EMERALDS ON THE EQUATOR:

AN AVOIDED DEFORESTATION CARBON MARKETS

STRATEGY MANUAL

by

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A practicum submitted
in partial fulfillment of the requirements
for the degree of
Master of Science Natural Resources and Environment
at the University of Michigan
December 2008

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Abstract

This strategy for producing and marketing avoided deforestation carbon credits applies Thoumi's Rational Convergence Model for effective communication, Thoumi's Emeralds on the Equator "Zamrud Khatulistiwa" Model for environmental services, Afuah's New Game business model, and Nordhielm's Big Picture model. Using the value stream of raw materials, manufacturing, and marketing and sales, the avoided deforestation project developer can successfully create value through carbon credits manufacturing and sales for the project owner. The four criteria a developer must use to successfully bring about an avoided deforestation project are the following: the land dictates the rules, rural communities are the gatekeepers for a project, governments dispense rights, and businesses structure risks.

Dedication

To my father, Dr. Francisco Thoumi

To my mother, Susan McGuire

To our gorgeous tropical forest islands,

our emeralds on the equator,

repositories of our imagination, our oxygen, our biodiversity.

Let us save them for all children of all species for all time.

Acknowledgments

Thanks to the Erb Institute for Global Sustainable Enterprise, the Stephen M. Ross School of Business, the School of Natural Resources and Environment and the Center for Southeast Asian Studies at the University of Michigan.

Thanks to Allan Afuah and Christie Nordhielm.

Thanks to Michael Moore, Richard Rood, Linda Lim, Arun Agrawal, Jan McAlpine, Tom Lyon, Tom Gladwin, Andy Hoffman, Tom Princen, Mark Hunter, Glen Barry, forests.org, Jim Bass, Holly Gibbs, John Holdren, Drew Horning, Cyndy Cleveland, Dominique Abed, Lisa Yee-Litzenberg, Chris Theriot, the Malaysian Nature Society, Maye Yap, the International Tropical Timber Organization, Environmental Finance, Graham Cooper, Mark Nicholls, Matt Colvan, PT Starling Resources, John Claussen, Rezal Kusumaatmadja, Sarwono Kusumaatmadja, Dharsono Hartono, Sarah Conway, WWF Indonesia, Daniel Murdiyarso, The Jakarta Post, Kornelius Purba, Rhett Butler, mongabay.com, Cathy Henkel, Dorjee Sun, John O'Niles, Felicity Blake, and Laura Rickloff. All greenhouse gases emitted in the production of this document were offset using community forest carbon projects.

Thanks to my editor, Marie Ward.

Thanks to the anonymous business contacts with whom I have spoken to these past two years.

Thanks to my family and friends.

Table of Contents

List of Tables

List of Figures

List of Acronyms

AFOLU	Agriculture, forestry, and other land uses
AVAC	Activities, values, appropriability, and change
BoP	Base of the pyramid
CCB	Climate, Community, Biodiversity Alliance
CCX	Chicago Climate Exchange
CDM	Clean development mechanism
DNA	Deoxyribonucleic acid
ENSO	El niño southern oscillation
FASB	Financial Accounting Standards Board
FSC	Forest Stewardship Council
GDP	Gross domestic product
GHG	Greenhouse gas
GIS	Geographical information system
HDI	Human development index
IAS	International accounting standard
IASB	International Accounting Standards Board
IPCC	Intergovenmental Panel on Climate Change
LULUCF	Land use, land-use change, and forestry
$MtCO_2e$	Metric ton carbon dioxide equivalent
PDD	Project design document
PIN	Project information note
PMP	Product market position
RNA	Ribonucleic acid
RPV	Resource-based View
RSPO	Roundtable on sustainable palm oil
VCS	Voluntary carbon standard

CHAPTER 1. INTRODUCTION

Our “emeralds on the equator” are the legacy of tropical forests that grace the Earth like a necklace. Currently, 13 million hectares of forests annually are deforested, the majority in the tropics. The business strategy for mitigating climactic disruption due to this deforestation involves creating carbon markets at the source of the problem, thereby turning an environmental liability into a financial asset, locally and globally.

This paper summarizes my experience working on eleven global tropical forest projects over three years. Six projects involved avoided deforestation projects in the Democratic Republic of the Congo, Malaysia, and Indonesia. I also participated in nine carbon markets conferences and informally interviewed over 350 market participants from 204 organizations including governmental agencies, for-profit businesses, multinational corporations, non-governmental organizations, local land conservancies, scientific organizations, and local community organizations.

Landowners face a strategic business choice in how they choose to manage their forested land. Avoided deforestation refers to landowners choosing to not deforest their land. Landowners need business strategies in the carbon markets designed around the greenhouse gas emissions of the host country, province, and municipality where the opportunity occurs. Since tropical forest countries such as Indonesia and Brazil emit the majority of their greenhouse gases from deforestation, it would be prudent that business strategies proactively engage solutions that will create a financial asset. The source of this financial asset is the natural capital that makes up the geographic landscape of these countries.

This manual describes a strategy for creating this financial asset by looking at the parts involved in project development—raw materials, manufacturing, and marketing/sales. This three-stage value chain includes forests as the raw material, carbon credits as the manufactured product, and the sale of carbon credits to create the financial asset for the project owner.

Raw Materials: The Forests

The project developer must understand the raw material as an ecosystem, a system of relationships between fauna and flora, landscapes, and soil, that exists spatially and changes over time. Ecosystems range in size from a few hectares to multi-million hectare landscapes, and the relationships involve climatology and hydrology as well as human society and the natural biological systems surrounding it. Landscapes change over time and at different rates, and a developer needs to understand a forest's inherent fluidity and dynamism, because a forest's growth patterns and other natural patterns, such as weather, hydrology, and soil, can impact carbon calculations.

Manufacturing Carbon Credits

The project developer can clarify and simplify the current avoided deforestation market, which is dominated by confusion and exaggeration, by using Thoumi's Rational Convergence model for communicating with the parties involved in this market. The land dictates the rules, and it is the through the use of scientific analysis that project developers know how much carbon can be consumed by the forest ecosystem on the land. The local communities, the project's gatekeepers, allow for a project to proceed

successfully. Without them and the civil organizations that represent these communities, project developers will not have a manufacturing base from which to produce carbon credit offsets. Because governments dispense rights like an accordion (in and out: given then withdrawn), the project developer needs to secure all the legal rights needed to develop a project. Finally, the project developer needs to manage and structure its business risks based around its own core competencies and the core competencies of the project owners and carbon credit buyers.

The project developer can focus its business strategy by using Afuah's (2007) New Game business model for business development. The project developer needs to decide what quality of project it wants to develop by focusing on action items using the activities, values, appropriability, and change model. The developer can then decide how and when to pursue its business strategy with a resource-constrained or position-constrained project, or both.

The project developer can check the project design document with the ecological services that are present on the land and used by the local community by using Thoumi's Emeralds on the Equator "Zamrud Khatulistiwa" model for environmental services. The project developer can analyze supporting, cultural, provisioning, and regulating services to understand and include all aspects of the ecological services into the project design document and thereby strengthen the project.

Selling Carbon Credits

The project developer can avoid issues that limit project success by using Nordhielm's (2006) Big Picture model, an iterative model for project design document

development and implementation. As the project is commercialized and marketed, revenue is generated can be used to implement and expand project scope. Because the avoided deforestation carbon credit market is an acquisition / stimulate demand market, the developer needs to educate desired consumers about the benefits of *both the brand and the market*. This requires a strong attitudinal and/or aspirational message that can be packaged into an awareness campaign that attracts new category users by focusing on a desired belief and consumer message that these credits create value, mitigating global climatic disruption with local biodiversity and community co-benefits.

Sustainable projects require transparency, liquidity, and assurance of completion. Through avoided deforestation projects that provide buyers the capacity to comparison shop, the avoided deforestation carbon model can develop from its current infancy into a successful global climatic disruption mitigation mechanism.

CHAPTER 2. RAW MATERIALS: THE FORESTS

Introduction

The avoided deforestation carbon market relies on a value chain model for project development, a three-part process for the production of carbon credits involving raw materials, manufacturing, and marketing and sales. The raw material is the land, managed by a project owner. The product is carbon credits, determined through various certifications and standards. The third part of the process is marketing and selling the avoided deforestation carbon credits.

This chapter lays the groundwork for forests as the raw material for an avoided deforestation project developer. Topics include the forest ecosystem, avoided deforestation projects, tropical deforestation, sustainability, market failure to market success, and Indonesia's forests as an example.

The Forest Ecosystem

Scales of Space and Time

Forests consist of a complex system of relationships, called ecosystems, between fauna and flora, landscapes, and soils—relationships that exist spatially and change over time. In size, ecosystems range from only a couple of hectares to regional multi-million hectare landscapes. Vertically, ecosystems range from interaction between the biotic community and weather patterns, which is the science of climatology, to groundwater seeping down to belowground aquifers, the science of hydrology. Between hydrology and

climatology is a complex system that encompasses human society and the natural biological systems surrounding that society. In this context, forests include local human communities who affect their surroundings along with nonlocals who affect the surroundings through externalities we call pollution.

This spatial scale is divided using a temporal scale. A landscape ecosystem approach looks at various snapshots in time much like photos from one's childhood. Landscapes change over time and at different rates, and a developer needs to understand a forest's inherent fluidity and dynamism. The trees making up a forest exhibit periodic, episodic, and rhythmic growth. A forest's episodic growth patterns will impact carbon calculations, patterns influenced by weather, hydrology, soil content, and other factors. Wind, flood, and fire can affect forests within a project area, all natural occurrences that can temporarily impair carbon uptake.

Forest Phenotype

Forests can be described by genotype and phenotype. Genotype refers to the genetic source material of DNA and RNA. Phenotype refers to a forest's physical manifestation affected by its external environmental influences, which include soil, nutrients, light, heat, other biota, and time. Forests can be described physically based on physiognomy, such as a dipterocarp forest. They can be described based on the resident fauna and flora, such as an orangutan forest. They can be described based on a landscape ecosystem, such as an area between various geographic points based on physiography: the geologic base material of the transect.

At the tree level, the processes include photosynthesis, respiration, transpiration, translocation, cellular activities, water and mineral uptake, and chemical reactions. From this, the phenotype of a tree can be described: age, growth rate periodicity, habitat, relationship with other biota, and resistance to natural hazards.

Because a developer is concerned with maintaining and promoting a healthier forest, plasticity of phenotype is critical because at this granularity, a stronger and strengthening forest will improve carbon uptake, limiting risk and increasing the developer's internal rate of return.

Forest Soils

The importance of soil to forest health cannot be underestimated. Forests receive carbon dioxide from the atmosphere, energy from the sun, and water and nutrients from the soil. Forest soils are critical to its reproduction ability, as dispersed seeds can germinate immediately or reside dormant within a soil seed bank until germination occurs. Sexual tree reproduction requires seed production, dispersal of seeds, germination, and growth to maturity of the new tree to reproduce again. The developer needs to understand that trees require fertilization to reproduce and require dispersal of seeds locally and regionally by secondary actors such as mammals, birds, insects, fish, and natural elements. Because forest reproduction may depend on fauna (Barnes et al. 1998), developers need to maintain a forest's biodiversity.

Soil chemistry and structure assist healthy tree development. Soils are affectionately referred to as the forest's parent material. The chemical components of soil assist healthy herbaceous and tree development. Trees need carbon, hydrogen, nitrogen,

oxygen, phosphorous, potassium, calcium, sulfur, and magnesium to grow (Barnes et al. 1998). These elements affect soil acidity, measured by pH: the negative log of the hydrogen ion concentration in the soil. Acidity affects the quantity of nutrients available for plants and trees. The physical properties of soil are texture, structure, color, and water. Texture is described by percent sand, silt, and clay. How soil aggregates as a result of the activities of microorganisms and plants affects herbaceous root structure. Color provides insights into the soil's mineral and organic composition and drainage patterns. Soil formation is not discussed in this paper.

These complex forest systems are studied, measured, and analyzed by scientists whose purpose it is to describe them. A developer needs to consider how these systems can influence the project. Because over time these systems are constantly changing, any systematic understanding must also change. Developers can manage this change over time using an iterative and adaptive management process. As information changes the project must also change.

Avoided Deforestation Projects

Deforestation, the conversion of forest to another land use or the long-term reduction of the tree canopy cover below the minimum 10% threshold (FAO 2005) produces 20% of anthropogenic global greenhouse gas emissions (Gullison et al. 2007). Deforestation is primarily caused by corporations conducting oil and gas development, forestry development, large-scale farming, and exotic-tree plantations (Laurance and Butler 2008).

To protect forests and mitigate greenhouse gas emissions, developers pay corporations and communities who have title to forests, either through ownership, lease, or rent, to receive carbon credits in return for not deforesting. Known as avoided deforestation projects ("projects"), they are paid for by institutions and individuals ("developers") who want to make a profit and sustainably develop communities.

Successful developers must understand the science, policy, business, and civil society frameworks to manage projects successfully. They need to know how to work with various people and organizations focusing on effective transdisciplinary communication while also taking a position that may be challenging to explain to the general population.

Forestry carbon valuations are based on the initial forest carbon plus carbon uptake over the period. Carbon credits are sold on the voluntary and compliance markets globally in units of 1 metric ton carbon dioxide equivalent ($MtCO_2e$). Carbon credit buyers purchase credits from developers because of speculation, pre-compliance and compliance, investment, and ecosystem services such as biodiversity, carbon, and water quality reasons. Currently there are over 200 projects active globally.[1]

Tropical Deforestation

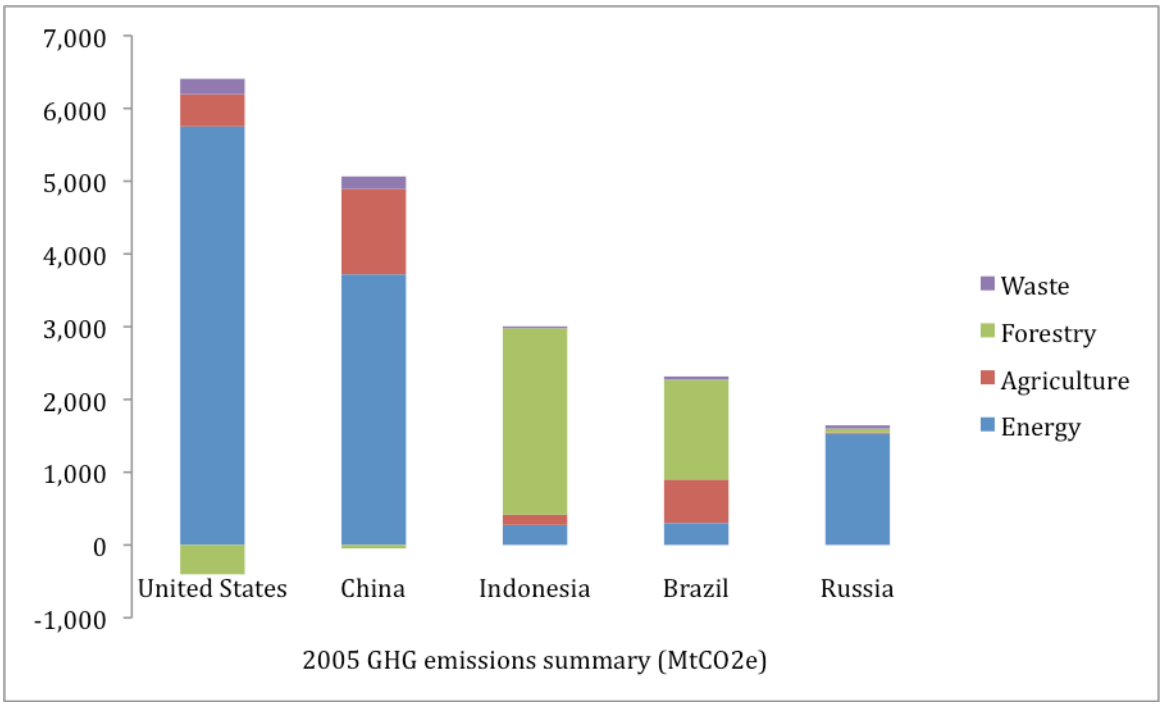
The world's tropical forests cover only 12% of the world's terrestrial land yet account for 40% of the world's terrestrial carbon. Tropical forest deforestation rates vary

[1] Personal anonymous communications with various developers and private research by Mr. Paul Leach.

across the 62 nations that have tropical forests. From 1990 to 2005, the deforestation rates in these 62 nations were 0% to 5% annually (FAO 2005). Within the next 20 years, most of the world's tropical forests could be deforested, converted to soy, cattle ranching, oil palm, oil and gas development, tree plantations, and unused, degraded land.

Indonesia annually emits 2.5 billion $MtCO_2e$ into the Earth's atmosphere solely through deforestation (PEACE 2007). This is 50% of the European Union's (27 countries) total emissions of greenhouse gases (GHG) (UNFCCC 2007). Controlling for and developing mechanisms that effectively end deforestation will mitigate global climatic disruption.

Eight-five percent of Indonesia's GHG emissions are from land use, land use change, and forestry (LULUCF) and deforestation. This sector needs to be enabled for full participation by countries such as Indonesia within the mitigation framework for global climatic disruption.



Source: PEACE 2007, p. 2

Figure 1: 2005 GHG Globally by Waste, Forestry, Agriculture, and Energy

Table 1 demonstrates that carbon markets business strategies need to be designed around each country's GHG opportunities. Since Indonesia and Brazil emit the majority of their GHG from deforestation, it is prudent for business to proactively engage in solutions focusing on deforestation. The business community can turn this environmental liability into a financial asset.

Table 1: Global Forest Greenhouse Gas Emissions

Emissions Source	USA	China	Indonesia	Brazil	Russia
Forestry	(403)	(47)	2,563	1,372	54
Energy	5,752	3,720	275	303	1,527
Agriculture	442	1,171	141	598	18
Waste	213	174	25	43	46
Total ($MtCO_2e$)	6,005	5,017	3,014	2,316	1,745

The table excludes EU from the comparison as EU comprises 25 countries. If EU as a block enters the calculation Indonesia stands 4th, and the ranking is US, EU, China and Indonesia. The data for energy emissions are from 2003. The energy data used International Energy Agency's 2005 annual statistics except for Indonesia where PIE 2005 statistics are used. The data for agriculture emissions are from 2005. Biomass combustion is included in the calculation. The data for forestry (LULUCF) emission are from 2000, from Houghton 2003. [G. Thoumi: This premise is supported by the more recent study of H. Gibbs, the Gibbs/Brown IPCC Tier I vegetation carbon calculation methodologies, and personal communication with H. Gibbs.] The data for waste emissions are from 2005.
Table and note source: PEACE 2007, p. 2.

Sustainability: Incorporating Environmental Liabilities as Financial Assets

A sustainable project requires three interlinked frameworks (see Figure 2). The definition of sustainability used in this paper is rooted in the Brundtland Report definition (United Nations 1987), modified by my professional experience. It defines sustainability as a rational land ethic that incorporates equitable utilization, no-harm principle, cooperation, and the precautionary principle, so that institutions can incorporate environmental operational liabilities as financial assets.

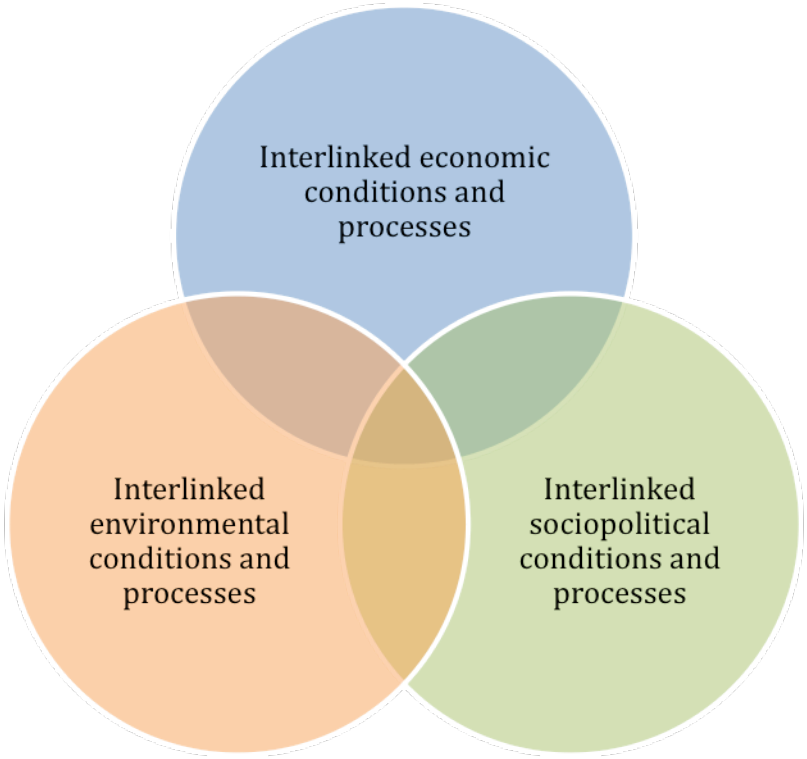


Figure 2: Sustainable Society

Equitable utilization is the efficient and fair distribution of natural resources. The *no-harm principle* means that harm to an ecological system is not done today in an effort to extract economic rent in lieu of consideration for tomorrow. *Cooperation* means that developers, individuals, nations, and municipalities need work within an adaptive management framework that is iterative with prescriptive laws to manage their shared natural resources. The *precautionary principle* means that actors need to demonstrate 100% that they will cause no harm. The burden of proof lies with the proponents of the action.

All foundational aspects of a project are interlinked and cannot succeed without the other. Economics, environment, and sociopolitical conditions and processes each require success in the other for sustainability to develop. According to Dr. John Holdren, sustainability includes:

> Eradicating poverty and preventable disease, maintaining the integrity of the oceans under increased demands and impacts, managing the intensifying competition for land, water, and terrestrial biota while preserving essential biodiversity, and providing the energy needed to create and sustain prosperity everywhere without wrecking global climate. (Holdren, 2008)
>
> Without energy there is no economy, without climate there is no environment. (Holdren, 2008)

A project must have a strong economic, environmental, and sociopolitical backbone to succeed, become profitable, protect biodiversity, and mitigate global greenhouse gas emissions. Our choice in this century is limited: adapt, mitigate, or suffer. Our challenge is to develop projects that can mitigate the threat of global climatic disruption. The global economic system is shifting from market limited to natural resources limited with ecosystem services becoming an investment class. Where previously forests and land, water, biodiversity, and air were considered externalities, developers and nations now consider these untapped wealth. This means liabilities and environmental externalities are now financial assets.

From Market Failure to Market Success

With more than 200 projects currently being developed and over 60 projects attempted in the past 15 years,[2] markets require liquidity, transparency, and assurance of completion for these projects to be successful (see Figure 3). The market has many actors, yet it lacks effective communication. Avoided deforestation markets ("markets") need to be transparent so that business, civil society, government, and science can understand the pricing power of their forestry assets. With this information, they can then determine how to receive the best pricing for their assets.

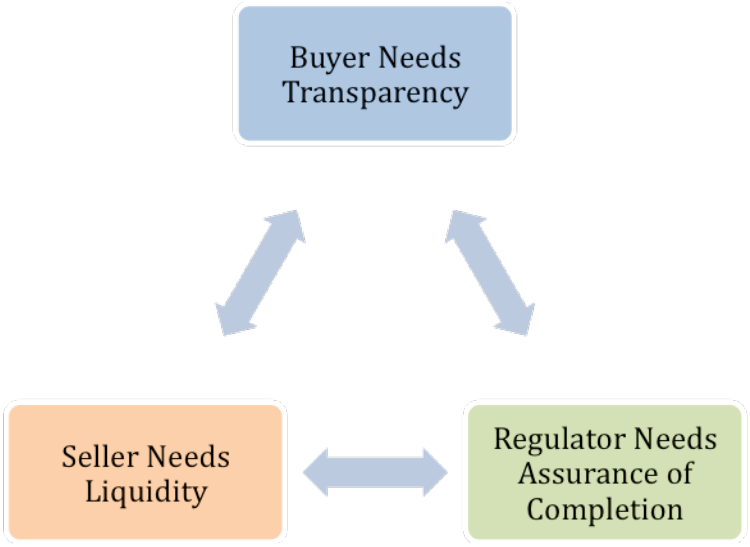


Figure 3: General Market Mechanics

By understanding the reservation prices for projects, developers can develop their projects accordingly. Liquidity means that it is possible to sell avoided deforestation

[2] Personal anonymous communications with various developers and private research by Mr. Paul Leach.

credits from projects quickly. This requires information regarding how others are pricing their projects so potential buyers can comparison shop. Assurance of completion implies that what is paid for arrives in a timely manner. Data need to be available publicly on how projects function and on the projects' ability to delivery credits and associated biodiversity, climate, and community co-benefits as promised.

The value chain within a project is shown in Figure 4. The conditions that must be met are clear property rights, legal framework, regulatory framework, monitoring and enforcement (Streck et al. 2008). Three issues must be addressed within this value chain for a project to succeed—permanence, leakage, and additionality.

Permanence refers to whether the tropical forest will permanently remove emissions from the atmosphere. Leakage refers to whether individuals and developers that are currently deforesting or degrading tropical forests will move to other locations if a developer secures the rights to protect a certain concession from deforestation in a project. *Leakage* can be categorized into two categories. Primary leakage refers to shifting activities from area A to area B. Secondary leakage refers to if the market can accept sustainable livelihoods and decrease the emissions of new entrants who migrate from their forest communities to cities. Leakage is managed by developing better employment opportunities for previously employed loggers.

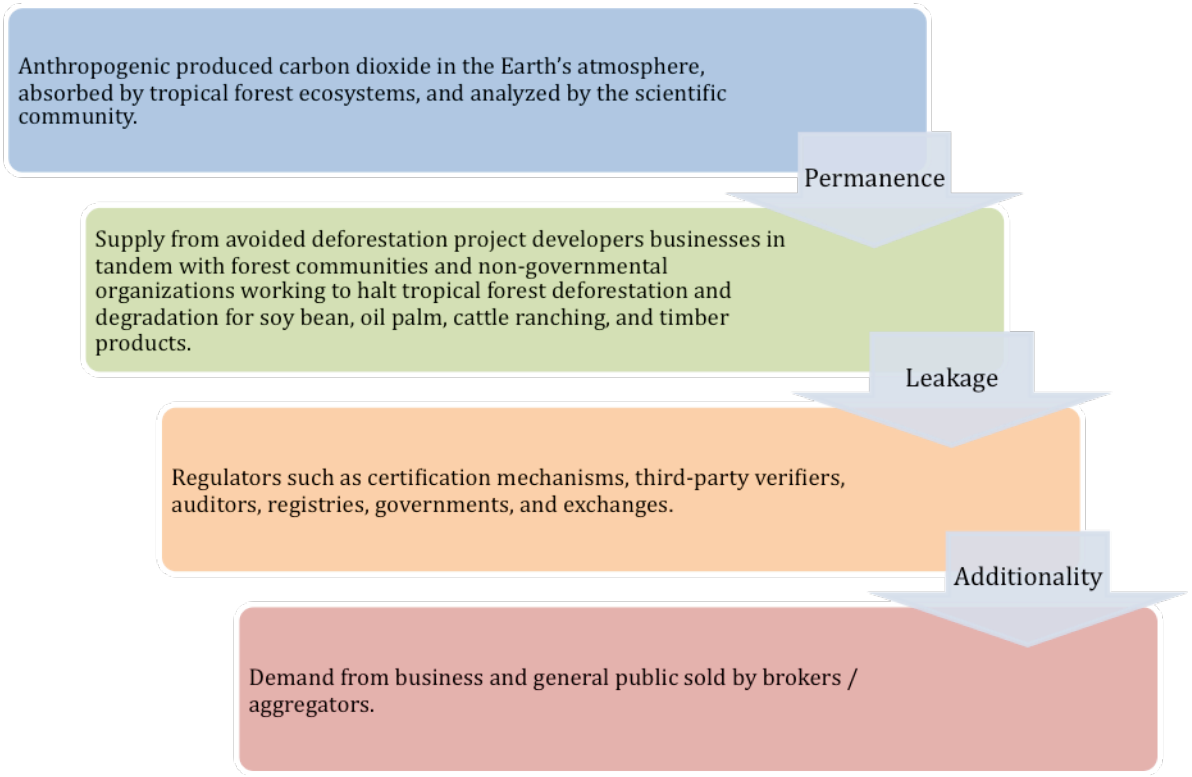


Figure 4: Avoided Deforestation Value Chain

This paper does not thoroughly discuss leakage, permanence, or additionality. Briefly, permanence and leakage can be managed through using buffers. In a well-managed project, a percentage of credits are put into a risk buffer that overtime decreases as the project owner demonstrates their capacity to manage for permanence and leakage. *Additionality* refers to whether a project would be profitably implemented without carbon financing.

The Challenge for Developers

Projects most likely will not exist absent markets because these projects are demand-driven by the need for carbon sequestration to occur now and paid for through the issuance and expiration of carbon credits in the markets. Developers need to value their projects by estimating the avoided deforestation rate less operations less permanence and leakage risks to determine their revenue. A developer needs to develop a complex systems approach when integrating, social, ecological, and economic systems—the triple bottom-line approach of people, planet, profit.

An Example: Indonesia's Forests

Asia's tropical forests account for 17% of the world's tropical forests and have the world's highest deforestation rates (Kumagai et al. 2004). Yet these forests are home to a high percentage of the world's biodiversity. In fact, fragmentary secondary forests now are greater than all remaining old-growth primary forests in SE Asia (Silk 2005). Indonesia's forests on Borneo are being deforested at 2% per year. All of the forest landscape on Indonesia's part of Borneo, called Kalimantan, may be deforested by 2020 (PEACE 2007).

Kalimantan's forests have two ecological zones—peat forests with dipterocarp trees and highland mountainous forests. Peat forests in Kalimantan consist of woody debris such as roots, shrubs, leaves, fallen trees, and trees. Peat forests are wetlands with a thin layer of decomposing organic matter. They occupy 3% of the Earth's surface yet store 15% of the Earth's terrestrial carbon (Takai 1996). Sixty-eight percent of the

world's tropical peat forests are in the area of the South China Sea and Indonesia (Jauhiainen et al. 2005).

Tropical peat forests account for 40% of the carbon storage capacity in the world's peat forests. This is 200 gigatons carbon. Kalimantan contains 68,000 sq km of peat forests (Page et al. 1999). Accordingly, Indonesia's Kalimantan peat forests have a 27 gigaton carbon storage capacity.

Most commercial timber in Borneo's lowland peat forests is from dipterocarp trees. Dipterocarp trees are highly dense—50 to 120 m^3 per hectare. When they are logged, 80% of the canopy is destroyed (Curran et al. 2004). In fact, the volume of dipterocarp timber exports from Borneo measured in cubic meters is greater than all tropical wood exported from Latin America and Africa combined since 1980 (Curran et al. 2004).

Borneo may have the Earth's greatest biodiversity (Peo 2005). The country has the Earth's highest documented tree diversity with, for example, 1,175 species in one 52 hectare plot in Lambir Hills National Park, Sarawak, Malaysia (Peo 2005). In fact, there are over 6,000 endemic plant species, over 15,000 total plant species, over 2,000 species of orchids, and over 265 dipterocarp tree species recorded so far in Borneo. For comparison, there are 50 tree species in Northern Europe (Peo 2005).

Since 1982-83, Indonesia has experienced increasingly catastrophic forests fires each El Niño Southern Oscillation (ENSO) year. In 1997-98, over 5 million hectares of rainforest, an area the size of Connecticut and Rhode Island, burned in the province of East Kalimantan (Cleary 2005). Through ineffective public policy initiatives, large parts of Indonesian Borneo were degraded and drained of water by corporate interests (Dennis

2006). This caused the lowland peat forests to become drier, creating optimal burning opportunities for ENSO years. This was also impacted by transmigration, corporate agricultural and timber concerns, and land use policy (Dennis 2006). Fires are expected to increase in severity as climate change accelerates (Cleary 2005). It is estimated that during the fires of 1997, 2.18–2.57 gigatons carbon were released into the atmosphere as a result of fires throughout the Sumatra and Kalimantan. This is 40% of the emissions of fossil fuels from car emissions globally (Page 2002).

There are few fires in protected areas in Indonesia. In Riau Province, Indonesia, the average number of forest fires within the protected areas between 2002 and 2006 was less than 1% per year versus the quantity of fires on unprotected land (Table 2). When comparing Indonesian Sumatra Acacia plantation fires with Chilean fires, Sumatran fires are six times more likely to be greater than 5 hectares. This is because even though Chile has higher fire risk, Indonesia has poor fire management, resources, and skills.[3]

Table 2: Fire Analysis in Riau Province

Year	Fires in Riau	Number of fires in protected areas	Percentage of fires in protected areas
2002	10,305	100	1%
2003	6,039	25	0.4%
2004	7,189	10	0.1%
2005	18,723	32	0.2%
2006	10,036	6	0.1%

Source: Yumiko Ukyu, World Wildlife Fund, private document

[3] Interview with Mr. Phil Cottle, CEO, ForestRe.

In fact, Indonesia and Brazil accounted for over 50% of the global carbon emissions from LULUCF during the 1990s (Houghton 2003).

Peat forests are of critical importance in managing Indonesia's GHG emissions and thus represent an opportunity for developers. This demonstrates how forests are the raw material within the carbon credit manufacturing process.

CHAPTER 3. MANUFACTURING CARBON CREDITS

Introduction

The project owner, who has access to the land, will contract with a carbon markets project developer, external to the community, to manufacture the carbon credits. This allows the owner to manage business risk by letting a developer manufacture the carbon credits.

This chapter discusses the necessity of effective communication between the parties involved in manufacturing carbon credits, with rational convergence as a model. Manufacturing strategies include Afuah's New Game model and Thoumi's Model for Environmental Services: Emeralds on the Equator "Zamrud Khatulistiwa." This chapter also discusses general themes for project management.

Thoumi's Rational Convergence Model for Effective Communication

To successfully manage the relationships needed to implement and manufacture carbon credits, it is recommended that developers use the model called rational convergence.

Rational convergence is a tool focusing on developing effective communication between the four parties in a project—science, civil society, government, and business (see Figure 5). Each party is assumed to maximize their rent seeking. The successful developer will need to focus on the overlap between the four parties. This overlap is where the project can most easily actualize itself.

Four rules dictate rational convergence:

1. land dictates the rules
2. local communities are the project's gatekeepers
3. governments organize rights
4. businesses structure risk

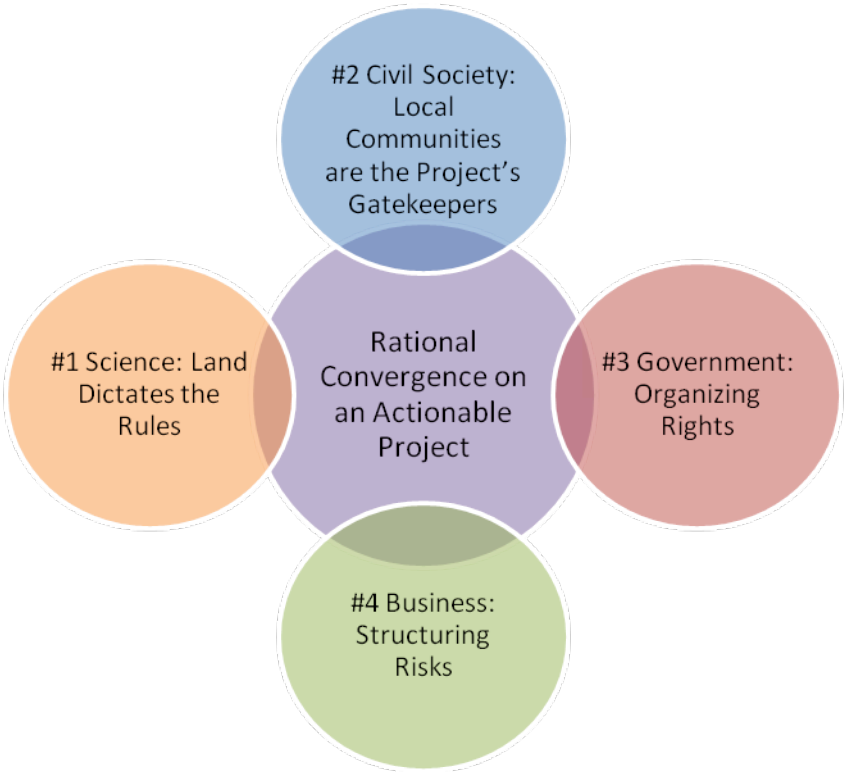


Figure 5: The Four Parties in Rational Convergence

Scientists need unknowns to push intellectual thought forward. This is done by using the scientific method to test a hypothesis based on observational data and theoretical understanding. Yet, this uncertainty can be interpreted as a lack of confidence

by the other three actors. Government, civil society, and business need to understand that science will always be uncertain.

Civil society thrives on fighting for the underdog. Because of this, it often struggles with engaging the other three actors on terms that are not aggressive or acrimonious. Knowing that civil society may always fight for the underdog, the developer needs to work hard to gain approval of the project by the local community.

Government organizes and dispenses rights. If a developer wants to gain governmental support for a project, the developer cannot be understood as removing rights sovereign to a nation.

Business structures risk. To maintain its profitability, it must manage the project in a manner that decreases the riskiness of the business concept while maintaining profitability. In summary, business needs risk to survive. This risk is codified by the use of rights dispensed by government. Civil society is concerned that government is eliminating rights that engage locals. Science debates the viability of a hypothesis. It is within this framework that the developer needs to focus efforts on maximizing the interests of each of the four actors while developing the project.

Benefits of Rational Convergence

The benefits from using rational convergence are improved communication by using language mutually intelligible by each of the groups and focused attention on actionable projects that can be achieved now. By focusing on actualization, the developer can get beyond rhetoric into developing a sustainable project. This allows a developer to focus on its core competency, which is managing delivery risk. Specifically, a developer

that delivers on promised carbon credits should be rewarded by being able to sell products at a higher margin than a developer that does not meet its carbon credit sales obligations.

Figure 6 demonstrates how scientists, civil society, governments, and business leaders might approach a communication challenge. Scientists demonstrate uncertainty when they say, as in this hypothetical example, "We are 98% sure but still don't know for certain." Civil society assumes, "No one understands communities and conservation like we do." Government doesn't "want to lose our rights to our land" if the project develops.

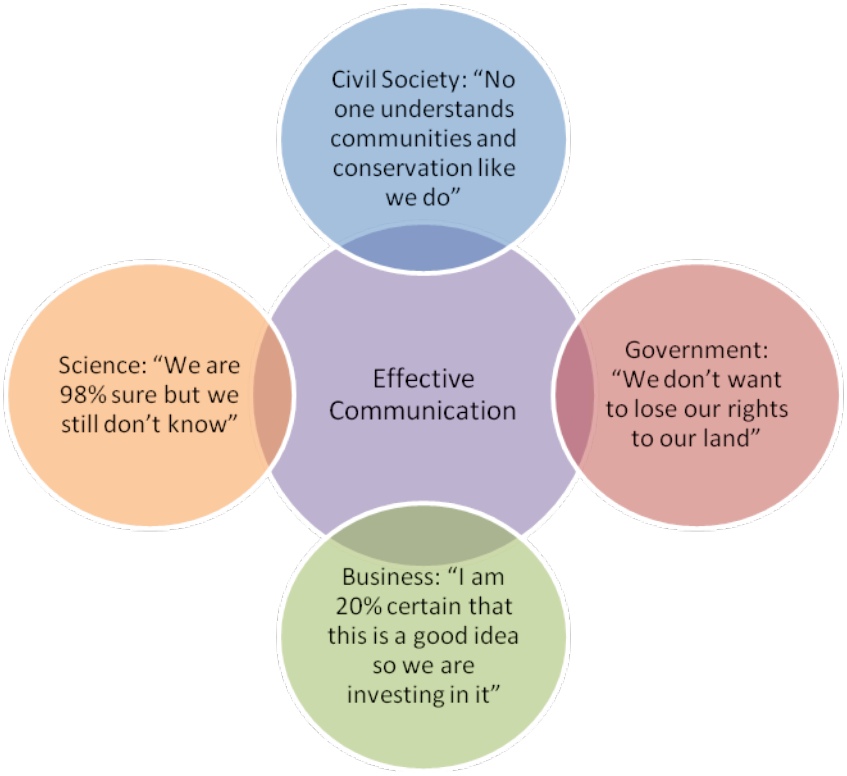


Figure 6: Rational Convergence and Effective Communication

Business needs risk. By gaining support from each actor, the developer promotes effective communication that promotes an actionable project. This is a manner by which the developer can employ a triple bottom-line business strategy of people, planet, profit.

Effective Communication with Scientists

Because the land dictates the rules, the developer needs to first understand the project's ecological landscape. This can be done by working with local scientists to understand the ecological framework within and surrounding the project site. Inherently, the developer needs to take this ecological knowledge and frame what the carbon credit opportunities would be locally. Once a developer has a strong understanding of the ecological stage, the developer can then begin to communicate with civil society.

Effective Communication with Civil Society

A successful developer understands that that the local communities are the gatekeepers because these communities live and work on the land near the project site. Therefore, local communities can make or break a project. They must be involved in a manner that is iterative requiring adaptive management. This means encouraging sustainable community development at the local level—improving water quality, nutrition, and small business development opportunities and developing local renewable energy opportunities. In fact, the discussion of carbon credits at the local level may not be relevant in the beginning. Therefore, effective protection and sustainable community development depends on developing trust between all rural stakeholders. This can be done by creating incentive mechanisms such as a community-based forest monitoring

program, a sustainable business development program with links to the market for non-timber forest products, along with micro-financing facilities as part of the project design.

Local communities often view increased conservation as a method in which their local communal land rights are diminished. Yet a project should facilitate land conflict resolution hectare by hectare, community by community. With a solid foundation for consensus building, a project may survive for many years. Having a common framework at the start of the project allows the developer and the local community to work together for a successful community sustainable development plan that has a carbon flavor. Local communities can define incentives to protect their local natural resources on their terms, while the developer can assist all stakeholders by providing advice, capacity building and advocacy. Taking the time to plan and implement the winning combination of a host of solutions is what experts have called best practices in natural resource management. The developer needs to work within these communities to learn how they understand their biodiversity, water, forests, and land tenure rights. With this information, the developer can begin to ask questions related to how nutrition, education, empowerment, land-use planning, water, sanitation, and energy production can be developed as it relates to sustainability.

Communities need to be involved in co-developing a land tenure system that functions for them while enabling the developer to engage the local community with forest protection. The key first step to resolving these land claim issues is to involve the community in community participatory mapping. Community participatory mapping occurs when a geographical information system (GIS) specialist works with the community asking iterative questions regarding community land claims. Next these

claims are mapped and then presented to the community to solicit community engagement. After an iterative process that seeks to resolve land claim conflicts, the community can then submit land claims for land tenure. By solidifying community rights to land, the developer seeks to develop solidarity with the local community in a manner that resolves conflict and provides for successful and effective communication going forward.

The developer can use the following steps to resolve land conflict claims. First, the developer can gain commitment by various actors within the organizations and community involved in the conflict to engage in a land conflict-resolution program. Next, the developer can establish an independent third party evaluator to monitor community action plans. This evaluator will want to publish process and education materials in local languages. Communities fear further intrusion into their local culture. So a developer needs to respect local customs while seeking community engagement. Explicitly, the developer should encourage local community participation in the sustainable management of resources. Land conflict resolution strategies that do not involve local customary law and procedures will fail. This failure in the future may increase a developer's operating expenses since at a future date the developer may be responsible for engaging local communities a second time in local land conflict resolution. The second time around the developer may face greater local antagonism based on previous failures. This is a fear of the irreversibility of economic harm. The local communities may not be in a place to judge accurately which scenario is in their best interest. If the local communities have not considered the nature of their property rights previously, such

as who owns the biodiversity rights within a forest, the complexity of the situation may increase.

Local communities need fairness. They need civil society that represents them effectively, engaging in protecting their interests and understanding the community's interests through the lens of sustainability. Engagement with local communities by developers and NGOs needs to focus on best practices. These best practices must be framed to include engagement, local cultural and religious sensitivity, nutrition and healthcare, sustainability, and improving education and economic opportunities. Without sustainable economic development, local communities will continue to appropriate value from their forests as opposed to create value from their forests. The developer can increase its success by approaching interactions with civil society through the lens of anthropologist. Culture matters, and positioning a project successfully as developing equity for local institutions and communities within the project area and outside of the project area by engaging with the local community and its cultural institutions will increase the possibility of success for the developer. This is the societal portion of triple bottom line.

Effective Communication with Government

Governments dispense rights through developing and creating international, national, regional, and municipal legislation. Dispensing of rights refers to how governments constantly are expanding and contracting private vs. public rights over time. The current trends are for fractionalization of communal rights into a bundle of private

rights. The developer needs to have clear title to the land that is its raw material, and it must have the legal capacity to sell the carbon rights from the trees on this land.

Of concern to the developer is the process that governments engage in redistributing property rights. This process generally has three rule developing processes—constitutional or statutory, collective choice, and operational. These rules can be proactive or reactive and made in response to exogenous conditions such as biophysical and material changes. In the case of the nascent carbon markets, rule making organizations such as municipalities, provinces, nations, and international bodies can be encouraged to be proactive in dispensing carbon rights for forests through developing legislation that develops carbon rights as a function of land tenure, title, and deed. Within the context of the avoided deforestation carbon market, there are two methods that entities can use when developing their legal statutes. Entities can use the compliance market, which is being managed by the United Nations under the Kyoto Protocol, and the voluntary market. The voluntary market allows for the most flexibility; this is critical since land is infinitely diverse, and consequently LULUCF requires a flexible, iterative, and adaptive management statutory support. Essentially, the voluntary market will test out ideas and methodologies that may migrate to the compliance market. The avoided deforestation voluntary carbon market assisted by governmental interaction and support can decrease governmental resources needed to combat climate change, can promote sustainable development, can facilitate technology transfer, and may be less costly to implement than other mitigation options.

Effective Communication with Business

Business leaders need to structure climate change risk, business risk, and sovereign / political risk so as to be successful when investing in projects. Structuring of these risks may diversify these risks allowing for risk mitigation. This process has two important functions. It can either enhance return while maintaining the same aggregate risk level or it can maintain return while decreasing the aggregate risk level for the developer. If the developer can lower its risk profile or increase its returns, it should be able to secure greater equity funding from the capital markets allowing for scalability. With scalability, the developer may be able to expand the scope of its business by protecting more land. Hence, the focus of the avoided deforestation business leader is on risk mitigation.

Successful Negotiations

Effective communication between science, business, government, and civil society and the developer are required for a successful iterative and adaptively managed project to develop. The developer may choose to facilitate the discussion between the four actors focusing on collaboration. In negotiations, the developer needs to be capable of inventing options after observing each party's emotional, intellectual, and spiritual point of view. During a successful negotiation (see Figure 7), a developer beforehand will need to write up the non-negotiable points with a range of negotiability attached to each, possible arguments of the other parties, the possible coalitions that could be formed, various scenarios, and possible creative and innovative solutions.

Using this framework, the developer can focus on common interests (not positions) between parties, dialogue about objective criteria, and invent options that work for all parties. By doing this, the project developer can negotiate with all actors within the rational convergence, thus furthering their capacity to develop an effective project.

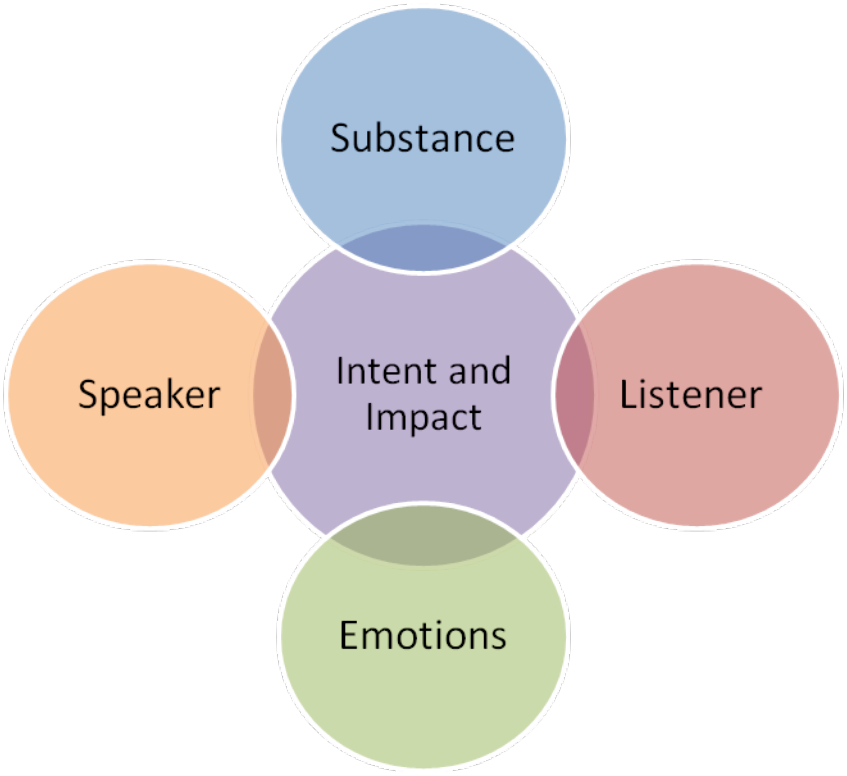


Figure 7: Successful Negotiation Communication Framework

Manufacturing Strategies for Business Development

Developers are competing for funding, buyers, and sellers. Developing a well-thought-out business strategy will benefit the developer. Developers need to understand that their raw material – the project's land – is what is used to manufacture carbon credits by the developer. This manufacturing perspective should frame their business strategy.

The complementary assets that these developers must have to succeed will differentiate themselves from one another. Developers, given the nature of starting a new market, must have strong relationships with their "coopetitors"—the buyers, sellers, suppliers, and competitors. Yet buyers have no switching costs. Whether a buyer purchases credits from a developer A or B may make no difference to the buyer. Yet, getting businesses up and running requires irreversible commitments on the part of the developer to the seller or project owner. In this regard, branding of the project is critical to success in this field. Branding will be arrived at by mitigating delivery risk and performing successfully while managing coopetitor relationships effectively. Developers may wish to let other developers resolve technological and marketing uncertainty before entering into the market. Free-riders may follow in a first-mover's footsteps. In the end, developers must earn first mover advantage from their investors, sellers, buyers, scientists, and local communities.

Afuah's New Game Model for Business Development

The New Game business strategy of Allan Afuah (2007) creates and/or appropriates values in a different manner than previously enacted. This strategy offers the opportunity to manufacture new resources and capabilities or translate existing ones. This creates the opportunity for developers to exploit first-mover advantages while setting standards that define the new avoided deforestation market. The opportunity for New Game business models arrives from opportunities and threats within an industry and macro-environment. Since developers usually have to compete to appropriate or take

value from one another, and cooperate to create value, the opportunity for developers within the framework of global climatic disruption is for cooperation.

An organization can review its current value chain activities and then design and enact new strategies that affect their value chain creating and appropriating value for their clients. Customers value products based on values perceived which is an aggregation of the developer's abilities and capacities to integrate rational convergence into managing business risk. Developers need to cooperate with competitors, suppliers, complementary organizations, and customers to create value. Developers have a choice when developing a product. They can either create a product that appropriates value, which means taking value or economic rent from another, or they can create a product that creates value, which means developing new value or economic rent where economic rent or value hadn't previously existed. The developers' goal is to create value. In other words, developers will be paid by the market to develop triple bottom-line projects. Developers can access the carbon markets to secure capital to fund protection of tropical forests.

Developers need to exceed their fixed and variable costs to be sustainable. This value is split between consumers' reservation price and developers' cost. The reservation price is the price at which the consumers perceive that they have not received enough value for their purchase (see Figure 8).

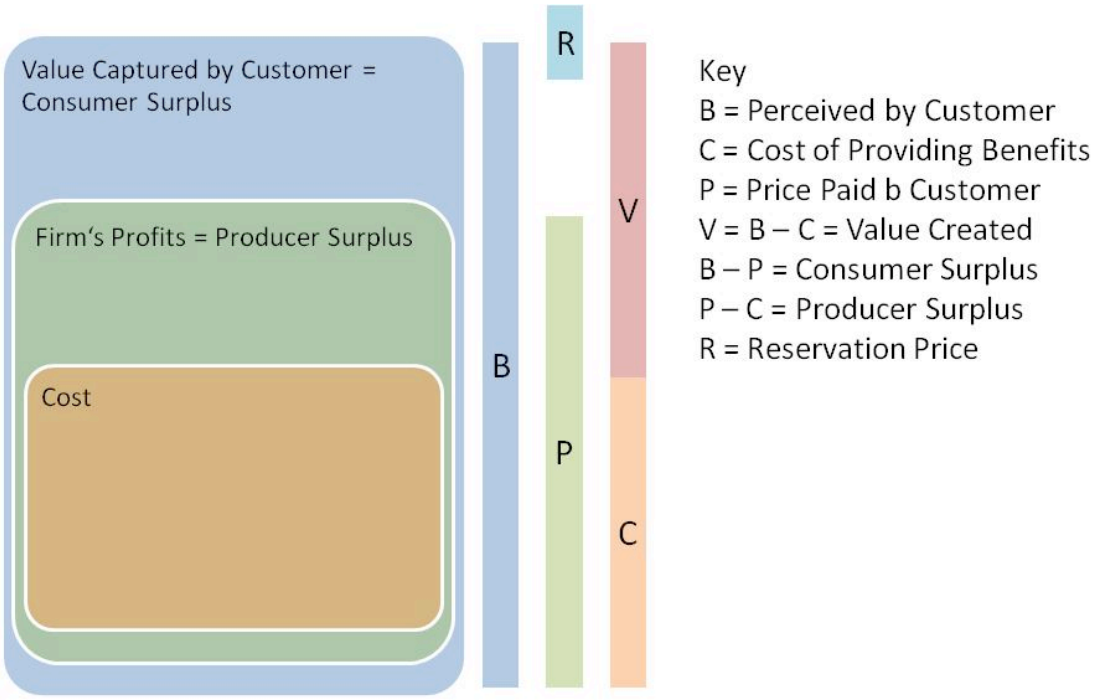


Figure 8: Calculating Reservation Price, Consumer Surplus, and Producer Surplus

New Game business strategy is a set of activities that are performed in a new manner. A good example is Henry Ford's assembly line and mass production. Labor, goods and services, products, and the quality of the products produced were restructured.

The New Game business model (see Figure 9) has four components—activities, values, appropriability, and change.

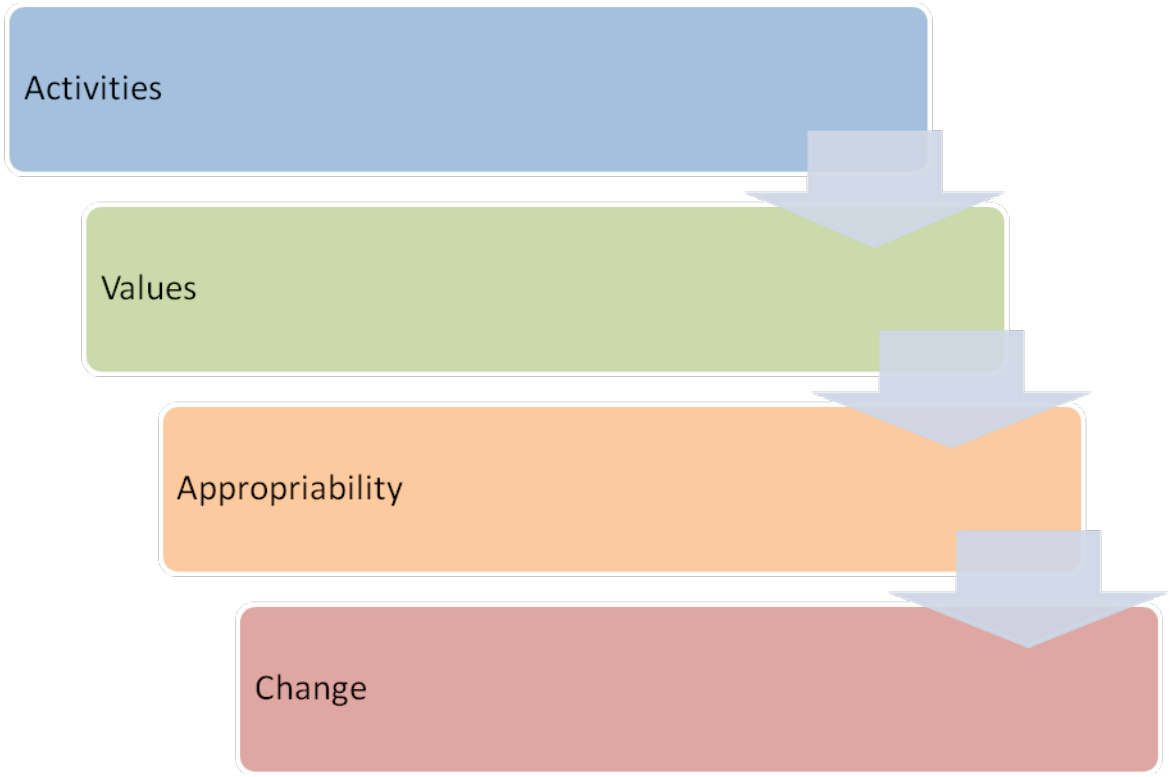


Figure 9: New Game Business Model – AVAC

Activities. Activities are a defined as the new activities and resources that constitute the organization's strategy. This includes how these activities create and appropriate value. These activities need to clearly attract and keep valuable customers, decrease regressive economic forces while reinforcing friendly ones, take advantage of the drivers of an industry's values, build new resources into superior positions, and decrease costs.

The developer needs to distinguish itself based on these activities. It must distinguish what a developer's activities are and are not. The developer must understand how these activities can create value by analyzing this value based on the triple bottom

line. A developer must also have an understanding of whether its activities will allow it to obtain clients, decrease costs, improve resources into superior positions, and take advantage of an industry's value drivers.

Values. Values are created by the strategy as understood by competitors and customers. Values need to explain why a developer is superior to its competitors. Customers with disposable income need to see this value. Values allow for customers to understand the product offering. If customers understand the product offering, the developer can understand if the product is perceived as being of greater, equal, or lesser value than its competitor's product offerings. If its customers perceive this value, they will spend their disposable income on their product.

Appropriability. Appropriability is the strategy allowing the developer to make money from the value created. The developer needs to have bargaining power over its coopetitors. The developer needs to understand the market, what the customers' reservation prices are, and how many customers are there. The developer needs to have the right complementary assets while understanding if its strategy can be imitated, what the impediments to its strategy might be, if there are substitutes for the developer's value, and if its complementary assets are well used. With appropriability, a developer can decide if the New Game business model allows the developer to seek economic rent. By understanding the developer's bargaining power is over its coopetitors and its complementary assets, the developer can strategize about how to approach the concession it has received. Complementary assets are tightly held assets, usually difficult to imitate, and don't necessarily offer opportunities to make money easily. For example, if a developer realizes it has bargaining power over its coopetitors because of political

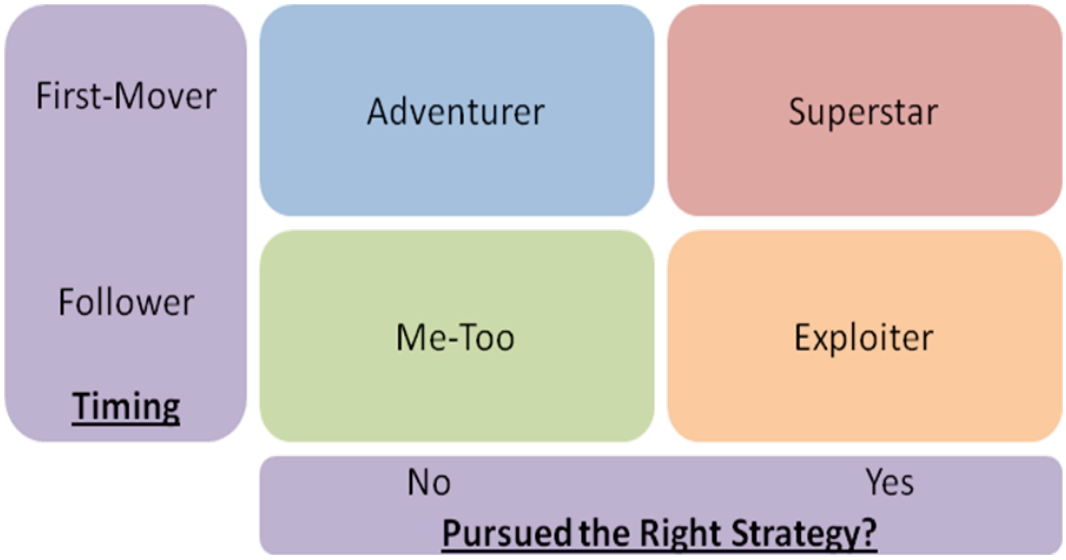
connections but is lacking the scientific capacity to develop its carbon methodology and baseline, the developer should appropriate this scientific capacity. If the developer realizes that other can use its market entry strategy, it needs to analyze the impediments to market entry by the other developers to see if it can further maximize its complementary assets.

Change. Change can be observed when the developer's strategy takes advantage of the dynamics of change to create unique value. When the developer creates value, the developer needs to generate value through change, use this new value created by value to expand its scale and scope, learn from coopetitors' first mover advantages and disadvantages and handicaps, develop proactive responses to coopetitors' reactions, and identify best alternatives.

Developers need to understand that the economic, community, and ecological environment is dynamic. The developer's strategy must incorporate this dynamism because this is key to the developer's success using a New Game business model. For example, it is important for developers to understand the competitive landscape within the avoided deforestation sector by analyzing their coopetitors first mover advantages, disadvantages, and handicaps. Developers need to understand if the activity they are engaging is the best alternative.

The New Game business model has four types of actors—superstars, adventurers, exploiters, and me-too's (Afuah 2007). Superstars pursue the right strategy at the right time and are first-movers. Superstars have a clear strategy to create value (see Figure 10). Adventurers pursue the wrong strategy at the right time. They are successful but lose their market share to superstars because superstars have superior strategy. Exploiters

pursue the right strategy but are not first-movers. They may be profitable but do not have the same brand recognition and price premium as superstars. Me-Too's pursue the wrong strategy and are not first movers. Me-Too's may be profitable because they are riding the innovation wave as the market adjusts to the New Game business model.



Source: Afuah 2007, p. 18.

Figure 10: Afuah's New Game Actors: Superstar, Adventurer, Exploiter, and Me-Too

Developers can separate themselves by basing their New Game business model on products with lower cost than market. This is a product-market position (PMP). Developers can also separate themselves by basing their New Game business model on products that have higher quality resources. This is a resource-based view (RPV). In this context, the developer may choose to invest in projects that have higher rates of endemism according to the IUCN Red List. This would be a resource-based view. If on

the other hand, a developer chooses to invest in a project that allowed the developer to undersell its competition, this would be a product-market position (see Table 3).

Table 3: Product-Market Position and Resource-Based View Comparison

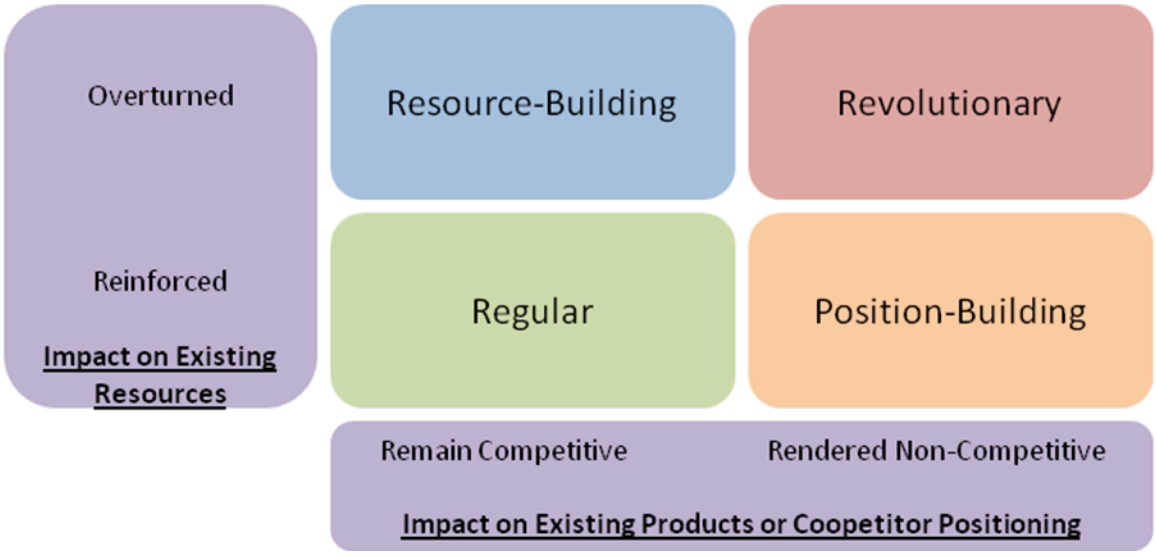
Characteristic	**Product-Market Position**	**Resource-Based View**
New ways of creating and appropriating value	Reinforce / decrease competition	
Opportunity to build or translate new RBV		Reinforce / decrease competition
Create first-mover advantage	Reinforce existing PMP	Reinforce existing RBV
Attract reactions by competitors and coopetitors	Competitors can erode PMP	Competitor's resources can decrease developer's effectiveness
Opportunities and threats rooted in macro environment	New environmental services demand can reinforce PMP	New environmental services demand can enhance RBV

Source: Afuah 2007, p. 28

Developers can apply four New Game business strategies (see Figure 11).

Regular Strategy. The first strategy, the regular strategy, builds on existing supply chain resources to offer a new but similar product that doesn't replace an existing product and improves its position in relationship with competitors. For example, The Nature Conservancy has an existing model that relies on financial donations to conserve species through land protection. By adding a carbon component, The Nature Conservancy is offering a similar product that allows for value appropriation from its customers yet it doesn't cannibalize its existing product customer base. It improves its position versus its competitors and coopetitors because now one can offset a carbon and conserve species

using The Nature Conservancy. This model reinforces existing resources and allows existing coopetitors to remain competitive.



Source: Afuah 2007, p. 36.

Figure 11: Afuah's New Game Business Strategies

Position-Building Strategy. The second New Game business strategy that the developer can apply is the position building strategy. In this strategy, the avoided deforestation product is superior to all existing offsetting projects and conservation projects such that it renders all previous products non-competitive. For example, if Carbon Conservation's Ulu Masen project is able to succeed where other civil society organizations have failed by offering a superior PMP, then Carbon Conservation is able to obtain the former clients of the other civil society organizations working in Aceh. This model renders non-competitive existing coopetitors while reinforcing existing resources.

Resource-Building Strategy. The third New Game business strategy that the developer can apply is the resource-building strategy. In this model, the resources that are used with the PMP are too different from the resources needed for the resource-building strategy. This means that the competitive advantage is held by those having the resources; this model incorporates new resources yet all competitors remain competitive. In this case, a developer like New Forests launches a completely new product such as its environmental services portfolio. This product, though, doesn't detract from existing competitors' offerings.

Revolutionary Model. The fourth New Game business strategy that the developer can apply is the revolutionary model. In this model, the organizational structure of current PMP developers doesn't compare to the capabilities of the new offering. All new products offered by the revolutionary developer render all existing competitor and coopetitor products non-competitive. Because the revolutionary model makes obsolete all existing resource based developers and renders non-competitive all existing products, it is from this strategy that developers can create the greatest value. For example, if Carbon Conservation and New Forests could offer products that were biodiversity positive, carbon positive, community positive, and had a high internal rate of return for their investors, this would be revolutionary.

The avoided deforestation market is developing into the revolutionary stage. It is fluid with dynamic actors, little cohesion, with the possibility of rewriting how conservation, overseas development, and institutional investors engage with nature. The developer's role is to overlay and stack biodiversity, water, and carbon credits in a method that yields optimal conservation, community, and climate gains while providing a

high internal rate of return. Developers need to focus on which strategy they wish to employ when deciding to develop a project. The developer can use Afuah's New Game business model to provide success.

Emeralds on the Equator –"Zamrud Khatulistiwa": Thoumi's Model for Environmental Services

Tropical forests form a generative life-providing necklace around the equator. The "emeralds on the equator"—in Indonesian, "Zamrud Khatulistiwa"—are the lungs of the Earth. These forests are located predominately in three countries: Brazil, DR Congo, and Indonesia (see Table 4).

Table 4: Deforestation Rates by Country

Country	Total land area (ha.)	Forest area 2005 (ha.)	Area 2005 (percent change)	Forest area annual change 1990-2005 (ha)	Annual change 1990-2005 (percentage)
Brazil	851,488,000	477,698,000	57.2%	2,821,933	(0.52%)
DR Congo	234,486,000	133,610,000	58.9%	461,400	(0.38%)
Indonesia	190,457,000	88,495,000	48.8%	1,871,467	(1.61%)

Source: FAO 2005, p. 191.

Both the voluntary and compliance markets provide methods for funding the protection of these last few remaining "utilities of global importance"[4] indirectly and directly using various methodologies. These tropical forests consume carbon dioxide and are repositories of remarkable biodiversity, agricultural diversity, cultural knowledge, and

[4] From a speech by Dr. Andrew Mitchell, Global Canopy Programme.

watershed services. These forests are carbon sinks that facilitate change through their existence because to maintain them sustainably, local communities' property rights will need to be supported by democratic rule. This will require an iterative, adaptive management model that adheres to ecological principles to develop an international market based on performance.

If tropical forest A outperforms B as a functioning carbon sink, then the local institutional structures that support A should receive greater remuneration from the capital markets as long as the basic market criteria of transparency, liquidity, and assurance of completion are met. Developers can assist with developing governance, business, and community structures that support local sustainable development through using carbon sinks. This could spread into a large-scale land use movement.

The developer can do this approaching a defined geographic region and analyzing it using the Millennium Ecosystem Assessment framework (Reid et al. 2005). This framework divides ecosystem services into four categories: provisioning, regulating, cultural, and supporting services. By developing an inventory of services, the developer can focus on the local opportunities to develop projects in conjunction with other local sustainable land use patterns.

Provisioning services include food, fiber, biomass fuel, freshwater, genetic resources, and biochemicals. These services provide marketable items that the economy can sell into the market. Often, communities may not be aware of what they can sell and they may lack the infrastructure to bring goods to market. For example, a community with gardening expertise may not have a refrigerated truck to ship their perishables to market before spoilage.

Regulating services include air quality, climate, water, erosion, water purification and waste, disease, pest, pollination, and natural hazards. These services are treated as public utilities within a regional land-use planning framework. If not, they are written into municipal code using a prohibitive legal framework. These laws may have various and inconsistent levels of local adherence and application.

Cultural services include recreation, ecotourism, and ethical values. Many communities hope to find economic growth using these services. Often, cultural services and regulating services are disconnected. If regulating services are not developed, then marketing and developing cultural services that meet customers' expectations is challenging.

Supporting services include nutrient cycling, primary production including carbon storage, and water cycling. These services generally require international legal contracts, brokering, divisible and stackable land rights, clean land tenure, and third-party monitoring, verification, auditing, and certification.

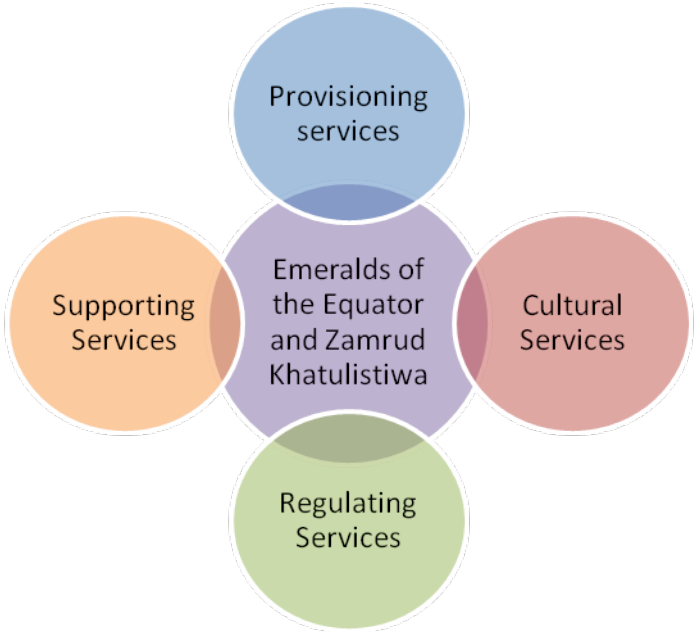
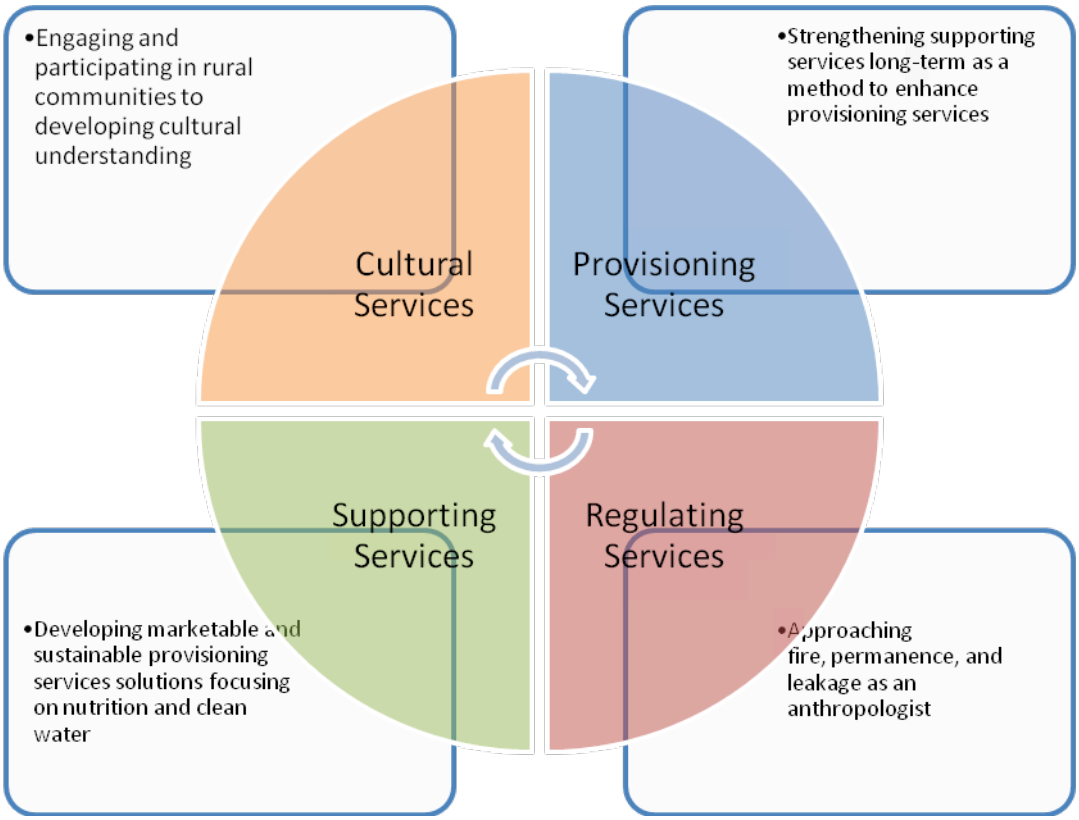


Figure 12: Project Focus for Emeralds on the Equator "Zamrud Khatulistiwa"

These four services are interlinked by the project focus as shown in Figure 12. In this framework, the developer needs to frame the project's reference point by focusing on the intersection between regulating, provisioning, cultural, and supporting services. This means that local economic stability must be developed. Best practices, using this model, are illustrated in Figure 13.



Source: Hanson et al. 2008, pp. 4–5.

Figure 13: Interlinking Services

Another problem the developer faces is how the property rights surrounding a forest are assigned. Often, lack of best practices in natural resources management is accompanied with challenges to how property rights are assigned and understood locally. Sometimes, tropical forests have few property rights associated with the land upon which they exist. These common-pool resources usually have no rights assigned to the carbon sequestration capacity of the forests on the land in question.

This means that a developer could develop a project while the nation could nationalize forest carbon sequestration capacity. It is important to understand at all levels

of government who owns the carbon sequestration rights, how they are assigned, and how they are transferred. Using this model, developers can design iterative and adaptive management projects that surpass a financial hurdle rate and thereby succeed at stopping local deforestation.

Overlapping Community Rights and Concessions Strategy

A community chooses to develop a project with a developer. The community has two criteria: maintaining sustainability and developing other forestry and agricultural industries. The developer is also engaged to develop these other projects if the community wants to develop the project. Now, the developer is managing a forest, a palm oil plantation, and biowaste management facility. In this case, the community has decided part of the business plan for the developer. The developer may need to develop mechanisms to overlap the following certifications (see Figure 14). Mechanisms could be using Climate, Community, Biodiversity Alliance (CCB) for forestry carbon, Roundtable on Sustainable Palm Oil (RSPO) for oil palm, Forest Stewardship Council (FSC) for forestry products, and Clean Development Mechanism (CDM) for energy from biomass.

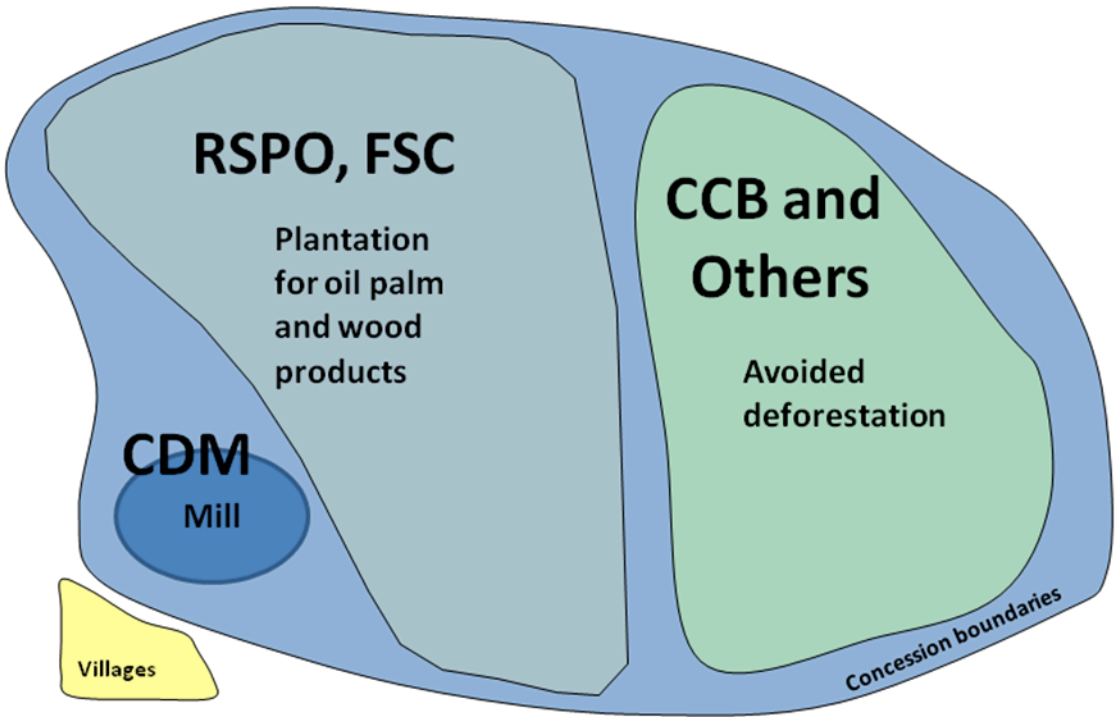


Figure 14: Overlapping Certifications Example

The developer will need to engage the community to find key themes between the four certification methodologies so as to overlap functionality and eliminate duplication. By conducting a local survey, engaging in community participatory mapping, and funding one project staff member per every hundred families in the community, success can be developed.[5]

A successful local project has many aspects. These include developing forest fire management skills, improving sanitation and clean water management, improving nutrition through developing community gardens which also provide a crop to be sold in

[5] Personal interview of Mr. Rezal Kusumaatmadja.

markets, improving Human Development Index (HDI) which is a measure of life expectancy, per capita GDP, education, and literacy, developing micro-finance and business credit, improving conservation of biodiversity, improving sustainability of chain of custody of products, developing value-added products, and improving land tenure transparency while decreasing local land conflicts. In this example, the community's sustainability has improved because of effective communication with the developer, allowing the project to continue with their project.

Portfolio Management

Once a developer begins to manage a project successfully, it faces a choice. The developer can manage a single project and market it as a single source of carbon, or else the developer can expand and begin to develop other projects. If the developer wishes to develop multiple streams of carbon credits, the benefits are threefold. First, it can begin to market its carbon credits as a portfolio of assets. Second, it can enhance returns through scalability of operations, branding, and marketing. Returns may be enhanced by stacking biodiversity and water quality trading rights on top of carbon credits. Third, by diversifying the project portfolio, the developer can diversify away sovereign risk, political risk, baseline risk, and project risk. This could lead to developing a funds management approach to managing biodiversity, carbon, and water rights.

If the developer wants to expand operations and begin to create a portfolio of ecosystem services, it may choose to apply the following framework. First, it will want to clarify its return objective using triple bottom-line metrics—the people, planet, profit

strategy—thereby improving people's livelihoods, enhancing biodiversity, and making money. Next, the developer will want to describe its risk tolerance by analyzing its ability and willingness to take risk. From this, it will derive its overall risk tolerance, which needs to be described in triple bottom-line terms. The developer then will determine the investment time horizon. Finally, it will analyze a possible portfolio for legal and regulatory concerns and whether there are any unique circumstances that will affect the portfolio's ability to meet these triple bottom-line objectives.

Project Financing

Financing a project can be done by selling carbon credits at different stages of the carbon credit manufacturing process. The process of calculating forestry carbon quantities is not the subject of this paper. Carbon credits can be sold forward to finance implementation and management of the project. Carbon credits can be sold in this fashion using a success fee percent of index forward pricing contract. This means that the project aggregator, who may manufacture the carbon credits on behalf of the developer, will assist with the sale of the carbon credits forward on a pre-sale contract at a percentage of an index on a future settlement date.

The developer needs to develop a baseline methodology with a financial bottom line, allowing the developer to focus on implementing actionable projects. The baseline methodology is an aggregate of current national, regional, local, and ecosystem deforestation trends averaged with assumptions regarding future business-as-usual scenarios. The assumptions that support the analysis in the project design document need

to be explicit, clear, concise, and supported by scientific analysis and national, regional, and local trends.

Major Offset Standards. Avoided deforestation carbon credits can be readily earned under the three major offset standards globally. These standards are

Climate, Community, Biodiversity Alliance (CCB)
Chicago Climate Exchange (CCX)
Voluntary Carbon Standards (VCS)

These three standards are voluntary and are not part of a compliance market. The available offset categories include *growing trees with or without harvest, no cutting of trees or cutting fewer trees,* and *using wood for a long time*:

1. Growing trees with or without harvest
    a. urban forestry (CCX)
    b. afforestation (CCX, CCB, VCS)
    c. reforestation (CCX, CCB, VCS)
    d. managed forest (CCX, CCB, VCS)
2. no cutting of trees or cutting fewer trees
    a. avoided deforestation (CCX, CCB, VCS)
    b. avoided deforestation mixed use (CCB, VCS)
    c. reduction of emissions from deforestation (VCS, CCB)
    d. reduction of emission from deforestation and degradation (VCS, CCB)
    e. improved forest management and converting logging forests to conservation forests (VCS, CCB)
3. using wood for a long time
    a. long lived wood (CCX)

All three voluntary mechanisms will certify avoided deforestation projects.

Selling Credits. Credit can be sold wholesale to institutions or retail to the general public. Generally, a developer will sell credits sold forward or at a spot price to an aggregator, broker/dealer, carbon fund, or institution. The carbon fund can be a multilateral agency, a private fund, or managed by a corporation. Institutions generally purchase credits for one of three reasons. These reasons are for investment purposes, for corporate social responsibility, and for speculation. The strategies employed by these investors are buying and holding credits, investing directly in actual projects, and investing in funds of diversified carbon assets. In fact, the developer can fund its project using forward sales and bank guaranteed loans given the developer's credit and risk history.

When a developer chooses its certification mechanism from CCB, VCS, and CCX, it needs to consider many issues such as marketability and price premium; separation of registry, auditing, verification, and issuance; transparency of accreditation process; deliverability of biodiversity and community co-benefits; additionality requirements either using financial or project specific; verification frequency with preferred verification as frequently as needed by market participants to assure creditability; ability to manage permanence; registries ability to remove capacity for double selling; credits removed from the market in an effort to trend towards carbon positive; and monitoring capacity and carbon pool calculation capacity.[6]

[6]This paper does not discuss certification mechanisms. Please refer to Merger and Williams (2008).

Project Management

Project Criteria. The developer works within a for-profit overseas development model that is similar to the Base of the Pyramid (BoP) examples found around the world.[7] If developers can develop sustainable local development models that sequester carbon, funding for project design and operations can come from the carbon markets as long as the project has additionality, permanence, no leakage, and positive community, climate, and biodiversity impacts. These are the criteria inherent in any project. The developer must follow the four rules that dictate rational convergence, which are the land dictates the rules, the local community is the gatekeeper, governments dispense rights, and business structures risks. These values can be co-opted by market participants. Independent, third-party audit is encouraged.

Communication. The developer will want to choose how to strategize how it will deal with the four actors using rational convergence. This choice will determine how the developer will market itself to buyers and investors. If it is able to communicate effectively with the four actors, it will be able to improve market quality. This is critical to the success of this market since a market requires multiple buyers and sellers and developers.

Certification. The developer will want to choose which certification it wishes to pursue. Given how certifications function, the developer may wish to choose to use a certification mechanism that overlaps with another certification mechanism in an effort to

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[7] Personal anonymous communication with various developers and interviews of Mr. Rezal Kusumaatmadja.

improve marketability. It is recommended that the certification transparently shares information regarding the project. Also, it is recommended that the developer keep at arm's length the interactions between certification, verifier, auditor, and registry. It is also recommended that all of these actors perform their functions using the utmost transparency since transparency will provide assurance to market participants.

Audience. The successful developer needs to understand who its audience is, including civil society, government, science, and business, so as to develop an actionable transparent project that meets this audience's needs.

Project Information Note. To start a project, the developer will need the funding for writing of a project information note (PIN). A PIN describes the facts of a project such as activities, location, stakeholders, anticipated impacts and anticipated carbon credits accrued. A PIN can be used to seek development funding. Funding costs for a PIN can be greater than US$10,000 depending on the project size and complexity. With a PIN, the developer can demonstrate their anthropological understanding of the community they are working with including how the community values its forest and the development process; understands natural hazard risks, leakage, carbon, and biodiversity; and relates culturally and religiously with its ecosystems. The developer needs to demonstrate understanding of how the community uses money and bartering, how the community communicates regarding money, and how the community approaches land tenure, civil society, and governance.

Letter of No Objection. A host country letter of no objection explicitly supports the developer seeking funding from institutions, foundations, corporations, development funds, and private parties. It describes the relationship between these parties, the tenure or

length of the proposed agreement, the nature of the possible agreement, and the nature of the agreement. It will provide a map along with concession data and municipal, provincial, and national laws that may be applicable. This letter will be part of the marketing packet that the developer uses to market the development of the project design document (PDD) to institutional investors. Because of this letter, institutional investors can have greater assurance that their investment will be respected by national authorities.

Seek Development Funding. With a PIN in hand, the developer can seek development funding. This funding will be used to implement the project. A developer needs to budget US$1.50 to US$2.50 per hectare to fund the PDD. To make the project operational, the developer will need US$9.00 per hectare. This is broken up into eight categories. These categories are governance and planning at US$2.00 per hectare, science and research at US$1.00 per hectare, enforcement and zonation at US$0.50 per hectare, information, education, and communication at US$1.50 per hectare, sustainable livelihoods at US$2.00 per hectare, marketing at US$0.50 per hectare, finance and administration at US$1.00 per hectare, and other at US$0.50 per hectare.[8] With this conceptually the target funding amount, the developer can then seek funding from various interested actors such as investment banks, foundations, civil society organizations, private individuals, and others.

Project Design Document. The key to writing a successful PDD is to define scale, scope, and space. Using this framework, the developer can write a functional document that is iterative and allowing for adaptive management. If bottom-up cost modeling is

[8] Personal anonymous communication with various developers and interviews of Mr. Rezal Kusumaatmadja.

incorporated into the PDD when implemented, projects can be quite profitable, with internal rates of return over 15%.

Third-Party Validation. A third-party validation process means an independent third-party verifier judges the PDD audited against its chosen standard. It is best to consult the standard to find out about guidelines in choosing a verifier and how to proceed with this process. The verifier will audit the project implementation process to confirm that the credits available for sale reflect accurately the process on the described in the original PDD. The auditor will audit the credit issuance process for double counting and double selling.

Accounting

As of 15 April 2008, the International Accounting Standards Board (IASB) and the Financial Accounting Standards Board (FASB) have not issued guidelines on how developers may account for credits in the voluntary market (IASB 2007c). Guidelines are needed government in lieu of best practices determines how to account for carbon credits. Currently, developers either generally use International Accounting Standard 2 Inventories (IAS 2), International Accounting Standard 38 Intangible Assets (IAS 38) ("Trouble-Entry Accounting" 2007), or account for credits like a manufactured product. The developer has three choices when choosing how to account for the self-generated credits. The options are (a) accounting under IAS 2 as "Inventories," (b) accounting under IAS 38 as "Intangible Assets," and (c) accounting as a manufactured product (IASB 2008). The developer needs to understand that accounting information has qualitative and quantitative aspects and that its decisions need to reflect accounting's four

conventions—disclosure, materiality, consistency, and conservatism. Accounting information needs to be relevant, timely, reliable, consistent, and comparable.

The three choices for a developer are to account for credits off-balance sheet as intangible assets, on balance sheet as inventory, or on balance sheet as manufactured product. Developers need to choose how to account for their self-generated credits explicitly as it relates to the following issues. Price Waterhouse Coopers ("Trouble-Entry Accounting" 2007) considers the following as important issues:

- Classification of credits as intangible assets, manufactured product, or inventory;
- Recognition of credits on accounting statements previous to third-party audit;
- Value ascribed to credits at initial measurement as fair value, nominal value, or inventory;
- Value ascribed to credits at subsequent measurement can be lower of cost, net realizable value, or work-in-progress;
- Requirements for amortization and impairment of credits depends on if as inventory, then should be valued at the lower of net realizable value or cost; if as an intangible asset, they as no amortization; and if as manufacturing inventory, should use last-in first-out practice;
- Presentation of credits on the income statement depends on timeliness associated when the income from the sale of the credits is recognized and both methods suggest that the actual sale of the credits be recognized as 'other income'; if using the manufacturing accounting paradigm, sales are recognized as income;
- Recognition of purchased credits for investment purposes can be recognized as inventory; if as an intangible asset, they must first past the intangible asset test which means all intangible assets must be identifiable, be controlled, and have future economic benefits;
- Value of purchased recognized credits at initial measurement should be at cost of purchase and;
- Value of purchased recognized credits at subsequent measurement can either be at lower of net realizable value or cost, or at cost less amortization and impairment, or as valued by current inventory.

If the developer chooses to use a manufacturing accounting method, it will have three types of inventory—raw material, work in progress, and finished goods. Accounting for costs related to project development can be, a priori, assigned to assumed slower developing portions of the project as method to increase profitability on credits sold quickly. This can increase income relatively in the short-term. Yet many costs are fixed such as salaries, depreciation, and rent. Therefore, the developer can increase its income by adjusting how many credits $MtCO_2e$ are "produced." This means that internally the developer may want to choose accounting policies based on what different developers in the avoided deforestation sector use, and if not public at least monitor how reported income and costs-of-goods sold are impacted by the various accounting assumptions used.

Developer accounting rules need to be adapted before being applied; otherwise, law and government will dictate the rules and thus inhibit innovation. While it might be prudent to acknowledge credits as an asset and inventory on the balance sheet, credits are a product based on additionality, permanence, and the lack of leakage. Because a credit represents 1 $MtCO_2e$ that is prevented from being emitted into the atmosphere, it is in effect something that can't be touched, felt, tasted, and the less of it produced, the more money earned—in other words, 1 $MtCO_2e$ is intangible. Developers need verifiers and auditors to be able to ensure public assurance of their goods and services related to 1 $MtCO_2e$. Without verification and audit and public information dissemination, the market may instead demonstrate uncertainty, loss of credibility, and the inability of accurate comparisons across developers and sectors. Developers need their products to be fungible and marketable in the marketplace. Given that markets require transparency,

liquidity, and assurance of completion to exist, developers must account for credits in a manner that supports these ideals.

Bottom-Up Cost Accounting. Bottom-up cost accounting separates expected project costs into eight categories (CCIF 2007). These categories are marketing; information, education, and communication; science and research; finance and administration; sustainable livelihoods; enforcement and zonation; governance and planning; and other. After the developer inputs economic statistics, work-plan strategy, and sales and marketing assumptions, the model breaks down these costs by these eight functions as specified by the developer. It is then possible to see how expenses, capital expenses, and annual net funding needs vary over time. Since projects have dynamic funding needs over time, it is important for the developer to use a model such as this one because this model may demonstrate future unplanned cash flows. The developer can balance its funding needs with required sales needs while maintaining its internal rate of return.

PDD Adjustment Process

While implementing the project, it is important that the developer also adjust the PDD to reflect new information. This requires an iterative and adaptive management process to be clearly defined and implemented. This means new information can adjust the PDD to improve efficiency and efficacy, increasing the triple bottom line potential of the project (see Figure 15). The steps in this process are the following:

1. begin with a new PDD
2. implement the new PDD
3. monitor results
4. ingest results and discuss feedback
5. adjust operations to reflect feedback
6. rewrite PDD

The PDD then becomes a business plan.

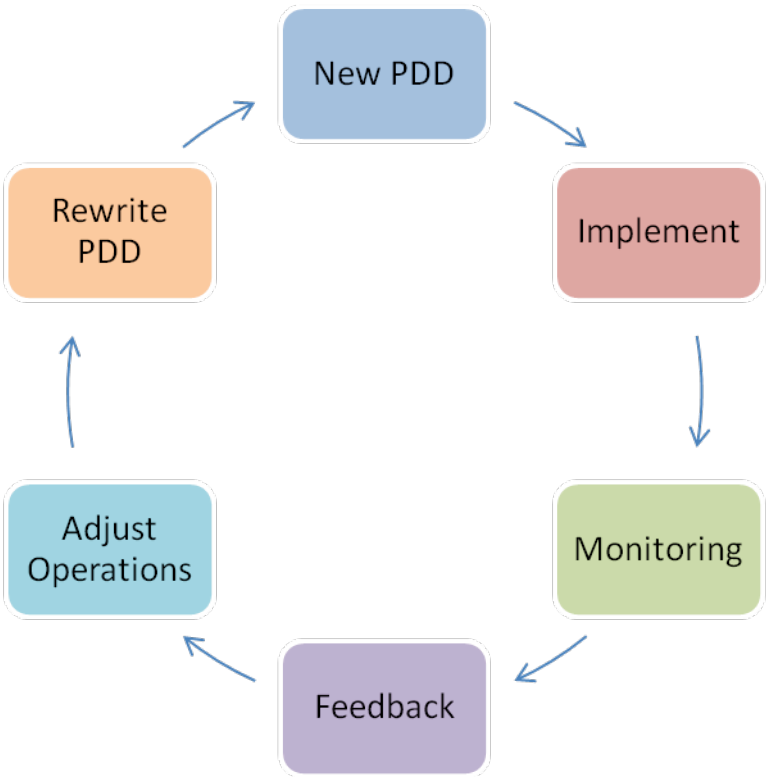


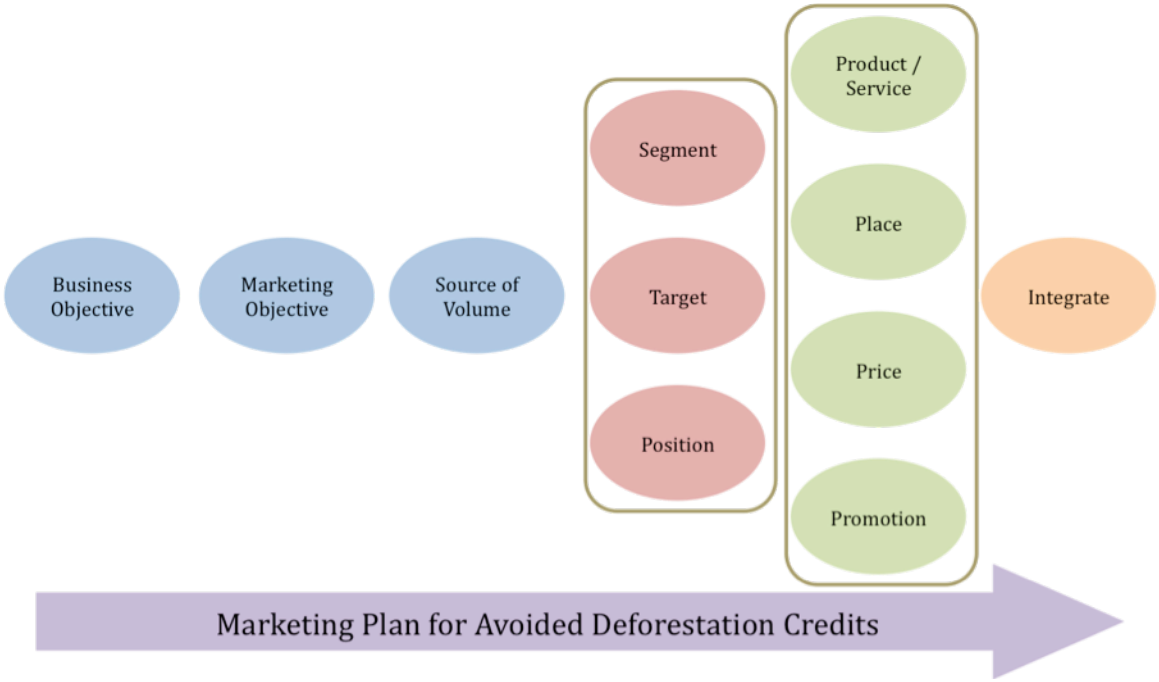
Figure 15: Project Design Document Adjustment Process

CHAPTER 4. SELLING CARBON CREDITS

Nordhielm's Big Picture Marketing Model

This chapter outlines nine steps for developing the business, from determining objectives to pricing and promotion.

Once carbon credits are manufactured by the developer and registered, the developer needs to decide how it will sell its credits. Nordhielm's (2006) marketing model, The Big Picture, is useful for scenario analysis for entering new markets (see Figure 16).



Source. Nordhielm 2006, p. xxvii. Adapted with permission.

Figure 16: Big Picture Marketing Plan

A big picture analysis allows the developer to conduct scenario analysis on how to market its carbon credits while maximizing the triple bottom line of people, planet, profit.

Step 1. Determining the Business Objective

The developer's first step is to decide its business objective. This is a reference point for the developer to aid in decision analysis. For example, if the developer is approached to design a grasslands project and its mission statement is to create carbon credits from forests, the grassland project should be followed through.

In deciding the business objective, the developer needs to answer three essential questions.

1. Who are we?— fundamental entity
2. What do we do better than anyone else?— core competence
3. Where should we go from here?— goal

The *fundamental entity* question, who are we, affects all future marketing decisions. The fundamental entity needs to be understood from the customer's perspective. Is the developer focusing on Asian tropical forest carbon? Is the developer developing fair-trade carbon with multiple added biodiversity and community benefits? Does the developer seek to have multiple distinct brands, hybrid/sub-brands, or an umbrella brand? This customer point of view assists the developer to design a project that can be easily sold. Umbrella branding versus distinct branding has significant advantages and disadvantages (Nordhielm 2006). Umbrella branding is more efficient while distinct branding has higher margins. Because developers are often cash poor and need sales, they might benefit from using an umbrella brand.

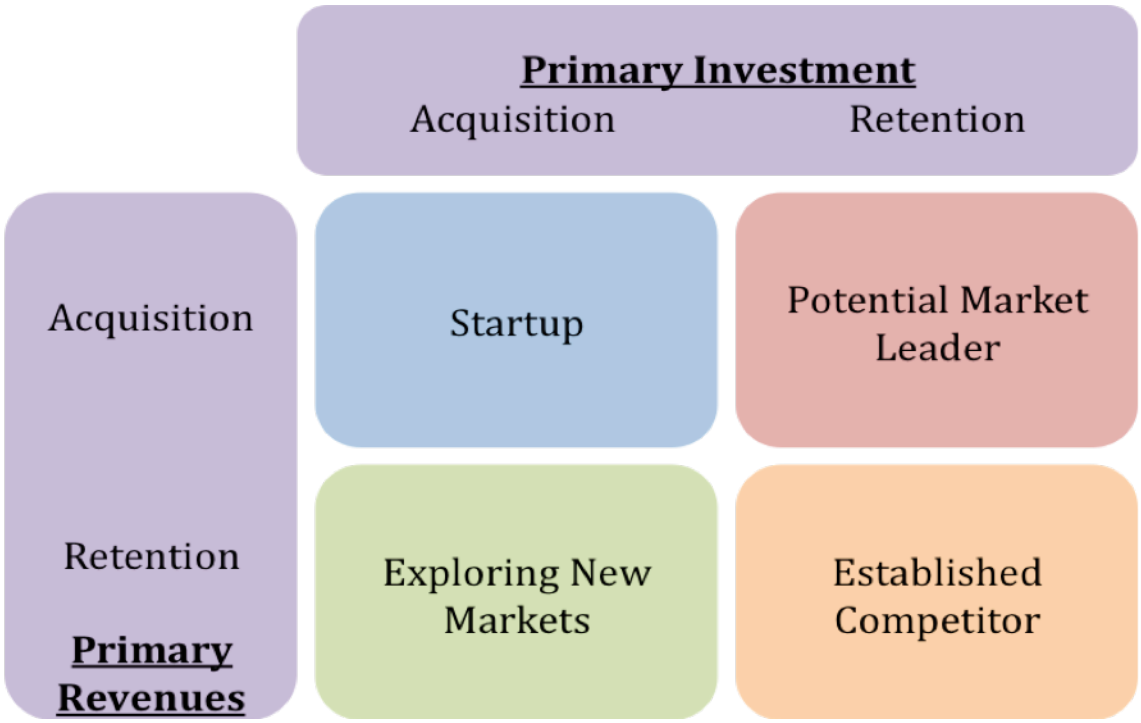
The developer determines its *core competence* by answering what it does better than anyone else—that is, better than any other competitor or coopetitor.

Once the fundamental entity and the core competence have been decided, the developer decides on its *goal*—where to go from here.

When all three questions are answered, business objective is defined within the framework of the developer's key strategic asset and key strategic benefit. For example, if the key asset is location, then the key benefit would be mitigating deforestation at this location.

Step 2. Defining the Marketing Objective

The developer's marketing objective is to acquire share. The market is growing and will not mature for many years, so developers should focus on acquiring rather than retaining share (see Figure 17). A developer needs to focus its primary investment on customer acquisition yielding its primary revenues. This makes the developer a startup company. Ultimately, the developer needs to keep customers, and to do this it needs to develop customer loyalty.

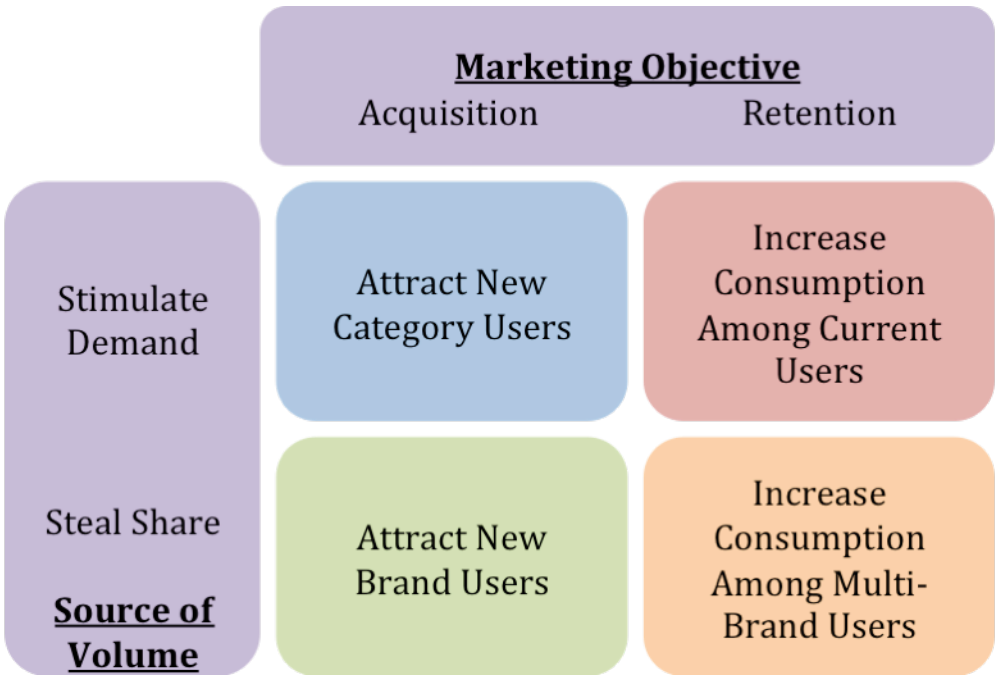


Source: Nordhielm 2006, p. 27. Used with permission.

Figure 17: Acquisition vs. Retention

Step 3. Analyzing the Source of Volume

The developer needs to analyze its source of volume. Volume can originate either from stimulating primary demand or stealing share. For the developer, volume source will be from stimulating primary demand. Due to the nature of engaging with multiple coopetitors, it is important from a market's perspective that the developer engage in transparency since this leads to liquidity and assurance of completion. The developer's strategy should be the acquisition / stimulate demand strategy (see Figure 18).



Source: Nordhielm 2006, p. 53. Used with permission.

Figure 18: Marketing Objective / Source of Volume

The developer can use this model to forecast cash flows from selling credits. To do this, it will need to do a top-down market analysis (see Table 5), a model that can yield intuitive understanding of buyers in the market. Using this model, the developer can forecast cash flows based on various assumptions. This type of model could be successfully integrated with the MPA cost model (CCIF 2007). These two models can evaluate the bottom-up cost accounting of developing a product that then can be sold to new customers.

Table 5: Bodies, Behaviors, Bucks Scenario Analysis

Inputs	Scenario #1	Scenario #2	Scenario #3	Scenario #4
Bodies				
Number of customers, target audience	20,000,000	5,000,000	2,500,000	1,000,000
Behavior				
Conversion ratio	5%	4%	4%	3%
Customers acquired	1,000,000	200,000	100,000	30,000
Units purchased per customer (MtCO2e)	200	100	100	50
Total MtCO2e purchased	200,000,000	20,000,000	10,000,000	1,500,000
10 MtCO2e per total project hectare – Total project hectares needed	20,000,000	2,000,000	1,000,000	150,000
Bucks (annual revenues)				
High assumption - $10	$2 billion	$200 million	$100 million	$15 million
Middle assumption - $8	$1.6 billion	$160 million	$80 million	$12 million
Low assumption - $5	$1 billion	$100 million	$50 million	$7.5 million

Source. Nordhielm 2006, p. 55. Adapted with permission.

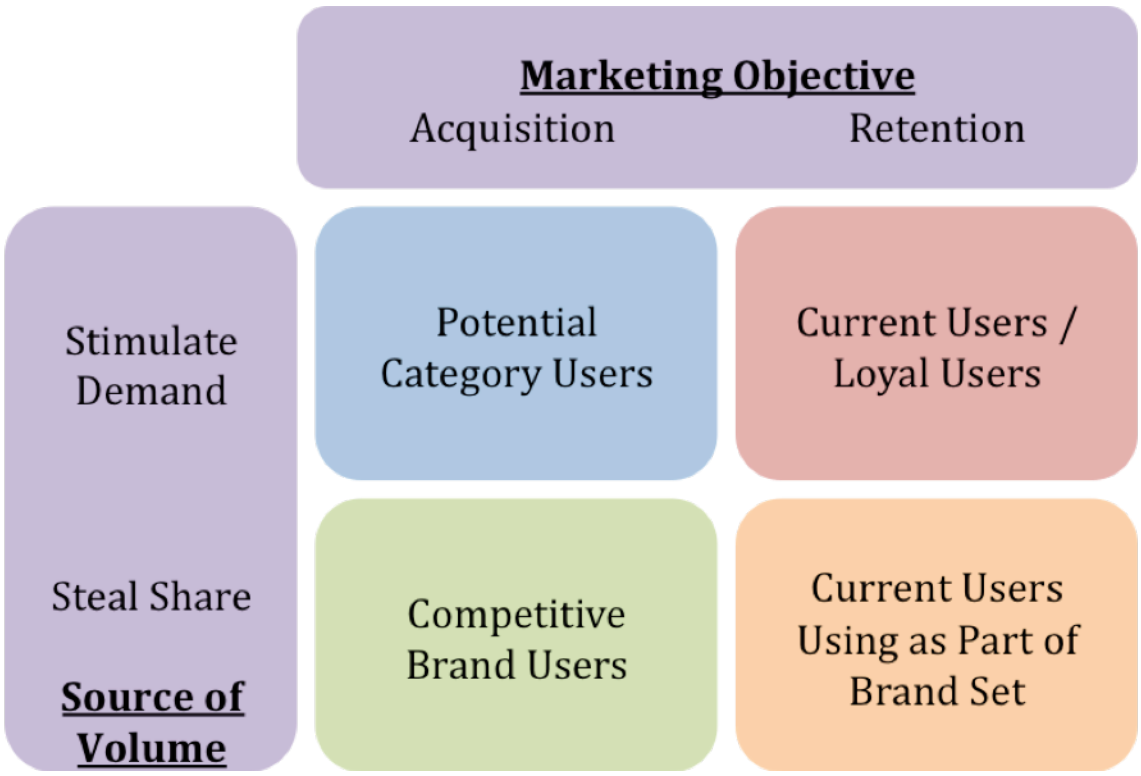
Step 4. Segmenting the Market

Developers will decide if they want to segment the market. Segmentation has four variables—demographics, behavior, attitude, and aspiration. Demographics are physical descriptions. Behavior describes specific customer actions. Attitude describes customer thoughts, values, and feelings. Aspiration refers to customer's wishes, dreams, and hopes. Aspiration is the segment with the highest margins. It is easier sell to demographic and behavior segments than attitude and aspiration segments. Yet attitude and aspiration provide a developer with a competitive advantage. From this point of view, the goal of the developer should be to develop an aspirational brand that emphasizes the category

variable of an avoided deforestation carbon credit's biodiversity and community co-benefits within an acquisition / steal share strategy.

Step 5. Targeting Users

The dynamic variable can improve this strategy. This means that the main variable is greenhouse gas emissions offsets with the dynamic variable being the project's co-benefits of biodiversity and community development offered. The developer should emphasize the co-benefits to segment its product from competitors and coopetitors. Segmentation variables can include characteristics of the main variable / dynamic variable such as consumer expectations and company capabilities. As shown in Figure 19, the developer will want to focus its acquisition / stimulate demand strategy on potential category users. The developer will want to create an imaginary ideal consumer. This idealized consumer who purchases the developer's credits needs to be described including habitat, behaviors, and consumption patterns. This will help design the developer's marketing plan.



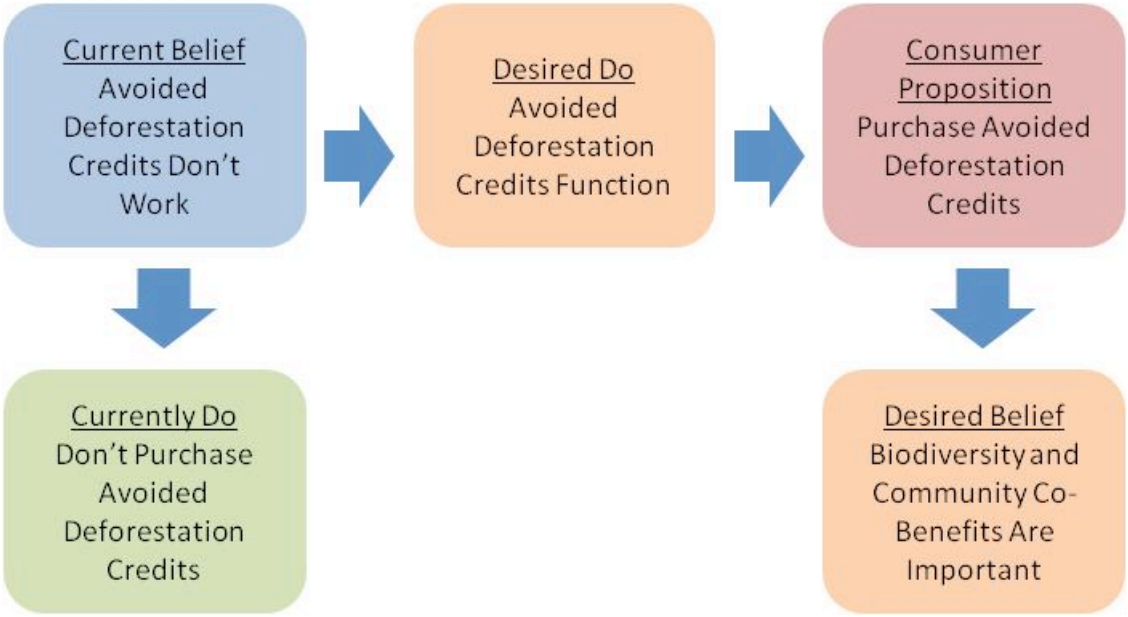
Source: Nordhielm 2006, p. 89. Used with permission.

Figure 19: Targeting Users Acquisition / Stimulate Demand

Step 6. Positioning the Project

In this step, the developer can begin to develop a message to the desired audience. In Figure 20, "Current belief" is how the desired market segment understands the developer's project positioning which then will result in a "Currently do." The "Desired do" is the direction that the developer wants to position its message. This will develop into a consumer proposition and desired belief. In the figure, the developer has crafted its message to allow for selling of credits into the market in a manner that engages the desired consumer in an attitudinal manner. This is the same attitudinal manner discussed

above under Segmenting the Market. In summary, the marketer will want to write a statement similar to this: "To high-net worth individuals, Conservation Inc. delivers the best co-benefits with carbon offsets because all our projects are audited and certified by PwC, SGS, and CCB as endorsed by Bank of America."



Source: Nordhielm 2006, p. 95. Used with permission.

Figure 20: Positioning

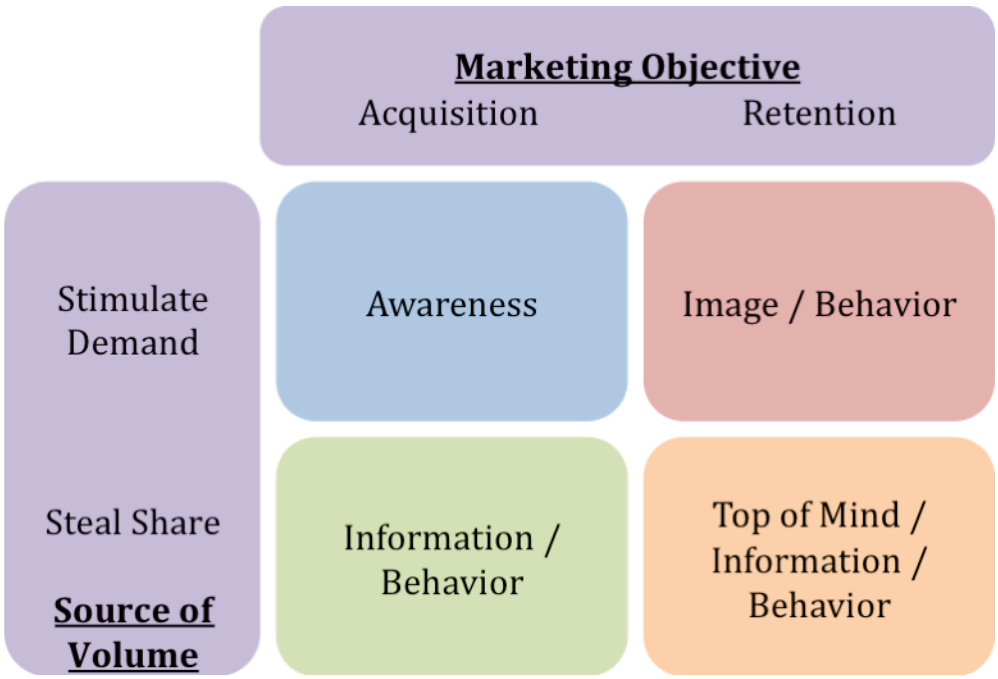
Step 7. Deciding on Product or Service

The developer needs to decide if its product is a service or a product. Most companies sell services if they also sell hard goods and products. Because of this, the developer will want to sell its product as a "service as a product." Services are intangible, cannot be inventoried, and generally are produced and consumed concurrently. There are

aspects of avoided deforestation carbon credits that do not exactly line up with a "service as product" framework, yet if the developer provides services to its consumers, it may be able to charge a higher margin because it will be creating added value for its buyers. The developer will need to manage expectations, production, credibility, and quantify services delivered. The developer can provide a high-end "fair-trade" carbon option to its buyers. This should be balanced with customers' expectations, emphasizing "consistency before brilliance" (Nordhielm 2006).

Step 8. Pricing, Placing, and Promoting

Since price is subjective, it is important that communications allow matching of the developer's marketing objective with the customer's needs. Marketing communication can be analyzed using basic awareness, top of mind awareness, information objective, image / attitude objective, and behavioral objective. Basic awareness lets consumers know that the product exists. Top of mind awareness encourages consumers to purchase the product because of brand rather than quality. Information objective lets consumers know what are the key distinguishing variables about a product are. Image / attitude objective changes consumers' attitude towards a product. A behavioral objective example is an infomercial. The developer needs to use marketing communication to affect basic awareness, information objective, and image / attitude objective resulting in increased sales. This is used in conjunction with a stimulate demand / acquisition marketing plan (see Figure 21). Marketing communication costing is based on the number of times a client is exposed to the marketing campaign.



Source: Nordhielm 2006, p. 146. Used with permission.

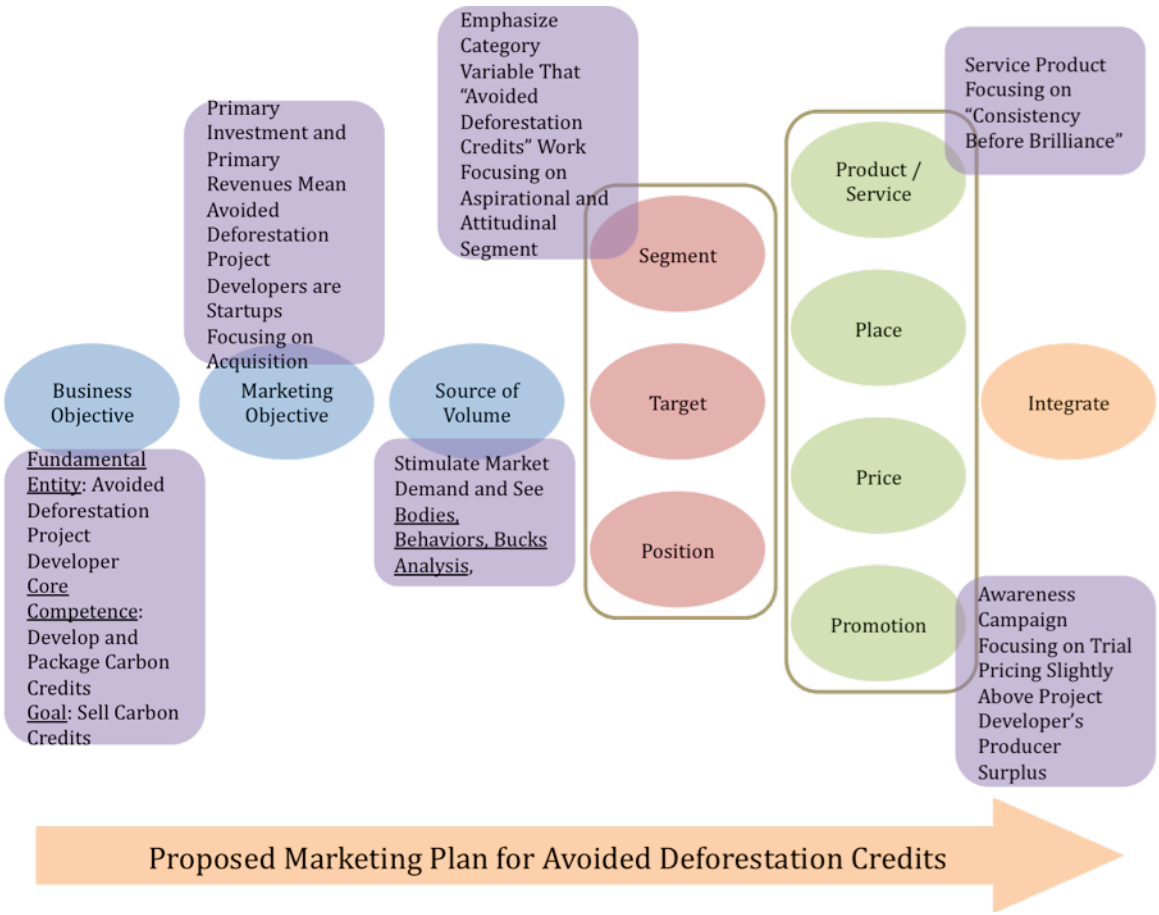
Figure 21: Awareness Campaign

It is important for the developer to price discriminate its carbon credits. Avoided deforestation carbon markets lack transaction transparency. It is difficult to know how much to pay for which added premiums within the avoided deforestation carbon credit market spectrum of products. The developer may choose to use penetrating pricing to enter the market. If it can provide superior customer service, it can then increase its prices above variable costs. The optimal pricing strategy places the avoided deforestation carbon credits between the consumer's reservation price and the developer's producer surplus (see Figure 22). This implies that to stimulate demand/acquire share, the

developer will need to engage in trial pricing. Trial pricing involves deep discounting as a method to gain market exposure and acquire share.

Step 9. Integrating the Steps

The avoided deforestation carbon credit market is an acquisition / stimulate demand market. The developer needs to educate desired consumers about the benefits of both the brand and the market. This requires a strong attitudinal and or aspirational message that can be packaged into an awareness campaign that attracts new category users by focusing on a desired belief and consumer message that these credits create value, mitigating global climatic disruption with local biodiversity and community co-benefits (see Figure 22).



Source. Nordhielm 2006, p. 166. Adapted with permission.

Figure 22: The Big Picture – Avoided Deforestation Carbon Credit Sales

CHAPTER 5. NEXT STEPS:

THE ECOSYSTEM SERVICES CENTURY

The 21st century is the ecosystem services century due to the fact that businesses and local communities will be able to make money based on conserving and protecting ecosystem services. Ecosystem services include the services that ecosystems provide society and the natural ecosystems that societies depend upon. This includes carbon sequestration, water quality, and biodiversity. In other words, as global climatic disruption escalates and thousands of hectares of tropical forest are eliminated daily, destroying their ecosystem services, these services become more valuable to society because of scarcity and demand by an increasing global population. Therefore, inasmuch as the 20th century was the century of financial capital, the 21st century is the century of natural capital.

Project owners and communities and project developers who have read this paper should now be able to implement the framework of raw materials, manufacturing, and sales to develop their projects. The project owner manages the land—the raw material from where carbon credits are created. The project developer develops the avoided deforestation carbon credit project and then uses the land to manufacture carbon credits. Both the project owner and project developer sell avoided deforestation carbon credits. The process is simple.

Thoumi's Rational Convergence Model for communication clarifies and simplifies the current avoided deforestation market for the parties involved—scientists, civil society, government, and business—in order to create the manufacturing base from which to produce carbon credit offsets. Afuah's New Game business model allows the

project developer to focus the project's business strategy on action items using the activities, values, appropriability, and change model. Thoumi's Emeralds on the Equator "Zamrud Khatulistiwa" Model allows the project developer to analyze the supporting, cultural, provisioning, and regulating services to understand and include all aspects of the ecological services into the project design document. Nordhielm's Big Picture model allows the project developer to commercialize and market its projects and avoid issues that could limit project success.

Sustainable projects require transparency, liquidity, and assurance of completion. By developing avoided deforestation projects that provide buyers with the capacity to comparison shop, the avoided deforestation carbon model can develop from its current infancy into a successful global climatic disruption mitigation mechanism.

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