

**MARKET RESEARCH STUDY FOR STARTUP COMPANY WITH  
FOCUS ON CARBON FOOTPRINT TRACKING AND  
MANAGEMENT**



**A THEMATIC PAPER SUBMITTED IN PARTIAL  
FULFILLMENT OF THE REQUIREMENTS FOR  
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entitled  
**MARKET RESEARCH STUDY FOR STARTUP COMPANY WITH  
FOCUS ON CARBON FOOTPRINT TRACKING AND  
MANAGEMENT**

was submitted to the College of Management, Mahidol University  
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**ABSTRACT**

**Objectives:** The purpose of this study is to provide business expansion strategy recommendations for a start-up company specialized in carbon footprint tracking and management. The recommendations are derived from in-depth market research, analysis and first-hand interviews of individuals who are experts on the subject and possible end-users.

**Goals:** The goal is to provide recommendations that are viable for business expansion, namely, strategies that will help the company grow its customer base and expand into new markets while increasing its competitiveness.

**Scope:** The scope of this study covers market research and analysis, which include internal and external business environment scanning, analysis of competitors, existing markets and potential customers.

**Research Methods:** The two main methods used are primary data research and secondary data research. The primary data research was conducted via interviews of individuals while secondary data research was conducted through researching data via reputable sources on the internet.

**Findings:** It was found that the company is in a good position to exploit the existing market due to climate change, however, they should expand their services to service more customer and limit their expansion to EU and N. America region.

**KEY WORDS:** Market research/ Market Analysis/ Business analysis

37 pages

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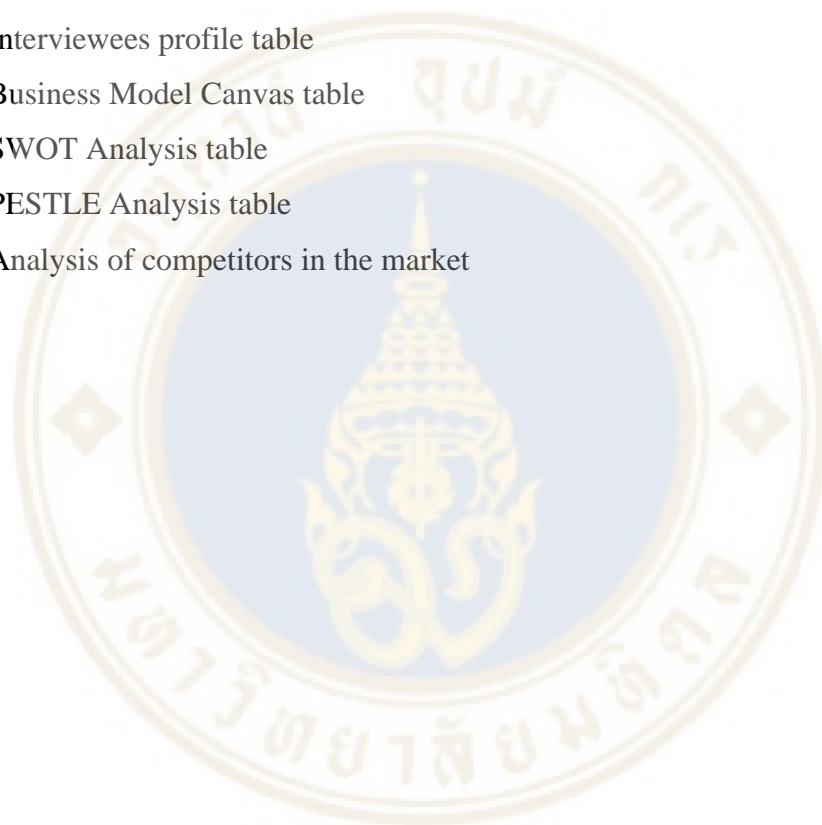
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## CHAPTER I

### INTRODUCTION

The topic of climate change has been a global issue since the start of this millennia, with water levels rising and the average temperature rising every year which will likely lead to more climate disasters. It is hard to argue about impending doom if we continue on this course. However, there continues to be certain groups of people arguing about the legitimacy of climate change and the science behind it. But what is not debatable is the ever-increasing figures of greenhouse gases emission caused by human activities. One of the major contributors in GHG is carbon dioxide.

Sorting to rectify the course of action, almost 200 countries assigned up to the Paris Agreement, with the aim to keep the increase in global temperature under 2°C. To achieve this goal, countries must reduce their GHG emissions as soon as possible. Several major emitting countries such as China, France and Germany have signed into law/or plan to be carbon neutral by 2050. Being carbon neutral means achieving net-zero carbon dioxide emissions, this can be done by balancing emissions of carbon dioxide through removal or by eliminating emissions from society.

Due to vast and ever-growing demands for solutions to slow down Earth's impending doom, many new high-tech organizations and start-ups had been formed due to this very purpose within the last decade. One such start-up is Company X (not their real name).

Company X is an international start-up company based in Berlin, focusing on the fields of space and environment and in the process of developing a satellite-based carbon emission monitoring platform. Company X aims to optimally estimate and record greenhouse gas (GHG) emissions in real time for companies and public institutions to track their carbon footprint.

The business model of Company 'X' is a B2B SaaS (software as a service). The product aims to address the challenges of proper estimation and regular monitoring of location-based greenhouse gas (GHG) emissions by providing effective tools for

companies and public entities to track their carbon footprint and perform fact-based climate actions.

Today, the company is operating globally, with customers from all over the world. However, they are focusing on 2 geographical locations and 3 industrial sectors which are Europe and North America. The three industries in focus are ports, forestry and agriculture.

During the course of this project, a group of students were tasked to conduct extensive market research for an innovation company, Company 'X', specialized in tracking carbon footprint using satellite technology. The main objective of this company project is to find promising market niches and possible market growth points. Company X is a relatively young startup company, they only began operation about 3 years ago and now focusing their efforts on growing their business and customer base.

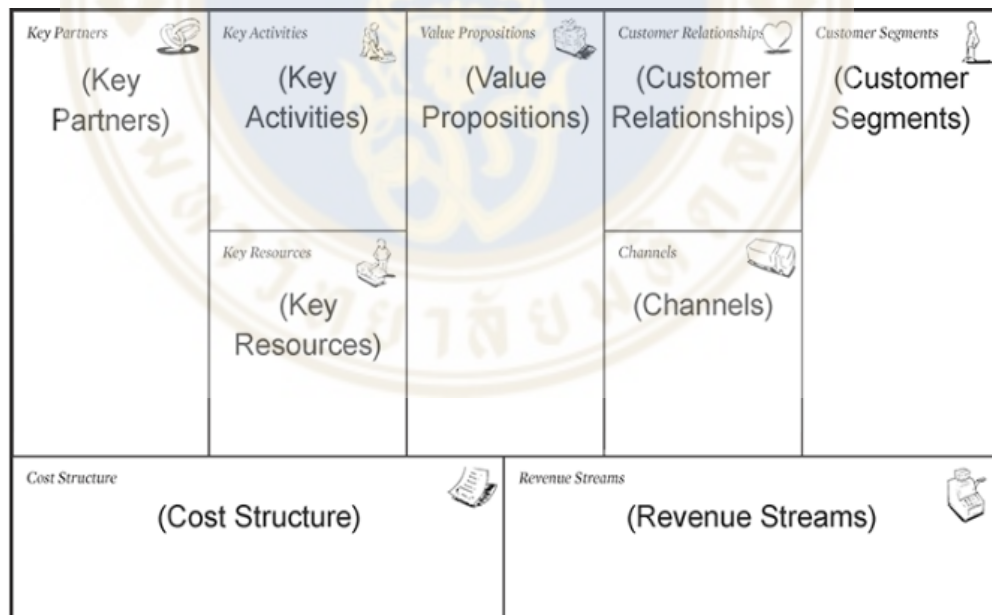
This paper will detail the process and steps undertaken by the student consulting team throughout the project. It will start from Literature review going on to Research methodology, Analysis and Findings and lastly finish at Recommendations and conclusion.

## CHAPTER II

### LITERATURE REVIEW

The goal of this chapter is to provide insight into the different literatures that are related to the project. As the main task of the consulting project is to conduct in-depth market research and analysis and to provide business recommendations, the literature reviews here will be related to strategic business management. The literature and theories provided the necessary understanding for the different frameworks that were heavily utilized during this project. In total, three business management frameworks/tools were applied, they are: Business Model Canvas, SWOT analysis and PESTLE analysis.

#### 2.1 Business Model Canvas



**Figure 2.1 Business Model Canvas diagram, Alex Cowan (2016) [1]**

To gain a better understanding and insight into an organization's business, we need to capture, translate and communicate the values which that organization possesses. The best way to do this would be to establish a business model in order to best visualize the underlying business elements. One such tool which is widely in use today is the Business Model Canvas (Osterwalder and Pigneur, 2010) [2]. The Business Model Canvas encompasses the nine building blocks of an organization's business which include:

- **Customer Segments:** are groups of customers that a business serves, different groups have different attributes and needs thus it is vital for any business to identify their customer segments and implement the best possible strategy to adhere to customers' needs. There are five different types of customer segments: Mass market, Niche market, Segmented market, Diversify, Multi-sided market.
- **Value Propositions:** describes the bundle of products and services that creates value for a specific customer segment. Value propositions may include characteristics such as newness, performance, customization, "getting the job done", design, brand/status, price, cost reduction, risk reduction, accessibility, and convenience/usability.
- **Channels:** describes how a company communicates with and reaches its Customer Segments to deliver its Value Propositions. An organization can choose between reaching its customers through its own channels (B2C), partner channels (B2B), or through a mixture of both.
- **Customer Relationships:** are the types of relationships a company establishes with specific Customer Segments, a company should clarify the type of relationship it wants to establish with each Customer Segment as well as the use of Channels to establish and maintain relationships.
- **Revenue Streams:** are ways a company generates cash from each Customer Segment as a result of value propositions being successfully offered to customers. Types of Revenue Streams includes: Asset sale, Usage fees, Subscription fees, Leasing/Renting, Licensing, etc.

- **Key Resources:** are the most important assets required by an enterprise to create and offer Value Propositions, reach markets, maintain relationships with Customer Segments, and earn revenues. Different Key Resources are needed depending on the type of business model. Key Resources induces: Physical, Intellectual Property, Human, Financial.
- **Key Activities:** are the most important actions a company must perform to operate successfully. They are actions which are required in order to create and offer a Value Proposition, reach markets, maintain Customer Relationships, and earn revenues.
- **Key Partnerships:** are the network of suppliers and partners that makes the business model work. Partnerships may be strategic alliances between noncompetitors as well as competitors (coopetition), joint ventures to develop new business or buyer–supplier relationships.
- **Cost Structure:** are all the costs incurred to operate the business model, Cost Structure have two types: Cost driven, Value driven.

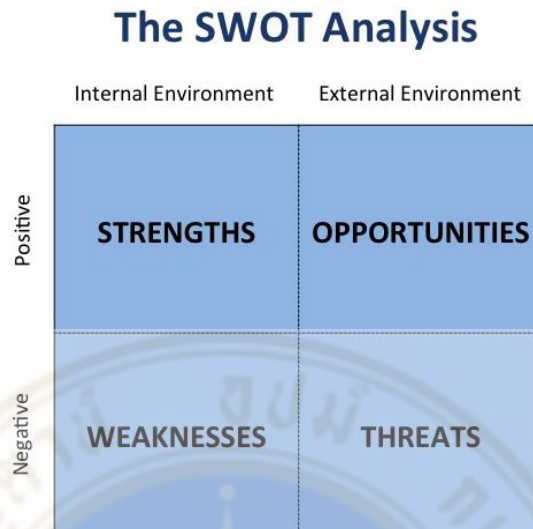
#### **Criticisms of BMC:**

Business Model Canvas, as easy as it is to use, does have several limitations and drawbacks which were pointed out by a number of academics and practitioners. Sinkovics et al, 2014 [3], noted that the BMC, while the framework allows users to visualize vital business activities, it does not facilitate the capture of changes in business strategy or the evolution of it.

Furthermore, R. King 2017 [4], stated that. *“The Business Model Canvas also neglects a Customer-focused Strategy, from which a pain-centered Value Proposition can be derived. At best, the customer Job To Get Done, Business Strategy, and Value Proposition should focus on continuously solving a “Big Urgent Market Pain (BUMP).” To iterate, the Business Model Canvas is not a direct tool for comprehensive pain (problem) discovery, learning, and solving. The Business Model Canvas also lacks inherent focus on a process for facilitating experimentation, prototyping, and execution of projects.”*



## 2.2 SWOT Analysis



**Figure 2.2 SWOT matrix, Bill Zipp SWOT analysis [5]**

The SWOT analysis is one of the best-known, widely used and taught today, supposedly due to its perceived simplicity and ease of use which makes it very popular with academics and students alike. This tool was derived from the LCAG model, Learned, Christensen, Andrews, Guth (1965) [6] and it is aimed at assessing both internal and external environment factors and as well as identifying the actions needed if the organization is either to capitalize upon opportunities or minimize the impact of the threats. SWOT stands for the following:

- **Strengths:** things that the business excel in, giving it an advantage over others.
- **Weaknesses:** things that the business lacks or at a disadvantage compared to others.
- **Opportunities:** favorable external factors that could provide competitive advantage.
- **Threats:** external factors that could potentially be harmful to the business.

### **Criticism of SWOT analysis**

As simplistic as it is, SWOT does have its detractors. Academic Jay Barney (Barney, 1991) [7] noted that SWOT framework prompts to consider the strengths and weaknesses of a firm and match them with the opportunities and threats. However, as the framework does not suggest how strengths can be identified and appraised, SWOT sessions often turn into generating lists of what the firm is “good at” and “not so good at”. Thus, it is not advisable to start off by just filling in the SWOT matrix but to utilize other tools such as PESTLE, 5 Forces, before filling in the matrix.

### **2.3 PEST/PESTLE Analysis**

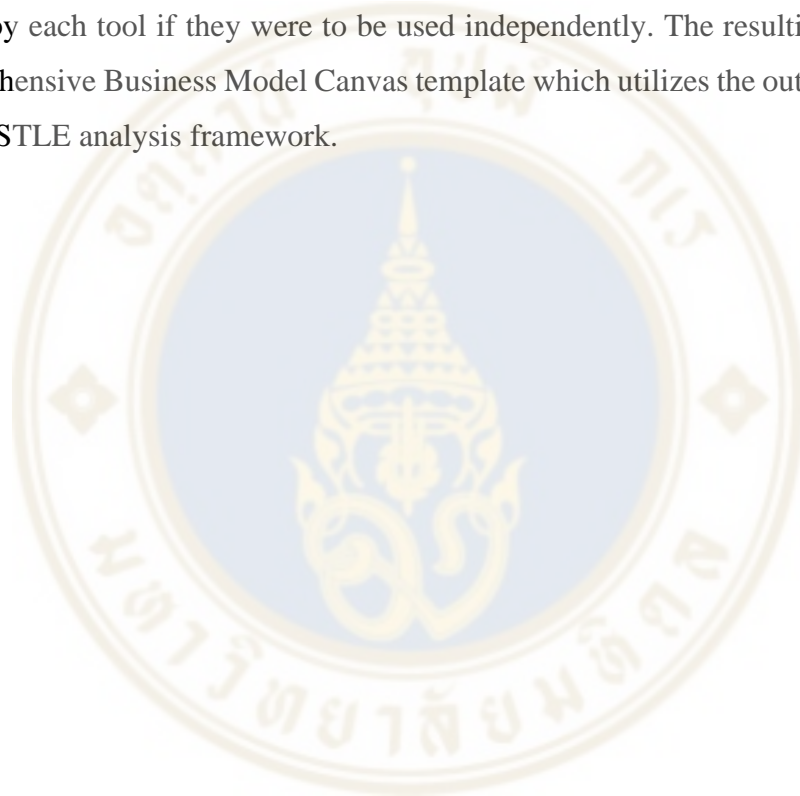
PESTLE analysis is a strategic management framework that is used to monitor and analyze external macro-environment factors that may have significant impacts on the performance of a business. As this tool is used to analyze the external factor of an organization, it is often should be used in conjunction with other strategic management analysis tools, namely SWOT and Porter’s Five Force, in order to gain a complete picture of the business environment. This is recommended by practitioners and researchers alike (P.H. Hanot, 2018) (J.K.K. Ho, 2014) [12] [13].

- **Political:** Tax policy; environmental regulations; trade restrictions and reform; tariffs; political stability.
- **Economics:** Economic growth/decline; interest, exchange, inflation and wage rates; minimum wage; working hours; unemployment (local and national); credit availability; cost of living.
- **Social:** Cultural norms and expectations; health consciousness; population growth rates; age distribution; career attitudes; health and safety.
- **Technology:** New technologies are continually emerging (for example, in the fields of robotics and artificial intelligence), and the rate of change itself is increasing. How will this affect the organisations’ products or services?
- **Legal:** Changes to legislation impacting employment, access to materials, quotas, resources, imports/exports, and taxation.

- **Environmental:** Global warming and the increased need to switch to sustainable resources; ethical sourcing (both locally and nationally), including supply chain intelligence. Pandemics and other emergencies.

### **What to look out for**

Every framework has its own advantages and disadvantages, therefore it is down to the user to be mindful when applying them in different cases. For this research, multiple tools were utilized in conjunction with each other to minimize the limitations posed by each tool if they were to be used independently. The resulting outcome is a comprehensive Business Model Canvas template which utilizes the output from SWOT and PESTLE analysis framework.





## **CHAPTER III**

### **RESEARCH METHODOLOGY**

This section of the report will detail the methodologies used during this study. As stated earlier, the main goal of the company project was to aid Company X's growth, thus it was identified from early on that this will mainly be a market research and analysis project.

From early in the project, Company X and the consulting team had already determined and identified three different external factors that needed more analysis and insights on. These factors were identified after performing SWOT and PESTLE analysis in addition to generating a Business Model Canvas. The team wanted to explore more areas but due to the limited time and resources given we believed these external factors would provide enough vital information in order to produce recommendations for Company X's business expansion strategy.

Those three external areas are; **Competitors, Financial Programs and ESG (Environmental, Social, Governance) data providers**. Knowing this, tasks for the consulting team are: to conduct market research by finding all relevant data, build a database, conduct in-depth analysis of the data found to gain useful information and, lastly, to provide business recommendations to Company X.

#### **3.1 Secondary Data Research**

Throughout the project, the primary method of gathering information was through conducting secondary data research. All of the information collected came from multiple secondary sources off the internet, most of which came from first party websites (organizations themselves) while some came from trustworthy third-party websites (e.g. institutions). All the data collected was then input into an Excel spreadsheet and then organized into various categories.

Secondary data research was the method of choice due to various reasons, first of which being the vast amount of data scope that has to be researched. This method allows the team to save time and manpower. Furthermore, the majority of the data we are seeking are readily accessible thus this method leverages what is already free and available to the public.

However, this method does have its limitations and drawbacks thus the team did recognize them and took precautions to avoid encountering such issues. Firstly, data from different sources are presented in different formats and units, as well as the difference in quality between each source which could result in insufficient information. Therefore, to counter this issue, the team only used data and information from reputable sources, as well as letting Company X consistently review the data that we found. This is to make sure that data is reviewed by experts' eyes as well as to let them know in advance of the possibility of misinterpreting or error in the data that was collected.

### **3.2 Primary Data Research**

Apart from collecting data via secondary data research, the team also collected primary data via interviews. Interviews were conducted in a qualitative research manner in order to understand the underlying attitudes, feelings and outlook (McDaniel, Gates, 2015) [8] of people towards Company X's services. Interviews were conducted with experts and potential end users of Company X's services and the data and information obtained from the interviews are later used for further analysis to produce recommendations for Company X at the end of the consulting project.

The interviews were conducted via phone call and lasted around 30 minutes. Notes were taken from the interview to be extrapolated later in the analysis phase.

**Table 3.1 Interview questions asked**

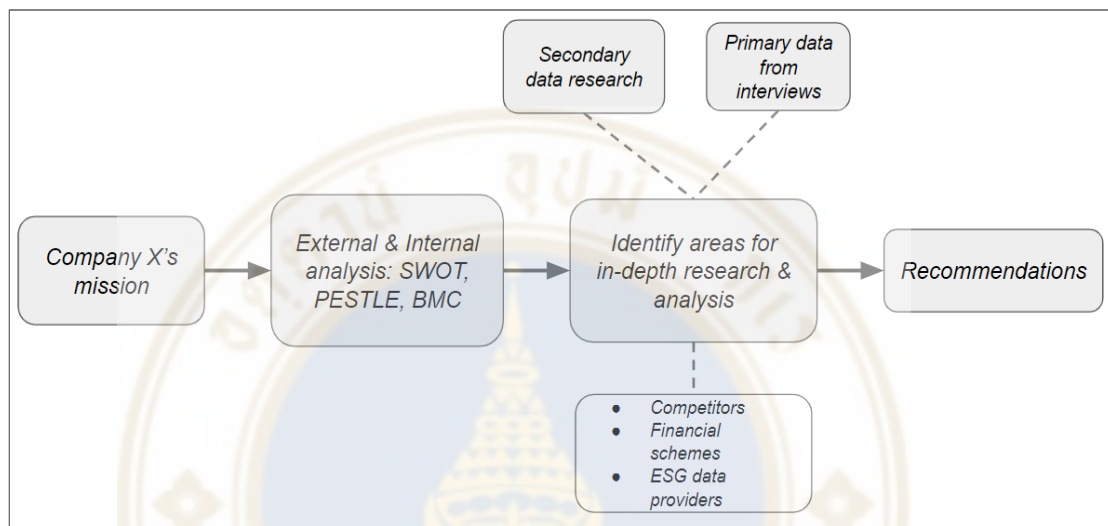
No.	Interview questions
1	Have you heard of services/products like this before?
2	Do you think Company X's services/products could be useful to you? Why?
3	Are there any incentives for you to use such services/products? Why?
4	Would you ultimately pay for such services and why?

**Table 3.2 Profile of each interviewee**

Type	Industry/sector
Expert - French	Carbon market operator
Potential user - Thai	Manufacturing - construction
Potential user - Thai	Logistic
Potential user - Thai	Oil & gas service

### 3.3 Research Framework

The research framework represented in the figure below shows the different stages of the study as well as the different input and output of each stage. The framework also logically shows the visualized combination of different types of data that goes into the analysis.



**Figure 3.1 Research Framework undertaken during this research**

## **CHAPTER IV**

### **ANALYSIS AND FINDINGS**

This chapter will provide information on all the analysis done throughout this project; the outcome of the analysis will be used to form recommendations to be provided to Company X. The recommendation would then, hopefully, be implemented into their future business expansion plan. The analysis will encompass multiple areas which include external and internal factors of Company X, expert's opinion and potential end users' opinions in regards to Company X's services/products.

#### **4.1 Business Model Canvas**

The Business Model Canvas seen here was done with the majority of inputs from Company X. This was the case as the company already has a draft BMC in hand and is willing to share it with the consulting team. The inputs provided are very comprehensive and covered areas of concern for the company. The two main factors, 'Value Propositions' and 'Customer Segments', are of high importance as they are the primary factors that Company X are focusing on. These factors would be used to conduct in-depth market research.

The Business Model Canvas table is shown on the next page.

**Table 4.1 Business Model Canvas table of Company X**

<b>Key Partners</b> <ul style="list-style-type: none"> <li>• Earth observation, air quality, ground truth, sensor and inventory data providers</li> <li>• Map Delivery solutions (Mapbox)</li> <li>• Sustainability &amp; research focused organizations (EIT Climate-KIC, DIL)</li> <li>• Sustainability consultants and auditors (Southpole, Climatepartner, Myclimate)</li> </ul>	<b>Key Activities</b> <ul style="list-style-type: none"> <li>• Product development: satellite and ground data collection, processing and fusion based on proprietary AI engine: back-end and front-end web-interface design</li> <li>• Business development: collection of customers feedback, launch of pilot projects, sales, marketing and content management</li> </ul>	<b>Value Propositions</b> <ul style="list-style-type: none"> <li>• Best spatial (30 meters) and temporal (1 week) resolutions</li> <li>• Reduction by up to 75% of costs associated with monitoring and improved decision-making process</li> <li>• Automation of carbon footprint reporting, compliance and planning</li> <li>• Increased transparency on sustainability and certain operations performance to take actions across the whole value chain</li> <li>• Broad number of carbon emission types</li> <li>• Improved transparency and attractiveness for sustainability-focused investors</li> </ul>	<b>Customer Relationships</b> <ul style="list-style-type: none"> <li>• 10 requests for PoC, incl. 3 from Ports, 3 from Food producers, 2 from Forestry.</li> <li>• B2B and B2G customer acquisition</li> <li>• Dedicated personal assistance</li> <li>• Target based pilot projects</li> <li>• Free trial period</li> </ul>	<b>Customer Segments</b> <p><b>Initially:</b></p> <ul style="list-style-type: none"> <li>• Ports</li> <li>• Agriculture</li> <li>• Forestry</li> </ul> <p><b>Later:</b></p> <ul style="list-style-type: none"> <li>• GHG Emitters and Compensators</li> <li>• Regulatory Bodies and public entities worldwide</li> <li>• Investors with ESG (Environment, Social, Governance) focus and portfolio,</li> <li>• Sustainability and eco-related research community</li> <li>• Consulting and Audit organizations</li> <li>• ESG-data providers</li> </ul>
<b>Cost Structure</b> <ul style="list-style-type: none"> <li>• Labour costs</li> <li>• Marketing (travels, conferences fees, representative costs)</li> <li>• IT infrastructure</li> <li>• Data acquisition and storage</li> <li>• Other costs (rental, legal, accounting, design, printing)</li> </ul>		<b>Revenue Streams</b> <ul style="list-style-type: none"> <li>• Subscription to the platform</li> <li>• Widget/API integration of the platform into third parties' services</li> <li>• Client-driven research projects and grants</li> </ul>		

### Factors of focus

- Value Proposition - analysis of competitors, what are they offering vs Company X?
- Customer Segments - analysis of existing markets, financial programs and GHG data providers.

As the goal is business expansion, several questions could already be derived from those 2 factors: What types of customers are we looking for? What can we offer to those customers? Will Company X's services answer the demands of these customers? These are some of the questions that will be answered along the way.



## 4.2 SWOT Analysis

The table below shows the SWOT analysis of Company X. This was done in conjunction with the company itself, they provided internal factors information which went into the strengths and weaknesses that can be found there. As for the external factors, Opportunities and Threats, they were identified along the way during the course of this market research.

**Table 4.2 SWOT Analysis table of Company X's environment**

<p><b><u>Strengths</u></b></p> <p><b>Technical know-how:</b> in house technical know-how, ease of access to technology and responding to customers' demands.</p> <p><b>Scalable solutions:</b> services on offer can be scaled up or down depending on customer requirements.</p> <p><b>Best in the industry:</b> in terms of spatial and temporal resolution, can detect CO2 emission down to an area of 30m2 and provide updates once per week.</p>	<p><b><u>Weaknesses</u></b></p> <p><b>Lack capital investment:</b> much lower initial investment compared to top competitors, millions vs tens of millions.</p> <p><b>Lack of reputation:</b> new start-up companies suffer from low awareness from the larger industry.</p> <p><b>Only focus on CO2:</b> Company X services is now only focused on CO2 emission while several competitors provide solutions to detect to</p>
<p><b><u>Opportunities</u></b></p> <p><b>Expanding market:</b> Carbon credit and management markets are expected to expand in the next 5 years. The CO2 management market is predicted to expand from \$9 billion to \$12.2 by 2025.</p> <p><b>Increasing awareness:</b> due to new regulations and the Paris Agreement, more individuals and organizations will be participating in CO2 emissions reduction.</p>	<p><b><u>Threats</u></b></p> <p><b>Competition:</b> new entries into the market will become easier and cheaper as similar technologies are being developed.</p> <p><b>Rapid and overwhelming demand:</b> possibility of customers' demands overwhelming the team.</p>

### 4.3 PEST/PESTLE Analysis

PESTLE analysis tool was used to scan the external macro environment in which Company X is operating in. The goal of this analysis is to pinpoint which external factors have the biggest impact and biggest influence on the business, this can either be positive or constraining influences.

In this PESTLE analysis, the aim was to decide which of the factors can change the rules of the game in the future. The future influence of the six factors – which may differ from their past influence – must therefore be forecasted.

To set the scope for this PESTLE analysis, following assumptions were made for the markets and geography:

Markets:

- Carbon footprint management market
- Carbon credit market

Geography:

- Europe
- North America

The table below shows the PESTLE analysis for Company X.



**Table 4.3 PESTLE Analysis of Company X and their potential impacts**

PESTLE	Factors	Impact	Likelihood	Trend	Horizon
<b>P</b>	<b>Green politics</b>	☆☆☆	<b>Average</b>	<b>Recurrent</b>	<b>Short run</b>
<b>E</b>	<b>Economic cycle</b>	☆☆	<b>Average</b>	<b>Limited</b>	<b>Long run</b>
<b>S</b>	<b>Consumer habits</b>	☆☆☆	<b>High</b>	<b>Evolving</b>	<b>Long run</b>
<b>T</b>	<b>Innovation</b>	☆☆	<b>Average</b>	<b>Limited</b>	<b>Short run</b>
<b>L</b>	<b>New regulations</b>	☆☆☆☆	<b>Unavoidable</b>	<b>Evolving</b>	<b>Long run</b>
<b>E</b>	<b>Global warming</b>	☆☆☆☆	<b>Unavoidable</b>	<b>Evolving</b>	<b>Long run</b>

[☆☆☆☆ = Highest impact]

As it can be seen from the table, the two factors with highest impact are the Environmental and Legal factors. They both received 4 stars ratings in terms of impact as well as unavoidable likelihood. While both factors may be separated, they are very much interlinked. This due the fact that the set of newer and tougher laws on CO2 reduction has been brought on by the increasing issue of global warming.

In reality, it could be said that the six factors here are all interlinked, for example, consumers are getting wiser to the issue of global warming and are actively seeking ways to reduce their own CO2 emission i.e. buy EV cars which has increase the demand in technological advanced solutions from industries to develop greener technology i.e. Tesla.

The PESTLE analysis done here shows that the environment in which Company X is operating in is filled with ample opportunities for growth in the now and for the foreseeable future.

## **4.4 Competitors Analysis**

### **4.4.1 Data collection**

Data collection process for competitors was conducted through secondary data sources. The initial list of competitors was provided by Company X, there are 21 competitors in total in the database. The profiles of these companies are in-line with the company's expansion strategy, which is to focus on the EU and US markets. Hence, all but two companies are from the EU or the USA.

Competitor's data is processed into 11 different categories; Name, Link, Headquarter location, Funding, Industry (e.g., oil & gas, cities), Services provided, Data used (by competitor), Weaknesses (compared to Company X), Strengths (compared to Company X), Customers.

The process of analyzing Competitors utilizes every category of data collected for each competitor. The data are combined, and the output is a quantifiable metric called 'Competitiveness level'. Factors such as funding, services provided, industry of operation, etc. all contribute to how well each competitor scores. The more they have, the higher their score they will get.

### **4.4.2 Market overview**

The first step in the analysis was to find out about Company X's main competitors. This step was done to provide a better understanding of competitors' business plans and market presence. In addition, it was a way to analyze their advantages and disadvantages against Company X.

A detailed analysis of the company's top 21 competitors was prescribed to obtain information regarding the location of the head office, the different methods used etc.

It was found that the market is dominated by companies located mainly in America. (1 Canada - 9 USA). A large part of the competitors located in the USA are gathered in California.

In Europe, there are 9 competitors specialized in the study of the carbon footprint. These companies therefore have a greater presence on the European market than American companies.

Concerning the sectors of activity, the majority of companies (80%) only highlight on their website one sector of activity where Company X is active in 3 sectors of activity (ports, forestry and agriculture). Caeli is the only company highlighting its seaports activity. The most highlighted sector is agriculture with 40% of competitors working with farmers. Forestry is the sector highlighted by 25% of the competitors. Some of the competitors analyzed are in sectors where Company X is not active such as mining, oil and gas.

Finally, a statistical analysis of the methods used allowed us to put forward several pieces of information. Firstly, 28% of Company X's competitors use several calculation methods in order to be more accurate. The most used method is the satellite image with 65% of competitors. Then there are the ground sensors which are excessively expensive and only have precise solutions close to the sensors, but which allows to obtain information in real time.

**Table 4.4 Analysis of competitors in the market.**

Localization	%	Activity sector	%	Methodologies used	%
Europe	42%	Ports	4%	Satellites	66%
America	47%	Farms	40%	Ground sensors	28%
Others	11%	Forestry	25%	Empirical Modeling	9%

#### **Takeaways from Competitor Analysis**

- There are no real competitors over the ports market. Therefore, this opportunity represents a serious value proposition.
- In forestry, value is created by monitoring the forests and selling the carbon credits.
- In agriculture, soil carbon is measured and can be certified in carbon markets for instance. But it is not all about carbon, whilst it looks like it is what pays the most. In reality, forestry and agriculture are broad sectors where Company X can find room for product development and expansion to answer a wider range of customers' demands.

## **4.5 Financial programs analysis**

Apart from mandatory carbon emission reduction schemes, namely carbon taxes and ETS (Emission Trading systems) which offer incentives to reduce CO<sub>2</sub> emission by monetary fines, there are also voluntary carbon reduction initiatives which instead pay participants to reduce CO<sub>2</sub> instead of fining them. These financial programs exist globally and are active in various countries but as many of them are difficult to access as well as to understand, this section will be only focusing on three programs within Europe that were easily accessible but are also promising to Company X's potential expansion.

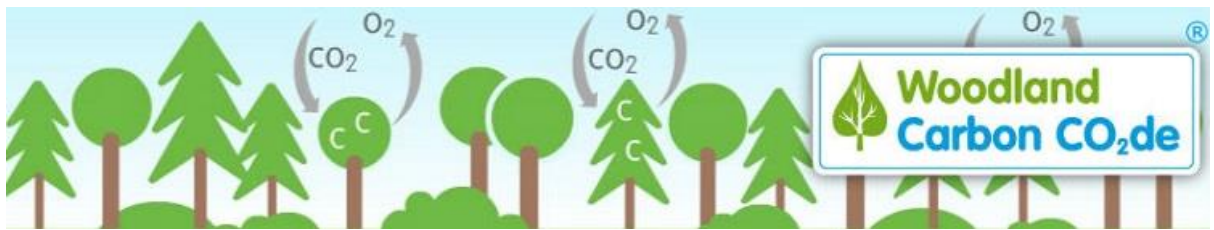
### **4.5.1 Data collection**

The method for collecting data for Financial Programs is the same as for the other two, through secondary data research on the internet. The initial list of financial programs was provided by Company X and the number of financial programs in the database is 44.

Financial Programs' data is processed into 10 different categories; Name, Type, Link, Eligible region, Industries, GHG accounting standards, Amount of CO<sub>2</sub> traded, Price per tonne CO<sub>2</sub> (sold), Phone number, Email (contact).

However, the process of analyzing Financial Programs data is different when compared to analysis of competitors as there will be no quantifiable outcome. This process requires more in-depth fact finding and research because many programs will not provide adequate amounts of information for the team to build a complete profile, thus it is impossible to process every financial program in the same manner as one another. Some programs will have an abundance of information on offer while some other programs will have little to none. This means that only a handful of financial programs have been highlighted and identified as promising enough for Company X to possibly partner with in the future.

#### 4.5.2 UK Financial Program: Woodland Carbon Code



**Figure 4.1 UK Woodland Carbon Code logo**

The Woodland Carbon Code is the voluntary standard for UK woodland creation projects where claims are made about the carbon dioxide they sequester. Independent validation and verification to this standard provides assurance and clarity about the carbon savings of these sustainably managed woodlands [WCC, 2019]. Participating in the WCC program requires special project management and processes which have to be followed throughout the project in order for the sequestered carbon to be registered and sold as carbon credits to buyers in need of carbon credits in the UK.

While an actual WCC project is overly complicated and takes a very long time to complete, it could be broken down into handful of oversimplified stages.

##### **The process (UK Woodland Carbon Code, 2019) [9]**

1. Check eligibility and commit to the WCC project management plan.
2. Measure carbon emissions for carbon sequestration before the start.
  - a. Tools (Excel spreadsheet) provided by the program to project owners.
3. Register carbon units with the UK Land Carbon Registry and sell to buyers.
  - a. Project owners, once the net carbon sequestration is the total amount of carbon sequestered, they then can be converted into carbon units.
  - b. Buyers will then come buy the carbon credits and project owners will receive proceeds.



#### 4.5.3 Spanish financial program: Registro de Huella de Carbono

The Registro Huella de Carbono (RHC) [10] is a voluntary carbon market for Spain operated by the Spanish Ministry of Environment. The RHC relies on the international standard known as the GHG protocol. The RHC is a public platform composed of three sections.

- One where organizations (private or public) calculate their carbon footprint and monitor their reduction.
- One where forestry projects sequestering CO<sub>2</sub> are registered.
- One that is a public registry of organizations offsetting their carbon footprints.


#### The process

1. **Calculate carbon footprint:** Firstly, organizations are obliged to calculate CO<sub>2</sub> footprint least four years before being inscribed into the Registry. The ministry provides calculations tools to estimate the footprint. Calculation tools take into account standard GHG protocol which includes the direct GHG emissions and the indirect emissions.
2. **Reduction of the emissions:** Secondly, the company has to show the ministry evidence that the organization implemented an emissions reduction plan.
3. **Compensation:** Thirdly, the organization has to choose a CO<sub>2</sub> absorption project among the ones of the “Registro” and find an agreement with the project to compensate all or a part of the company’s carbon footprint. Once the project is launched, the verification by a third-party organization should occur every 5 years.
4. **Award:** Verification of reduction and absorption by the program. “Sello” awarded: logo of RHC.



**Figure 4.2** Awarded RHC logo, awarded to programs that followed the guidelines

#### How the carbon sequestration is being calculated



**CALCULATING CO<sub>2</sub> SEQUESTRATION**

The Registry has a mandatory methodology for calculating the carbon sequestration. There are two different types of calculations:

- **EX-POST CALCULATIONS:** based on actual figures of a forest cover at a given time. It allows for the estimation of the sequestration up until the moment when the calculation is made.
- **EX-ANTE CALCULATIONS:** predictive calculations, on the basis of the estimated growth of the species, for the permanence period. CO<sub>2</sub> removals expected to be generated by the project can be known beforehand.

**Figure 4.3** How CO<sub>2</sub> sequestration is calculated in RHC projects

#### 4.5.4 French financial program - Label Bas Carbone

The financial program in France is called "Label Bas Carbone", this label was created in 2018 by the Ministry of Ecological and Solidarity Transition, with the collaboration of the Institute for Climate Economics, I4CE (I4CE, Low Carbon Label) [11].



**Figure 4.4** France Label Bas Carbone logo

The aim of the Low Carbon Label is to contribute to France's climate objectives which is to be carbon neutral by 2050 (French Government, 2021). This program offers financial support to projects which are under the label.

This label is today governed by a public administration and managed by the French Ministry of Ecological and Solidarity Transition. The label's current projects concern agriculture and forestry (cattle farming, reforestation, restoration of protected areas, etc.).

The methodology for labelling a new project is made up of several stages.

1. Project notification and application: This stage enables the project holder to inform the authority of the intention to launch a project. The project must meet the methodological expectations validated by the Bas-Carbone label in order to be labeled as a valid project.

2. Audit: An independent auditor is to verify the veracity of emission reductions on behalf of the authority. This auditor is chosen by the project developer and is not imposed by the label. The Bas Carbone label only offers a list of organizations that can serve as auditors (Label Bas Carbone, 2020).



### **Takeaways from financial programs**

Upon completion of the analysis of the three schemes, it was identified that they all operated in a similar manner to achieve similar goals thus there will be several instances where Company X's product could be utilized in all schemes presented here. Therefore, it could be concluded that Company X services are valid and have legitimate application within such sector.

- Prior to starting a project, project owners have to measure the carbon emission of that area before that area is turned into forest to be used for carbon sequestration. Company X could provide their services here.
- Currently, the process to assess carbon emission is done manually through an Excel spreadsheet. Landowners have to input values such as land areas, types of plants/trees, type of soil, etc. in order to get an estimate of CO<sub>2</sub> emission. It can be assumed that this process is highly likely to be time and resources consuming.
- The proposed service is a surefire way to provide a more efficient tool to assess CO<sub>2</sub> emission without the need for an Excel worksheet. Reducing time, manpower and risk of error compared to an Excel worksheet.
- Company X services can provide real-time CO<sub>2</sub> emission during multiple phases of a project thus keeping auditors and project managers up to date, as well as reducing the paperwork needed to keep track of emissions.

## **4.6 ESG Data Providers Analysis**

### **4.6.1 Data collection**

The data collection method for ESG data providers is the same as the previous two, secondary data research on the internet. There are 15 ESG data providers in the database and the initial list of ESG data providers were provided by Company X.

ESG data provider data were processed into nine different categories; Name, Link, Description, Which industry, Metrics for CO<sub>2</sub>, method for measuring CO<sub>2</sub>, metrics influencing ESG ratings, targets/how to be good, benefits for being good.

The analysis process for ESG data providers is similar to that of Financial Programs where there will be no quantifiable outcome. The outcome of this analysis will be a list of ESG data providers that are most likely to be indeed of services from Company X, this was mainly determined by factors such as method of measuring CO<sub>2</sub>, metrics influencing ESG ratings and which industry they are operating in.

### **4.6.2 ESG data providers findings**

The work around ESG Providers was aimed to determine whether Company X could help companies to get better ranked by these organizations. What we call ESG Providers are organizations that rank companies based on three factors, Environmental, Social and Governance criterion. The better they do in each category, the better score and ranking they get.

ESG data providers are able to guide investors that want to invest in sustainable companies as well as provide consultation to companies who want to be more sustainable. An example of the ESG providers could be 2° Investing Initiative (2DII). It is an international, non-profit think tank working to align financial markets and regulations with the Paris Agreement goals.

The goal for Company X was to understand how the organizations were measuring the carbon footprints, what metrics they were using, and in what sectors the companies were working. However, despite exhausting research, very few details were disclosed or found to be useful. ESG data providers are not willing to communicate their processes and findings in detail about them. One could gain access to such information after paying several thousand dollars.

The little information that was found are as follows

- 9/15 ESG Providers use their own methodology to gather GHG emissions metrics and to integrate them to their ranking system. The other 6 organizations were not clear about their process. Each ESG ranker has its own methodology and is not freely accessible.
- No detailed information could be found in regard to what extent the emissions metrics are influencing the ESG ranking. But it is to be believed that the higher the emission, the worse the ranking.

#### **Takeaways from ESG data providers analysis**

Due to the little amount of information that can be gathered, it is inconclusive of how Company X services could be applied and offered to ESG data providers. This means Company X could continue in either ways, to pay for ESG data in order to understand the inner workings, or to walk away from this market and search for other avenues.

## **4.7 Interviews Analysis**

### **4.7.1 French expert interview**

To gain an expert view on Company X's services and products, an interview was conducted with Mr. S. He is responsible for bioresources at a French organization providing advice and strategy regarding agriculture and ecology.

In the interview he explained that in agriculture, the carbon stored by a crop is considered neutral as what has been fixed will be released after harvest: it is a temporary storage. In comparison, forests store carbon for a longer time (in the trunk and roots, as forests grow during dozens of years). To effectively store carbon and get carbon credits in agriculture, it is all about practices (see Label Bas Carbone).

To improve the content of organic matter in the soil, cultural practices exist:

- Implementation of cover-crops + reducing tillage which is crucial when growing crops.

- the more specific “agriculture-forestry” cultivating system.
- optimization of grasslands management when the farm raises cattle.

Subsequently, the storage happens in the soil, making it hard for satellite technologies to measure relevant data. Though it could be used to verify the implementation of these practices to some extent. Competitors such as Cloud Agronomics are able to measure soil carbon while Company X cannot at the present. For other GHG emitted in agriculture such as ammonia and/or nitrous oxide, Company X could and should be looking into ways to detect and monitor these types of emissions as well. Otherwise, no other applications within the carbon market for agriculture monitoring using Company X’s tool.

To conclude, according to Mr.S, the farming systems in France and Europe in general are made up of smaller scale infrastructure that would not be compatible with Company X’s solution. However, he recommended that the solution proposed would be suited to larger scale farming industries such as the ones in Argentina, Brazil, US and Russia for example.

#### 4.7.2 Thailand’s interview/perspective

In order to gain some perspectives on Company X’s services outside of Europe, three interviews were conducted with companies in Thailand. The three companies are operating in different industries, but all pollute CO<sub>2</sub>.

- **Company 1:** logistics
- **Position:** Assistant operations manager
  
- **Company 2:** manufacturing of construction materials
- **Position:** Senior Marketing Specialist
  
- **Company 3:** oil & gas service
- **Position:** Owner

After conducting three interviews, here are the findings.

#### 1) Have you heard of services/products like this before?

- **Company 1:** “No, never heard of such services before in Thailand. But I have heard of such systems in countries such as the US and those in Europe.”
- **Company 2:** “No, personally I have not heard or experienced such products or services before. However, our factory must conduct an environmental inspection every year and that includes the air quality. But from what I've seen, inspections were conducted without any scientific measurement tools.”
- **Company 3:** “No, I haven't heard of such a product before.”

**2) Do you think Company X's services/products could be useful to you?**

**Why?**

- **Company 1:** “Not useful right now, will just be extra cost.”
- **Company 2:** “Yes, as we are located in an industrial zone near to residential areas, we should be able to monitor carbon emissions into surrounding areas to control our pollution. This will benefit us as well as surrounding citizens. In addition, we might get incentives”
- **Company 3:** “Such services will just be extra cost, so no, they would not be useful to our company.”

**3) Are there any incentives for you to use such services/products?**

**Why?**

- **Company 1:** “No, none at all, not from any sectors, none from the government or private.”
- **Company 2:** “Yes, there are schemes called ‘Green building initiatives’ and ‘LEED certificate’. Such certificates are awarded to companies that manufacture building materials through sustainable methods e.g. low CO2 emission. LEED certified construction materials can be sold at a higher price



and are seen as higher quality. Utilizing such service/product to control our carbon emission cold help with that.”

- **Company 3:** “No, none I could think of anyway.”

#### 4) Would you ultimately pay for such services and why?

- **Company 1:** “No, because we are not being forced to do so by any sectors nor are there demands or desire to use those type of services. They will just be a burden on our expenses. Our customers want the best price and service possible, that means low price and fast delivery. That won’t be possible with such services.”
- **Company 2:** “No. As much as we like the benefits those services and products could bring to our company, nothing is guaranteed and there are no regulations forcing us to use those types of services. The service is not verified by those schemes at the moment, and we don’t want to spend where it is not necessary.”
- **Company 3:** “No, because there are no laws forcing businesses to reduce their CO2 emissions. We also want to keep expenses to a minimum in this economic climate.”

In conclusion, it could be explicitly stated that it is more than likely that most Thai businesses are not willing to use Company X’s services and products as of right now. The reasons are mainly due to the fact that there are no regulations or laws making businesses monitor or reduce their carbon emissions. From the interviews, they all state that there is no monetary gain from using such services and it would just be extra cost that will eat into the business margin.

However, from the interview, Company 2 is the most likely of all the companies here to utilize services and products of Company X. This is due to the fact that they have the highest level of incentives among all companies which were interviewed. They will gain monetary rewards as well as improved reputation and

accolades if they deploy Company X services, on the other hand, the other two companies will not gain any benefits for doing so in this current climate.

Fortunately, if there are to be new regulations or laws in the near future, these businesses are willing to adopt such services if they are certified by the government in addition to being a one-stop-service that is easy to use and access.



## **CHAPTER V**

### **RECOMMENDATIONS AND CONCLUSION**

#### **5.1 What to look out for / limitations**

- The consulting team has no experience with carbon credits buying or selling, thus we lack insights of the step-by-step process of how companies select and buy carbon credits as well as how carbon credit schemes sell carbon credits. Furthermore, we lack practical experience on how organizations measure and calculate their CO<sub>2</sub> emission apart from what some companies state in their website or via third parties e.g., ESG data providers. This means we have no real understanding of an organization' pain points or needs in real world practical settings.
- Throughout the project, we did not focus on the ports and their needs. First, we did not have many inputs about ports. Second, as final consumers of Company X, we mainly focused on the schemes, whose clients can be ports. In the end, we did not focus on the ports as much as we focused on farmers or forest owners to be the final users of the tool, which could have been interesting.
- This leads on to the next point, the research done, and recommendations provided here are mostly theoretical as we have not put them into practice. While we strongly believe that the recommendations made here are valid, it also means that Company X should apply caution when following recommendations provided by the consulting team.



## **5.2 Going forward and recommendations**

Going forward, Company X position in the market is promising with a highly specialized/niche product on offer to customers around the world. Today, 11 out of 22 competitors we analyzed are offering services that are extremely competitive to Company X. They either received a score of 4 or 5 for competitiveness and some are at an advantage to Company X because they offer more services and have more funding when compared to Company X. Those are areas that Company X will need time and resources in order to match.

Therefore, to enhance market penetration in our current situation, what we've recommend is to **focus on niche markets** with the three strategies that we believe that will help expand Company X's market share.

### **5.2.1 Business development towards organizations & ESG data providers**

As of 2016, over 90% of Fortune 500 companies utilize GHG Protocol to measure their CO2 emission as there is a need to calculate direct emissions (scope 1) but also indirect emissions (scope 2 & 3) from their business activities (GHG Protocol, 2021). This presents an opportunity for Company X to create an all-in-one product that could measure carbon emissions encompassing all three GHG Protocol scopes.

Same recommendation regarding ESG Providers as they rely on GHG data released by companies. There is a demand from investors, as they are looking for precise emissions measurements though according to 2DII the GHG emissions from investments ('financed emissions') fall in the third scope of the GHG protocol.

### **5.2.2 Business development towards carbon offsetting projects**

We believe that the product suits the needs of carbon offset projects, therefore we recommend that Company X promote and offer its services to such programs UK WCC and Registro de Huella de Carbono. As we believe this is a niche market that is well suited for Company X services as both parties are focused on measuring and calculating carbon emissions.

Development by contacting both parties

- Contacting afforestation projects managers to offer them the best tool on the market.
- Contacting the companies linked to the afforestation projects to present them the product that will ensure the measurement of their offset thus validating with the best precision on the market their carbon credits.

### **5.2.3 Business development towards carbon credit retailers**

Carbon credits retailers, such as Cool Effect and Native Energy, conduct extensive measurements of CO<sub>2</sub> emission when calculating carbon credits. They would send groups of scientists, researchers and third-party verifiers to an area to survey the land, infrastructure and biomass in order to collect relevant data to calculate their standard of carbon credit.

Company X should contact these retailers and offer the product that will reduce their workload and save them valuable time. But be aware that they do not rely solely on one method of measuring CO<sub>2</sub> emission, thus they cannot use a single service like Company X.

Company X could offer a short product demonstration period, i.e. 8 weeks, for the program and project managers to demonstrate the capability of the product. This could possibly generate initial buy-in among users as well as the possibility to gain insight into the inner workings of such schemes for future references.

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