analyze sales data, including sales performance, trends, and customer behavior, to help sellers develop strategies for business growth.

## Design Specifications

### Hardware

**High-performance Processor:** Platforms with high computational needs, such as e-commerce websites, require servers with high-performance processors to handle blockchain transaction algorithms and execute smart contracts efficiently. Processors like Intel Xeon or AMD EPYC can provide sufficient processing power for optimal server performance.

**CPU:** The CPU is considered the central processing unit of the system, performing general computing tasks, maintaining system operation, and smooth processing. The stronger the CPU, the more powerful the system's performance. Intel Core i7 is highly regarded for use in this system.

**GPU:** GPUs are primarily used for graphics processing and are not heavily dependent on Corda's information processing. However, CPUs may not efficiently handle repetitive data processing at high frequencies. Therefore, GPUs are used to



handle high-frequency computational density and allow CPUs to focus on other critical algorithms.

**Nodes/Clients:** Nodes and clients perform the main functions of the blockchain network, including transaction verification, record storage, and data maintenance. Each node/client represents an individual participating in the system, including buyers, sellers, and verifiers.

**Cluster:** A term used to describe a set of nodes used in cases with high computational volume or complex requirements. Clusters have the ability to balance the amount of information, enhance and expand the system's fault tolerance, and then monitor and alert the servers.

## **Software**

**Solidity:** Solidity is a popular programming language used for developing smart contracts in blockchain. Developers can write algorithms used in smart contracts, ensuring that transaction records are authoritative and cannot be forged or tampered with.

**Corda Network Map Service:** This service provides information about participants and nodes in the Corda system, helping establish reliable connections within the Corda network.

**Corda Firewall:** It enhances the security of the system and allows the management of access sources to ensure that only authorized participants can join the network.

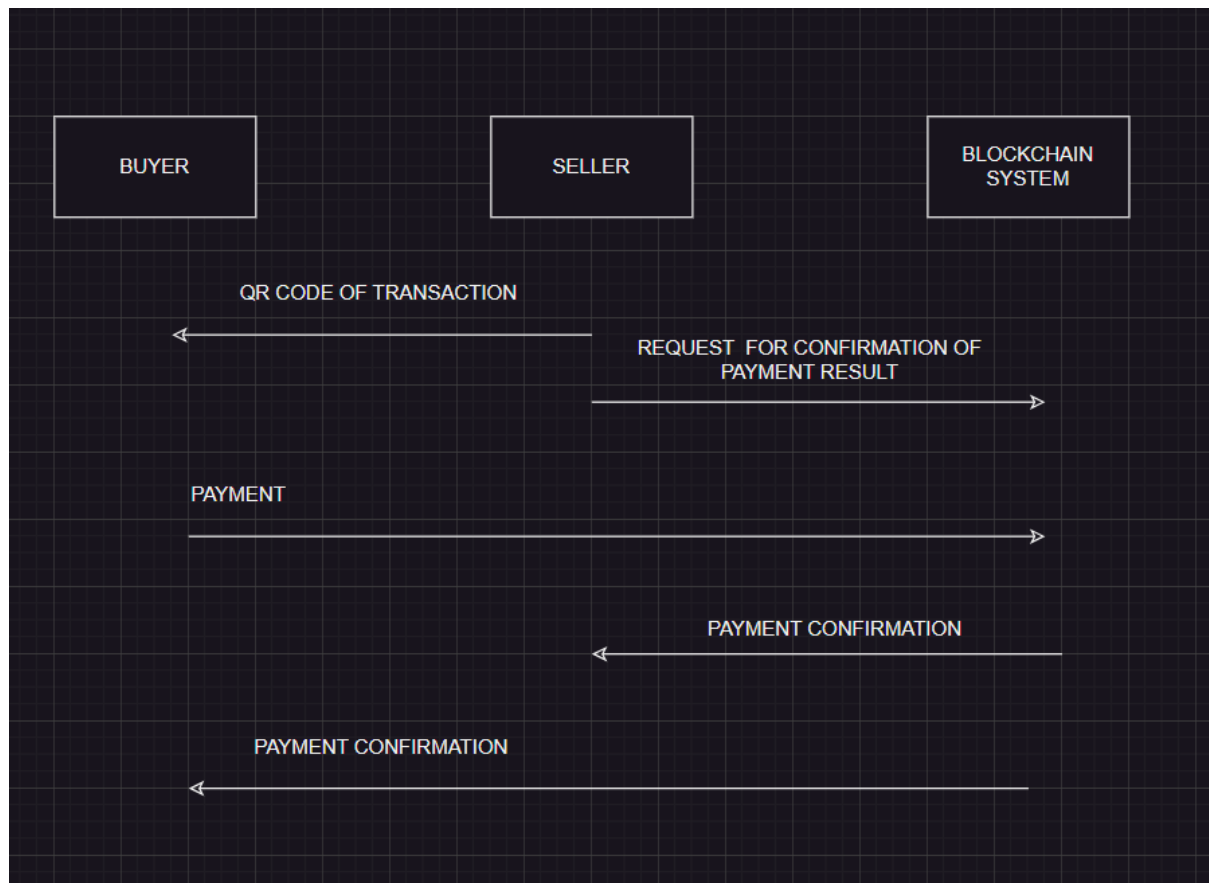
**Corda Explorer:** It assists users in managing transactions and system states, providing detailed information about the system's operations.

**Corda Testnet:** It is a dedicated testing network for developers to run experiments, perform tests, and validate before deploying the system officially to ensure a flawless system.

## **Design benefits**

**Access and Equity:** Blockchain helps improve and expand market access to digital businesses and consumers. It enables small and medium-sized enterprises to participate in e-commerce markets. With the decentralized nature of blockchain, it helps reduce intermediaries and creates equality within the system.

**Health and Safety:** In the context of the COVID-19 pandemic, digitizing transaction processes and reducing physical contact between individuals helps limit the spread of the virus. Transactions encrypted in the blockchain enhance privacy, protecting customer information and data.



**Appropriateness:** Designed to cater to the conditions and e-commerce industry in Vung Tau, blockchain addresses transparency issues and customer trust in online transactions. The platform can be customized to meet the requirements of local markets.

**Affordability:** Blockchain supports cost savings for businesses and consumers by reducing intermediaries and streamlining processing procedures. Additionally, it eliminates physical retail stores, reducing expenses for businesses and lowering prices for customers.

**Environmental Health:** Reducing the frequency of material transportation and carbon emissions into the environment. The reduced number of vehicles due to online shopping helps improve air pollution. Digitizing processes also reduces paper consumption and related resources, minimizing annual waste disposal.

**Sustainable Livelihoods:** It allows small and medium-sized businesses to expand their customer base beyond local markets, even reaching international customers, by providing a secure and efficient shopping platform to stimulate economic growth in Vung Tau city and the southern region.

## Design Constraints

**Adoption and User Onboarding:** Encouraging businesses and consumers to adopt a new platform can face resistance because users are accustomed to the old platform or lack authentic information about the new platform.

**Technical Expertise:** Implementing a Blockchain system in e-commerce requires experienced developers with specific knowledge and expertise in Blockchain, particularly Corda. Integrating payment gateways and related services can be complex and demands developers' extensive experience.

**Regulatory Compliance:** Legal issues such as consumer rights, financial regulations, and other relevant rights need to be strictly adhered to.

**Security and Privacy:** Robust security measures must be implemented, regular checks conducted, and vulnerabilities that may impact customer privacy addressed.

**Cost Management:** The software and hardware components of the Blockchain system require continuous maintenance and development. Therefore, tight cost management is necessary to ensure the sustainable development and efficient operation of the system.

## Design idea 5 - Le Minh

### Introduction

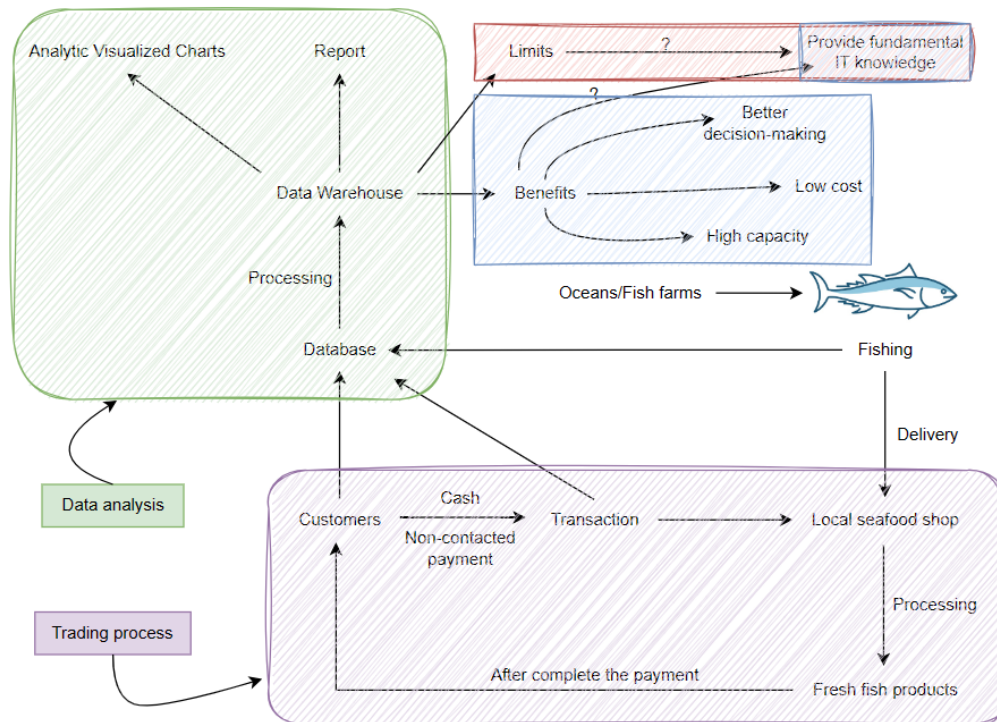
Vung Tau city is known for its seafood wealth and taking an essential role in providing a tremendous amount as the way to promote its industry. However, the trading procedure is still too simple: the native people catch then sell, and the consumers purchase the fresh seafood products. Sellers lack abundant information management that they can try to utilize these advantages in this modern technology world. It would be better if the businessmen can understand more about their customers such as the demands, trending, receiving feedback, recognize the favorited product selections based on history transactions in order to preserve relationships with buyers in the long term. Moreover, merchants can gain better marketplace insights to conduct statistical reports and adjust prices depending on seasonal fishings for better decision-making. To make this possible, a data warehouse is a perfect option for this issue.

Data warehouse is basically a platform that gathers and controls data from different types of sources that has been summarized and processed. It helps to provide better visions from analyzed information with statistics for the upcoming decisions. This is very useful for most businesses and marketing organizations.

With the marketplace industries' improvements, it will indirectly and slightly boost both tourism industry and ecosystem conservation.

## Design outline

# Data Warehouse Design Outline



**Transactions history:** recording customers' payments or transactions for comparison with previous monthly or annual revenues.

**Customer information:** buyers can easily create an account online to buy seafood on websites with offers, a variety of seafood selections and the business can save customers' credentials for understanding their demands through their preceding transaction.

**Trending:** depending on seasonal fish catches and clients' needs, products can be adjusted with the limited amount and prices and can be omitted when it is unavailable which can prevent redundant loss

**Feedback:** getting customers' opinions to improve services.

**Analytic visual chart:** to have a better objective review for the future decision-making process.

**Pricing adjustment:** can make changes of seafood cost with statistical monthly revenue and fluctuating amount of resources.

**Overall report:** a summary of organized and consolidated information throughout the whole month or year of sales, revenue, profit or loss.

## Design Specifications

There are various number of softwares that support data warehouses, one of them is Amazon Redshift. Amazon Redshift is known for its simplicity, fully managed, cost effective, user-friendly data warehouse solution by using standard SQL along with Business Intelligence tools so it can perform complicated queries. There are also some similar data warehouse softwares with general purposes such as MarkLogic, Oracle, Snowflake, etc.

Besides, hardware like phones or computers can integrate and interact with these data warehouse softwares to ensure its smoothness and convenience by accessing crucial data at any place and any time on a one-platform service.

## Design benefits

**Efficient labor distribution:** avoid unnecessary expenses with dedicated management.

**Software interface:** easy, simple to use as it is user-friendly.

**High capacity:** accumulated data with huge volume, low response time and high productivity.

**Summarized and consolidated overview of data:** tremendous amounts of information can be indicated through a periodical report or illustrated through visualized charts, which can be used as a guidance to conclude greater in selecting choices for future markets.

**Low cost:** most data warehouse softwares charge consumers based on the capacity of data used to store it, which is typically low.

## Design Constraints

**Disseminate IT knowledge to local people:** sellers most likely do not have or very few access to this new and modern technology, with completely different views of business management, which is a huge hurdle for them to get adapted with at the beginning. But throughout time, with some fundamental relevant courses, this could build up a solid foundation of knowledge for native people to approach similar technology education that can be applied in their real life.

Word count: 5999 words

## Team Breakdown:

Each member is responsible for a specific segmentation in the whole process of successfully innovating and developing how Vung Tau can significantly develop in harmony with modern age people's expectation, especially after the endurable recovery from COVID 19 pandemic.

Tran Thanh Minh: mainly responsible for developing and functioning the best services on our online marketing tourism website.

Cao Phuc Khai Hoan: in charge of deploying and carrying the best use with the AR mobile application to draw more users' good impressions and delightment by fully immersing in the application.

Bani Hashemi Le Minh: mainly work on making research and investigating better business intelligence via directly working on data warehouses for small to medium-sized local businesses.

Nguyen Dang Vinh: pairing with Le Minh, this member is responsible for doing research on logistics and supply chain management for local authorities and retailers.

Tran Kim Thu: take hold responsibility for ensuring the security of online transactions made between clients and providers via the website by putting a strong emphasis on the new technology of cryptography - blockchain.

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