CHALMERS

Strategic planning of an Anti-poaching Project in Sub-Saharan Africa

- *Valuating the rhino and determining the potential for Project Ngulia*

Bachelor's Thesis in Industrial Engineering and Management

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Abstract

Problem - Rhinos in sub-Saharan Africa are facing extinction, especially the Black rhino. Approximately 5000 Black rhinos remain in the world and the number is decreasing by the day. Responsible for this development are the people participating in the supply chain of wildlife trading, including criminal organisations, traditional medicinal practitioners in Asia, and poachers who slays the rhinos for their horns. Many organizations are making an effort to save the animals from their fate, however, none have accomplished to create a sustainable solution to the problem. The issue at hand is to secure the rhino specie and the environment for the people who risk their lives when protecting the rhinos.

Aim - The purpose of this thesis is to calculate the value of a rhino in Africa, and to use this value when analysing the potentials of an anti-poaching project like Project Ngulia. Project Ngulia is a non-profit organization and is situated in Tsavo West National Park in Kenya, in a sanctuary named Ngulia. The project provides a bottom-up technological security and a border control solution, which also meets sustainability requirements.

Within the thesis an estimate valuation of a rhino's value is calculated. This information is used in the argumentation for wildlife conservation and to identify the market potential. The market potential is presented in a strategic plan and the conclusion made is that the venture will have to expand to other areas that are in need of a new innovative security solution, and thereby possibly save the rhinos and other endangered animals. The authors also recommends the project to increase their publicity, through social media and the internet, as they are competing with other projects conducted by e.g. Google and WWF.

Theoretical Framework - The thesis is based on theories from renowned sources. The literature and theories included in the thesis has generally been collected from course literature, which has been covered in the bachelor's programme Industrial Engineering and Management at Chalmers University of Technology. The theoretical framework consists of models and concepts regarding valuation of natural resources, creation of business plans, market analyses and risk analyses, which has been the foundation as to answer the research questions. Chapter four consists of information about branding, corruption, globalization, digitalization, innovation, economic growth and corporate social responsibility. These factual categories have been used in the different models conducted throughout the thesis and finally in the closing discussion.

Method - The thesis makes use of an inductive approach, meaning that empirical observations and data collections are used to create new theories. The main methodology was qualitative, although, some quantitative elements are present. The valuation of a rhino and the analysis of Project Ngulia were conducted to make trustworthy conclusions. Primary data was collected through interviews conducted in person, over Skype/phone, or via e-mail. All data has been scrutinized according to criteria presented in methodology literature to ensure that it holds sufficient quality.

Results and Implementations - The case studies, together with subsequent discussions, have resulted in an approximated value of the rhino and an analysis of the market potential, competitive- and risk climate of Project Ngulia. The value was approximated to $290 000 - $675 000 which helped conduct the consecutive discussion. Using the calculated value of a rhino showed that the number of rhinos necessary in a park to reach break-even, in one or five years, for an investment in Project Ngulia's solution would be 269 and 54 respectively.

Furthermore, the results showed that there is in fact a market potential for Project Ngulia and that it has certain unique aspects, compared to competing projects, which will make it stand out. The identified risks will not threaten the project if they are managed carefully and precisely.

Connecting the case studies with the theoretical framework showed that companies have many advantages to gain from investing in the project.

Sammandrag

Problem – Noshörningar i subsahariska Afrika hotas av utrotning, framför allt spetsnoshörningen. Idag finns det omkring 5000 noshörningar kvar i världen och antalet minskar. De som är ansvariga för denna utveckling är de som är del av leveranskedjan för handel av naturliv vilka är kriminella organisationer, utövare av traditionell medicin I Asien och tjuvjägarna som dödar noshörningarna för deras horn .Tusentals noshörningar dödas varje år och även om många försök görs för att rädda dem så har inga lyckats skapa en hållbar lösning till problemet. Uppdraget är att säkra noshörningarnas fortsatta existens och miljön för de som riskerar sina liv för att skydda noshörningarna från utrotning.

Syfte – Syftet med denna rapport är att beräkna värdet för en noshörning i Afrika och använde detta värde till att analysera potentialen för ett projekt som jobbar mot tjuvjakt, som projekt Ngulia. Projekt Ngulia är en icke vinstdrivande organisation som är belägen i Tsavo West National Park i Kenya, i en fristad vid namnet Ngulia. Projektet levererar en bottom-up teknologisk säkerhet- och gränskontrollslösning som möter kraven för hållbarhet.

I rapporten beräknas en estimerad värdering av en noshörning. Denna information används i argumentationen för naturlivsbevarande och för att identifiera marknadspotentialen. Marknadspotentialen presenteras i en strategisk plan och slutsatsen som görs är att uppdraget kommer att behöva expandera till andra områden som är i behov av en ny innovativ säkerhetslösning och därmed möjligen rädda noshörningen och andra utrotningshotade arter.

Teoretiskt ramverk – Rapporten är baserad på teorier från ryktbara källor. Litteraturen och teorierna som är inkluderade i rapporten har generellt samlats från kurslitteratur, som har undervisats på kandidatprogrammet för industriell ekonomi på Chalmers tekniska högskola. Det teoretiska ramverket består av modeller och koncept som berör värdering av naturresurser, skapande av affärsplaner, marknadsanalyser och riskanalyser, vilka har varit fundamentala för att besvara frågeställningarna. Kapitel fyra innehåller information om märkesprofilering, korruption, globalisering, digitalisering, innovation, ekonomisk tillväxt och Corporate Social Responsibility som har använts i olika modeller och i den slutliga diskussionen.

Metod – Rapporten använder en induktiv ansats vilket innebär att empiriska observationer och datainsamlingar används för att skapa nya teorier. Den huvudsakliga metodologin var kvalitativ, men vissa kvantitativa element förekommer. Värderingen av en noshörning och analysen av projekt Ngulia utfördes för att komma fram till pålitliga slutsatser. Primärdata samlades in genom intervjuer i person, via Skype/telefon, eller via e-post. All data har granskats enligt kriterier, som finns presenterade i metodologilitteratur, för att försäkra att den håller tillräcklig kvalitet.

Resultat och implementation – Fallstudierna, tillsammans med efterföljande diskussioner, har resulterat i ett uppskattat värde på en noshörning och en analys av marknadspotentialen, konkurrensklimatet och riskklimatet för projekt Ngulia. Värdet på en noshörning uppskattades till $290 000 - $675 000 vilket hjälpte till att utföra den efterföljande diskussionen. Genom att använda det uträknade värdet skulle det antal noshörningar som behövdes i en park för att nå break-even, på ett eller fem år, för en investering i projekt Ngulias lösning vara 269 respektive 54 stycken. Resultaten visade att det finns marknadspotential för projekt Ngulia och att projektet har vissa unika aspekter jämfört med konkurrerande projekt som gör att det kan stå ut i mängden. De identifierade riskerna hotar inte projektet om de hanteras noggrant och precist.

Sammankopplingen av fallstudierna och det teoretiska ramverket visade att företag har många fördelar att ta del av om de investerar i projektet.

Glossary

Benefit Transfer Method (BTM) - A valuation method based on revealed preferences that extracts data from existing studies and uses it in a similar case.

Command-Control-Communicate (C3) - An information system used within military organizations.

Consumer surplus - Occurs when a consumer is willing to pay a higher price than the actual market price of a good or service.

Contingent Valuation Method (CVM) - Valuation method based on stated preferences.

Gross domestic product (GDP) - A monetary measurement and is the value of all services and goods produced in a time period.

Kenyan Wildlife Service (KWS) - A Kenyan state corporation which conserves and manages Kenya's wildlife

Sub-Saharan - The area of Africa that lies south of the desert Sahara.

Travel Cost Method (TCM) - A valuation method based on revealed preferences. The valuation is based on tourists' total travel costs to a destination.

The Big Five - Five African mammals, which are popular on safaris: Elephant, Rhino, African buffalo, Lion and Leopard.

Visitations rate - The number of visitors per 1 000 or 1 000 000 inhabitants of the zone. It is used in the Travel Cost Method.

Unmanned Aerial Vehicle (UAV) - A more common name is drone and it is an aircraft without a human pilot. It can be operated with a remote controlled by a human or fully autonomously manoeuvred by on board computers.

Willingness to Pay (WTP) - The maximum price a consumer is willing to pay for one unit of the product or service.

World Wildlife Fund (WWF) - The world's leading conservation organization working to protect the future of nature.

Xeric shrublands - A type of climate often found in deserts.

Table of Contents

1. Introduction

This introduction will describe the background of the subject treated, the purpose as well as the delimitations and the research questions that the thesis aims to answer. The reader will, in the end of this chapter, also find an explanation of the thesis's structure.

1.1. Background

This thesis addresses the issue of poaching of rhinos in sub-Saharan Africa and will also explain the potentials of Project Ngulia, an anti-poaching project in Kenya. In the segment below, the reader will find a background description of both the subject of poaching of endangered wildlife and of Project Ngulia.

1.1.1. Wildlife Poaching

Poaching is not a new phenomenon. In fact, poaching of the Black rhino was already a critical problem in the late 1900's (Tatham et al., 1989). Studies show that over a 10-year period, from 1970 to 1980, the African continent saw a decrease in the Black rhino population with 50 000 animals. Even more remarkable is the price increase that has evolved during the years. Since the 80's, the kilo price of rhino horn has increased by a factor of 100 and today it is worth approximately $65 000 per kilo, which makes it one of the most valuable animal resources to be illegally traded (Douglas et al., 2014). The demand on rhino horn mainly originates from Asia, where the horns are used as an ingredient in traditional medicine (The Assam Tribune, 2016). What Project Ngulia aims to accomplish is to stop or reduce the poaching epidemic and secure the areas affected by the poaching.

In Kenya alone, the population of Black rhinos has decreased from 20 000 to 650 in a period of 40 years (Project Ngulia, 2015). Theoretically, this means that the Black rhino would face extinction in Kenya in less than two years. Even worse, the entire rhino species would, at the current rate, face extinction in ten years. If this became reality there would be both a loss in biodiversity as well as have a negative impact on Kenya, economically and socially. Nonetheless, this conclusion is based on worst-case scenario, when in reality many uncertain factors will have an impact on the future development.

Project Ngulia does not have a well-defined strategy and lacks a clear description of how they should approach their goals and vision, like many other similar organizations. This thesis will therefore form a business plan framework for projects working against poaching of rhinos, where Project Ngulia acts as example for which the structure is built upon.

1.1.2. The Background of Project Ngulia

In 2013, the immediate threat of Black rhino extinction inspired the initiative Project Ngulia by representatives from Stimson Center[1]. The project is a pilot project owned by Kenya Wildlife Service, KWS, and is currently being tested in Ngulia rhino sanctuary in Tsavo West National Park. Stimson and Linköping's University are the main partners assisting KWS to implement the security systems. Stimson is an organisation which is highly involved in creating and developing innovative ideas, aiming to change the world for the better, where environmental crime, border

[1] Bergenäs, Johan; Senior Associate and Director of the Partnerships in Security and Development Program, Personal Interview, 22 January.

security, partnership development and security are a few of its main focuses (Stimson Center, 2016 (B)). Linköping's University is one of Sweden's largest, and technology is one of the university's main fields (Linköping University, 2016). The project has attracted additional partners and today consists of a team with several organizations who all share the common belief that it is a moral and environmental responsibility to preserve the Black rhino population. Project Ngulia's internal information document can be found in Appendix 4.

Together the partners work against the poachers and strive to rival them in their inventive ways of conducting environmental violations (Project Ngulia, 2015). However the project is more than a quest to save the rhino specie; it is a quest to outperform criminal organizations and people who do harm to others. Research also suggests that social- and border security have an impact on Kenya's ability achieving its main objectives in terms of economy and politics (Bergenäs, 2013).

Furthermore, the project has been featured in media outlets and has had considerable publicity (Project Ngulia, 2016). The UN and the Word Bank, together with large newspapers such as The New York Post, have all published articles about the project (Westman Svenselius, 2015). In 2014 the project also became a part of the Clinton Global Initiative Commitment to Action.[2]

According to the KWS the goal is not only to create a secure environment, but to create a cost-effective bottom-up technological platform that promotes security. The system ought to be scalable and applicable to other national parks (Khayale, 2015). The key is to create an easily implemented toolbox, consisting of different security applications and devices[3]. The general aim is to create a concept adapted for Kenyan and African culture, which will make scalability and replicability within the area possible. The phases of the project: finished, active and planned, are presented in Figure 1.1. below.

Below, the different phases and the progress of Project Ngulia are described.[3]

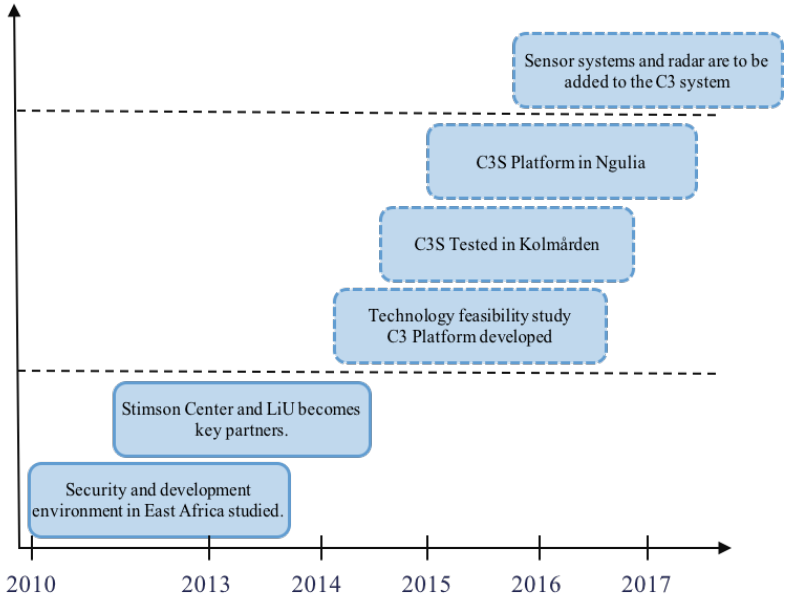


Figure 1.1: Phases of Project Ngulia.

[2] Bergenäs, Johan; Senior Associate and Director of the Partnerships in Security and Development Program, Personal Interview, 22 January.
[3] Gustafsson, Fredrik; Professor at Linköping's University, Norrkoping, 2016, Project briefing and study visit to Kolmården, 21 April.

1.2. Purpose

The purpose of this thesis is twofold: To calculate the value of a rhino in sub-Saharan Africa and to establish the market potential for Project Ngulia. The value of a rhino will be determined by using prevalent valuation methods while the market potential will be established by performing a situation analysis, a market analysis and an assessment of the current risk climate. Lastly the calculated value of a rhino will be used to further extend the market potential discussion.

1.3. Research Questions

The purpose of this thesis presents two main research questions:

- What is the value of a rhino in sub-Saharan Africa?
- What is the market potential for Project Ngulia?

There are factors to consider when calculating the value of a rhino. The research question regarding the calculation of the value of a rhino can therefore be further divided into:

- What is the relationship between supply and demand on the market for rhino horn?
- How great are tourists' recreational expenses to view wildlife?
- How important are the rhinos for the tourist industry in Kenya?

The research question regarding market potential can be further divided into:

- What other projects are working proactive against the poaching of rhinos and what distinguishes Project Ngulia from these competitors?
- How large is the market for projects like Ngulia?
- Is the project economically, environmentally and socially sustainable?

1.4. Delimitations and Limitations

To be able to complete the thesis in the set time period, delimitations have been made. There have also been some limitations due to lack of funds and data. The delimitations and limitations are further described below.

As for valuation methods, the Contingent Valuation Method (CVM) has not been used. This method is based on making on-site surveys. Lack of funding made an on-site visit impossible, so this method is not used when evaluating the value of a rhino. Surveys are also a part of the Travel Cost Method (TCM), but for same reason as described above, this has not been conducted. Instead the study is based on information collected from other studies using the Benefit Transfer Method (BTM). The complete TCM requires substantial amount information not accessible to the authors of the thesis and a decision has been made to make calculations based mostly on the Zonal Travel Cost Method.

Further delimitation has been made in the *Supply and Demand based model* as the costs for parks to maintain rhinos have not been taken into account when comparing the illegal and legal market. For an even more reliable result these cost ought to be considered.

The theoretical framework describes how a market research ought to be conducted. When doing a market analysis a market research usually is included, however the scope of a market research on this subject is too broad. Therefore it has not been possible to conduct one due to time restrictions.

Delimitations have also been made regarding the theoretical framework. There are a plethora of different theories regarding business plans and competitive analysis. The ones presented in

Chapter 2 are seen as the most relevant for this thesis. To present all of the existing theories would be both irrelevant and divert focus from the main purpose.

Due to time restrictions and a suggestion from the project managers that it would be unproductive, interviews with all partners have not been conducted. Information about partners has been gathered from project managers as well as from some selected partners that were deemed to be most important.

As for limitations, the research group has not been able to make an on-site visit to the Ngulia sanctuary because of insufficient funds. To compensate for this, continuous dialogue and detailed interviews have been held with managers of Project Ngulia, as they make regular visits to the Ngulia sanctuary and can therefore deliver a fair evaluation of the situation.

Another limitation is the lack of data available. This has called for the need to make assumptions, which are presented, in the specific chapter where they are used. Moreover, Chapter 5, which is based on mostly numerical data, has been limited because of the difficulty to collect valid data and assumptions in this section have been made based on available data and interviews with experts in the area.

Without these constraints the thesis could have been further developed and the thesis authors therefore suggest and encourages further research on the subject. The call for further research has been presented in the concluding chapters. These suggestions include doing a more in-depth research for the different sections of this thesis and thereby provide more accurate results.

1.5. Thesis Disposition

The thesis comprises eight chapters with an accompanying appendix where a business plan for Project Ngulia can be found. Chapter 1 describes the background of the thesis and a subject presentation is presented together with the purpose, research questions and delimitations. This ought to give the reader an initial understanding of the overall subject. In Chapter 2, theoretical framework, relevant theory and models are presented. Chapter 3 describes the procedure used to guide the choice of methods for the thesis. Chapter 4 includes facts about Kenya and rhinos that are necessary for the valuations in Chapter 5 and for the analysis of Project Ngulia in Chapter 6. As discussions are included in the different sub-chapters of the case studies, Chapter 7 consist of a summarizing discussion, also describing the sustainability of the projects and its weaknesses. The thesis ends with Chapter 8, presenting a conclusion of the entire thesis. An illustration of how the different segments of the thesis relate to each other is shown in Figure 1.2.

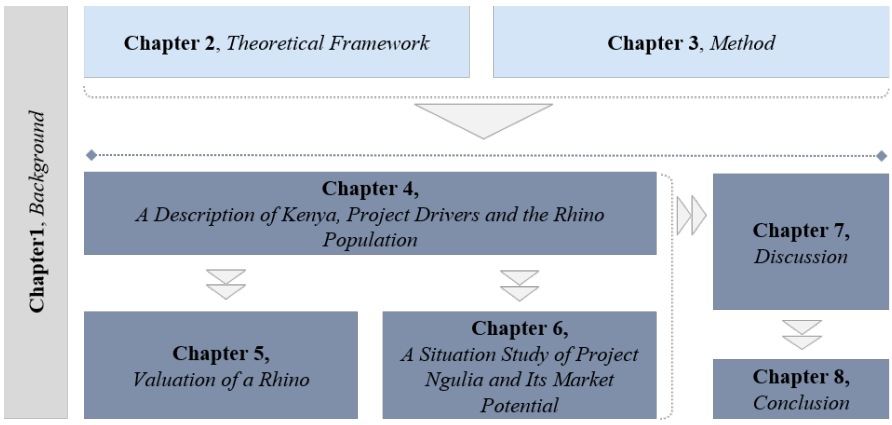


Figure 1.2: Thesis structure.

2. Theoretical Framework

In this chapter, theories used in this thesis are described. Firstly, different sustainability variables will be specified, they will act as the foundation for the discussion chapter. This section is followed by theory regarding different valuation methods. Lastly, in accordance with the second part of with the twofold purpose, theories regarding market potential will be presented.

2.1. Sustainability Variables

Sustainable productions, and projects, are defined and described through three dimensions: economic, social and environmental aspects. These can be seen from a global and national perspective, depending on how the project contributes and in what way. Additionally sustainability can be defined through a project's or corporation's perception. A brief description of the different perspectives and the sustainability requirements that need to be met, before they can be regarded as economical, social or environmentally sustainable are plotted below in the Table 2.1.[4]

	Economic	Environmental	Social
Global	▪ Equal distribution of wealth	▪ Reduce global warming ▪ Global health issues ▪ **Biodiversity** ▪ Use of natural resources	▪ Global political stability ▪ Global welfare ▪ No military conflicts ▪ No abuse of human rights
National	▪ **Growth for national economy**	▪ Reduce global warming ▪ Global health issues ▪ Use of natural resources	▪ **Improve standards of living** ▪ **Job opportunities** ▪ **Social security** ▪ **Good infrastructure**
Project/ Corporate	▪ Growth and profit consumption	▪ Minimize energy consumption ▪ Minimize material consumption ▪ **No health hazards**	▪ **Company survival** ▪ **Corporate Social Responsibility** ▪ **Employee benefit programs** ▪ **Employee training**

Table 2.1: Sustainability variables from different perspectives

2.2. Demand and Supply of Wildlife Parts

In a pure market economy, the interaction between demand and supply depend mainly on the price of the goods (Eklund, 2013). On a market, where the price is elastic, the interaction will lead to an equilibrium, which is demonstrated in Figure 2.1., where p_c is the market price at the point where the demand equals the supply and q_c is the quantity at the price p_c. Regulations on markets change the price mechanism and affect the market price. Demand depends on customer preferences, market growth, consumer income, price on related products and competing innovations (Granstrand, 2010). Demand surplus can lead to supply shortage on the market and therefore result in illegal markets, which also generate higher prices and therefore attracts new producers and sellers to the market (Eklund, 2013).

[4] Winroth, Mats; Professor in Economies of technology and organisation at Chalmers University of Technology, Gothenburg, 2015, lecture in production management, lecture, 1 April.

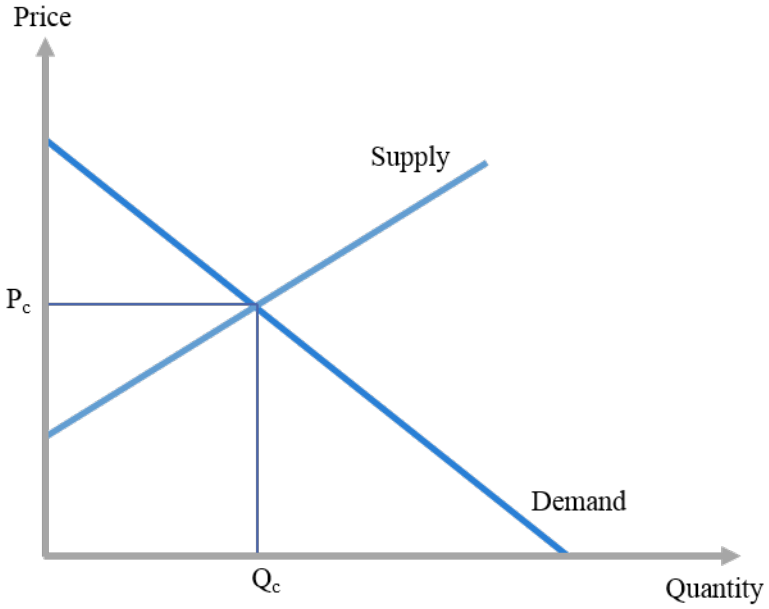


Figure 2.1: Supply and demand model on a free market.

The commercial trade is one factor that has influenced the overexploitation of wild species. To be able to predict how the trade will develop in the future, analysing elements such as the patterns of demand, price elasticity and the co-evolution of supply and demand for a specific species are key (Brooks et al., 2010).

The price elasticity of demand is the change of quantity in demand as a consequence of one% price increase (Granstrand, 2010). The elasticity may vary. Research indicates that the demand of rhino horn is not sensitive to changes in the price of the horn (Crookes et al., 2015). Crookes states that rhino horn can be classified as a luxury good, meaning that consumption of horn will escalate with increased income.

The demand surplus of wildlife parts leads to illegal trade and black markets (Wyler et al., 2008). Factors driving the illegal hunting of wildlife parts are, to mention some, trophy poaching, household consumption and commercial gain. Disturbances between supply and demand of commodities cause high volatile prices on the market, leading to new supply chains rapidly being formed (Brooks et al., 2010). Trade of biodiversity products is challenging as it can lead to the loss of species.

2.3. Valuation Methods

Valuations form the basis for decision-making regarding amounts of money or wealth transferred from one party to another (Thomas et al., 2010). Valuations are used e.g. when determining whether a strategic initiative should be implemented or when buying a privately held business. Thus valuation is of importance for both businesses and projects.

The value of an item varies between different stakeholders (Friedman, 2006). Stakeholders are persons or groups with specific interest in a particular object, as a result of their involvement or how the item is affecting them. A firm has to create and distribute value to a plurality of stakeholders for long-term survival, which leads to ambidexterity paradoxes (Minoja, 2012). Stakeholder management consists of comparing and balancing short- and long-term effects of decisions for both the different stakeholders and for the whole firm itself.

Sustainable management of wildlife could provide a revenue source for developing countries (Navrud et al., 1994). One challenge is to find methods to realise the economic potential of

wildlife. Economic analysis methods from traditional business markets have been transferred to new areas such as natural resources (Haab et al., 2002). To measure how efficiently resources are being allocated, estimations of the benefits and the costs associated with the item is measured. Valuation of a nature resource starts with defining what should be valued. Thereafter, an economic model is formulated followed by questionnaire design and finally estimations of the resource value are made.

Two different types of methods are used when evaluating environmental goods; revealed and stated preference methods (Navrud et al., 1994). Stated preferences methods relies on answers from survey questions, while revealed preference methods are built on statistical implications based on values from actual choices people made (Champ et al., 2003). The Travel Cost Method and The Benefit Transfer Method, which are revealed preference methods and the Contingent Valuation Method, which is a stated preference method, are three independent valuation methods to valuate environmental goods.

2.3.1. Contingent Valuation Method

CVM can be used to receive an economic valuation of a non-market good such as the natural environment (Black et al., 2013). It is based on surveys to find out how much a consumer would be willing to pay, know as Willingness to Pay (WTP), for a feature, or the compensation the customer would require for the loss of a specific environmental feature. The method aims to obtain information about individuals' preferences and WTP through direct questions (Navrud et al., 1994). It can be used to evaluate a large spread of public goods or services. Surveys are used to estimate individuals' WTP depending on changes of the quantity and quality of goods.

2.3.2. Travel Cost Method

Another method for determining the value of natural resources is TCM (Park et al., 2013). The conceptual idea is to calculate visitors' total travel costs to a specific destination, and this information can then be used as an approximate valuation of the site (Tourkolias et al., 2014). The TCM identifies the fluctuations in travel cost which can be used to create a demand curve (Navrud et al., 1994).

There are three different types of TCM; the Zonal, the Individual and the Random utility TCM (Tourkolias et al., 2014).

- *The Zonal Method:* The simplest method that solely takes the travel costs in consideration.
- *The Individual Method:* An analysis to see if there is any relationship between numbers of visits made by one visitor to the site and the travel costs. This method is complex resulting in a good approximation for the valuation of the site.
- *The Random Utility Method:* The method that is most commonly used (Haab et al., 2002). The reason to this is that it also considers the quality of the site.

The first step in the TCM is to determine the different geographical zones that visitors come from, and the division should be distance dependent (Tourkolias et al., 2014). The next step is the data collection regarding numbers of visitors and the visitation rates from each zone. There are several important factors to consider when calculating the average cost for each tourist, which is the next step. These factors are entrance fees, tour costs, travel expenses, accommodation costs, the cost of time and other expenses made at the recreational site.

After choosing a statistical model and when all the data is collected, a demand curve can be created, for example the linear model or the semi-log model (Tourkolias et al., 2014). By using the demand curve, a total annual value for a site can be estimated as the sum of total travel costs and consumer surplus for all the visitors.

2.3.3. Benefit Transfer Method

BTM makes use of existing studies to determine e.g. welfare estimates or the value of an environmental asset (Johnston et al., 2015). The method extracts data from an existing study and uses it in a similar case. It is most commonly used to estimate the WTP for customers who are, in some way, interacting with the environmental resource in question. Reasons for using this simplified approach for valuation of environmental resources is that it does not need the same amount of resources compared to primary research and can therefore provide results in a situation where e.g. time and capital are limited. The results from the BTM can only be of the same quality as the studies that are used to produce the results.

There are two types of the BTM (Johnston et al., 2015). Benefit Function Transfers uses an estimated parametric function based on data from pre-existing studies to determine WTP. The other method, called Unit Value Transfer, is completed by transferring numbers or sets of numbers from a pre-existing study. These numbers can be transferred directly without modifications or they can be adjusted depending on how great the fit between the pre-existing study and the study at hand is. Benefit Function Transfer often outperforms unit value transfer in terms of accuracy. However, Unit Value Transfer is very advantageous when it comes to ease of implementation and data requirements. And if the study site and the site in the pre-existing study is very similar, the Unit Value Transfer can produce good results.

Studies using the CVM method, or other stated preference methods, are well suited for doing a BTM (Johnston et al., 2015). They provide a flexibility that is not available in revealed preference methods. Stated preference methods also captures different kinds of values, both use and non-use values.

2.4. Business Plan

Strategic planning is a necessity for any organisation that wants to do the right thing and do that thing right (Allison et. al, 2005). It clarifies the task and goal to all involved parts and it also provides information that can be used to market the organisation towards new potential funders. The plan creates a forum for stakeholders to discuss the values and ideas while reminding them of what the core importance of the organisation actually is, thereby causing them to devote more focus to reach that specific goal.

Many non-profit organisations (NPO) include a business plan in their planning process (Allison et. al, 2005). While the financial aspects of an organisation are of great interest for investors, the business plan has to be adapted because the financial goals for a NPO are not to be profitable. It is difficult to predict the pay-off for investors, as there is an uncertainty in future revenue streams.

2.4.1. The For-profit Context

Sahlman argues that many business plans fail because they rely too heavily on numbers and therefore do not dedicate enough focus to describe the more relevant parts of the plan (Sahlman, 1997). A business plan should consist of four main areas:

- People: everyone who are affiliated with the project are of great importance because of their competence and knowledge, both in general and regarding the subject at hand. This becomes the core of a project and may determine if it will succeed or fail.
- Possibilities: implicates what the actual goal of the idea is and what potential obstacles it may encounter.
- Context: refers to the elements that might influence or affect the idea but cannot be controlled by the project participants. This could be the rate of inflation, governance regulations, interest rates, demographic trends etc.

- Risk: this part should state any threats the project may face and how they should be handled if they do occur.

2.4.2. The Non-profit Context

A proposed approach for business planning in a non-profit context is the case statement, which can be seen as the non-profit equivalence of the for-profit business plan (Fredricks, 2010). The case statement should include a telling of the project's history i.e. the reasons for the project, why there is a need for it and where and when it was founded. Further, the case statement must describe the mission of the project and its goals as well as why it is unique compared to similar projects. It is important to state the beneficiaries of the project and what needs or problems they have and how the project plans to solve them. A thorough description and quantification of the need will make the proposal persuasive enough to attract potential investors. Arguments regarding why someone should invest in the project and how they will benefit from it, should then be formulated from these components.

The plan for a non-profit project must describe how it will be funded since there is no guarantee that those who invest will receive a monetary return on their investment (McLeish, 2011). On that note, the NPO's strategy should clearly state in what way it delivers value to the investors. McLeish also highlights the importance of building and maintaining relations with investors. After investors have provided the project with capital (e.g. money, knowledge etc.), continuous dialogues should be kept with them describing the progress of the project. The lack of guarantee of a return on the investment obligates the project to state its chances of success.

As there is a potential absence of monetary returns, it is important to have a clear purpose for the organisation so that the people involved can be inspired to work towards the goals that have been set (McLeish, 2010). Since the stakeholders are affected by the decisions made within the organisation, it is important to present them, and understand their connection to the organisation, in the business plan. The purpose should define where the organisation is at the present and where it wants to be in the future. It is not a description of what the organisation is doing, but rather why it is doing it. Furthermore, to create a strategy with a high level of competitiveness, it must include a market analysis as well as an exact perception of the problem. To achieve this perception, all involved parts of the project must be allowed to present their thoughts on the project so that a complete vision can be formulated.

Finally, it is argued that some logic concerning commercial business planning is applicable to the non-profit context as well (Bingham et al., 2011). Non-profit projects no longer focuses entirely on sustaining what already exists, but instead has made a shift towards being more innovative and in turn producing entire non-profit supply chain networks.

2.4.3. Business Model Canvas

A Business Model Canvas is a way to graphically organize important parts of a business idea (Trkman, 2015). The Business Model Canvas is easy for other people to understand as it demonstrates the entire picture of a business idea on a single canvas. A Business Model Canvas is a poster or a sheet of paper with nine blocks that represents different aspects of business planning. It is often used as a tool in studies within the area of entrepreneurship. Moreover, it is a well-known and used concept outside of the academic arena as it is a useful tool for developing and nuancing business concepts. The original example of the nine blocks is; customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structures. This example is illustrated in Figure 2.2.

The core in the Business model canvas is the value proposition (Osterwalder, 2014). This describes the value the project delivers to the customers, what problems it solves and what needs

it satisfies. It is important to state to whom the value is created and what kind of resources and activities that are needed to be able to deliver a solution to the problem.

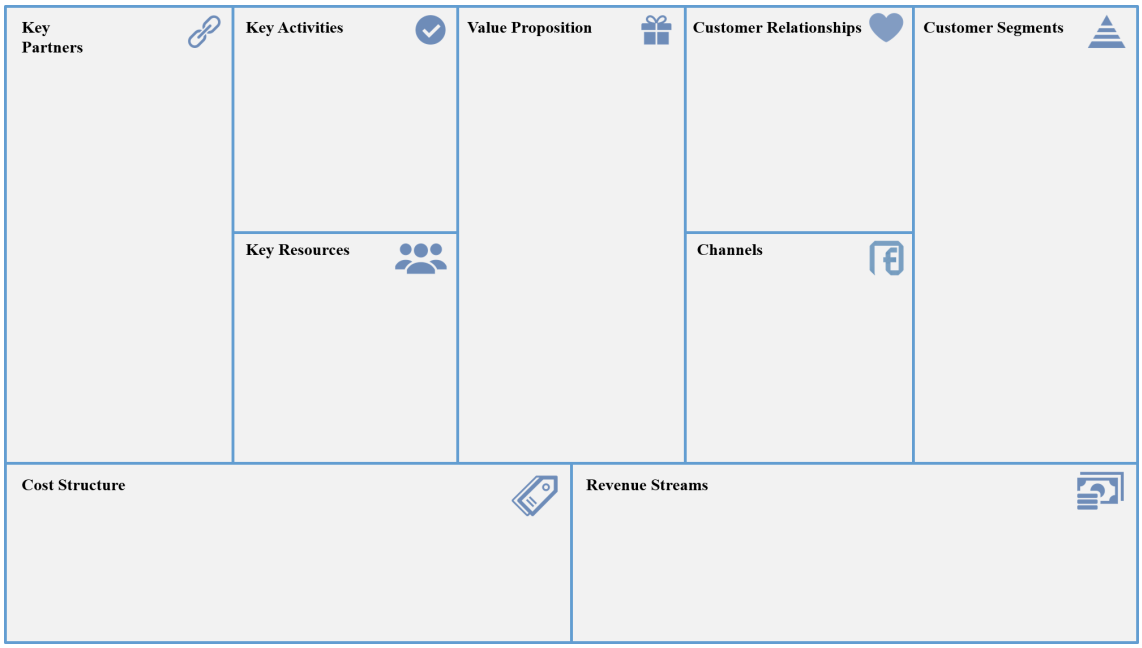


Figure 2.2: The Business Model Canvas

2.5. Market Analysis

A market is a platform where demand meets supply for a specific good or service (Robinson, 2016). When creating a business plan, the understanding of what a market is and what factors the market in question contains, is fundamental (Barringer, 2009).

Insight in the targeted market creates possibilities to match products or services accurately with the customer's needs (Barringer, 2009). A market analysis must confirm and communicate the potential that exist in a target market, which ought to be consistent with the business's general goals and ambitions. A market analysis is both a quantitative and a qualitative evaluation of the market where both volume and value are important factors to determine (Kerr, 2016).

When analysing information, it is important that this is done correctly as it will determine the characteristics of the market that the business possibly will penetrate or create (Barringer, 2009). Key decisions will also be based on findings in the expansive analysis. Once a market analysis is completed it should contain and describe the market in such manner that it gives an understanding of the customers, competitors, potential sales, market shares and buying patterns.

The economic environment, in terms of regulations, is also important to mention in an analysis and a discussion ought to be held about the attractiveness of the market from a financial standpoint (Barringer, 2009). A well conducted market analysis containing all vital parts and demonstrating economical, social and environmental potential within a certain market could possibly raise the incentive for investors to invest in the business (Kerr, 2016).

2.5.1. Market Size Evaluation

A market analysis begins with locating the needs of the potential customers (Barringer, 2009). To locate general needs and similarities between customers, one must start by segmenting the market. Segmentation is an iterative process and the main purpose is to satisfy the customer's needs and deliver sustainable competitive advantages for the company in question (McDonald, 2012). By

segmenting the market, a company can identify opportunities for its product or service. One could say that the segmentation is a building block for effective marketing planning.

The different market segments represent unique customer groups that have specific characteristics in terms of needs and behaviour (Barringer, 2009). Segmentation increases profit opportunities because different groups of customers attach different economic or physical values to the offered solution (Doyle, 1998). Recognizing the differences in customers' needs makes it easier to establish a successful marketing strategy as this makes it easier for the company to match the needs with its proposition (McDonald, 2012).

A market can be divided in many ways depending on what factor or factors that are in focus (Barringer, 2009). How one would choose to segment a market, according to Barringer, normally depends on:

- Geography: city, state or country.
- Demographic variables: age, gender, family, size, income.
- Psychographic variables: personality, lifestyle, values.
- Behavioural variables: benefits sought, product usage rate, brand loyalty.
- Products type: varies by product.

Once a target market that represents the best prospect of entry is pre-selected, the size and the trends within it should be studied (Barringer, 2009). This will determine if it is large enough and healthy enough to meet the firm's objectives. Estimating the size of a market that is specific to a particular location or geographic area can be seen as difficult and a market research must be conducted.

If assumptions and limitations are made during the different stages in completing the market analysis, one should regard the reader's judgment of the reasonableness of the assumptions made (Barringer, 2009). The key is to follow a sensible process based on the best available data and conduct primary research if necessary.

2.5.2. Competitor Analysis

A market analysis also includes making a description of the competitors (Metayer, 1999). The main part of such a competitor analysis, is creating an understanding of the major competitors, their positions and their culture. This gives the business plan a better width and provides knowledge that can be used to gain competitive advantages in the environment the business will be situated in. There are several different methods for conducting a competitive analysis and almost every author has a different suggested approach (Porter, 1980).

A framework for the competition within an industry, as described by Porter, is visualized in Figure 2.3. (1980):

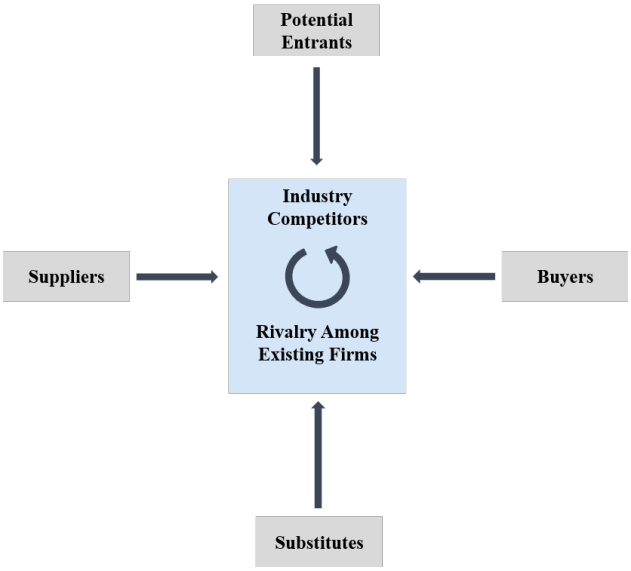


Figure 2.3: Entry barriers

The forces described by Porter clearly demonstrate the effects on firms in a regular market place where WTP among consumers and the strength of suppliers affects the competitive terrain.

However, when making a competitive analysis for a non-profit organization, one must bear in mind the differences in the marketplace (McMillan, 2009). Whereas for-profit businesses compete in a marketplace where customers' satisfaction drives the sales and the marketplace often has a diverse set of actors, the non-profit organization exist on a market close to being a non-market or if one will, a grant-market.

Despite the difference in the marketplace, there is considerable value in doing a competitive analysis (McMillan, 2009). For a non-profit organization the drive behind making an analysis is similar to that of for-profit businesses (West et al., 2013). In a regular business, you can either compete by differentiating your own business model, creating a competitive advantage, or by delivering lower-cost products i.e. gaining a cost advantage. For a non-profit organization the competitive advantages are the primary factors generating donations enabling organisations to reach their mission.

2.5.2.1. Making the Competitive Analysis

One approach to conduct a competitive analysis, is to divide competition into three domains; direct, indirect and potential competition (Bergen et al., 2002).

- Direct competitors have the same target customers and normally similar products.
- Indirect competitors meet the same customer needs but do not necessarily have the same customers.
- Potential competitors/Imitators are competitors that eventually become direct or indirect competitors.

Examples of direct, indirect and potential competitor scenarios are listed in Figure 2.4.

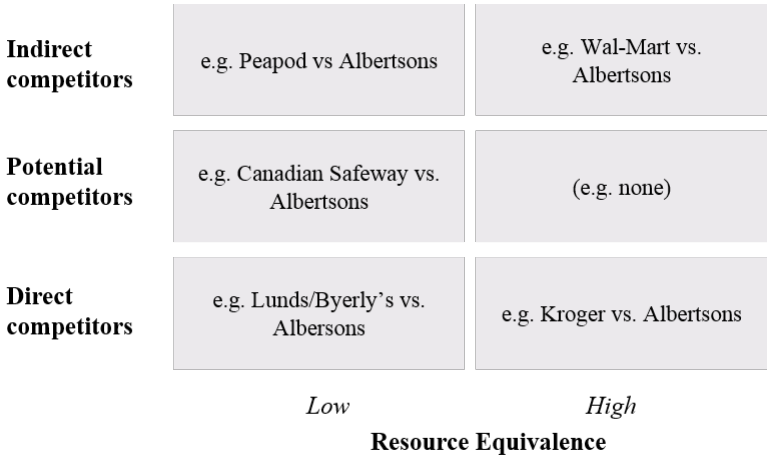


Figure 2.4: Framework for competitor analysis. (Bergen et al., 2002).

The width and depth of the analysis can also change according to the chosen literature and the identified purpose (Bergen et al., 2002). In a broader and more overall approach, the first step will be to make a competitive identification the second part is a mapping of the terrain and concluding by making a competitive evaluation.

2.5.2.2. Competitor Identification

A solution for competitor identification can be summarized in a framework with two axes in Figure 2.5. (Bergen et al., 2002). On the x-axis, the companies' resource similarity is plotted. On the y-axis the market commonality is depicted.

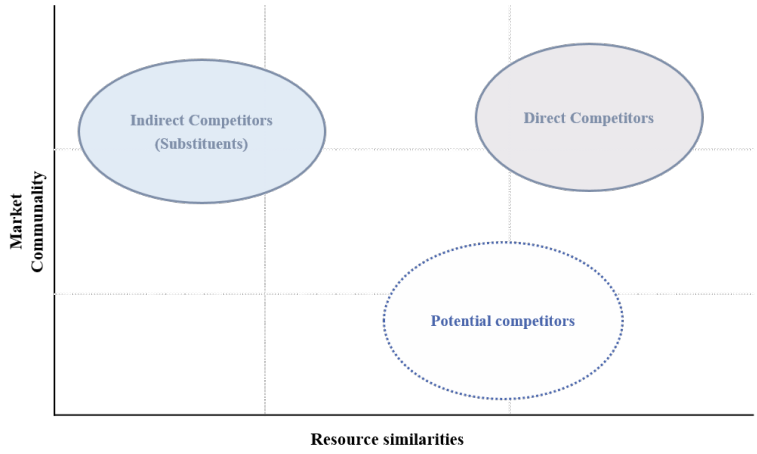


Figure 2.5: Mapping the competitive terrain

Under the category market commonality, the competitors are sorted based on the degree to which they address similar customer needs and how much the company overlaps with the focal firm in terms of customer needs served (Bergen et al., 2002). The other axis, resource similarity, sort the

competitors based on the degree to which their resource base is similar when considering type of composition. Important when making a competitive analysis is to consider both the demand and the supply side and creating an awareness of the company's competitive landscape. The importance of this mapping is often overlooked, and therefore, making a competitive mapping can result in a competitive advantage (Metayer, 1999).

2.5.2.3 Competitor Evaluation

The second step of the competitor analysis is making the actual evaluation of the selected peers (Bergen et al., 2002). The basis for this analysis is defining the difference in resource equivalence i.e. how well a competitor can satisfy the same needs as the company in question. Although this is not an absolute or definite measure one can use it in terms of high and low degrees. In this model, if two companies have equivalent resource similarity, they are close in being capable of satisfying the same customer needs and it also implies that they address, or can address, the same market.

2.5.2.4 Competitor Advantage

The competitive advantage of a firm or organization is defined as the attributes, or combination of attributes, that allows the organization to outperform the competitors (West et al., 2013). Deciding or rather identifying the competitive advantages of the organization will facilitate the work going forward since determining the strengths also demonstrated the weaknesses (McMillan, 2009).

Some factors that give a competitive position are shown in Table 2.2. (MacMillan, 2009):

Criteria
Good location and logistical delivery system
Large reservoir of clients, community, or support loyalty group
Past success securing funding
Superior track record or image of service delivery
Large market share of target clientele currently served
Gaining momentum or growing in relation to competitors
Better quality service and/or service delivery than competitors
Ability to raise funds, particularly for this type of program
Superior skill at advocacy
Superiority of technical skills needed for the program
Superior organizational skills
Superior local contacts
Ability to conduct needed research into the program and/or properly monitor program performance
Superior ability to communicate to stakeholders
Most cost effective delivery of service

Table 2.2: Competitive factors.

2.6. Risk Analysis

For a business or an organisation, managing risks and preventing them is a core issue that must be dealt with (Kaplan et al., 2012). One part of business planning is therefore to identify the risks, their importance and how they might be mitigated.

The initial step in this procedure is to find the qualitative distinctions between the types of risks that an organization might face (Kaplan et al., 2012). Firstly, there are the risks that can be categorised as preventable. These are the risks arising from the company itself and for the most part, these risks can be controlled by active prevention such as guiding people's' behaviour and decisions. Secondly, there are the strategic risks that a company might face. This category is in many ways different from the internal risks because they are not inherently undesirable. They are a part of, or an effect of, the business model and managing these risks is a key factor for success. Thirdly, there are the external risks that arise from events outside the company, thus making them hard or impossible to influence and control. Due to the fact that businesses can not prevent these events, the management for these type of risks must include identification and mitigation.

There are also the different stages an organization must pass to be able to go from an idea to an actual business or project (Granstrand, 2010). These uncertainties can be summarized in the following three categories; technical, commercial and economic risk. When a project or a product meet the technical specifications, one can say that the business has reached technical success and thus the risks included in this phase have been overcome. The second step, which requires that the innovation has found its first customer, and thus been used, means that the commercial risks have been avoided. For the last step, economic success, there are different measurements one can use to decide whether or not this phase has been reached. Either one can measure the economic success by a positive net present value or if the projects has reached its payback time in the chosen time frame.

2.7. Branding

The perception of a specific brand will determine a company's success and reputation (Wheeler et al. 2013). A brand is a constant symbol of a business's core values and its heritage. A brand communicates and delivers emotional links between the customers and the company. When companies use branding as a marketing solution, they can build awareness and customer loyalty, both within the company and externally.

The strategy used when building a brand is usually built upon a vision that emerges from a company's values and culture (Wheeler et al., 2013). Branding is a unique way for a business to define their position, gain competitive advantages and steer the perception that customers ought to have of the company. If a company manages to create a unique value proposition through branding, it will also inspire the employees within the company. Employees are referred to as internal-customers. As for this, it is important to be aware of the stakeholders' characteristics, behaviour, needs and perception.

2.8. Corporate Social Responsibility and Cause Branding

Corporate Social Responsibility (CSR) has in the last decade become a common practice within companies and it is slowly being integrated into all the activities within an organization (Demetriou et al., 2010). Today, companies can not only focus on revenues and a positive outcome for the company itself, it must also take account for the overall impact that the business processes have on society and the environment (Slack et al. 2013). In most businesses, a CSR plan should answer the question how the relationship between the business and wider society should be viewed, assessed and, if possible, managed (Slack et al. 2013).

Apart from fulfilling the social, environmental and economical obligations set on a business, CSR has become a method for organizations to generate the anticipated brand loyalty and reliance that is often used in combination with brand management (Demetriou et al. 2010). CSR has to integrate the organisation to strengthen corporate reputation and profitability. It displays a value for the stakeholders and shareholders that the company is involved in ethical commitments that goes beyond the common authoritarian requirements.

Large corporate companies are more frequently linked with CSR, which correlates with society support such as acting with charity donations, corporate philanthropy, community participation, strategic philanthropy and cause-related marketing (CRM), where CRM has become the dominant way of supporting people, cultures and foundations (Demetriou et al., 2010). It is proven in a study that engaging in CRM creates a positive brand perception and improves customer attitude towards the company. One can define CRM as a commercial action to achieve a co-operation between firms and charities to market an image or product for mutual benefits.

Significant aspects that should be considered when companies are in the phase of initiating a CRM program, whether the purpose is for-profit or non-profit, is that there should be a long-term focus, the action should benefit all involved parties and the employees at the companies must believe in the action taken (Demetriou et al. 2010).

The corporate image can indicate if a company will be successful or not, as the imagery will act as the foundation of the achievements (Demetriou et al. 2010). A positive corporate image can make it easier to recruit new talented employees, generate sales, attract investors and can act as a competitive advantage.

2.9. Innovation and Economic Growth

Innovation is defined as an invention that has found a useful and commercially viable application (Granstrand, 2010). It is new to all and useful to some, at least one. The person introducing innovation, the entrepreneur, is taking a risk of failure and has to make the distinction between unwise and justified risk (Galindo et al., 2013).

One important and widely influential study on innovation is a paper written by Prof. Abramovitx in the mid-1950s (Rosenberg, 2004). What Abramovitx did was to measure the growth in the American economy between 1870 and 1950 and then set this into relation to the growth of the inputs of capital and labour over the same period of time. What his research showed was that there was a gap of 85% in output that could not be accounted for by increase in input. This residual was later on found to have the same size by many different accomplished scientists. The figure persuaded most economists that technological innovation must have been a major force in the increase of output in industrialised economies. This fact stresses the importance of not just making inventions but having agents and, entrepreneurs, which are able to turn inventions into innovations (Fagerberg, 2005). To be able to do so, they need to combine several different kind of capabilities such as; knowledge, resources and skills.

For less developed countries, innovation is an integral part of stabilizing the economy and making good use of the country's existing resources, although the process of innovation for developing countries differs somewhat from developed countries (Kim et al., 2000). Whereas developed countries stand on the frontier of innovation, countries such as Kenya are primarily learning how to use and acquire already existing technology. The rapid economic development for many Asian countries builds on these premises. For developing countries to secure a more stable future on a limited amount of resources, both internal innovation and innovation acquisition is required.

3. Method

Methodology in difference from methods, which are techniques to collect and analyse information, is a subject that addresses the principles and theories that guides the choice of methods (Walter, 2013). In this chapter, the methodology for this thesis will be described. The methods that are used for the analysis, data collections and securing quality, will also be presented below.

3.1. Research Methodology

The method that is used in a study will either have a qualitative or quantitative character (Winch et al., 2005). To gain an understanding of the research methodology used in this thesis, a clarification of quantitative methods and qualitative methods will be made.

3.1.1. Quantitative Methods

A quantitative method is used when the area being studied can be expressed in quantitative terms (Kothari, 2004). Quantitative approaches produce quantifiable data that in turn can be used for qualitative interpretations. Quantitative data is useful when there is a need to research the commonality of a certain occurrence (Winch et al., 2005).

3.1.2. Qualitative Methods

Qualitative methods express data in an explanatory manner, such as declaring why certain phenomena occur (Winch et al., 2005). Qualitative methods are used to understand the context of the research (Gillham, 2010). They should provide the researcher with knowledge of how things are and why they are in that particular way.

This thesis makes use of both qualitative and quantitative methods to answer the questions formulated in the problem section. To determine the value of a rhino, calculations are done to arrive at an interval of quantitative values. Hence, a quantitative method is used. The results from the quantitative approaches are analysed with a qualitative research approach. The subject discussed in this thesis is advanced and data on the subject is elusive. Hence, the quantitative research does not present exact answers that can be established as facts. However, this does not mean that it is dismissible as it provides a great understanding of the situation in quantifiable terms. The results presented are instead used to strengthen qualitative reasoning.

3.2. Research Approach

The research approach explains how and for what reasons the thesis is produced.

3.2.1. Inductive Approach

An inductive approach to do research is done by making empirical observations and thereafter constituting theories from those observations (Wallén, 1996). The research approach has met some critique e.g. that the theories that are produced are nothing but a repetition of empirical data. This specific critique is however dismissed as it could be said for all kinds of research approaches. A more valid critique to the inductive approach is that the observations made to constitute theories cannot be done without bias.

In this thesis, an inductive approach has been used in the case studies. The motivation behind this choice is that it was essential to make empirical observations and collect data so that analysis on the different areas could be conducted. The authors have chosen to only make observations and data collection from people and sources that agree that poaching is bad and needs to be stopped.

This bias is not seen as a hindrance for the quality of the inductive approach. To ensure that any bias in the collection of data within this segment is addressed, advocates of many different solutions to the poaching problem have been interviewed. This greatly reduces the risk that the observations are biased towards any of the proposed solutions to end poaching.

3.2.2. Descriptive Study

Describing studies are done to determine properties for a research subject (Wallén, 1996). This kind of study includes gathering of data about the subject but also about the surrounding environment. Inductive approaches are closely related to descriptive studies. What characterises a descriptive study is that it explains the situation as it is at the present (Kothari, 2004). The researcher does not have any influence on the variables that are studied. This thesis matches the definition of describing studies and inductive approaches well. Both have been used to guide the choice of methods.

3.3. Case Study

A case study is conducted to observe a substantial subject (Wallén, 1996). It does not require the researcher to be a part of the subject, however, the research presented could inspire change in the subject. The subject that is chosen for the thesis is studied to answer research questions related to the specific case (Gillham, 2010). When conducting a case study, it is important to not exclusively use one source of evidence, as the use of multiple sources of evidence is a cornerstone of a case study. Using multiple evidence sources do not only refer to gathering evidence from different people, but also to gathering evidence from alternative sources such as documents, records etc.

To create research, one must have evidence to build that research upon (Gillham, 2010). Scientific evidence, in difference to legal evidence, is a product of the methods used in obtaining the evidence. This indicates the importance of having a well thought out methodology when conducting a case study.

Gillham (2010) proposes four steps that should be conducted initially in a case study:

- Gathering of relevant literature
- Gaining a clear understanding of the specific case that is studied
- Decide upon the broader aims of the research
- Formulate the research questions

In this thesis, these four steps are covered although not in a sequential manner. The structure of the thesis writing process compels formulating the research questions prior to acquiring relevant literature. Research questions may change radically over time in a case study as the researcher gains more knowledge and insight to the subject (Gillham, 2010). This validates the approach made in this thesis, as the formulation of research questions is an iterative process in case studies.

Case studies fit the purpose of this study well. Answering the questions presented requires data and observations from an actual situation. Evidence on the project itself, as well as a wide variety of evidence on the situation in sub-Sahara Africa, has been collected. The evidence collected will be analysed to produce research.

The information in case two, *A Situation Study of Project Ngulia and its Potentials*, is mostly collected from the interviews with the project coordinators: Johan Bergenäs and Fredrik Gustafsson, and from interviews with experts within their area.

3.4. Models

"A model constitutes an intended simplification and a hypothetical alternative to describe or explain an event" (Wallén, 1996). Further, a model should be able to illustrate the situation and communicate a message to viewers, substantialize abstract discussions and be able to legitimize a mutually understood and accepted view of the case (Eriksson et al., 2008).

Models and methods are collected from literature studies and applied in the research process to compose the foundation for the thesis's conclusions. To be able to evaluate the market values and to be able to predict Project Ngulia's future prospects, models and methods concerning these topics have been used. Models used in determining what components a business planning should contain are collected from renowned works of strategic planning, both in the profit and the non-profit context. Models such as the cast statement (Fredricks, 2010) and the Business Model Canvas have been used. The methods used for market valuation are BTM and the TCM. Additionally, discussions concerning the demand and supply curve are used in evaluating the market value of a rhino.

3.5. Data Collection

Data collection is the process of identifying different properties and recording the number of objects with specific properties (Wallén, 1996). As previously mentioned, the collected data can be qualitative; interviews and terms, or quantitative; numbers. It is important that the one conducting the collection of data is well acquainted with the field of study to be able to distinguish valuable information from information that will not contribute or even be harmful to the results. Data collection in this study is conducted while having continuous contact with project managers for Project Ngulia, in particular Bergenäs and Gustafsson, who are well acquainted with the field of study, to ensure validity. The purpose of this is to secure and establish the quality expected from the thesis, which will also increase the overall value of the thesis. The project managers have excessive experience and knowledge in the studied areas and can therefore provide insight to identify the parts in the thesis that are more significant than others, and to validate that the content is consistent with Project Ngulia's future prospects.

3.5.1. Primary Data

When securing data directly from the source, as in the case of conducting interviews or making direct observations, the information collected is called primary data (Eriksson et al., 2008).

3.5.1.1. Interviews

Interviews in this study are conducted with representatives from different organisations involved in this project or other similar projects. The main interviews have been held with the project coordinators, partners, an expert on private rhino farms in South Africa and with a student attending the Swedish Defence University that has done research on potential competitors. Additionally, a few interviews have been conducted with an expert within the area of poaching and wildlife in Africa. Thereby a general impression of the information sought is provided. Questions in the interviews have a cognitive character, which is the most powerful aspect when gathering data through interviews (Medbo, 1998). Cognitive questions are meant to provide information on why certain individuals act as they do in a situation. All interviews were conducted in person, by e-mail, over the phone or via Skype and the people interviewed are listed in Table 3.1. The questioners can be found in Appendix 5.

Individuals within a specific system have got an extensive insight and knowledge regarding the system in question (Medbo, 1998). Additionally there is the inside information about different aspects of an identified system, impossible to determine by simply observing it. However, it is

equally important to bear in mind that the information extracted from individuals is a reflection of their interpretation of the system, which usually includes subjective influence.

Conducted interviews			
Bergenäs, Johan	**Senior Associate and Director of the Partnerships in Security and Development Program**		
	Personal Interview	*22 Jan. 2016*	Linköping
	Skype Interview	*28 April 2016*	Gothenburg
	Email	*Continuously*	
Gustafsson, Fredrik	**Professor at Linköping's University**		
	Personal Interview	*22 Jan. 2016*	Linköping
	Personal Interview	*21 April 2016*	Norrköping
	Email	*Continuously*	
Hanks, Dr. John	**Expert environmentalist**		
	Skype Interview	*13 April 2016*	Gothenburg
Boustred, Samantha	**Marketing Coordinator at Saab Grintek Defence**		
	Personal Interview	*13 April 2016*	Gothenburg
Ahlberg, Elin	**Student at University of Gothenburg**		
	Personal Interview	*23 March 2016*	Gothenburg
Jansson, Tina	**Sustainability Inspector,**		
	Email interview	*21 April 2016*	Norrköping
Bell, Colin	**Founder of Africa's Finest project**		
	Email interview	*18 April 2016*	Gothenburg
Pelham, Jones	**Chairman of Private Rhino Owners Association**		
	Email interview	*18 April 201*	
Shaw, Dr. Jo	**WWF rhino project manager**		
	Email interview	*15 April 2016*	Gothenburg

Table 3.1: List of persons interviewed

The questionaries' for the key interviews can be found in Appendix 5.

3.5.1.2. Observation

The procurement of information through observation can be both time consuming and demanding (Chung, 2003) but the strengths of seeing the actual situation for yourself might also give the clarification needed to understand the system in depth (Huttlinger, 2006). To produce the results of the thesis, direct observation will not be strictly necessary. However, the authors of the thesis have visited Kolmården where certain components in the technology are being tested.

3.5.2. Secondary Data

The difference between primary and secondary data is that the latter contains facts derived not directly from the source but from available compiled data (Eriksson et al., 2008). Moreover, this

difference results in a more pronounced need to critically evaluate the collected information to avoid pitfalls and ensure quality.

3.5.2.1. Literature

A big part of the thesis is built on literature, which stresses the importance to use information of high quality. To ensure validity of information the main objective has been to use scientific reports, as these have to pass certain standards to get published (Voight, 2012). Hence, most of the articles used in the thesis are either scientific or recommended by an expert within the area.

Finding for literature are mainly conducted via the library resources at Chalmers University of Technology, Google scholar or other field-specific libraries such as the economic library at The School of Business, Economics and Law at University of Gothenburg. If case specific articles or reports were not successfully found, and no recommendation was given from an expert, other authentic Internet sources were used. Different valuation methods, e.g. benchmarking and guestimates, have been used when needed. Course literature and other course material from the bachelors programme in Industrial Engineering and Management was used when it was found relevant for the thesis.

The accessed literature makes up the basis for Chapter 2, *Theoretical Framework*, and Chapter 4, *Current Situation Analysis of Kenya and The Rhino Population*. In turn these chapters are the foundation for the rest of the thesis.

3.5.2.2. Pitfalls of Data Collection

When obtaining data there are two types of deficiencies that might occur, external loss or internal loss (Wallén, 1996). If conducting an interview and answers are not received from everyone asked, this is characterized as external loss and should be kept at a minimum. Selected individuals have been contacted giving a high response rate, implicating that the risk for external loss will be minimized. An internal loss means that the inquiry, interview or poll has not been answered in its entirety. In this study, one method for data collection is interviews with various people and organisations. Many of the persons interviewed are involved in the project or in similar areas; hence an answer or detail that is missing in one interview can often be complemented with more thorough answers in complementary interviews.

3.5.2.3. Quality Ensurance

To ensure that the collected data is substantial and credible, the information obtained should be critically studied (Eriksson et al., 2008). When data is collected, the researcher has to consider if there are any more questions to be asked and also question the data to see if it is sufficient. Most importantly, the relevancy of the data has to be determined.

Eriksson mentions four criteria that data must meet to be considered credible (2008). First, the data should be expressed in our time i.e. not out-dated. Second, understanding that providers of data could have personal interest influencing the data. Third, checking if sources are dependent or influenced by one another. Fourth and finally, assuring that the data is authentic. All four steps have been considered in this study when analysing the collected data.

3.6. Source Criticism

When collecting data, it is important that the source is trustworthy and reliable (Thurén, 2003). The purpose behind this thesis has required great amount of data collection, which can lead to unreliable sources, biases and misunderstandings that may affect the results and conclusions. Hence, source criticism is of great importance to assure high quality of the work delivered.

According to Thurén there are four criteria: time, dependency, authenticity and tendency. These can be used to determine if the source is trustworthy enough.

3.6.1. Time

A more recent source is more reliable than an older one (Umeå University, 2016). It is important to check when a material is published, if it covers all the important aspects and if it needs to be updated. An attempt has been made to compile legitimate and up to date data, especially for the quantitative information, which can alternate swiftly. Since the rhino population has decreased rapidly, new publications and sources have been necessary. However, some of the information has been difficult to collect and in those cases, older articles have been used. These articles have been more critically judged.

3.6.2. Dependency, Authenticity and Tendency

To classify a statement, at least two independent sources have to verify it (Thurén, 2003). It is important to clarify that the source is authentic and reliable. All aspects must be considered to make sure significant information is not left out due to personal gains. In the scientific reports this problem is mitigated through the procedure of peer response (Voight, 2012). When considering the conducted interviews, this aspect is of greater importance since a dependency bias can arise easily due to personal gains (Thurén, 2003). To minimize that, the thesis is based on different sources with different aspects and standpoints.

A biased information source can, by hiding some information, affect the results (Thurén, 2003). Due to the limited amount of time and the distance to Kenya, secondary data has been necessary. The method Benefit Transfer has been used. To ensure good quality, different sources have been used to compare information found in different sources and to validate the information. Regarding valuation of complicated goods, such as rhinos and national parks, it is difficult to collect unbiased facts since different stakeholders have different standpoints. A great amount of time has been allocated for resource and data collection.

4. A Description of Kenya the Rhino Population

Chapter four consist of collected information about the situation in Kenya today, the influencing factors on the current situation and the rhino population. This data and facts are needed to answer the proposed research questions.

4.1. Kenya: A Brief Summary of the Country's Current Situation

Until 2007 Kenya was viewed as one of the most stable countries in Africa (Hanson, 2008). Since then a lot has happened and today the country faces a number of pressing challenges. Many argue that the diverse population with its cultural differences is the source of conflict (BBC, 2016) while other stress the fact that it might be the political system that brings about the outbreaks of violence (Hanson, 2008).

In Kenya, the president appoints most institutions and important positions (Hanson, 2008). Experts say that the elections have a winner-takes it all mentality. Because elections are so important the political candidates have a history of hiring armed forces. Outbreaks between these forces and the population killed nearly 600 people in the election of 2007 and spurred future violence. The election resulted in the appointment of Mwai Kibaki, from the Kikuyu tribe. In the election of 2013 new outbreaks of violence occurred as Uhuru Kenyatta, also from the Kikuyu tribe, was elected head of state (BBC, 2016). Other tribes consider the Kikuyu tribe as having gained a disproportionate share of the economic growth in the country, creating tribal tensions.

In September, a few months after the election of Uhuru Kenyatta, somali al-Shabab militants took hostages and killed 60 people in the Westgate shopping mall in Nairobi (BBC, 2016). Thereafter, several more attacks by the group al-Shabab were carried out and one of the most recent was a massacre at the Garissa University College. In the attack 148 people were killed. These terrorist attacks are putting further strain on the country.

Many Kenyans see democracy and economic growth as inevitably linked but the distribution of power and bribery (Hanson, 2008). Clearly, corruption obstructs a country's strive towards economic equality between groups. The role for international actors, such as the US or EU, to affect the political and economical situation going forward is seen as limited.

4.2. Economy in Developing Countries

Three broad classes are employed by the World Economic Situation and Prospect (WESP) to categorize the countries of the world; developed economies, economies in transition and developing countries (WESP, 2012). The purpose of these groupings is to reflect the basic economic condition of a country. To be classified as a developed country, some standards have to be met. These include a certain threshold to growth national income per capita, human asset index per capita and economic vulnerability index per capita. Kenya does not meet all the requirements and hence, Kenya is a developing country.

The path to achieve economic growth is essentially the same for industrial countries as for developing ones (McConnell et al., 2012). This amounts to using existing resources more efficiently as well as expanding the available resources. The difference between those countries that have succeeded and those that have not, are the physical, human, and socioeconomic environments of the various nations. The aspects associated to the problems with developed countries can be narrowed down to various headlines (McConnell et al., 2012):

Natural resources: A weak resource base can be an obstacle for growth (McConnell et al., 2012). But even in countries with a rich supply of valuable minerals and other natural resources, this does not equal prosperity. In many of the developing countries, large international corporations

owns, controls and exploits the resources of a country and only a smaller fraction goes to the population of the country in question.

Human resources: Three statements describe the problems associated with the population of developing countries (McConnell et al., 2012).

- The population is large
- There is a widespread problem of unemployment
- Low level of education and labour productivity

When income increases in developing countries, it subsequently leads to higher living standards. (McConnel et al., 2012) This in turn generates better opportunities for survival that, for a while, leads to an increase in population. This stands in contrast to the proved fact that higher education levels and good health systems leads to lessened fertility and birth rates (IIASA, 2008).

Capital accumulation: A focal point of economic development is, as mentioned above, using existing resources more effectively (McConnell et al., 2012). The machines and inventories of the industrial sector in developing countries are often at a lower level of quality and this leads to lower productivity. Better and more equipment would lead to a growth in output per capita.

Technological advances: The possibilities for developing countries to use and copy already existing knowledge produced by already developed countries are wasted (McConnell et al., 2012). To which extent these have been applied can be discussed and differs between countries. There are mixed views on how industrial countries' technology can be applied without modifications in developing countries. Major adaptations might be necessary to extract the gains that might be made.

Sociocultural and Institutional factors: Economic considerations alone will not explain why economies mature or not (McConnell et al., 2012). A transition from a more traditional society to a more modern one is a prerequisite of economic development and the will to make this transition is an intangible but vital ingredient.

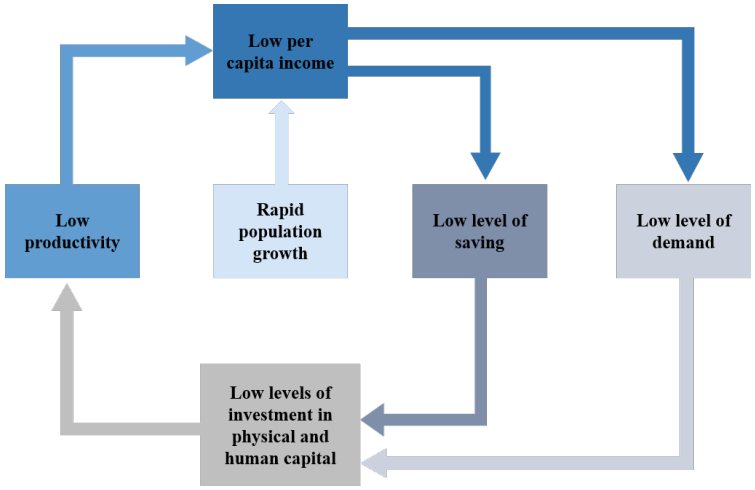


Figure 4.1: The Circle of poverty.

These factors can be described schematically in the circle of poverty, Figure 4.1. (McConnell et al., 2012). The picture above illustrates that a low income per capita makes it difficult for poorer nations to save and invest. This in turn leads to a situation that perpetuates lower productivity and lower incomes. If there is an increase in income per capita this will most likely be absorbed by

rapid population growth due to increased standards of living. This increase in population will destroy the possibility of breaking the poverty circle.

4.3. Corruption

The World Bank describes corruption as "the abuse of public office for private gain" and the term covers a broad range of human actions (World Bank, 1997 (A)). Bribes are one of the main tools for corruption and occur in the private sector as well as in the public sector. Fraud and bribes often have costly results in terms of economic efficiency, political legitimacy and basic fairness. Moreover, it can make a country vulnerable to financial crises and macro-economic instability. In legal processes bribes can be used to change the outcome by inducing the government to ignore illegal activities, such as drug dealing or pollution. The effects of corruption, e.g. costs, vary depending on country conditions. Few would disagree that corruption has undermined development in Africa and experienced experts suggests that corruption is bad for development. Improvements in business culture and ethics may be required to control corruption.

The result of an investigation suggests that foreign investors generally avoid countries with corruption because it is considered wrong and it can create operational inefficiencies (Habib et al., 2002). Corruption is a serious obstacle for investments and foreign investors should take an aggressive stance and combat corruption for their long-term interest.

Kenya is classified as one of the most corrupt states in the world (Ronald, 2014). The corruption is systematic and goes beyond individuals to structural and institutional levels. The culture of corruption is deeply rooted in society at large and has become endemic, indicating problems with the governance of the country.

4.4. Globalisation

Globalisation is a development increasing the internationalization of production, manufacturing by governing and financing processes (Homann et al., 2007). The process of globalisation results in advantages for all parties according to established economic theories (Soludo et al., 2004). Even if globalisation is said to have a lot of benefits; many people experience it as a threat, not only to their economic existence but also to their cultural and moral self-image (Homann et al., 2007). Globally acting corporations often promote western ideals and images of consumption in marketing and distribution, and they are supported in this role by the globally dominating position of western mass media.

The Kenyan economy is predominantly agricultural but industrialisation has been a central part of the country's development strategies, both in the colonial and the post-colonial periods (Soludo et al., 2004). Kenya has embraced capital-intensive technologies, with limited contribution to job creation and technical externalities (Muthoka, 2015). This has led to a growing income inequality. Improving the policy regulation, to encourage labour-intensive technologies, may improve Kenya's benefits from globalisation.

There is a sense that we are living in a smaller, more compressed and interconnected world, and tourism is often invoked in this process of globalisation, a process perceived differently by different people in different places (Mowforth et al., 2016). Tourism is both a cause and a consequence of globalisation. There is a rapid expansion of capitalistic relations of production in the Third World (a critical factor of economic globalisation). Moreover, the tourism has spread and those two factors are resulting in destinations, local cultures and environments (such as national parks, wildlife and so on) being transformed into commodities to be consumed by tourists. One example of the transformation into commodities is that an animal's value can be calculated. An Amboseli lion is calculated to be worth $27,000 a year in tourism revenue. Another example of the transformation into commodities is the way in which ceremonies and

cultural traditions are packaged and sold to tourists. An existing package is luxury safaris: 'Classic Kenya' – 'an escorted private safari in the old style tradition'.

4.5. Digitalization

The definition of something becoming digital varies within a wide range (Döner et al., 2015). Some organizations might focus on seeing digitalization as acquiring more technological devices, while other sees it as a whole new way of doing business. Aside from that, there is also the aspect of the two conceptual terms "digitalization" and "digitization" which are closely related and sometimes used interchangeably (Brennen et al., 2014). They have a few common denominators, however there is an analytical value in separating them and specifying their differences.

According to Gartner's IT Glossary "Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business" (Gartner, 2016). On the other hand digitization is defined as "The process of changing from analogue to digital form" (Gartner, 2016). Digitization targets the automation or change from older technologies to more recent, however it does not emphasis the difference in the business model acquired (Moore, 2015). Digitalization means, not only improving how things are done, but also creating new and extended value to the client.

What is more, digitalization is a paradigm shift. It is not only about going from analogue to digital but replacing structures and how things are accomplished by thinking in a different way (Khare, 2014). Digitalization aims to improve collaboration among workers, handle data more effectively, increase flexibility, raise productivity and create a business environment more sustainable to future changes. For countries with less developed economies, finding cost-effective solutions to pressing problems are key for future growth (McConnell et al., 2012). Thus digitalization of businesses and systems is a possible way of capturing the potential for these countries going forward.

4.6. Illegal trade

Poaching of rare and endangered species as a mean for feeding the illicit trade of wildlife is intensifying at an alarming rate (Lawson, 2014). The market was, at the beginning of 2014, worth between $8 and $10 billion per year. This makes it one of the most lucrative and largest trades in the world, among other illegal trades such as human trafficking, drug trade and counterfeiting.

Poaching does not only affect the almost extinct animals, there are also links between illicit trade and a number of other problems; erosion of the national institutes in the affected countries, global security threats, the fuelling of civil conflicts and the provoking of substantial economic losses internationally (Lawson, 2014). Both the direct and the indirect costs from this business are huge and the implications of illegal trade are much larger than the environmental factors of the declining rhino population.

Additionally, it is worth mentioning that the illegal trade today is not merely a rural hunt but instead a high technology gaming activity with automate weapons, helicopters and night-vision goggles supported by some of the world's most prominent terrorist groups (Scientific American, 2013). This implies that the profits made from illegal trade are often used to finance other illegal activity (UNEP, 2014). Examples of groups involved in poaching in sub-Sahara is the Somali militant islamist group al Queda affiliate; al Shabaab and the Lord's Resistance Army in Uganda as well as other al Queda affiliates (Scientific American, 2013).

Furthermore, the situation calls for a multitude of different actions to retaliate against the illicit trade and its effects (Lawson, 2014). Some of the recommendations made are to gather information about involved actors, mapping the actors and understanding the trade chain

(Lawson, 2014), international collaborations (UNEP, 2014), legalizing the trade of wildlife parts (Global Initiative Against Transnational Organized Crime, 2015), educating the potential customers of wildlife parts (Scientific American, 2013), financial aid from developed countries and also, which is the subject for this thesis, implementing high technology and digitalized solutions (Bergenäs, 2013).

4.7. Rhinos

After the extinction of the West African Black rhino in 2011, there are only three remaining subspecies: Southern-central-, South-western- and East African Black rhino (WWF, 2016 (B)). Black rhinos are found in eastern and southern Africa. Their main habitat is tropical and subtropical grasslands, deserts, savannahs and xeric scrublands.

Adult Black rhinos can reach up to 1,5 meters in height and weigh 1,4 tonnes, which is less than the generally larger White rhino (WWF, 2016 (B)). The Black rhino's most distinguishing feature from the white rhino is its prehensile upper lip. Of its two horns, the front horn is the longer one measuring 50 centimetres in average. The horn, which consists of keratin, grows between 0,6-1 kilograms annually and weigh between 3-6 kilograms.[5] If dehorned regularly by humans a rhino can have between ten to fifteen horns during its life.

Females have their first calf when they are 6,5-7 years old (WWF, 2016 (B)). Males normally have to wait until they are 10-12 years old before reproducing. The breeding period is normally 16 months and occurs throughout the year. Every brood consist of one calf and in average, breeding befalls every 2,5-3,5 year. Statistics compiled by different zoos in Europe shows that the rhino females get at maximum 14 calves. More information regarding the dam's highest offspring can be found in Appendix 3 (Kolmården, 2016). A Black rhino can live between 40 - 50 years (WWF, 2016 (B)).

The lack of insight in the black market makes it difficult to know the exact market value of the rhino horn (Ayling, 2013). Anecdotal evidence state that the market price per kilo is $75 000. According to WWF, Stimson Center and Biggs et al. Rhino horn is worth more than gold and platinum with a market price of $65 000 per kilogram on the black market (WWF, 2016 (A)), (Biggs et al., 2013), (Stimson Center, 2016).

4.7.1. Distribution of Black Rhinos

Earlier, Black rhinos were found throughout the entire sub-Saharan Africa, except for the Congo basin (WWF, 2016 (B)). The large population made it possible to encounter dozens in a single day. Hunting by European settlers in the 20th century led to a quick decline in the population. In the 1960's, the number of Black rhinos was estimated to 70 000 on the continent and had gone extinct in some countries.

A poaching epidemic started in the 1970's (WWF, 2016 (B)). This resulted in a colossal drop in the population figures and 96% of all the Black rhinos disappeared between 1970 and 1992. Rhinos outside conservation reserves as well as rhinos in national parks and private reserves were affected the most. In 1993 only 2,475 Black rhinos remained and the species became critically endangered. Poaching is still endangering the rhino population but thanks to successful conservation and anti-poaching efforts, the population has risen to roughly 5000 in 2016.

[5] Hanks, Dr John; Expert environmentalist, Gothenburg, 2016, Skype Interview 13 April.

4.7.2. Importance of Rhinos in Kenya

A total of 1 520 000 tourists visit Kenya each year (World Tourism Organisation, 2015). Today the tourism industry in Kenya generates 15% of the Gross domestic product (GDP), where wildlife is one of the most important factors that attract tourists (Okello et al., 2007). The most attractive animals are the Big Five. The rhino species is very important for Kenya since it generates revenue and work opportunities in the tourism industry.

4.7.3. Demand of Rhino Horn

The transnational trade of rhino horn historically has two main markets (Ayling, 2013). One is the market for carved dagger handles that were used by Yemeni men and were seen as a symbol of status. In 1982, the usage of horn was banned in Yemen and the demand has since then gradually diminished and Yemen is no longer one of the largest markets.

Asia is today the largest market for rhino horn (Ayling, 2013). Powder made from rhino horn is used in traditional Chinese medicine and is believed to have curative properties. Some diseases that these medicines are said to cure are: hangover, rheumatism, gout, palliation of fever and stroke. Vietnam has also become a market for the horn where a rumour is that the horn can cure cancer is spread and therefore the demand got enhanced. Because there is no scientific evidence that the horn has any medical value, most countries using traditional Chinese medicine such as China, Japan, Taiwan and South Korea no longer have rhino horn in their traditional medicine pharmacopoeias. This evidence has however not eliminated the demand. One reason is that the belief that rhino horn has curative properties has deep-seated cultural value and that the horn itself has a great symbolic value. WWF has made a simplification of the wildlife trafficking routes that shows where the demand and supply are located and the trade flows are illustrated in Figure 4.2. (2012 (A)).

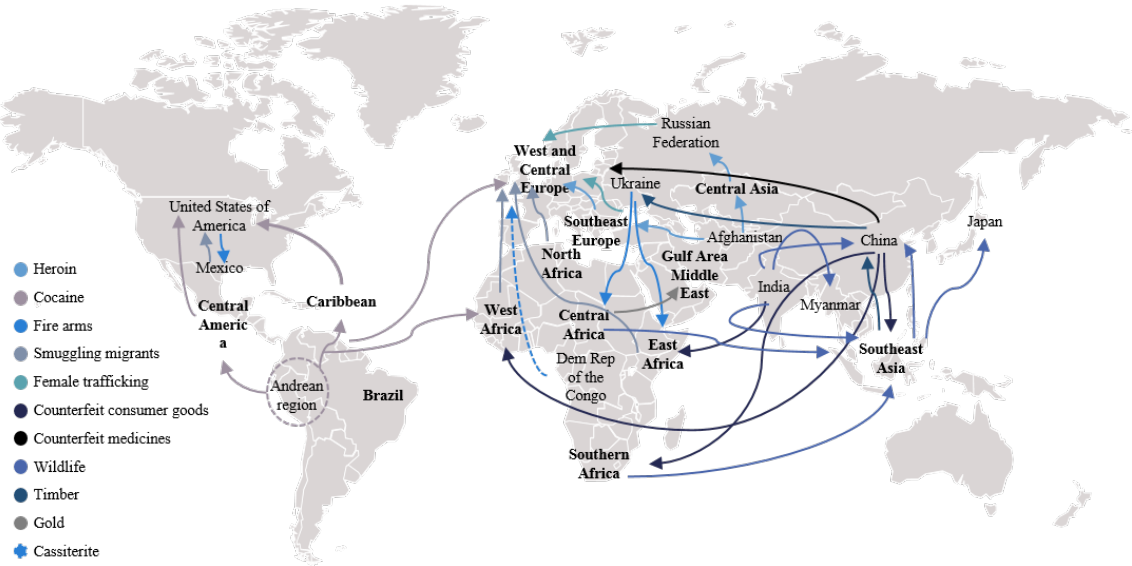


Figure 4.2: A simplified view of the international trafficking routes of illegal activities.

One potential factor driving up the demand for rhino horns during the last decades is the rise in wealth of the population in China (Graham-Rowe, 2011). The increased income levels have led to a larger share of the population being able to afford medicines containing rhino horn.

Traditional Asian medicine has its origin in China, which together with its large population makes China the largest market for rhino horns.

4.7.4. Supply of Rhino Horn

The supply side of illegal wildlife trade consists of organized criminal groups who are attracted to a combination of the huge profits and the low risk-nature of the crime (Ayling, 2013). Wildlife goods are generated from many different actors. Poachers form a wide range of individuals; local individual poachers acting through middlemen, criminal and rebel groups that need to finance their illegal activities, and professional international hunters. Wildlife products also come from privately held stocks not registered with the authorities and from legally hunted trophies.

WWF illustrates in their report, *Fighting illicit wildlife trafficking*, that organized criminal groups are the link between source countries and consumer countries (WWF, 2012 (A)). The supply often includes transit destinations and indirect routes to minimize the risk of detection. Figure 4.3. shows a simplification of the value chain (WWF, 2012 (A)).

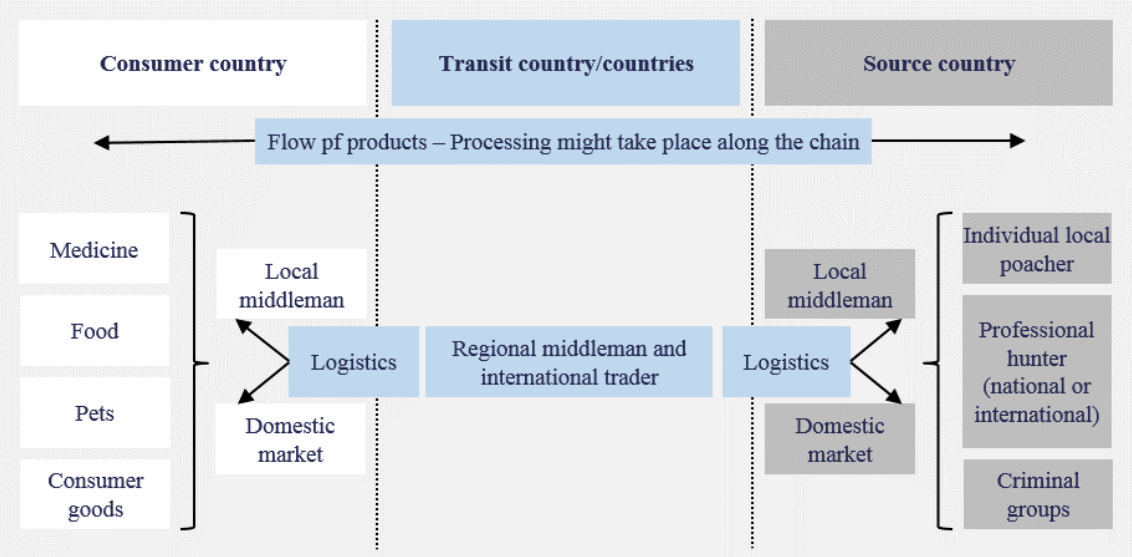


Figure 4.3: A simplification of the value chain of wildlife trafficking.

For residents living close to national parks, poaching can be a well-paid job (WWF, 2012 (A)). Ex-poachers describe how the salary earned from other jobs available generated nothing compared with poaching jobs. They knew that hunting the protected animals was wrong, but the relative small risk of getting caught and the high salary involved made the job too alluring.

Dehorning rhinos is common to reduce the incentive to poach them (Biggs et al., 2013). The large demand and the value of the remaining horn stubs make this solution ineffective if no additional security is in place. To reduce the poaching, one debated solution is to legalize the trade of rhino horn. Since the horn is composed of keratin it regrows. The estimated demand of horn could be met by private conservations, which already today dehorn the rhinos to protect them, and by using the horns from rhinos that have died from natural causes. A legal trade would simultaneously supply horns and generate income that can be used to fund rhino protection. A legal supply can

deliver the horns more reliably and cost-effective. When dehorning a rhino, anaesthesia to immobilize the animal is necessary.[6] For wild animals, this procedure is stressful and risky.

Some of the rhinos are hunted by so called trophy hunters (Foley, 2014). The Namibian government sells five permits to hunt one Black rhino each year. Namibia has about 1400 of the remaining 5000 Black rhinos and the income from the sales funds local conservation efforts (Child et al., 2012). One auction that got global headlines is the Dallas Safari Club's (Foley, 2014). The permit to hunt a Black rhino was sold for $350 000. These sorts of auctions are debated because of the fact that Black rhinos are classified as critically endangered.

[6] Jansson, Tina; Sustainability Inspector, Gothenburg, 2016, Email, 14 May.

5. Valuation of a Rhino

In this chapter, three different methods have been used to estimate the value of a rhino. The first one is based on supply and demand reasoning. The second is inspired by the TCM where national parks containing rhinos have been valuated based on the tourism income they generate to the country. The last method is based on the contribution of the tourism industry to the Kenyan GDP. All the calculations made in this chapter can be found in Appendix 1 and 2.

5.1. Supply and Demand of Rhino Horn

Supply and demand reasoning will be the main idea behind the first, of three, calculation for valuing a rhino. It is difficult to predict and plot changes in demand of horn since it is an illegal market and therefore, factors influencing the supply of the horn are what primarily have been evaluated. According to the demand and supply model for free markets; the demand will decline when the price increases. In this case, the market for horn is not a free market and elements, such as the horn being a status symbol or the risk of an endangered species going extinct, makes analysing the changes in demand a complex task. Changes in supply are also difficult to predict, but if horns are available and the market price is large enough, there will be an existing supply of horns.

For the calculations conducted below, primary and secondary data have been collected and used. Factors such as tourism, indirectly affecting the value of the rhino, have not been included in this chapter but has been considered in the second study, the TCM.

5.1.1. Equation for Determining the Value of a Rhino

The equation below in Equation 5.1. has been developed to determine the value of a rhino. It plots the value of a rhino based on four different variables that affects the supply of horn:

1. The price of rhino horn.
2. The number of horns generated by a rhino in its lifetime. (This variable requires a legalisation of the trade of the horn.)
3. The number of calves birthed by one rhino.
4. The number of generations that are taken into account. When a rhino is killed, its potential reproduction is also lost.

$$\boldsymbol{Value = X \times K \times H \times \left(1 + \sum_{i=1}^{n} \left(\frac{Y}{2}\right)^{n}\right)}$$

Equation 5.1: Formula for valuation of a rhino.

- Kilo price of the horn (X)
- Weight of the horn (K)
- Number of horns generated in a rhino's lifetime (H)
- Number of calves (Y)
- Number of generations (n)

By combining different scenarios, an interval consisting two different markets has been plotted, one for the illegal market and one for the potential legal market. An estimated value on a hypothetical legal market will work as an indication of the potential value of a rhino i.e. the total value that is wasted when a rhino is poached. The resulted graphs are based on different input data, which are correlated to the two markets and can be found in Table 5.1. Except for the variable used in each graph, the data below has been used.

Factor	Market value Black Market	Potential value Legal Market
Kilo price of horn	$65 000	$30 000
Weight of the horn	4,5 kilogram	4,5 kilogram
Number of horns	1	3
Number of calves	0	5
Number of generations	1	2
Market	Legal/Illegal market	Legal market

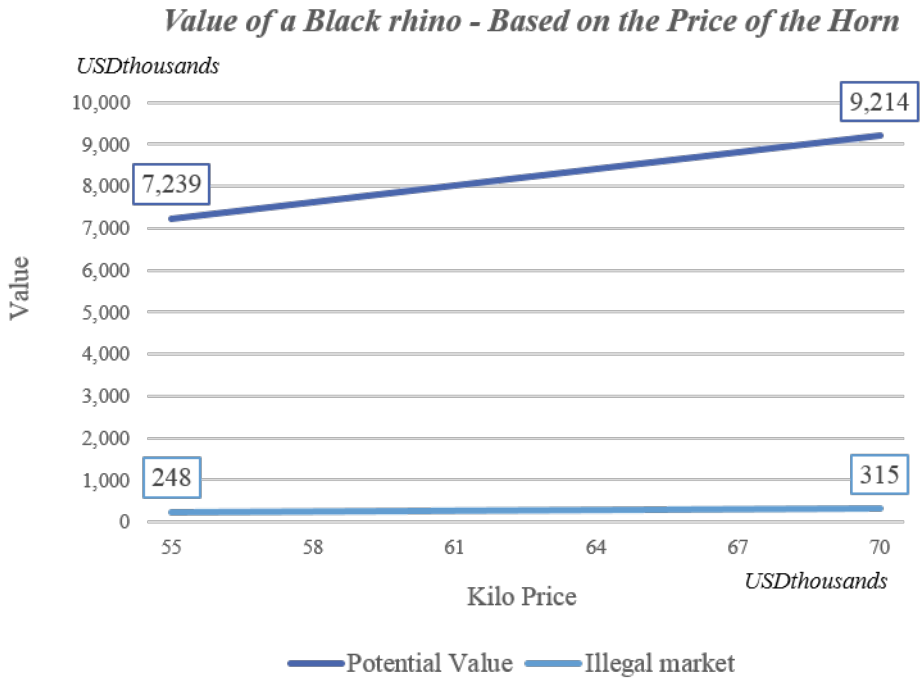
Table 5.1: Input data for value graphs.

On the illegal market for rhino horn, most of the supply comes from poaching (Graham-Rowe, 2011). Therefore, in the illegal market scenario, the number of horns a rhino generates is assumed to be one. Poaching stops the reproduction and therefore, only one generation has been included in the calculations. Since it is difficult to know the market price of the horn on the illegal market, different references have been used to generate the resulting interval in Graph 5.1.

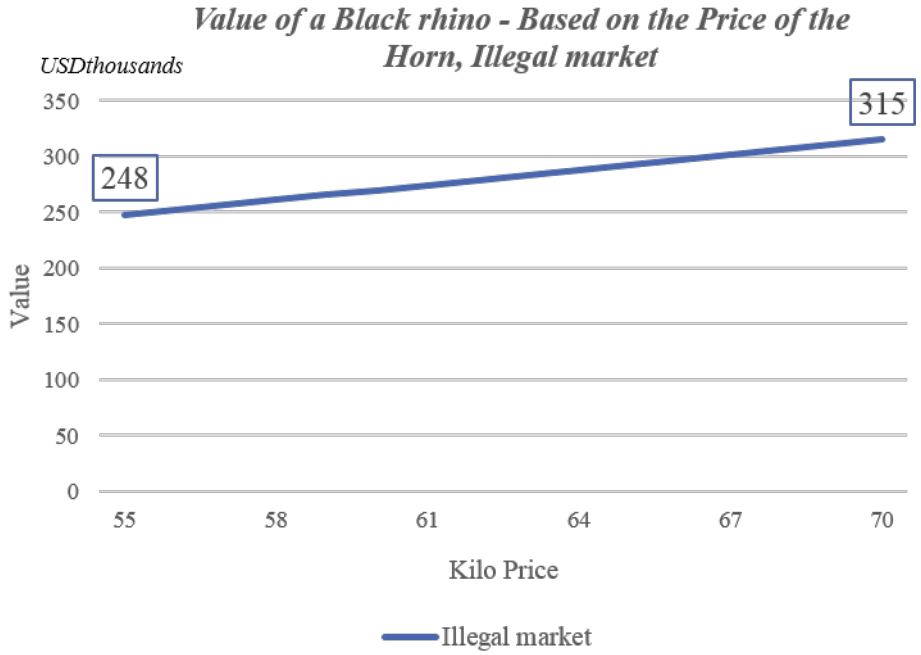
The other scenario shows the potential value of a rhino on a legal market. The average weight of a rhino horn, 4,5 kilo, has been used in this study. Each rhino is estimated to generate three horns during a lifetime, this to make the calculations as truthful as possible. On a hypothetical legal market, the price of the horn per kilo is assumed to decrease compared to the illegal market price as a consequence of the removed market regulations. In this study, the price per kilo has been assumed to be $30 000 per kilo. Using statistics from Kolmården, found in Appendix 3, regarding maximal numbers of calves that one dam can get, combined with information regarding rhino's reproduction cycle, the maximal number of rhinos in this calculations are set to five. This is done for the purpose of not overestimating.

5.1.2. Result from Supply and Demand Graphs

Below, five graphs are used to visualise the results from the different input data in the Supply and Demand based model.



Graph 5.1: Plot of the value of a rhino based on the price of the horn.

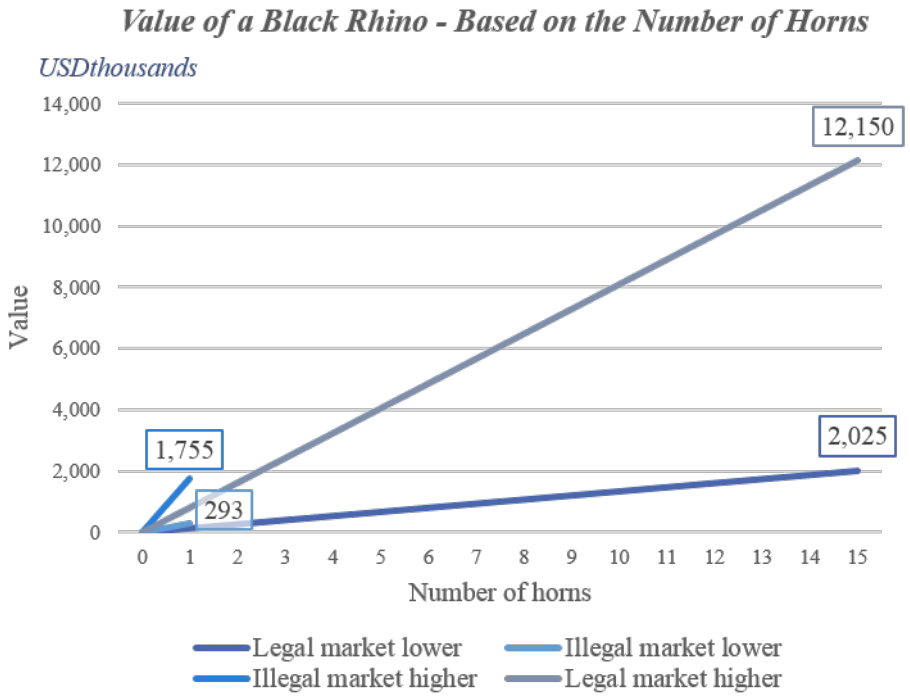


Graph 5.2: An enlarging of the illegal market in Graph 5.1.

Graph 5.1. shows how large impact the kilo price has on the value of the rhino. Because of the black market it is difficult to establish the real market value of the rhino horn. Graph 5.2. shows an enlarged illustration of the value of a rhino on the black market based on the kilo price. If a rhino gets poached and it cannot reproduce calves or new horns and the latter illustrated scenario will arise. If the horn weighs 4,5 kilos, the rhino will be worth $4{,}5 * X$, where X is the kilo price

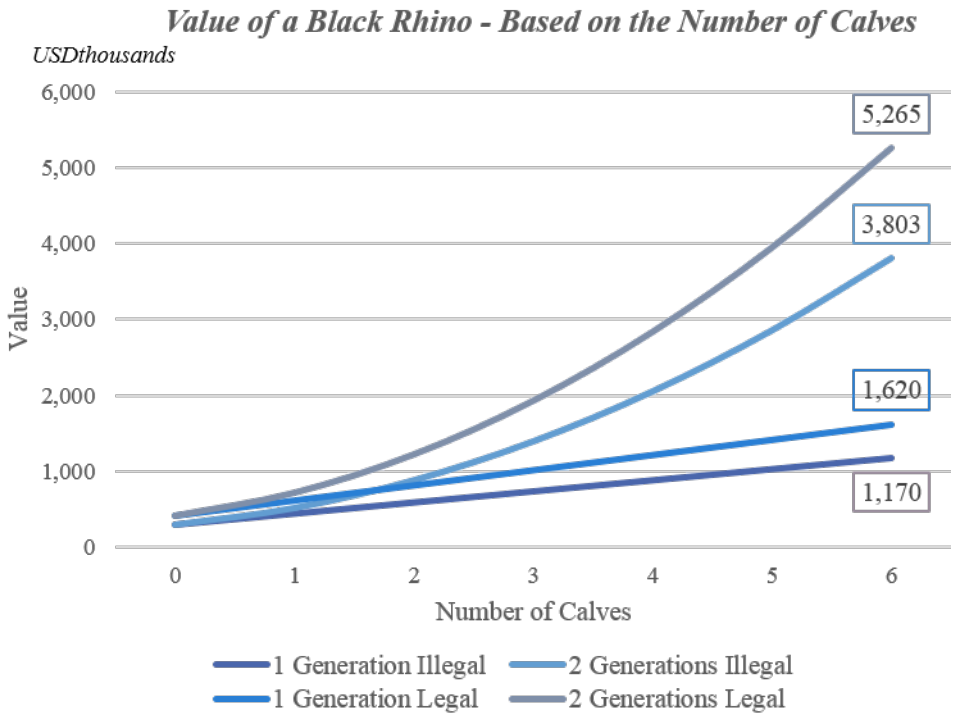
of the horn on the Black market. The graph labelled "Legal market higher" shows the potential market value of two generations of rhinos based on the assumption that the rhinos would have gotten five calves each. By poaching the rhino, the potential value will never be realised. The kilo price varies with 27% units leading to a corresponding increase of the total rhino value. The potential value of a rhino is 29 times greater than the calculated value of a rhino on the black market.

Graph 5.3. plots how the number of ablated horns generates a higher value of the rhino. In this graph, two different markets have been plotted. The two short lines represent an illegal market and poaching. Poaching stops the reproduction of horns and therefore only generates one horn. The longer lines symbolise a legalisation of trade of rhino horn. A rhino could generate up to 15 horns during its lifetime and the potential value of one single rhino is calculated to be **$2,0** millions or **$12,1** millions if two generations with five calves each are taken as parameters.

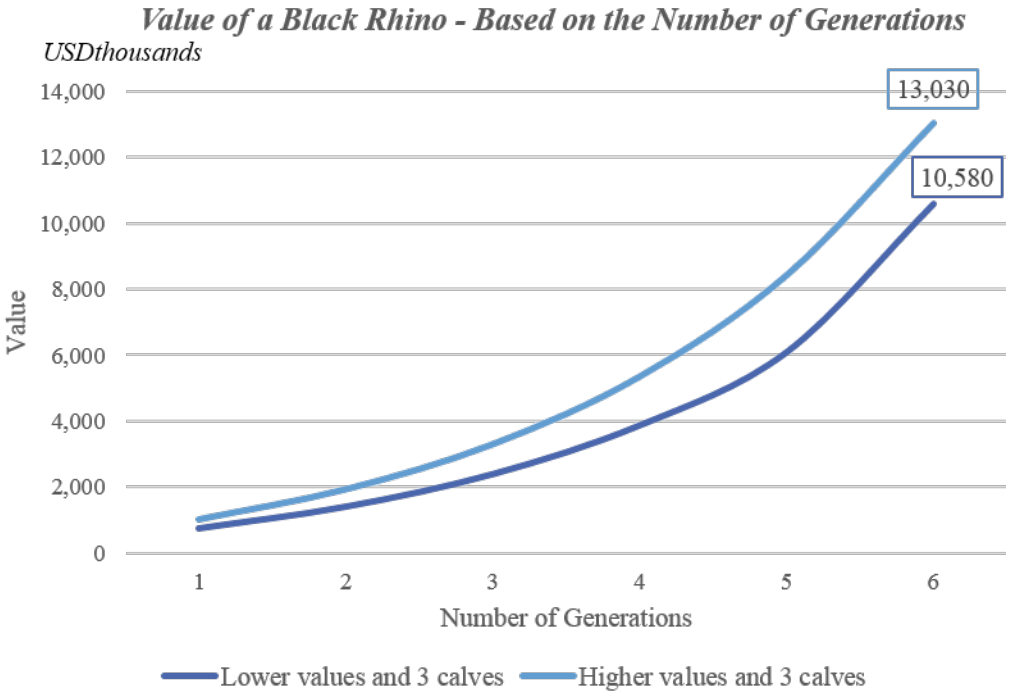


Graph 5.3 Value of a rhino based on number of horns.

The effect of number of calves and number of generations is plotted in Graph 5.4. and 5.5. These graphs also indicate that the potential value is larger on a legal market than on an illegal market because of the number of horns and calves. The legal value generates a 1,4 times higher value than the illegal value for two generations.



Graph 5.4: The value of a rhino based on the number of calves.



Graph 5.5: The value of a Black rhino based on the number of generations.

When many generations are being considered, the value rises rapidly. If a rhino give birth to many calves, which in turn can give birth to many calves, the potential value quickly rises, which is illustrated in the graph above.

5.1.3. Discussion of the Result

There is a large demand for rhino horn. This combined with the relative small supply leads to a high market price. The horn is associated with status and the demand is not very price elastic. The market is therefore not very sensitive to price changes. This indicates that the demand will continue to be high even with higher market prices.

Based on the research made for this chapter, the market price on the illegal market for rhino horn today is assumed to be $\mathbf{\$65\ 000}$. The market value of one rhino on this market is therefore from Graphs 5.1. and 5.2. counted to be $\mathbf{4,5 \times 65\ 000 = \$290\ 000}$. From the results illustrated above, the highest value is $\mathbf{\$13\ 030}$ million. This number is based on the optimal case with six generations on a legal market. A more realistic value is $\mathbf{\$675\ 000}$, which is the potential value of a rhino that generates five horns on a legal market with a market price of $\mathbf{\$30\ 000}$ for the horn which can be seen in graph 5.3. The lowest value is $\mathbf{\$248\ 000}$, which is the value of the rhino on an illegal market with a kilo price of $\mathbf{\$55\ 000}$.

It is interesting to compare the potential value of a rhino on a legalised market with the market price of the horn on the illegal market to see how many resources that potentially go to waste. In the short run, the illegal market generates a much higher value but considering the fact that an illegal market prevents continued reproduction of calves, the legal market will in the long run generate a higher value. In this study, the costs to maintain the rhinos have not been taken into consideration, which would decrease the difference between the potential value and the value on the illegal market. To get a more reliable result, these costs must be considered.

It is difficult to predict what would happen if the trade of horn was legalised. Here, the market price has assumed to be cut in half, which might lead to less supply and can consequently lead to less poaching. The income generated from the legalisation could go to the owners that could reinvest it into wildlife security and preservation. The revenue could also lead to economic growth within the country instead of financing criminal groups. Another outcome of a legalised market is that the demand does not adjust and that the supply instead increases when there is less risk involved. However, according to Kolmården Zoo, it is a very stressful process for rhinos to be put into anaesthesia to immobilize them, which is necessary to dehorn them and therefore it might not be a sustainable solution to dehorn the animals, which is an important factor to consider. This is also the reason why only five horns have been considered above.

The large demand on the black market gives incitement for continued poaching and the absolute value of the rhino will continue to be high as long as the market price is high.

5.2. Travel Cost Method

To estimate the value of a rhino for tourists, inspiration from the TCM is used in this study. Qualified data from surveys was not possible to be collected due to the time frame of this project. Therefore, this study is based on revealed preferences collected from other studies, by using the BTM.

Since the time scope of the thesis is too short to find primary data, and because of the absence of secondary data, a decision has been made to focus on the Zonal Travel Cost Method. Because of the same reasons, some simplifications and assumptions have been made to be able to use this method to make an estimated valuation of a rhino. Since the TCM requires a lot of information

that is not accessible for the thesis authors, it has not been possible to fulfil the method. Instead aspects from the TCM have been used to inspire the calculations below.

5.2.1. Input Data for Estimation of Tourists' Willingness to Pay

In this section of the thesis, a step by step explanation of how the Zonal TCM has been applied to estimate tourists WTP to see a rhino will be displayed. Below, the Zonal division that was made in the beginning of this study is presented:

- Zone 1: Kenya
- Zone 2: Africa
- Zone 3: North America
- Zone 4: Europe
- Zone 5: East Asia and Pacific region
- Zone 6: Other areas (South America, West Asia et al.)

The first data collected in this study was the number of tourists traveling from each zone to Kenya. World Tourism Organisation annually publishes a compendium with statistical information over the tourism sector for the whole world (2015). This compendium includes information regarding the number of tourists visiting Kenya each year and also which region they come from. After collecting data regarding the total population in the different zones, the visitation rate could be calculated in Table 5.2.

Zone	Total Visits /Year	Zone Population	Visitation rate (per 1000)
1 (Kenya)			
2 (Africa)	286000	1216129000	0.235
3 (Americas)	166000	783063000	0.212
4 (Europe)	826000	738849000	1.118
5 (East Asia, Pacific Ocean)	125000	1618777000	0.077
6 (Others)	117000		
Total visits	**1520000**		

Table 5.2: Information from World Tourism Organisation (2015) and Population Pyramid (2016).

The next step was to calculate the travel cost for each zone for one tourist (Tourkolias et al., 2014). The different factors that were considered are presented below and the different calculations are explained:

5.2.1.1. Entrance Fees

Five different national parks have been investigated to find the average cost for visiting a national park containing rhinos (Safari Bookings, 2016). The different national parks, which all maintain rhinos, that have been analysed are presented below:

- Tsavo West National Park

- Tsavo East National Park
- Lake Nakuru National Park
- Nairobi National Park
- Laikipia Plateau

Information regarding entrance fees are collected from the tariff guides that are found on the websites of Kenya Wildlife Service (2016 (A, B, C, D)) and Ol Pejeta Conservancy (2016 (A)). The average cost was estimated to $67. During the calculations, an assumption has been made that 80% of the visitors are adults and 20% are children since the fees vary depending on age. Another assumption is that 50% of the tourists reserve entrance tickets online before visiting the site, and 50% do not. These prices also vary.

5.2.1.2. Tour Costs

To see as much as possible during the safari, many tourists choose to have a guided tour in the National park. Information regarding these costs has been collected from the same tariff guides as for the entrance fees (Kenya Wildlife Service, 2016 (A, B, C, D); Ol Pejeta Conservancy, 2016 (B)). The assumption that 50% tourists purchase a guided tour longer than 4 hours and the remaining 50% choose to have a shorter tour that last maximum 4 hours has been done, which generate an average price of $27 for these four parks. For the national park Laikipia Plateau, an estimation has been made that tourists spends in average $40 on a guided tour. The results from the calculation gave total average tour costs of $30.

5.2.1.3. Other Expenses in the Recreational Site

In the national park, tourists spend money on food and other consumables. Assumptions has been made that tourists buy breakfast, lunch, dinner, coffee and 2 litres of water per day. The average cost for food has been calculated after collecting information from a text written by Mark Wiens, *Cost of Traveling in Kenya – How Much Do You Need?* (2011). Under this category, vehicle expenses have also been included, and this information has been collected from the same tariff guides as for entrance fees (Kenya Wildlife Service, 2016 (A, B, C, D))), (Ol Pejeta Conservancy, 2016 (B)). Vehicle expenses are expenses for taking a car into the national park. The costs for leasing a car is included under travel expenses instead of this category. The average total cost for other expenses in the recreation site is estimated to $46.

5.2.1.4. Travel Expenses

The definition of travel expenses is the money spent traveling to the country. Information from the World Tourism Organisation's compendium shows that 75% of the tourists travel to Kenya with airplane and 25% travel on the road by bus or car (2015). The average cost for traveling with airplane to Ngulia from the different geographical zones, which was earlier defined, was calculated by comparing a thousand different travel companies and sites (Momondo, 2016). In total 16 locations has been analysed over 12 different time-periods scattered throughout the year to get a feasible average cost. The result from this research is that the average cost to fly to Nairobi from the different zones is $804**.** To calculate the average travel cost for a tourist traveling by road, three different factors were important; fuel price (Factsoft, 2014), the cost of renting a car (Europcar, 2016) and average distance from adjoining countries (Google Maps, 2016). Calculations made, after making the assumption that the average rental time is three days and assuming that the fuel used is diesel, resulted in an aggregated cost of $109/person if the average amount of people in a car is three. The average travel expense for a tourist traveling to Nairobi is $627.

Tourists traveling from Nairobi to the national parks are assumed to travel by car. The costs for traveling from the airport to the national parks have therefore been calculated in equal manner as

the cost for renting a car above. With these calculations the average travel cost when traveling from a zone to a national park is $739.

5.2.1.5. Accommodation Costs

When calculating the accommodation costs, a simplification that the average time staying in the area around the national park is three days has been made. One more expensive and one more cheap accommodation alternative have been used to include different segments of tourists. An assumption has been made that the choice of accommodation are divided equally among the tourists. Information regarding different accommodation opportunities for the different parks have been collected from Matthew D. Firestone's book (2009), KWS Self Catering Accommodation (2016 (E)) and Sun safaris (2016). The average cost for accommodation for three days in a national park in Kenya is approximately $300.

5.2.1.6. The Cost of Time

This factor has been excluded in this survey because of the lack of time and other resources. Since many tourists travel from Europe, where many have paid holidays, this factor will probably not affect the result in any significant way.

5.2.1. Calculation of the TCM Result

In this section, the results from the research inspired from the TCM has been put together to get an idea about how much money a tourist is willing to pay to see a rhino in Kenya. The average amount of money that a tourist spends on a visit to Kenya for three days to watch wildlife is $1 182.

Some additional calculations have been made to get a picture about how big the tourist industry is in Kenya. As previously stated a total of 1 520 000 tourists visit Kenya each year. According to Okello et al., around 80% of the tourists visits Kenya because of the wildlife. The assumption that every tourist spends in average 3 days on wildlife safari has been made. From that assumption, the aggregated money the tourist industry generates is **$1 437** millions per year connected to wildlife. In this figure, the costs for flights are included which strengthen the revenue stream for the airplane companies and not Kenya as a country. This is instead an indication of tourists WTP to see rhinos in Kenya. If numbers of tourist will increase or decrease with for an example 20% the total money that the tourist industry generates will instead be **$1 149** millions and **$1 724** millions.

From the calculations of WTP, a valuation of a national park is possible.

Additional information required for valuating national parks based on its rhino density;

- Number of tourist visiting the national park annually (X)
- The impact Black rhinos have on the attraction of the national park (E)
- Number of Black Rhinos in the park (R)
- Result from TCM (T)

With this information it is possible to calculate how much money one park generate to the tourist industry, both in Kenya and in other countries. After dividing the result by numbers of rhinos in the national park, an approximate value of a rhino will be produced. The formula is shown in Equation 5.2.

$$\boldsymbol{Value\ of\ a\ rhino} = \left(\frac{\boldsymbol{T \times X \times E}}{\boldsymbol{R}}\right)$$

Equation 5.2: Formula for value calculation.

In Table 5.3., two examples of this calculation have been made on two different sized national parks in Kenya. Since the Black rhino is a part of the big five, an assumption has been made that the effect that rhinos have on the attraction of the park is 20%.

Tourists/year	100 000	50 000
Result from TCM (T)	1182	1182
Total WTP	$118 164 000	$59 082 000
Effect on the attraction	20%	20%
Number of black rhinos	80	30
Per Rhino	$295 410	$393 880

Table 5.3. Approximation of Rhino value based on the data listed above.

5.2.2. Discussion of TCM Result

The first conclusion from this study is that the tourist industry related to wildlife in Kenya generates **$1 437** millions each year, showing its importance to the country. Even if not all of this money is allocated to Kenya, it is an indication on how big impact the wildlife has.

The other result from the research is that the amount of money that tourist are willing to pay to see a rhino is approximately **$295 000** annually for a big national park and approximately **$394 000** annually for a smaller park. This is not enough information to make a valuation of a rhino since the costs also have to be included, which will not be calculated in this investigation because of lack of resources.

The results from this research will therefore function as an indication about how important the tourist industry is for Kenya and, in turn, also the rhinos. By calculating tourists WTP, national parks can get a better understanding for the market they operate in and realise the size of potential revenue. This information can also help rhino owners to gain insight in how many resources that can justifiably be spent on protecting the rhinos.

5.3. Calculation of Gross Domestic Product

To get a better picture of how large the tourist industry in Kenya is, additional calculation has been made. By applying the method benefit transfer on earlier studies regarding how much money the tourist industry generates annually, an extra calculation has been made. The aim with this computation is to compare the results from the TCM with the results from the calculation of GDP in order to validate earlier calculations and to serve as a complement.

From the World Tourism Organisation information regarding how much of Kenya's GDP that comes from inbound tourism expenditure has been collected, in 2011 the rate was 5,4%. This is the sum of the direct costs that tourists spend during a trip to Kenya. When considering the total tourism expenditures in Kenya, it is much higher.

As stated above, the tourism industry in total generates 15% of the total GDP in Kenya. To calculate the total amount of money that the tourist industry generates, information regarding GDP for the most recent years has been collected from the World Bank's website.

To make an estimation regarding how much money the rhinos generate to the tourist industry in Kenya annually, two important factors have to be determined. The first is that 80% of the tourism industry consists of wildlife activities, based on the article by Makonjio Okello et al. The second is that the tourism would decrease with 20% if the Black rhino would go extinct, which is determined by assumptions. The results from the calculations are registered in Table 5.4.

	GDP (Millions USD)	Tourism expenditure (Millions USD), 5.4%	Total contribution (Millions USD), 15%
2011	41,950.0	2,265.3	6,292.5
2012	50,410.0	2,722.1	7,561.5
2013	54,930.0	2,966.2	8,239.5
2014	60,940.0	3,290.8	9,141.0
Average		***2,811.1***	***7,808.6***
Wildlife, 70%			
2011		1,585.7	4,404.8
2012		1,905.5	5,293.1
2013		2,076.4	5,767.7
2014		2,303.5	6,398.7
Average		***1,967.8***	***5,466.0***
Rhinos, 20%			
2011		317.1	881.0
2012		381.1	1,058.6
2013		415.3	1,153.5
2014		460.7	1,279.7
Average		***393.6***	***1,093.2***

Table 5.4: Estimations regarding how much rhinos generate to the Kenyan tourism industry.

5.3.1. Conclusion for TCM and GDP Calculations

By using the TCM, the estimation for how much rhinos in Kenya generate to the tourist industry is **$1 437** millions annually. The result when using the BTM, and collecting information regarding the development of the GDP in Kenya during recent years, is that the rhinos contribute with average **$1 093** millions annually when considering the total contribution to the tourist industry.

When only considering the direct costs for tourists during their trip, the contribution will be lower, an average at **$394** millions annually.

Finally, the conclusion is that rhinos contribute with at least **$394** millions each year to the tourist industry in Kenya. One of the reasons why the estimation from TCM was higher is that all the travel costs were included in these calculations. Since the travel cost consists of airplane tickets, some of the aggregated value does not contribute to Kenya's economy.

From these studies, a range for the total amount of money that the rhinos contribute with to the tourist industry has been determined; this value is between **$394 - $1 437** millions. If only considering the contribution of the tourist industry to Kenya the range will stop at **$1 093** millions.

5.4. Discussion of Valuation Methods

Valuation of natural resources tends to end up in an interval since the value often differs for different stakeholders and affected parties. Due to this, the intrinsic value may vary from the market price.

The value of a rhino and a national park differ depending on situation and individual. For some, the value of a rhino is the same as the market price of the horn, which in this study has been calculated to **$290 000**, given that the kilo price is **$65 000.** At the previously mentioned auction in Dallas 2014, the value of a rhino was the same as the right to kill it, **$350 000.** For private farmers the value can be the amount the security system costs to protect the rhinos.

Part of the supply side of rhino horn consists of a collaboration between illegal organisations and local residents who are familiar with the area. Due to the money the business involves, they chose to participate in the criminal supply chain. For these people, the value of a rhino is the income the business generates. Their income is less than the market price of the horn since the market price must finance the whole supply chain. Socio-economics is therefore one factor affecting the value of a rhino. This aspect has however been outside the scope of this thesis.

In previous chapters, different calculations regarding the value of a rhino have been performed. Different intervals were generated depending on which variables that was observed. The supply chapter gives a concrete value of the rhinos, since it only looks at the market value of the rhino. The calculated value is between $**290 000** – $**675 000**, where the lower is the market price today on the illegal market, and where the higher value is the potential value of a rhino.

The TCM chapter indicates that a tourist is willing to pay around $**1 182** to see wildlife in Kenya. Depending on the density of rhinos and number of tourists visiting the national park, this result can be used to suggest the value of the national park. When distributing the value on the number of rhinos, this also indicates how much a rhino is worth for all tourists, which is around $**350 000** annually and lies within the above interval.

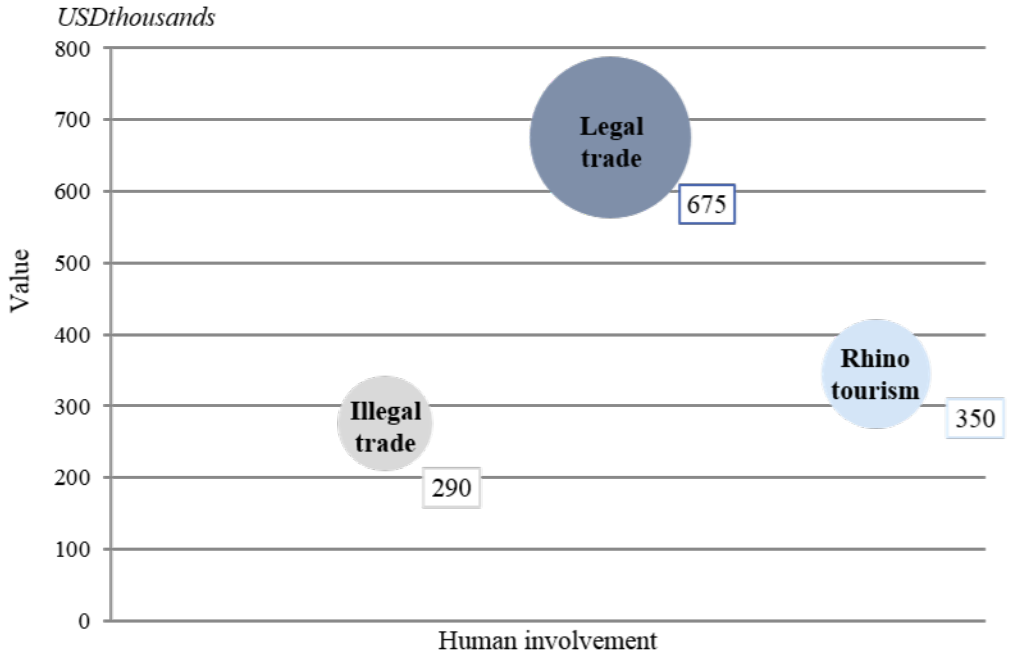
The value of the national parks and the wild animals where rhinos, as one of the Big five are included is of significance for the tourist industry in Kenya. In 2014 the total contribution was about **$1 280** millions. In the GDP chapter, the resulting value of the rhino population in Kenya is between $**394 – $1 093** millions annually, depending if direct or total contribution is considered. When dividing the GDP value on the total rhino population, each rhino will be worth less than the above values. A conclusion from this might be that a rhino is not of great valued alone, but that the total rhino population in total generates a large amount of tourists.

Another conclusion based on this result is how extreme the market value of horn is since it is the main factor leading to the high values above.

Research by Crookes indicates that the demand of rhino horn is not price sensitive (2015). Depending on changes of market conditions, the value of the horn, and thereby the rhino, will

differ. From the demand and supply graphs, the potential value of a rhino was compared to the market value on the illegal market. The potential value of a rhino, based on a legal market kilo price, indicates that the value of a rhino could amount to $**675 000** with a market price for the horn of $**30 000**. This is a much higher value than the black market value of a rhino and shows how much a rhino potentially can generate if the resources were used more effectively, which means that poaching must be reduced. If the security in national parks increases, the risk associated with poaching also increases, which most likely will affect the market price. Similar, a legalisation of the market would lead to less risk involved which probably would lead to increased supply. A market of horn will probably continue to exist even though large risk is involved with poaching. As long as there is a demand surplus, the market price will be high.

To summarise and qualify the different values calculated in this chapter, a plot has been constructed and can be seen below in Graph 5.6. The values are differentiated by the degree of human involvement, which is an indication of how many people that are affected by rhinos and to what degree. If the human involvement is high, the value is connected to a solution that will be good in the long run for the rhino spices, tourists and other people involved. The graph shows that the highest value is from the legal trade, where the rhino is dehorned. This solution is more sustainable than the illegal market, and also generates more money. The value calculated from the tourist industry is lower than the legal market, but is even more sustainable, since the rhinos will not be physically injured, which can happen when dehorning. The optimal solution is to combine the value from the tourism calculations with a legal market, which is possible when or if the trade of rhino horn gets legal.



Graph 5.6: Plot of different values depending on the degree of human involvement.

If the population of rhinos would grow rapidly and the risk of them getting extinct would disappear, the value of each rhino would level out. If the opposite would occur, the value of each rhino would increase. The value of a rhino is increasing with a decreasing number of rhinos. This can be explained from economical models as the one in the demand and supply chapter; if there exist a demand and the available supply is low, the market will be willing to pay a high price. This market behaviour can be seen already, since the demand has continued to grow even though there is a large market price of $**65 000** per kilo.

If the standards of living improve around national parks and residents can aliment on different resources, the reasons for killing rhinos might be less. The value of a rhino is not only the horn itself; it is important to include the income the animals generate to national parks and thereby also to Kenya. This is an important factor since locals, who know the area and are willing to poach, are a big threat to the rhino population even though a large amount of money is invested in security systems aiming to secure the rhinos. The value of the rhino and a national park depends on focal point and how resources are being used. For national parks however it is important not only to value the rhino based on the cost it generates, but instead it is important to see the overall picture and also value the income the animals generate to the country.

6. A Situation Study of Project Ngulia and its Market Potential

This case study covers the content of Project Ngulia and the different factors affecting the project's future, both internally and externally. This case will act as the fundament for the business plan conducted and found in Appendix 6. A brief description of how the business plan was created is also included.

6.1. Situation Study Introduction

As mentioned in the introduction, a business plan for Project Ngulia will be compiled. This business plan will be conducted using a custom made framework that is developed for this specific case. Inspiration from both the profit context and the non-profit context has been used to produce this framework. The reasoning behind this is that Project Ngulia is a non-profit project and theory about non-profit business planning has therefore been used, however, there are aspects from for-profit business planning that is of importance due to the fact that there are parts of the concept that could be commercialized in the future. As stated by Bingham et al. in the book *The open innovation marketplace: creating value in the challenge driven enterprise* (2011), the lines between non-profit planning and for-profit planning is getting more blurred, which is especially true for an innovative project like Ngulia. The theory found on for-profit business planning also stated that the people working with a business or project are of vital importance (Sahlman, 1997).

As the project, at the present, does not generate any revenue, there is a need for funds and resources in order for the project to continue.[7] Therefore, parts from McLeish's (2011), *Successful Marketing Strategies For Nonprofit Organizations,* model of strategic planning has been used. Those parts include a description of how the project is funded and what additional funds that are needed. Taking inspiration from Fredrick's (2010) case statement in, *Ask : How to Ask for Support for Your Nonprofit Cause, Creative Project, or Business Venture*, a section focusing on the beneficiaries has been included, as this strengthens the content of the business plan.

External factors are also included in this case study to see which opportunities and threats the project is, and could, be exposed to. To show the potential for Project Ngulia, the business plan must contain a market analysis (McLeish, 2010). The conducted market analysis for Project Ngulia can be found in chapter 6.4. The case study also looks at projects that offer similar solutions or solutions that solve the same problem, to determine what is unique about Project Ngulia. The competitive analysis and the risk analysis can be found in chapter 6.5 and 6.6 in this case study.

Common to both for-profit and non-profit businesses is that the business plan should contain a description of the purpose and goals of a project (Fredricks, 2010), (Sahlman, 1998). As these parts have already been introduced in the introduction chapter, they will not be repeated in this section of the thesis. The business plan framework that has been developed for Project Ngulia is shown in Figure 6.2. below.

6.2. Business Model Canvas

When conducting the business plan for Project Ngulia, Osterwalder's (2014) Business Model Canvas has been used to visualize Project Ngulia's offer and what value it delivers to its beneficiaries. The contents of the canvas have thereafter been further developed to create the

[7] Bergenäs, Johan; Senior Associate and Director of the Partnerships in Security and Development Program, Personal Interview 22 January.

contents of the business plan. The Business Model Canvas for Project Ngulia is shown in Figure 6.1.

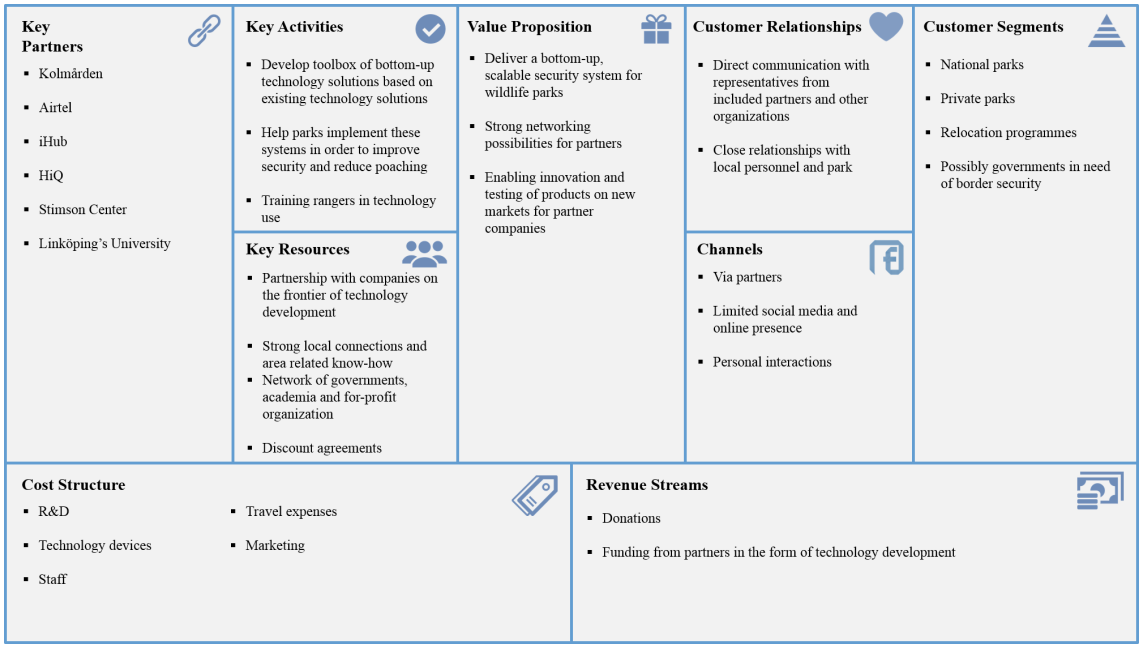


Figure 6.1: Business Model Canvas for Project Ngulia.

6.3. Framework for Business Plan, Project Ngulia

Below in Figure 6.2., one can find the data collected on Project Ngulia and the different factors and actors that have, and are playing a large part in the accomplishments.

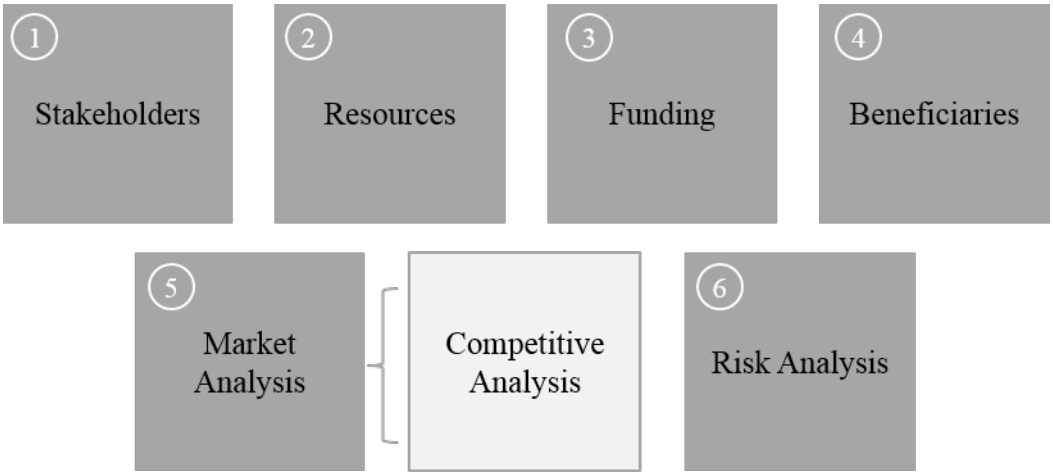


Figure 6.2: Building blocks of the business plan framework.

6.3.1. Stakeholders

Kenya Wildlife Service, the project coordinators, all the partners, the competitors and Tsavo West National Park are all stakeholders. Seen from a wider perspective one can say that the community

and government in Kenya, tourists and poachers, among others can be viewed as well stakeholders since they will be affected by the outcome of the project. All of the stakeholders are shown in Figure 6.3.

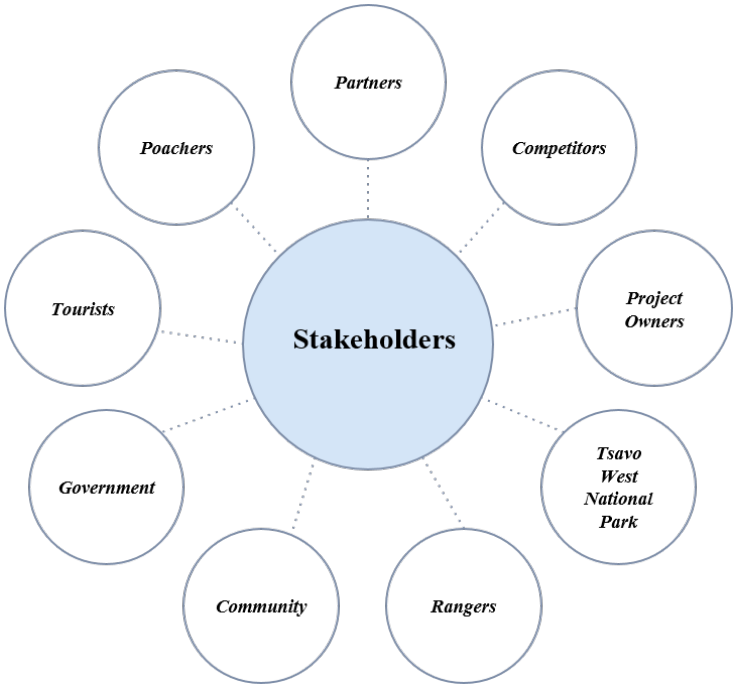


Figure 6.3: Stakeholders for Project Ngulia.

6.3.1.1. The Project Coordinators

Fredrik Gustafsson, who is a professor in sensor informatics at Linköping's University, leads the technical research team and is responsible for management and supervision of technical development plus the system integration (Deveximpact, 2016). However, Gustafsson has got other commitments at the university, and Project Ngulia is only one of his professorial duties.[8] To locate and involve potential partners that can add value to the project, specifically in the technology area, is Gustafssons responsibility where he evaluates their suitability. The development of the concept is not affected too much by what partners can offer, instead it is based on what is thought to be the most suitable solution.

Johan Bergenäs, who works at Stimson Center, is responsible for overall strategy and relations with project stakeholders, as well as replicating and scaling the project with assistance from partner organizations (Deveximpact, 2016). Bergenäs works towards other countries, multilateral organizations, peer NGOs and the private industry.

[8] Gustafsson, Fredrik; Professor at Linköping's University, Norrköping, 2016, Project briefing and study visit to Kolmården, 21 April.

6.3.1.2. Partners

Partners supporting Linköping's University to implement Project Ngulia are Kolmården, Airtel, iHub, HiQ, SAAB, Superfly.tv, Mowana Media, Nokia, Vinnova, GPS Perimeterlarm, Termisk Systemteknik, Meteksan Savunma, UAS Forum Sweden, Mountaindog, Modio, FLIR, Flexenclosure, AXIS communications.[9] The partners contribute with either funds, competence, technology or all three depending on what type of company it is and what technology or other competence Project Ngulia is in need of. The partners differ in that they originate from different countries and vary in size; several of them are placed in Sweden or in Kenya.

6.3.1.3. Communication Channels

The communication channels between Project Ngulia and the partners go through Johan Bergenäs and/or Fredrik Gustafsson. Communication between different partners is encouraged as they are collaborating in creating a concept for the project.

6.3.1.4. The Partners Incentives

The incentives partners have for contributing to Project Ngulia are that it is a respectable way to work with CSR questions and being a part of the project communicates that the company or organization acts in line with an overall sustainable development.[9] The most essential reason for partners to commit is that the project acts as an incubator for new application areas for existing technology. This is a modern and innovative way to reach new markets and Project Ngulia acts as a showcase for the different application areas.

It is also important for the partners to find new value for the product base and, while working with the development of new technology for the project, the awareness on the possible add-on functions to existing technology is very likely to increase.[10] The partners are cooperating with each other and gain a valuable network with potential partners.

The marketing coordinator at SAAB AB, Samantha Boustred, one of the partners to the project, explains how the involvement has affected the company.[11] Seeing CSR as an important factor to increase the brand among customers is common; but Boustred explains that the results of the involvement are more remarkable within the company and among the employees. When promoting news regarding Project Ngulia through their internal network channels, the news receive higher attention and engagement than other corporate news.

An example of how companies have contributed to the project with both resources and knowledge is NOKIA's contribution, raising the mobile network from 2G to 3G.[10] This shows how companies can work with CSR by using their expertise instead of creating a book or compendium regarding environmental sustainability which NOKIA did before.

6.3.2. Resources

Project Ngulia is a unique combination of resources.[9] The project coordinators have good relations with the people in Tsavo West National Park and have continuously been able to visit the sanctuary in Kenya for updates and continuing of the development. On site tests together with park rangers, commanders and research staff have been performed.

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[9] Bergenäs, Johan; Senior Associate and Director of the Partnerships in Security and Development Program, Personal Interview, 22 January.

[10] Gustafsson, Fredrik; Professor at Linköping's University, Norrköping, 2016, Project briefing and study visit to Kolmården, 21 April

[11] Boustred, Samantha; Marketing Coordinator at Saab Grintek Defence, Gothenburg, Personal Interview, 13 April

6.3.2.1. Competence

The project is human capital-intensive.[12] Industry and research work alongside as high-technological businesses and Linköping's University combine contributions to accomplish the set goals[8]. In the collaboration, knowledge has been transferred between the involved parties and the diffusion of technological knowledge in Kenya enables potential new markets and business opportunities for the companies involved.[12] For many of the partners in the collaboration, this is a complete new way of business involvement. These are e.g. sensor manufactures, system integrators and retailers, companies with cyber-security knowledge and drone operations in Africa and media productions

An advantage with Project Ngulia is the close collaboration with the people operating nearby the sanctuary.[12] Airtel and the technology community iHub have made the bottom-up development of the technology possible.

6.3.2.2. Technology

Working as a ranger, and protecting the rhinos from poachers, can be dangerous (Stimson Center, 2016). Before Project Ngulia, the rangers used radio communication, which is an exposed form of communication that anyone could overhear.[12] Their only tracking device was a dog and they used a wheel from a tractor to smooth out the sand to then be able to detect footsteps from potential poachers entering the border of the sanctuary. Additionally, they had limited access to vehicles and binoculars with night vision mode. In contrast, the poachers often have helicopters, more advanced night vision equipment and heavy weapons. Project Ngulia is actively working on creating a safer and more effective work environment for the rangers.

The rangers have been equipped with cell phones containing the developed C3 app, and through the cloud-based-database, which hosts all information and communication, rangers can communicate with each other and their management.[12] The app is primarily an input device where the rangers can note their observations. The cloud-service enables them to navigate and see the position of all rangers via GPS technology. Additionally, it is possible to monitor where the animals have been observed during the daily patrolling rounds as photos can be uploaded and the reports automatically get geo-tagged. The commanders can see the positions of all rangers and vehicles. It is also possible for the rangers to observe, issue, or receive security alerts. With the new equipment, data can be analysed in real time and retrospect and commands can be sent directly to the rangers. Previously, the rangers used handwritten logs; this platform therefore enables rangers and commanders to have more effective communication.

iHub is responsible for developing the design and interface used in the app and to maximize the usage of the platform. Additionally, the company is responsible for the training programs where support and maintenance are in focus and are guided by Linköping's University (Khayale, 2016). Linköping's University has developed the technical solutions and the hardware consisting of well-tested mature technology (Westman Svenselius, 2015). A good overall comprehensive view of the sanctuary is possible through smart algorithms that connect data from different sensors in the Ngulia Sanctuary with the reports written on the rangers' cell phones.

Kolmården Zoo in Sweden, a partner to the project who also retains rhinos, has a test site where all sensor systems can be thoroughly evaluated in its right environment.[13] This is an important part of the quality control of the technology that will be used in the Ngulia sanctuary.

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[12] Gustafsson, Fredrik; Professor at Linköping's University, Norrköping, 2016, Project briefing and study visit to Kolmården, 21 April

[13] Gustafsson, Fredrik; Professor at Linköping's University, Norrköping, 2016, Project briefing and study visit to Kolmården, 21 April.

6.3.2.3. Future Development

Two different GPS devices are under development for obtaining GPS positions of rhinos.[13] The primary one is a foot ring that has been developed for this purpose and is currently being tested at Kolmården zoo. The other device can be positioned, internally, in the thick skin on the rhino's neck. Other than giving the position, the device might be able to give information about the animal's physical condition. Whether this type of tracking devices will be used on the animals in the future remains to be seen. One challenge with this solution is the batteries limited life-length. Since it is very stressful for rhinos to be tranquilized, the battery can only be exchanged a limited amount of times.

In future project phases, the C3 platform will contain sensor systems and radar for border and intruder detection as well as area surveillance.[13] Smart algorithms can distinguish animals and humans and monitor movements. The radar systems will be able to detect a vehicle within a ten kilometre radius and animals and humans within five kilometres. Under a two year time period, a radar will be lent to the project from a Turkish radar company.[14] This sort of hardware is expensive and the loan is generating great value to the Ngulia test site. In parallel, other sensor systems will be investigated, examples are: microphone networks, radio detection, fibre optics and laser barriers.[13]

6.3.3. Funding

The financial means used to develop Project Ngulia are based on resources from partners within the project.[14] It is central that the project is economically sustainable, and it is fundamental that the project is not dependent on large donations. Most of the partners have financed their own work as a part of their contribution to the project. Some hardware and software used in the project have been financed with donations.

The project has received $185 000 to finance the phase where hardware was integrated in the C3 system (Khayale, 2016). The rest of the funding comes from other contributing partners and consists of approximately $1,4 millions – all which represent technical and human resource contributions. To achieve the goals for the project and add border and intruder detection as well as area surveillance, sensors and radar system are required and the investment will reach approximately $1,3 millions – again in technical and human resource contributions.

6.3.4. Beneficiaries

Organizations and companies have different beneficiaries. Those are groups and individuals that benefit from the organization's activities. Project Ngulia has numerous beneficiaries, however, the rhinos, the national parks, Kenya, the tourists and the companies involved in the project are central.[14] In the section below, a description of the specific beneficiaries and their requisites will be clarified.

A dead rhino is worth more than one being alive.[15] The need for a higher security in the national parks is immense, else the rhino could go extinct. Besides, the Black rhinos are exposed to animal cruelty when poachers remove the horns. The fierce removal is a consequence of time pressure and the fact that if they extract the horn from the root, the amount of horn extracted is maximized[11]. One of the project's goals is to increase, but above all secure, the rhino population. This would generate a greater population of the species, which is good for biodiversity.

[14] Bergenäs, Johan; Senior Associate and Director of the Partnerships in Security and Development Program, Personal Interview 22 January.
[15] Hanks, Dr John; Expert environmentalist, Gothenburg, 2016, Skype interview, 13 April.

The poachers are equipped with weapons and they do not hesitate to use them to get hold of the valuable horns (Reuters and VICE news, 2015). With Project Ngulia, the rangers, who are risking their lives protecting the rhinos, are given the ability to communicate with other rangers and commanders, which increases the security and defence within a park.[16]

Moreover, approximately 1.5 million tourists annually visit Kenya (World Tourism Organisation, 2015). Today, 12% of the workforce are connected to the tourism industry (ENCA, 2013). Incidents in Kenya the last years, like the terrorist attack against the shopping mall in Nairobi 2013, have had a negative effect on the tourism industry. Among others Tsavo West National Park has noted a loss of income due to these attacks.[17] Before they had a daily revenue of $12 300 per day and today they only get $1 000 per day. It is not clear that all the effects are consequences of the attacks, but the managers at Tsavo West National Park states that they have seen a decrease of school groups visiting the park.

Kenya is in need for economic growth to become a developed country. With increased tourism and general safety and security, which could possibly become an outcome of the project, Kenya will hopefully also benefit from the project.

6.4. Market Analysis

This market analysis will describe and analyse the potential market for the project's concept in Africa. In the process of segmenting the market, an identification of potential customers has been made. The analysis focuses mainly on national parks/reserves, private parks and relocation programmes containing and handling Black rhinos. For the market analysis to be of complete structure, a market research ought to have been conducted, however, due to resource limitations, this could not be accomplished. The analysis is built upon interviews with people who carry expertise knowledge and experience in the field.

Research has been made in order to map out application areas outside of the Ngulia sanctuary where the concept of the project could be viable. In order to make a correct analysis of the market, a macro-segmentation has been made where the research is limited to the segment with parks that have a presence of the Black rhino. Only countries with a substantial Black rhino population have been taken into account. This is done to simplify the analysis as resources are, as mentioned, limited. From this segmentation, Zimbabwe, Namibia, South Africa and Kenya are deemed to be suitable for the analysis.

Followingly, segmentation on a micro level gives a detailed description of what different kind of habitats the Black rhino resides in. The three segments that are identified are national parks, private reserves and locations where rhinos are moved to in different relocation programs. These relocation programs move the rhinos to a safer environment, although there are no funding to support security at these new sites.[18] The segmentation is illustrated in Figure 6.4.

[16] Bergenäs, Johan; Senior Associate and Director of the Partnerships in Security and Development Program, Personal Interview, 22 January.

[17] Stenmarck, Martin; Systems Engineer / Project Manager at HiQ Ace AB, Gothenburg, 2016, Email: Martin.Stenmarck@hiq.se, 10 May.

[18] Hanks, Dr John; Expert environmentalist, Gothenburg, 2016, Skype interview, 13 April.

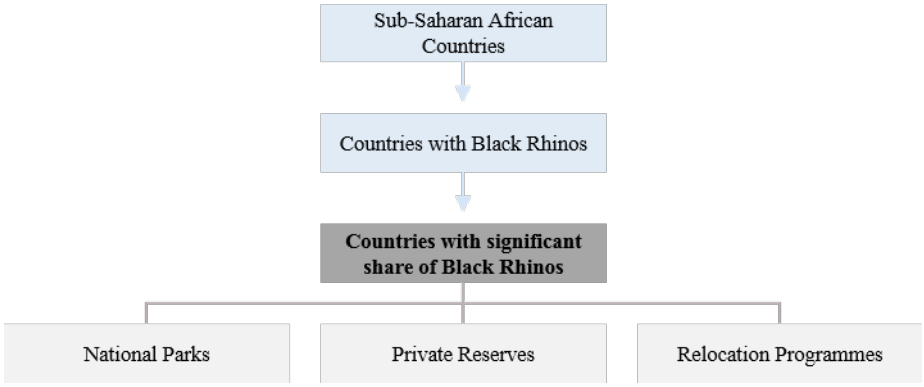

Figure 6.4: Segmentation

The macro segment contains counties containing Black rhinos with a substantial population. The Black rhino is distributed between Namibia, Zimbabwe, South Africa and Kenya, which contains 98% of the total population of the Black rhino (WWF, 2016 (B)).

6.4.1. National Parks

National parks are normally owned and financed by the government.[18] Although, this may differ. For example, in Kenya and West Africa, the government has increasingly taken upon itself the responsibility for wildlife whereas in Zimbabwe there has been a transfer of ownership of this responsibility from the State to the owners of land on which wildlife is found (Cirelli, 2002).

National parks are often open for tourists and are usually the highlight when visiting these countries (Frost et al., 2012). In the existing national parks the security levels vary, however, some parks have immense amounts of resources at their disposal but the poaching does not seem to abate.[18] The current situation has made the rhino a rarity and it is found in very few places. Exact data on the whereabouts of all the Black rhinos is elusive. The numbers presented in this analysis are based on estimates whose purpose is to give an idea of where they reside and where more security efforts are needed.

6.4.1.1. Kenya

Kenya is currently home to approximately 650 Black rhinos (Project Ngulia, 2016). The largest national parks in Kenya, Tsavo West and Tsavo East, are facing severe difficulties in battling the poaching threat. There are several factors contributing to these difficulties. The infrastructure in the park is in poor condition making it hard to move around inside the park.[19] The ranger force consists of more than 300 rangers whom are responsible for a 22 000 square kilometre area. Vehicles, fuel and ammunition are scarce and many outposts are in poor condition. A possible explanation for the severe situation could be the economic situation in Kenya with a current GPD per capita of $1 588 compared to South Africa's which is $6 354 (Global Finance, 2015). Fortunately, efforts in various sanctuaries in Kenya has managed to increase the population.

6.4.1.2. South Africa

South Africa has got the largest population of Black rhinos in the world amounting to around 1754, including those privately owned (Earth Touch, 2014). The majority of the rhinos can be found in Kruger National Park (KNP). Compared to parks like Tsavo in Kenya, KNP has a more

[19] Gustafsson, Fredrik; Professor at Linköping's University, Norrköping, 2016, Project briefing and study visit to Kolmården, 21 April

developed security system. KNP's security force consists of 550 rangers in total, tracking hounds, scouting helicopters, sensor systems and cameras at almost every entrance to the park (Ramsay, 2014). All these preventive measures have not been as efficient as one could hope. In fact, 1 175 rhinos, both Black and White, were killed in South Africa in 2015, more than 500 in KNP (Stoddard, 2015).

There are other national parks in South Africa with Black rhinos, like the Addo Elephant Park (Freeman et al., 2013) and Pilanesberg National Park among others (Hrabar, 2005). However, none of these face the large amount of cases of poached animals that KNP does (Stoddard, 2015). This is mainly because Mozambique, one of the poorest countries in Africa, shares border with KNP making it accessible to the poor locals who get bribed by villains to kill the rhinos.[20]

6.4.1.3. Zimbabwe

The majority of Zimbabwe's Black rhinos can be found on private land, due to the transfer of ownership as mentioned above (Zimbabwe Parks and Wildlife Management Authority, 2015). As few as 39 out of Zimbabwe's 484 Black rhinos lives on the state owned land, which has the size of about 3000 square kilometres. A more thorough analysis of private reserves, and thereby also most of Zimbabwe's Black rhino population, can be found in the analysis on that segment. During 2014, ten rhinos (Black and White) were killed by poachers. In the first half of 2015, 21 rhinos were killed by poachers. This shows a more than threefold increase in poaching numbers in Zimbabwe.

6.4.1.4. Namibia

Namibia has a large portion of the total amount of Black rhinos, 28% which is approximately 1400 (Child et al., 2012). The Namibian Black rhino has been left alone for a long period of time, since 1994. This was a result of the efforts Namibia did to educate the population about the rhinos. Additional effort included involving local communities which showed great results for the Namibian Black rhino. But as with so many other countries, the number of poaching incidents is growing.

A summary of the major rhino populations is shown in Figure 6.5.

[20] Hanks, Dr John; Expert environmentalist, Gothenburg, 2016, Skype interview, 13 April.

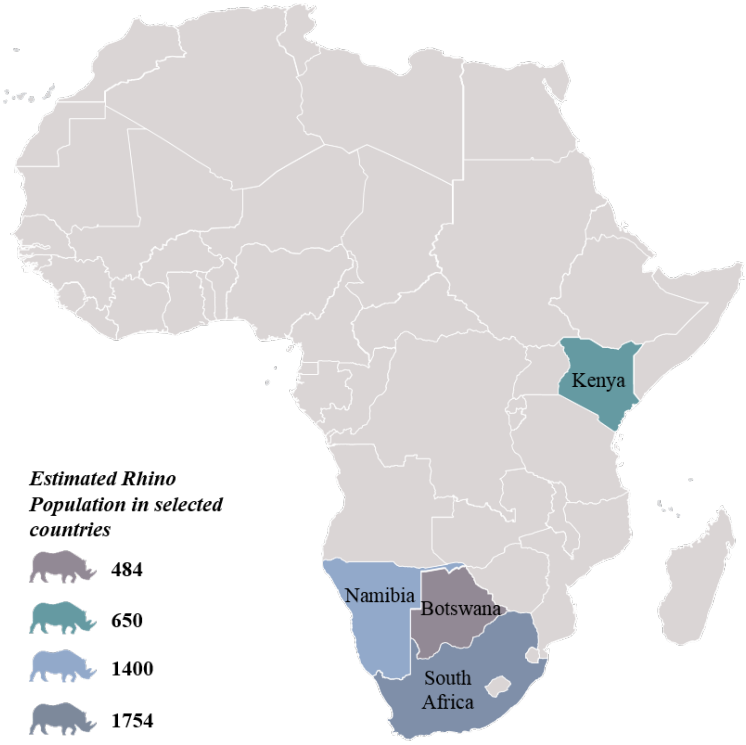

Figure 6.5: Rhino distribution.

6.4.2. Private Parks

Private reserves are, as the name indicates, owned privately and are generally funded by the owner or/and by the revenues received from visiting tourists.[21] However, some reserves are completely private i.e. not open to the public. The owners in question are cautions about information leakage and do not want sensitive material to reach the public, regarding number of animals, especially rhinos and other resources that the farm possesses.[22] Consequently, it has been difficult to locate data revealing the market size and the customer potential for Project Ngulia regarding private parks. To cover the knowledge gap, the analysis has been constructed on collected data from renowned sources. The information stated in the section below is a confirmation that there is a need for a security reconstruction and revolution in private parks.

Today there is approximately 10,000 to 14,000 private parks in southern Africa. (Child et al., 2012). It is difficult to define and describe the private parks as customers, as they are so many and hard to find information about[18]. An example showing the complexity that comes with private parks as customers is that in South Africa many landowners collectively removed their fences between themselves and the Kruger National Park. (Child et al., 2012) This was meant to generate substantial revenues from hunting and tourism and the economies of scale associated with tourism and wildlife allowed the private reserves to share management costs and principles over a larger area and to generate more money than they would as individual properties.

Security is today one of the major expenses for a private reserve[18]. An example that states the enormous security expenses is The Buffalo Dream Ranch, the world largest rhino farm. The farm has a total of 1 261 rhinos. The monthly cost for the security is approximately $210 000, leading

[21] Hanks, Dr John; Expert environmentalist, Gothenburg, 2016, Skype interview, 13 April.

[22] Shaw, Dr Jo; WWF rhino project manager, Gothenburg, 2016, email: jshaw@wwf.org.za, 15 april.

to an annual expense of $2,52 millions. However, in 2015 the farm lost 17 rhinos and the owner is convinced that it is the lack in security that contributes to this, and that they are inside jobs (Laing, 2016).

In South Africa alone there are approximately 10 000 private parks of which 330 have rhinos (Black and white) and together they act as home for 6 200 rhinos.[23] This is equal to 33% of the total national population of rhinos. Together they spend an annual amount of $24,5 millions on rhino security each year. To accomplish the wanted security at these farms the money is used to buy guns, uniforms, radio equipment, night vision equipment, vehicles and aircrafts.

6.4.4. Relocation Programs

An alternative approach to the different security solutions available is the relocation programs. These programs take rhinos from areas with high poaching rates and moves them to safer areas.[24] One such program was initiated by Wilderness Safaris in 2001 where rhinos were moved to the Moromi Game Reserve in Okavango Delta, Botswana.[25] The reserve is surrounded by water making it hard to access. The rhinos that are relocated to the Moromi Game Reserve can move over the water and roam free in a 30 000 ha area. This particular relocation program was dependent on the support it got from the government in Botswana as well as private sector safari companies and the department of Wildlife and National parks. The costs for the program is no longer carried by Wilderness Safaris as they were in the beginning. Instead, the private sector safari camps now cover the costs.

There are rarely any actual security systems in place at the locations that the rhinos are moved to.[24] This questions the long-term viability of the relocation programmes as a sole solution. Some different relocation programmes are:

The Black Range Rhino Expansion Project by WWF: A project that has relocated 130 Black rhinos to safer areas (WWF, 2016 (C)). The project encourages rhino farmers to remove fences between each other.

The Botswana Rhino Project by Wilderness Safaris: A joint venture between the Department of Wildlife and National Parks and Wilderness that has relocated both Black and White rhinos to the Moremi Game Reserve (Rhino Conservation Botswana, 2016).

Zambia Rhino Relocation by African Wildlife Services: Partnership between Africa Wildlife Services and Zambia Wildlife Authority that relocated four White rhinos from South Africa to Zambia (African Wildlife Foundation, 2016). The project has managed to restore the population from one rhino to nine rhinos.

The Rhinos Without Borders Crowd Funding Campaign by the Great Plains Foundation: Aims to relocate at least 100 rhinos from densely populated areas to Botswana, where poaching barely exists (2016).

6.4.5. Competitive Analysis

The following identification and evaluation aims to narrow the selection down to a few direct competitors and make a comparison of these projects and Project Ngulia.

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[23] Pelham, Jones; Chairman of Private Rhino Owners Association, Gothenburg, 2016, Email: Pelham@vibe.co.za,18 April.

[24] Hanks, Dr John; Expert environmentalist, Gothenburg, 2016, Skype interview 13 April.

[25] Bell, Colin; Founder of Africa's Finest project, Gothenburg, 2016, Email: colinbell@iafrica.com, 18 April.

6.4.6.1. Competition Identification

Autumn 2015, a competitive identification for Project Ngulia was made by Elin Ahlberg. The thesis authors have taken part of the collected facts[26] from this report and combined it with a complimentary internet search resulting in an identification of several different anti-poaching projects. The purpose of the initial framework mapping is to assess the similarities between Ngulia and these projects and chose some of them for a competitive positioning analysis.

6.4.6.1.1 SMART

Launched in 2013, SMART (Spatial Monitoring and Reporting Tool) is a device that aims to simplify the work of wildlife rangers by analysing collected data (SMART Collaboration, 2015). By using GPS locations from rangers' reports, SMART analyses the data to determine where poaching is most likely to occur. SMART is a free application and is being used by the WWF's Wildlife Tech Project and CITES MIKE (Monitoring Illegal Killing of Elephants) Program. The application has extended further and SMART also works as a communication tool to evaluate and implement best practice for planning done by rangers and wildlife managers.

6.4.6.1.2. Cybertracker

Cybertracker, like SMART, is a low cost application for computers and smartphones (Cybertracker, 2016). The purpose of the application is to map out where poaching is more likely to occur using data from reports made by rangers containing not only information about the animals, but human activity and vegetation as well. The application has already found application areas in large parks such as Kruger National Park and Enzemvelo KZN Wildlife park.

6.4.6.1.3. Mataki

The aim of developing the Mataki device was to produce a low cost alternative to other collars available on the market (Mataki, 2016). The lower price is not all that distinguishes this collar; it is also user friendly, can send data wirelessly and can be reprogrammed. The device has mostly been used on birds but is being tested on tigers in the Corbett National Park in India.

6.4.6.1.4. 3D-horn Pembient

This project has a quite different take on the problem. Instead of trying to reduce the supply of rhino horns, this projects aims to increase the supply by making fake rhino horns by 3D-printing them (Pembient - PRNewswire, 2015). These horns are then to be sold primarily in east Asia and Vietnam. Research shows that as much as 45% of the consumers are willing to use fake horns instead. The Pembient project is funded by IndieBio which offers its start-ups $100 000.

6.4.6.1.5 WWF (Google)

WWF has a program which they call Wildlife Crime Technology project, which is a project that, by using modern technology, is creating an innovative conversion model against poaching (WWF, 2015 (F)). In 2012, Google's Global Impact Award funded the project with $5 million. The project is combining four different technologies, one of them being an RFID chip. These chips work as a part of a GPS surveillance system that tracks movement through the ground or through mobile sensors. The system, which is called the Falcon, is now in use in all rhino

[26] Ahlberg, Elin; Student at the Swedish Defence University, Gothenburg, 2016, Personal Interview, 23 March.

conservation parks in Namibia. In November 2015, WWF launched the "WILDLABS.NET: the conservation technology network" (WWF, 2015 (F)). The purpose of this is to create a community with global users and other developers of technology based techniques for wildlife conservation.

6.4.6.1.6. Air Sheperd & the Anti Poaching Engine

The Air Shepard initiative is a system combining the use of drones and a so-called anti poaching engine (Airsheperd, 2016). This anti poaching engine is a mathematical algorithm able to predict where it is most likely that rhinos will be and thus a combination of the two technologies will make poaching much more difficult (Dickerson, 2011). Today the system is implemented at the province of KwaZulu-Natal in South Africa, a province that is home to over 2500 rhinos (Airsheperd, 2016).

6.4.6.1.7 Peace Parks Foundation and the Rhino Protection Program

Peace Park is a foundation that has been in action over 20 years (Peace Parks, 2016). The foundation is based solely on donations and aims to create a safe environment for Africa's wildlife and nature. In 2014, Peace Parks got involved as a part of the Rhino protection Programme. Rhino Protection Programme's collaborators are Ezemvelo KZN Wildlife, South African National Parks (SANParks), Peace Parks and South Africa's Department for Environmental Affairs. The project includes cutting-edge technology such as the project's own Geographic Information System (GIS). Peace parks are training the students at the Soutern African Wildlife Colleges to use this GIS technology in combination with other tools, such as GPS and other monitoring and evaluation systems.

6.4.6.1.8. Project Rhino KZN and ZAPwing

Rhino KZN project coordinates the work between NGOs, Ezemvelo KZN Wildlife and game reserves in the KwaZulu-Natal province in South Africa (Project Rhino KZN, 2016). The project is based on donations and includes several technical aspects such as thermal imaging units, ground-to-air radios, cyber-trackers, camera traps among other technologies. As a part of the Project Rhino KZN, project ZAPwing has four different manned aerial surveillance planes (ZAPWing, 2016). Project Rhino KZN has got many beneficiaries including Tembe Elephant park and the Mkhuze game reserve in South Africa among others (Project Rhino KZN, 2016).

6.4.6.1.9. Airware and Ol Pejeta Conservatory

The Ol Pejeta conservatory is the largest Black rhino conservation site in east Africa, with over 100 Black rhinos (Ol Pejeta Conservatory, 2016 (C)). The park has worked in collaboration with project Airware to develop a UAV that is well suited for conservation purposes. They have made sure that the UAV is user-friendly and has a well working autopilot that can be sent to different areas of the park using Google earth (Hoarn, 2014). Ol Pejeta also works together with Princeton University. The collaboration aims to develop the so called Hotspotter programme, a mathematical algorithm which can make identifications of animals on a film and categories them according to species. In addition to this the conservatory also employs infrared cameras, a small airplane, GPS-chip implanted in the horns of the rhinos, electrical fencing, armed ranger patrols and bloodhounds.

6.4.6.1.10. Wildeas

Wildeas is not so much a project but more of a consultation company that combines security expertise with great technology know-how (Wildeas, 2016). They create customized models and strategies for protection of wildlife using state-of-the-art technology. When WWF's Wildlife

Crime unit needed to evaluate the most suitable drone, they hired Wildeas. Currently they are developing a test site in Africa, where new systems and technologies can be assessed and tested.

6.4.6.2. Mapping

Identification of similar projects has led to the mapping in Figure 6.6. based on the market communality/resource similarity grid.

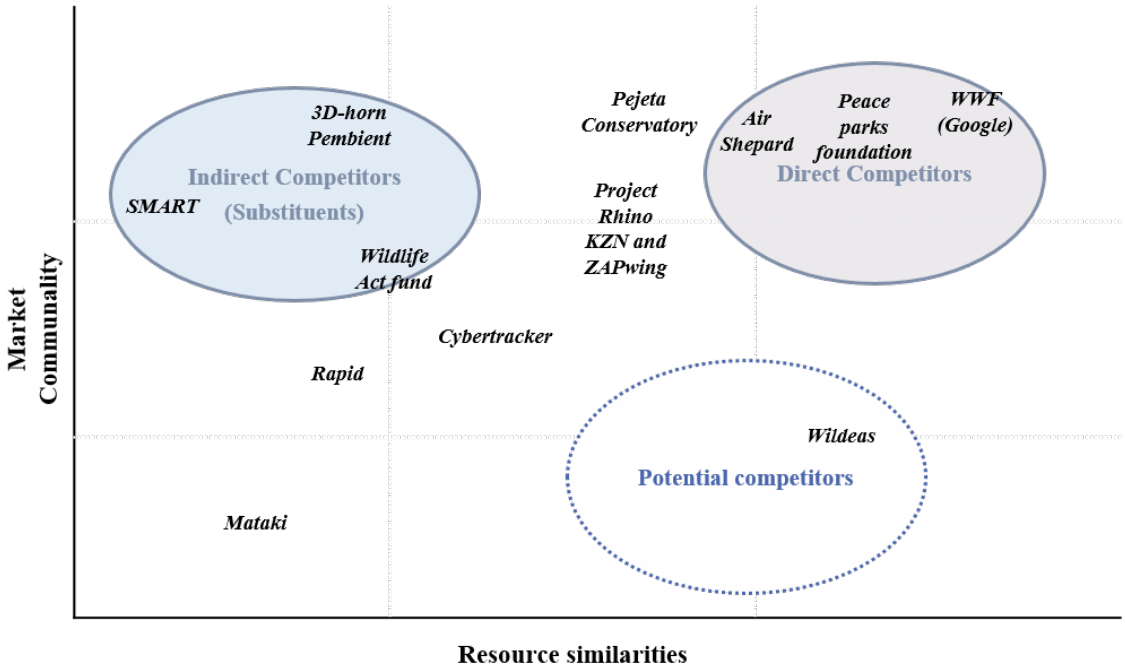


Figure 6.6: Mapping of the competitor projects.

6.4.6.3. Competitor Evaluation

The consecutive ranking of the key competitors from the different categories based on resource equivalence has yielded the results in Table 6.1.

Indirect competitors	Smart / 3D-horn Pembient	None
Potential competitors	Wildeas	None
Direct competitors	Pejeta conservatory	Air Shepard/Peace Parks/ WWF
	Low	*High*
	Resource Equivalence	

Table 6.1: Competitor Evaluation of Project Ngulia.

The term resource equivalence for a non-profit project is a bit different since customers do not mean the same thing as for regular businesses. In the evaluation above resource equivalence is based on the perceptive of the possibility to generate funding, the strength of the idea and the commitment of organization behind the project. The assessment above goes to show that the primary competition for Project Ngulia can be summarized to three different projects; Air Shepard, Peace Parks and WWF.

6.4.6.4. Competitive Positioning and Competitive Advantages

The combination of attributes, which differentiates Project Ngulia from the listed competition, will be summarized in the following section. The resulting core offering will give an illustrative picture of what will be the key drivers for Project Ngulia.

Competitive Position of the Direct Competitors according to McMillan are listed in Table 6.2. (2012):

Criteria	Ngulia	Air Shepard	Peace Parks	WWF
Good location and logistical delivery system	✓	✓	✓	✓
Large reservoir of clients, community, or support loyalty group	✓	✓	✓	✓
Past success securing funding	✓	✓	✓	✓
Superior track record or (image) of service delivery		✓	✓	✓
Large market share of target clientele currently served	✓	✓		✓
Gaining momentum or growing in relation to competitors	✓			
Better quality service and/or service delivery than competitors	✓	✓		
Ability to raise funds, particularly for this type of program	✓	✓	✓	
Superior skill at advocacy	✓	✓		✓
Superiority of technical skills needed for the program	✓	✓		✓
Superior organizational skills	✓			✓
Superior local contacts	✓	✓	✓	
Ability to conduct needed research into the program and/or properly monitor program performance	✓	✓		✓
Superior ability to communicate to stakeholders	✓			
Most cost effective delivery of service	✓			

Table 6.2: Competitive Positioning of Project Ngulia

The benchmarking in Table 6.2. demonstrates that Project Ngulia has some well-defined competitive advantages to the direct competition but also demonstrates some weaknesses such as lack of a track record.

The main core offering and advantages can be summarized in the following five qualities:

- Partnerships with both private and public institutions resulting in local know-how and financial strength.
- Strong technology competencies and a bottom-up technology approach leading to a well thought out strategy and a long-term holistic approach
- Engaged and competent management delivering superior ability to communicate the vision.
- A scalable solution which can be adapted to different purposes, making the Ngulia system accessible even for smaller parks with less means available
- Thorough business understanding generating an increased possibility to attract future partners and delivering value-add for both clients and partners

These strengths are what Project Ngulia should focus on communicating to potential partners, governments and parks to differentiate their offering even further from the competition. Thus making them the given choice for implementation of park security system.

6.4.5. Conclusion of the Market Potential and competitive Climate for Project Ngulia

As indicated above, the needs differ from park to park. Fortunately, Project Ngulia develops technologies that are compatible with, but not dependent upon each other. This creates a greater market potential within the different micro-segments. The technology offered can meet the needs in the different segments in different, yet uncertain, ways and the solution offered could be customized after suitability for the specific parks needs and demands. This will enable a larger market, as flexibility is a significant competitive advantage and will in that way satisfy more customers' needs.

When looking at national parks as potential customers the conclusion can be drawn that it will most likely be cost-effective for them to implement a security system of quality such as the one assembled by Project Ngulia. This conclusion has been made when looking at KNP's security plan that is mentioned above, which makes one question the efficiency of the present solutions and whether or not Project Ngulia offers a solution that is more resource efficient.

As mentioned in the private park chapter there are approximately 10 000 to 14 000 private parks in southern Africa, which implies that there is a potential large market that Project Ngulia could compete in. In the area close to KNP, the parks have removed their fences to create a collaboration and Project Ngulia could see this collaboration as a great potential customer. A collaboration of so many parks and KNP could obtain a sustainable security situation if they all had the same cost-efficient solution, which could be provided by Ngulia. This could, in other words, be a superior customer for Project Ngulia as it is one large area that should be secured where lots of communities and individuals are involved.

Another reason for Project Ngulia to enter the market segment containing the private parks is that the evidence that private parks spend a fortune on security today. It is also highly unlikely that parks will afford to replace an entire security system, but as Project Ngulia can deliver a bottom-up security technology for a reasonable price this could be a perfect customer to approach. The cost and flexibility should be highlighted when delivering information to private parks as this is the main advantage. For example, The Buffalo Dream Ranch has some goals in common with Project Ngulia, to save the rhinos from extinction and this could possible lead to a great collaboration if goals, needs and costs are met.

Moreover, Project Ngulia could provide relocation programme sites with a complete security solution that will be affordable and of high quality. The new safer locations may provide shelter for some time, but as populations reduce elsewhere, the poachers' attention will be turned to these relatively unguarded areas. Relocation programmes, like the one carried out by WWF, only have funding to do the translocation, meaning there is insufficient funds to guard the rhinos in their new habitat. This makes the relocation sites a prospect for Project Ngulia as it can offer a cost-effective security solution that can be afforded by the governments and/or private actors that becomes in charge of the rhino's safety at the new location. Project Ngulia has a solution that would work well in combination with relocation programmes.

Looking at the market in South Africa as a whole, one realizes that the situation is severe and is a result of a combination of negative factors. The country needs to gain governmental and local support, and above all it needs to work with border security and legislation. Project Ngulia has great potential in South Africa, but cannot alone solve the problems with poaching and neither can any other security solution. The factors mentioned above are prerequisites for any kind of security solution to work. Fortunately for Project Ngulia, cost-efficient solutions will always be needed as money is a scarce resource when handling wildlife preservation.

The rhino value is an important aspect to consider when conducting the market analysis, as this will determine the necessity of a security system. Parks with less than a significant numbers of rhinos has not been taken into account when segmenting the market. One must analyse and compare the difference between the investments for the customers and the total value of the park i.e. number of rhinos and other animals. The value of the investment should not exceed the value of the park's resources for the investment to be sustainable. Further discussion and a break-even calculation for investing in Ngulia's concept, has been conducted in chapter seven.

Looking at the direct competitors, it is clear that these are potentially viable solutions and could take market shares from Project Ngulia. Peace Parks does not pose an immediate threat to Project Ngulia. However, they do involve students to participate in training to use the project's technology, and as greater involvement of surrounding communities, as discussed previously, is fundamental to solve the poaching issue. But one could argue that students in Africa, seeing as only 36% have access to a secondary education, are not in an economically deprived state and involvement of poor surrounding communities should be prioritized (The Africa-America Institute, 2015). Involvement of students is still useful as it spreads knowledge of the issue. Ngulia involves both surrounding communities as well as students making its competitive standpoint stronger than Peace Parks.

The greatest competitor to Project Ngulia is WWF's Wildlife Crime Technology project. It will probably be easier for this project to gain recognition considering the fact that it was created by one of the world's well-known companies, Google (Badenhausen, 2016). WWF's brand is also well known and has gained media attention in social media. This recognition advantage combined with the technology used in the Wildlife Crime Technology project, which according to the comparison in Table 6.2. is accomplishing many of the criteria that Ngulia does, could make it easier for WWF to gain public support and gain funding. While Ngulia has got an advantage in technology and development terms, it lacks in media presence and recognition. As NPOs are dependent upon funding, gaining the trust of the public and potential contributors is vital. To be able to tackle the competitive threat that the Wildlife Crime Technology project poses, Project Ngulia must increase its marketing efforts so that future funding and support can be secured.

6.5 Risk Analysis

Facing risk is something every business does, from the smallest non-profit organization to large multinational corporations (McGarty, 2006). Project Ngulia has managed to pass the technical stage and has had its first actual implementation, meaning that the project has managed both the

technical and the commercial risks of the implementation of the mobile application (Granstrand, 2010). Since the project currently is driven in a non-profit way, economic success is not applicable in the same way as for profit driven organizations.

Although overcoming the foreseen difficulties does not mean that the onward process will be risk free (McGarty, 2006). There are several aspects that might obstruct the project and these needs to be identified and addressed.

A micro-focused aspect of the risks connected to Project Ngulia is the situation where people actually might die if the technology and business idea around it does not work. When changing from the old, rural but established methods, the implementation has to be seamless and overlapping. The guards are under a constant danger for their lives and if there is a problem with the app or other parts of the system this might in turn lead to an increased risk for the guards lives. This risk can be categorized as a preventable risk and can be avoided completely by using the right routines and guiding people to make the right decisions when facing problems (Kaplan et al., 2012).

One of the major strategic threats is competition from other projects (Kaplan et al., 2012) The competition has been identified and evaluated in the previous chapter resulting in the following ranking of the riskiest competition; WWF, Peace Parks and Air Shepherd. Tackling this competition is a fundamental part of securing a stable future for the project. The overall procedure for avoiding this strategic risk will be to enhance the project's own advantage, continuously improve and differentiate the business model.

As non-profit organizations exist on what has earlier been described as a grant market, rather than a customer based market, one strategic risk for the project is not being able to secure future funding. Since the project has not been commercialized, the future and development depends on companies, organizations and private donations. Should these flow of funding cease to exist the project would face the possibility of not being able to continue its operations. Differentiating and developing their competitive advantage is one way to address this risk (Kaplan et al., 2012). One effective method is to use marketing and social media to enhance the general public's awareness of the project and thus make future funding less uncertain.

For Project Ngulia, getting support from the Kenyan government has been crucial. Possible implementation in other parks in other countries requires the support from their respective governments. The widespread issue with corruption in African countries will make this an arduous obstacle as government’s incentives to help projects like Ngulia are diminutive.

Another aspect of the threats of the project includes the external risks of a deficit of demand. Although highly unlikely, the poaching of rhinos might decrease dramatically. Perhaps due to legalization of trade or other initiatives, this would evidently make the technology and organization that the project delivers obsolete. This scenario is as mentioned highly unlikely and facing the risk of a situation where there is no market need not be one that needs mitigation to the same extent as other risks.

7. Discussion

In this chapter, the reader will find a discussion regarding the results and analysis made in this thesis. Previous thesis chapters that include a discussion will only be briefly deliberated and the focus will lie on combining the different results to make recommendations and conclusions.

7.1. Different Aspects of Sustainability

One of the thesis research questions is whether Project Ngulia is economically, environmentally and socially sustainable. For projects to be defined as sustainable, the outcome must be greater than the input, or else equal. When comparing input with output, all aspects of importance must be considered. Below, the reader will find a discussion that has connected the sustainable elements in the thesis to create an understanding of the current situation in Kenya and how the project is viable from a sustainable point of view.

7.1.1. Social

This part of the discussion will discuss the impact that Project Ngulia has had on social sustainability.

7.1.1.1. The Increase in Tourism

As the rhino population decreases, the price to view a rhino will increase. The tourists face the risks of the rhinos going extinct and that safari expenses will intensify. Either way, the accessibility for tourists will be reduced and fewer would find it motivating to travel to Kenya due to security deficiency and lack of animals. Since one of Project Ngulia's goals is to decrease poaching, the rhinos will hopefully increase in population in the long-term and the outcome could be that more tourists will visit the Kenya. This development would benefit Kenya as a country and its bio-diversity. The declination of poaching, and a potential boost in the tourist industry, could lead to a positive social impact on society, both short-term and long-term. Indirect effects will be new work opportunities since the demand for accommodation, food, transport etc. will grow with the increased tourism.

7.1.1.2. The Outcome for Surrounding Societies in Kenya

Kenya is currently facing problems that are common for developing countries, such as unemployment, low productivity, corruption, a weak resource base or potential resources being owned by large international corporations. The project's vision is not only to improve living conditions for rhinos, but also to improve the living standards for the surrounding population. There is a general aspiration to make an impact on different areas such as the tourist industry, unemployment, innovations and start-ups, digitalization, the political situation and border security. Many of these are interconnected; being direct or indirect impacts from each other.

7.1.1.3. A Seed of Sustainable Security

As Kenya is defined as a developing country, many international companies view the risks to establish a business in Kenya greater than the advantages. A way to create new businesses in a country is to establish foreign companies in the country. A secure business environment and political stability is fundamental for new companies to enter a specific market. Nonetheless, a large threat towards the security in Kenya is the terrorist groups, which are funded by the illegal trade of rhino horn and other illegal actions. Beyond these problems, there are many other factors that have to be improved as well, such as the political stability and a more equally distributed power within the government, to be able to see social sustainability.

Important to highlight is that terrorist organizations are funding their activities with the illegal trade of wildlife parts. If these organisations' revenues are reduced, they will have a difficult time conducting their operations. This in turn will hopefully lead to weaker terrorist organisations and as a consequence less attacks, which will increase the attractiveness for investors to set up business in developing countries. This would be one of the project's long-term effects, where Ngulia security principles and solutions are implemented and used nationally. In this way, from a long-term perspective, a more secure and intelligent security base could be created in the relatively unsecure areas of Africa.

7.1.2. Economical

The project will have both short-and long-term economic effects that are presented below.

7.1.2.1. Short-Term

As mentioned in the section above, the project can generate new job opportunities and simultaneously stimulate the work experience in the parks. This is regarded as a short-term economic success as more people can be employed and avoid poverty and desperation.

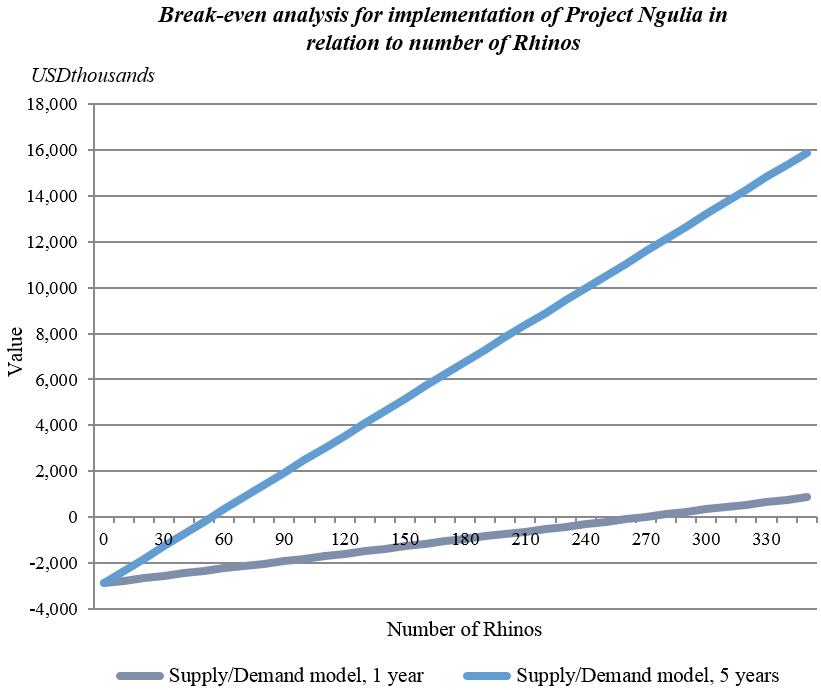
7.1.2.2. Long-Term

In the theoretical framework it is described that innovation is key for economic growth in a country. In an environment where the risks are greater than the positive aspects for a new company, new innovations will not arise. When Project Ngulia developed the app helping the rangers to communicate, the Africa based community, iHub, was in charge. This setup also contributes to work opportunities, and an exchange of knowledge leading the spread of innovation and spurring growth.

Considering the long-term effects that the project could potentially lead to, the thesis authors see potential for further globalisation in Kenya due to the potential tourism, increase in security and above all the new way of communicating, delivering and connecting knowledge from different sources. Globalisation is, as stated, a development that increases the internationalisation of production, manufacturing by governing and financing processes. Since globalisation results in advantages for all parties according to established economic theories, the project could help accomplish the long-term economical sustainable environment in Kenya.

7.1.2.3. Break-Even: When is the Project Economically Viable to Invest in?

Assuming that the initial cost for launching the project in another park amounts to the same total funding needed for the project at Tsavo National Park and comparing this cost to the yearly value for a Rhino, based on the Supply/Demand valuation, one gets the results in Graph 7.1. What the graph plots is the number of rhinos needed to match the total project costs in one year and in five years after the implementation.



Graph 7.1. Illustration of break-even for number of rhinos in a park.

The simplifications of this model includes the assumptions that the project cost would be the same if implemented in another park, the most likely scenario would be that the costs were much lower since the development of the technologies is included in the total project costs. Using the concept at other parks would solely mean the actual implementation. Another assumption made is the median value and age of the rhino that generates the annual value used in the graph. The value chosen is in the median of the range from the Supply Demand valuation, that is $482 500, and a rhino is estimated to live 45 years.

The two other valuation methods: TCM and GDP are not included in the mapping. This depends on the fact that TCM generates a very high annual value, which is due to the fact that many other factors are included in the valuation, such as the price of airplane ticket. With the TCM value of $350 000 annually per rhino, only nine rhinos would be needed to reach breakeven in one year. As for GDP, this method results in an overall value of the rhino population and consequently this figure cannot be used in a break-even calculation.

In summary, for the project to reach break-even in one year, 269 rhinos are needed in a park while 54 rhinos are needed to reach break-even in five years. These figures are probably too high since the development cost is included in the total cost. However, it still gives a reasonable demarcation on the incentive for parks to invest in a project such as Ngulia.

7.1.3. Environmental

The project promotes bio-diversity in its absolute form. Saving the rhino from going extinct would preserve the enriched ecosystem and as the rhino is a historical creature, it would be devastating to see an additional animal species exterminated due to humanity's stupidity and greediness.

7.2 Project Sustainability

This discussion looks at the internal sustainability of Project Ngulia.

7.2.1 Uniqueness of the Project

In this chapter the strengths of Project Ngulia will be discussed to identify the uniqueness of the project.

7.2.1.1 Front-Edge-Competence and an Irreplaceable Network

One factor that separates the project from others is the unique combination of partners. During the few years that the project has been operating, over 20 partners have been involved. The involvement includes contributions and support towards the goal to secure the rhinos and many partners still work actively with the project. Partners have contributed to the cause in unique ways and have together combined knowledge from contrasting fields. All involved parties provide front-edge-competence, commitment and constitutes a unique network. Most of the funding derives from involved partners and not from external donation, which is a strength for this project.

7.2.1.2 Beat the Illegal Trade with Bottom-up

When striving for a sustainable solution for Kenya, the key has been to develop and introduce the application through close collaboration with rangers and also companies that originate from Kenya. This constitutes the bottom-up technology that makes this project unique. When looking at Kenya alone, one realizes, from the facts stated in the theoretical framework, that the larger population lack both digital competence and technological confidence that is established in most parts in the western word. This makes most of the competitors' top-down solutions difficult to manoeuvre for a person with no previous experience with digital devices. It is the knowledge and communication interaction that will create the possibilities and beat the barriers of incapacity. On that note, the authors state that Project Ngulia's solution, and the general idea of creating a sustainable bottom-up solution, is a more sustainable solution in this case.

7.2.2 The Potentials for Project Ngulia

In this section the future potential for Project Ngulia will be further discussed.

7.3.2.1 The Need for Sustainable Security Solutions

The market area described in the market analysis chapter specifies that the project is suitable for various parks and reserves containing rhinos. This is because the concept created is a so-called toolbox solution. A park can, as declared, either buy the complete platform or exclusively purchase the parts that are needed. What is interesting about this project is that the authors can identify a possible spread as it could act as an overall solution for all kinds of parks, farms or areas. Additionally, the solution could also benefit other animals and areas since it is a simple but yet advanced way to increase the general security.

The cost of surveillance is of importance when discussing the sustainable development in the areas containing extinct animals. As stated above, a private landowner spends up to $120 000 per year to protect the rhinos in a reserve. This indicates that the costs to protect the rhinos are extreme and unsustainable. To be able to stop the poaching at a low cost, both in terms of investment and day-to-day operations, high efficiency solutions must be available.

7.3.2.2 One Size Fits All

According to John Hanks, one of the vital factors when creating a successful project against poaching of rhinos is to make it economically sustainable for all kind of potential customers. A park's initial investment can be adjusted by only applying solely one of the solutions innovated by the project e.g. if the most important thing for a park owner is to keep the security costs low,

the communication application (the smartphone-based-software) could be implemented, since this do not require many resources after the implementation. Because of the fact that one can pick and choose from the toolbox created by Ngulia, the cost can be paired with the park's economic environment and is another strength that the project should try to communicate through different channels.

7.3.2.3 Involving Students

The issue that this project approaches is well known worldwide and one can comprehend a great interest from different societies such as students, teachers and other people who see this as a serious and significant matter that needs to be addressed. This is a positive fact for Ngulia and they should continue working with e.g. university students. This should not be neglected or overseen by the project managers as students can come with new and inventive ways to develop projects. When more people want to help, more people will become connected and the network will advance and develop, hopefully for the better.

7.2.3. The Potentials for Partners and Companies Involved in Ngulia

Before companies and partners choose to get involved in a project like Ngulia, they want to address the advantages and potentials that this involvement could mean. Some have already been noted earlier, as the chance to be a part of the unique network and the publicity that is gained from the involvement. Below, even more advantages will be discussed.

7.2.3.1 CSR

As mentioned in the theoretical framework, the existence of a strong corporate brand can attract and inspire employees, stakeholders and business partners, build public support and provide goodwill for an organization. The initiating incentives for companies to pursue involvement in environmental and social projects, such as Ngulia, are difficult to establish, however, hypothetical reasons are CSR, PR-opportunities and new market exposure. As explained in earlier examples, there was positive internal response when one of the partners marketed their involvement to their employees.

In exchange for a company's contribution to the project, they obtain the right to use the brand of Project Ngulia as an exchange for the resource that they contribute with. The level of publicity that the project has is a great advantage, as coverage of the project's general idea is essential for engaging and locating new suitable investors/partners. This gives positive PR for the involved partners.

7.2.4.1 Existing Technology, New Technology and New Markets

Important to highlight is the aspect that the resources put into the project could possibly be advantageous in future projects or businesses for those involved, which could, due to the connections and resources, lead to new unique solutions. If the project succeeds and new customers request the platform solution in Ngulia, involved partners will also benefit and receive more market presence. Moreover, whilst being a partner of the project, companies have, for example, the chance to develop and test a new product that later on can be commercialized on the open market. By testing a product through an environmental project instead of introducing it in the traditional way, the risks can be decreased. The motive to do work in this way is that if the testing would fail, the investment can still be recognized as successful and the result can be justified as charity or CSR.

To receive further resources in form of competence, time and material, Ngulia must communicate the real value of the project to potential partners. Some of the advantages and benefits the partners

receive from contributing might not show instantly, instead value will be generated in the long run.

7.2.4 The Project's Weaknesses

The project is and will be facing different challenges and problems, which arise inside the project or externally. Therefore, it is of great importance to be aware of the different weaknesses that the project has and the threats that the project face, or possibly could face. This section will be a description of these factors and also a description of suggested solutions on how to strengthen the weaknesses and counter the threats.

7.2.4.1 Time is Limited

Today the two project leaders are responsible for the communication between all the partners and for coordinating the project. Since none of them are working with the project full time, one of the limited resources are time. To be able to see a sustainable and growing project in the future, more time, people or new communication methods are needed. As the network is expanding, the workload and importance of clear communication increases. Thus resources have to be invested in the team of leaders.

7.2.4.2 Barriers

Stated in the thesis, Johan Bergenäs emphasizes the importance of introducing partners to each other as this will make communication possible with less involvement by the project leaders. This is a solution to rationalize the workload for the project leaders and also reduce the communication barriers.

An additional barrier for the project is the distance. The different steps when testing and implementing needs more effort because of the geographical distance, but also the culture and language differences creates a barrier between the project team and the people in the Ngulia Sanctuary. Today, an interpreter is used to simplify the communication. This thesis's authors suggest that by involving more companies or organizations in the project, that are situated or active in Kenya, the cooperation will be made easier between the project team, rangers and others affiliated with the project e.g. the partner iHub.

If more people and organizations in Kenya are involved with the project, the understanding and awareness of the poaching problem will grow. No matter how much effort other countries will add to hinder the poaching; if the government and people in Kenya do not engage in the issue, the poaching will not stop or decline, because of the problems with corruption and neighbouring villages being persuaded to help the poachers. This is a weakness that should not be overseen and the fact that the poachers pay nearby villagers more than a job at a national park pays makes the poaching difficult to conquer since desperate people do desperate things.

Considering the implementation, many problems can arise. When implementing a new system there is always a risk that the users will have a negative attitude to changes and therefore go back to the old and familiar ways of working after the implementation (Magnusson et al., 2014). When the technology is brand new, the risk is even greater. To avoid this, post-evaluation is very important as well as continuous follow-up and support for the problems that arise. To be able to operate in this post-phase, resources are needed, but this is a cost that rarely is accounted for when budgeting.

7.2.4.3 Funding Drawbacks and the Technology Being Too Advanced

As mentioned in the risks section, if the funding or the donations are insufficient in the future, there will be no possibility to fulfil the project or reach the set goals. The recommendation to

minimize this risk is to communicate the vision, inform companies about possible contribution, work with students since they will be representing companies in the future, communicate the advantages with this type of network and use all different types of communication channels that are suitable. One possible reason why the project might not find enough funding is that the security solution developed will exceeded forecasted costs. This would be because a driving force for an engineer developing the solution is to create a product with a high technical level. These types of products are often not user-friendly and are difficult to implement. This could lead to a fall-back to the old system if the new system becomes too advanced and difficult to maneuverer. There is a big difference in technical knowledge and experience between the project team and the national park team. If the security system has a high level of technical complexity, problems will occur when implementing or when updates are required.

Since we live in an alternating world, which is changing rapidly technology wise, all these products and systems grow old very fast. An application that is new to the market today will require continuous updates tomorrow. A technical product will also require updates and after a certain amount of time will eventually need to be exchanged to support the total system. This is a negative aspect since the investments have to be continuous to keep the system running. Therefore, the project ought not to seek for selective measure but long term ones.

Corruption is a serious obstacle for investments and foreign investors should take an aggressive stance and combat corruption for their long-term interest. Corruption is spread in Kenya, it is systematic and goes beyond individuals to the structural and institutional levels. The culture of corruption has grown roots in society at large and has become endemic. This indicates that something has gone wrong in the governance of the country and Kenya is classified as one of the most corrupt states in the world.

8. Conclusion

The research questions answered in the thesis are:

- What is the value of a rhino in sub-Saharan Africa?
- What is the market potential for Project Ngulia?

These questions, with their sub-questions stated in chapter 1.3 Research Questions, have been answered successfully, despite some limitations due to time constraints. The end result will be presented below.

The results from the TCM, GDP and Supply and Demand calculations indicates that the value of a rhino is within the following intervals:

The demand surplus together with the inelastic market demand makes the supply of horn a lucrative business due to the high market price on the illegal market. The kilo price of the horn is the factor that affects the value the most. Calculations made in the thesis indicates that the value of a rhino in sub-Saharan Africa is approximately between $290 000 - $675 000.

Tourists' recreational expenses to view wildlife is estimated to $1 182 and the amount of tourists dedicated to wildlife-related activities is approximately 80%. Since 15% of Kenya's GDP comes from tourism, wildlife is of great importance for the country's economy. The value of the rhino population is estimated to generate at least $394 millions annually.

269 rhinos are needed to reach break-even in one year and 54 rhinos are needed if the break-even time is set to five years. Even if the figures are assumed to be too high because the development cost is included in the total cost, it is still a useful indication.

There are several different projects aiming to reduce poaching, working with a diverse array of methods. Some projects are using capital intensive equipment which might hinder small parks from applying those tools as it is too expensive and too advanced for them. Other projects, such as Pembient, go about the problem in a completely different way by overflowing supply instead of reducing it, the result of this technique is not yet finalised. The project leaders for Ngulia has a key advantage in that they understand that the project needs to have a clear business model which can be communicated to future partners, describing what is in it for them. What also differentiates Project Ngulia from other organizations can be summarized in these key characteristics:

- Partnerships with both private and public institutions resulting in local know-how and financial strength.
- Strong technology competencies and a bottom-up technology approach leading to a well thought out strategy and a long-term holistic approach.
- Engaged and competent management delivering superior ability to communicate the vision.
- A scalable solution which can be adapted to different purposes, making the Ngulia system accessible even for smaller parks with less means available.
- Thorough business understanding generating an increased possibility to attract future partners and delivering value-add for both clients and partners.

By answering the research questions about tourism and the relationship between supply and demand on the market for rhino horn, a value of what a rhino is worth could be approximated. Using this value together with a market analysis it is clear that there is a need for projects that protects the rhinos. Adding the comparison with competitors, it is evident that there are great opportunities for Project Ngulia in sub-Saharan Africa, both concerning national parks and private reserves. There is therefore market potential for Project Ngulia.

As time and resources were limited the TCM could not be conducted exactly according to the theoretical description of the method. In order to obtain a more precise value, more time is needed and more thorough research including surveys and greater amount of data is recommended. Further research is also advised on the market analysis as numbers are based on estimations and are continuously changing.

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Appendix

Appendix 1: Travel Cost Method

Calculation of Weighted Average Ticket Price

Currency: USD *Everything calculated for one person*

Exchange rate from Kenyan currency (KSHS) to USD		
1 KSHS is	0,0098515	USD

Background information			**Number of tourists from the zones**	
Search criteria	2v (14-28) vacation		**United States**	166000
Info			**Europe**	826000
			and the	
1 SEK	0,12	USD	**Pacific**	125000
1 KSHS is	0,01	USD	**Other**	117000
Total # of tourists	1520000		**Total**	**1234000**
Prices for period:	27:e -13:e 2016			
Accessed:	Momondo 2016-03-17			

ZON	**JAN**	**FEB.**	**MAS**	**APR**	**MAY**
United States					
New York	866	737	778	778	794
San Fransico	950	944	1406	851	1182
Chicago	800	738	752	747	965
Ottawa	1012	1210	1386	1233	1006
Brasil	2074	2703	2886	2061	2036
Europe					
Frankfürt	629	672	1099	722	614
London	684	675	923	739	739
Copenhagen	564	637	647	565	603
Amsterdam	755	721	731	663	730
Rom	448	567	575	479	479
East Asia and the Pacific States					
Singapore	1235	1256	1422	1272	1270
Peking	1243	1712	1306	888	932
Sydney	1371	1411	1411	1461	1162
Other					
New Delhi	525	921	921	397	444
Moskva	433	506	542	600	660
Pakistan	956	920	920	819	866

ZON	JUN	JUL	AUG	SEP	OCT
United States					
New York	780	753	753	836	811
San Fransico	1446	1439	1475	965	965
Chicago	835	1148	811	905	758
Ottawa	1017	1435	1140	1005	986
Brasil	1576	1956	1748	1938	1676
Europe					
Frankfürt	658	1121	813	589	629
London	739	771	902	739	766
Copenhagen	563	802	624	565	626
Amsterdam	663	846	981	688	733
Rom	479	563	670	479	479
East Asia and the Pacific States					
Singapore	1270	1270	1326	1043	1270
Peking	888	1269	1429	888	936
Sydney	1453	1717	1555	1162	1162
Other					
New Delhi	463	501	584	473	415
Moskva	611	495	473	682	659
Pakistan	859	819	983	859	819

ZON	NOV	DEC	Average price	Percentage of tourists	Weighted average ticket price
United States			**1211,3**	**13,5%**	**162,9**
New York	893	1404	848,6		
San Fransico	844	1361	1152,3		
Chicago	740	1254	871,1		
Ottawa	1228	973	1135,9		
Brasil	1965	1965	2048,7		
Europe			**673,5**	**66,9%**	**450,8**
Frankfürt	589	589	727,0		
London	745	759	765,1		
Copenhagen	571	617	615,3		
Amsterdam	663	712	740,5		
Rom	479	538	519,6		
East Asia and the Pacific States			**1259,6**	**10,1%**	**127,6**
Singapore	1270	1235	1261,6		
Peking	888	1156	1127,9		
Sydney	1105	1703	1389,4		
Other			**659,3**	**9,5%**	**62,5**
New Delhi	463	463	547,5		
Moskva	410	622	557,8		
Pakistan	819	834	872,8		
Total					**803,9**

Data, Fuelprices

Currency: USD

Time	Price (USD/litre)
High-octane petrol	
29.35.36	0,87
24.41.35	1,00
23.35.35	0,95
18.41.34	1,09
17.35.34	1,06
12.41.33	1,07
09.35.33	1,05
08.35.33	1,02
08.35.33	1,02
17.45.32	1,46
14.41.32	1,16
17.39.32	1,37
22.45.31	0,99
Average price	**1,09**

Time	Price (USD/litre)
Disel	
29.35.36	0,69
24.41.35	0,82
23.35.35	0,86
30.45.34	0,89
30.45.34	0,94
29.45.34	0,93
28.45.34	0,89
18.41.34	0,99
17.35.34	1,00
12.41.33	0,98
17.37.33	1,08
17.45.32	1,39
17.39.32	1,30
22.45.31	0,91
Average price	**0,98**

Traveling With Car to Nairobi

Currency: USD

Country	Distance to Nairobi (Swedish miles)	Price for Diesel in USD	Price for rental car, 3 days	Total Cost
Kampala (Uganda)	65,8	64,2	271,2	335,4
Jamaame (Somalia)	80,3	78,4	271,2	349,6
Arusha (Tanzania)	26,4	25,8	271,2	296,9
Average price				**Cost**
One car				327,3
One person				109,1

Compiled table of values

Currency: USD *Everything calculated for one person*

Entrance Fees	At the Gate		Booked Online		
Parks	**Adults (80%)**	**Children (20%)**	**Adults (80%)**	**Children (20%)**	**Total**
Tsavo West National Park	75,0	40,0			**68,0**
Tsavo East National Park	75,0	40,0			**68,0**
Lake Nakuru National Park	80,0	40,0			**72,0**
Nairobi National Park	50,0	25,0			**45,0**
Laikipia Plateau	95,0	48,0	85,0	42,5	**81,0**
Average					**66,8**

Tour costs			
Parks	**Up to 4 hrs**	**Over 4 hrs**	**Total**
Tsavo West National Park	19,7	34,5	**27,1**
Tsavo East National Park	19,7	34,5	**27,1**
Lake Nakuru National Park	19,7	34,5	**27,1**
Nairobi National Park	19,7	34,5	**27,1**
Laikipia Plateau		40,0	**40,0**
Average			**29,7**

Expensece in the recreational site			
Parks	**Food**	**Veichle cost in park/day**	**Total (for 3 days)**
Tsavo West National Park	15,1	31,0	**46,1**
Tsavo East National Park	15,1	31,0	**46,1**
Lake Nakuru National Park	15,1	31,0	**46,1**
Nairobi National Park	15,1	31,0	**46,1**
Laikipia Plateau	15,1	31,0	**46,1**
Average	**15,1**	**30,8**	**46,1**

Total Travel expenses						
Parks	**Airplane (~75%)**	**Car (~25%)**	***Distance from Nairobi to National Park***	**Cost disel/person**	**Rental car, 3 days**	**Total travel expences**
Tsavo West National Park	803,9	109,1	*286,0*	18,6	90,4	**735,6**
Tsavo East National Park	803,9	109,1	*415,0*	27,0	90,4	**744,0**
Lake Nakuru National Park		109,1	*182,0*	11,8	90,4	**728,8**
Nairobi National Park	803,9	109,1	*530,0*	34,5	90,4	**751,4**
Laikipia Plateau	803,9	109,1	*263,0*	17,1	90,4	**734,1**
Average	**803,9**	**109,0**	***335,2***	**21,8**	**90,4**	**738,8**

In these calculations it's assumed that it is average 3 persons in each car, and the fuel price has been collectedfrom earlier calculations.

Accomodation costs				
Parks	Accomodation A (50% of tourists)	Accomodation B (50% of tourists)	Accomodation costs, 1 day	Total accomodation costs, 3 days
Tsavo West National Park	75,0	63,0	69,0	**207,0**
Tsavo East National Park	75,0	63,0	69,0	**207,0**
Lake Nakuru National Park	50,0	125,0	87,5	**262,5**
Nairobi National Park	50,0	125,0	87,5	**262,5**
Laikipia Plateau	187,5	187,5	187,5	**562,5**
Average				**300,3**

Total Travel expenses						
Parks	Entrance Fees	Tour costs	the recreational	Total Travel expenses	Accomodation costs	
Tsavo West National Park	68,0	27,1	46,1	735,6	207,0	**1084**
Tsavo East National Park	68,0	27,1	46,1	744,0	207,0	**1092**
Lake Nakuru National Park	72,0	27,1	46,1	728,8	262,5	**1136**
Nairobi National Park	45,0	27,1	46,1	751,4	262,5	**1132**
Laikipia Plateau	81,0	40,0	46,1	734,1	562,5	**1464**
Average	**66,8**	**29,7**	**46,1**	**738,8**	**300,3**	**1182**

Background information	
Number of tourist visiting Kenya each year	1520000
Tourists traveling for wildlife	80%
Money the tourist industry generates	1436900000

Exampel two different National Parks		
Tourists/year	100000	50000
Result from TCM (T)	1181,6	1181,6
Total WTP	118163909,4	59081954,7
Effect on the attraction	20%	20%
Number of black rhinos	80	30
Per Rhino	295410	393880

Sensitivity Analysis, tourists in/decrease with 20%			
	Today	**-20%**	**20%**
Number of tourists visting Kenya each year	1520000	1216000	1824000
Tourists traveling for wildlife	80%	80%	80%
Result from TCM (T)	1181,6	1181,6	1181,6
Money the tourist industry generates (millions)	1436,9	1149,5	1724,2

Appendix 2: The calculations of Supply and Demand.

Supply and Demand Calculations

Currency: USD *Everything calculated for one person*

Kilo Price	Illegal market	Potential Value
$55 000	$247 500	$7 239 375
$56 000	$252 000	$7 371 000
$57 000	$256 500	$7 502 625
$58 000	$261 000	$7 634 250
$59 000	$265 500	$7 765 875
$60 000	$270 000	$7 897 500
$61 000	$274 500	$8 029 125
$62 000	$279 000	$8 160 750
$63 000	$283 500	$8 292 375
$64 000	$288 000	$8 424 000
$65 000	$292 500	$8 555 625
$66 000	$297 000	$8 687 250
$67 000	$301 500	$8 818 875
$68 000	$306 000	$8 950 500
$69 000	$310 500	$9 082 125
$70 000	$315 000	$9 213 750

Number of times the horn regrows				
Numbers of horns	**Legal market lower**	**Illegal market lower**	**Legal market higher**	**Illegal market higher**
	30000	**65000**	**30000**	**65000**
0	$0	$0	$0	$0
1	$135 000	$292 500	$810 000	$1 755 000
2	$270 000		$1 620 000	
3	$405 000		$2 430 000	
4	$540 000		$3 240 000	
5	$675 000		$4 050 000	
6	$810 000		$4 860 000	
7	$945 000		$5 670 000	
8	$1 080 000		$6 480 000	
9	$1 215 000		$7 290 000	
10	$1 350 000		$8 100 000	
11	$1 485 000		$8 910 000	
12	$1 620 000		$9 720 000	
13	$1 755 000		$10 530 000	
14	$1 890 000		$11 340 000	
15	$2 025 000		$12 150 000	

Number of calves					
Calves	Calves per rhino	1 Generation Illegal	2 Generations Illegal	1 Generation Legal	2 Generations Legal
0	0,0	$292 500	$292 500	$405 000	$405 000
1	0,5	$438 750	$511 875	$607 500	$708 750
2	1,0	$585 000	$877 500	$810 000	$1 215 000
3	1,5	$731 250	$1 389 375	$1 012 500	$1 923 750
4	2,0	$877 500	$2 047 500	$1 215 000	$2 835 000
5	2,5	$1 023 750	$2 851 875	$1 417 500	$3 948 750
6	3,0	$1 170 000	$3 802 500	$1 620 000	$5 265 000

Numbers of Generations		
Numbers of Generations	Lower values and 3 calves	Higher values and 3 calves
1	$731 250	$1 012 500
2	$1 389 375	$1 923 750
3	$2 376 563	$3 290 625
4	$3 857 344	$5 340 938
5	$6 078 516	$8 416 406
6	$10 580 273	$13 029 609

Appendix 3: Statistic of Rhinos offspring from Kolmården.

Dams with most offspring:

494	14
496	13
225	13
97	13
329	10
1026	9
211	9
224	8
106	8
241	7
103	7
102	7

Compiled by: Lars Versteege thru Safaripark Beekse Bergen
Data current thru: 7 Aug 2015 - European regional
Printed on 9 May 2016 using Sparks v1.66

Appendix 4: Project Ngulia original project description

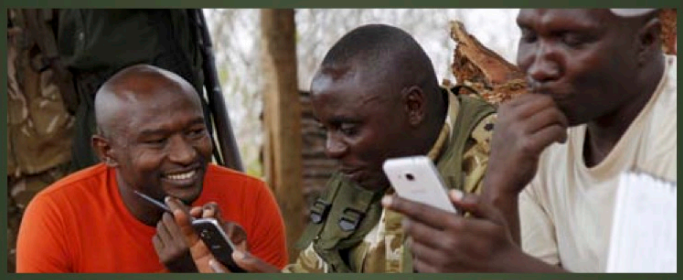
Project Ngulia

Building a new gold standard for wildlife and natural resource protection through technology and innovation

A Clinton Global Initiative Commitment to Action

The project
In partnership with the Kenya Wildlife Service, a public-private sector consortium is deploying an impactful, cost-effective and bottom-up technological platform that secures the Ngulia Rhino Sanctuary in Tsavo West National Park. The sanctuary is home to about 10 percent of Kenya's black rhinoceros and situated where 10,000 rhinos once roamed.

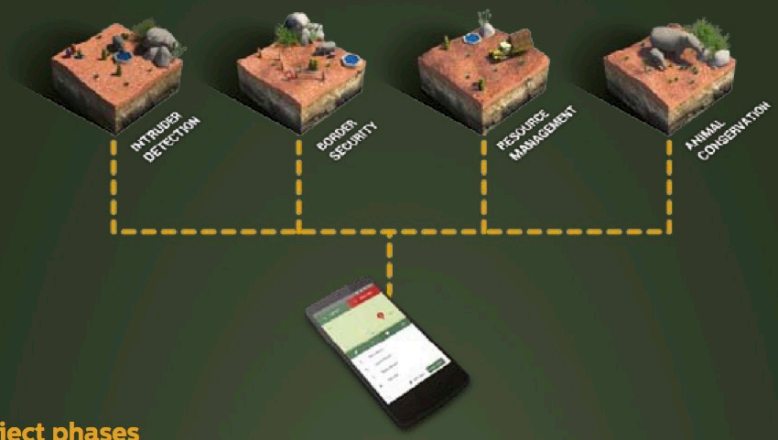
The technological solution is scalable and replicable to other national parks in Kenya and beyond. The project has received international recognition and was featured during the 2015 Clinton Global Initiative Winter Meeting.



Why
140,000 elephants and more than 3,500 rhinos have been slaughtered by poachers since 2012. In 1970s, Kenya's black rhino population was 20,000, today it is 650. In short, we are currently experiencing a conservation crisis, which has significant implications for Kenya's development as fifteen percent of Kenya's GDP comes from tourism, where wildlife is the star attraction.

A dramatic decrease in wildlife is not only a socio-economic development problem. There also exist direct and indirect links between poaching/wildlife crime and transnational criminal organizations, insurgencies and even terrorism financing. Some of the world's worst criminals and terrorist organizations are involved or benefit from poaching and other environmental crimes, for example, the Islamic State, Joseph Kony's Lord's Resistance Army, the Janjaweed, Boko Haram and Al Shabaab.

project
ngulia



Project phases

Phase 1 (2010–2013)
The Stimson Center, in partnership with local nongovernmental organizations, conducts a comprehensive policy analysis of the current security and development environment in East Africa, particularly focusing on Kenya. Besides working with relevant Kenyan authorities, Stimson engages the broader donor community, including relevant offices in the United Nations and the governments of Australia, Finland, Sweden and the United States. The outcome is an invitation by the Kenya Wildlife Service to conduct a pilot project focused on technology and innovation in Tsavo West National Park aiming to safeguarding the remaining rhinoceros population there.

Phase 2 (2014)
The year kicked off with a robust technical feasibility study at the Ngulia Rhino Sanctuary in Tsavo West National Park conducted in partnership by the Kenya Wildlife Service, Stimson and the project's technology and innovation partner, Linköping University. This exercise results in a two-year technology and training plan. Partner organizations also negotiate and sign a Memorandum of Understanding in the fall of 2014 and begin preparations to fully execute the plan in 2015.

Phase 3 (January – June 2015)
Together with iHub, one of Africa's largest ICT organizations, software for a smartphone-based command, control and communications (C3) platform is designed. This platform is further developed following testing in the field with about 25 park rangers, commanders and research staff. Project partners also solidify a telecommunications partner in Airtel that agrees to provide data packages and other necessities associated with the C3 system. Airtel also agrees to try to increase connectivity in the Ngulia sanctuary to ensure more advanced technology in subsequent phases of this project.

Phase 4 (July 2015 – 2016)
Following the C3 system, sensor systems and radar for border and intruder detection, as well as area surveillance, will be added to the technological platform. One or two radars will cover large objects moving inside and around the Ngulia border. Smart algorithms will be developed to distinguish humans from animals, and to monitor the rhino movements. The radar systems will have coverage of 5 and 10 km radius, respectively. Pending further investigation, aerial surveillance could become relevant.

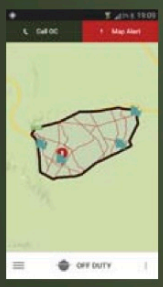
Phase 5 (2016 -)
At this point, the park rangers, commanders and research team is taking full advantage of the technological platform that make their jobs easier, advances their mission and cuts cost for the broader organization. Following the successful deployment other parks and organizations can scale and replicate the platform. This new gold standard for how technical systems can be used to tackle natural resource protection will assist governments, foundations and the commercial sector worldwide.

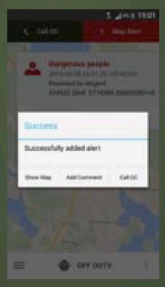
Test site Kolmården Zoo

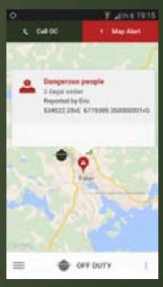
All sensor systems will be thoroughly evaluated at our test site at Kolmården Zoo in Sweden. When both technology and software are mature, procurement of equipment and deployment in Ngulia will be initiated.

Public profile

The project and its partners have been featured in premier media outlets and forum, including the New York Times, the Washington Post and European outlets. In February, project partner Johan Bergenas was invited to speak at the Clinton Global Initiative Winter Meeting, attended by President Bill Clinton and former Secretary of State Hillary Clinton. The project is frequently covered in media and project partners are often asked to make presentations about Project Ngulia.







Project partners

New project partners welcome...

project ngulia

For more information, please visit
www.ProjectNgulia.org
or contact Johan Bergenas at
jbergenas@stimson.org
or fredrik.gustafsson@liu.se

Appendix 5: Interview questioners

Questionnaire - Elin Ahlberg

1. How did you come in contact with the Ngulia projects?
2. What work have you done for the Ngulia project?
3. What did you work process look like?
4. What is the general concept behind your thesis?
5. In what way is your thesis valuable for the Ngulia project?
6. How many competing projects did you find in your study?
7. Which are these competing companies?
8. How big of a threat are these competing projects for project Ngulia´s success?
9. In what ways does project Ngulia differ from other projects?

10. Questionnaire - Fredrik Gustafsson

11. What is your main purpose when working with the project Ngulia?
12. What are the general goals for the projects Ngulia?
13. What vision do you have for the project?
14. What are your future prospects for the Ngulia projects?
15. Explain what the tasks distribution looks like within the project?
16. How do you communicate with all the involved parties? What communication channels
17. What are your tasks when you are located at Tsavo West National Park?
18. Is it just you and Fredrik that have communication with the park or can the other partners contact them directly. ?
19. How do you normally communicate with the employees at the park?

Stimson related questions

1. What initial incitement did Stimson have when joining and contributing to the project Ngulia?
2. What does Stimson contribute to the project?
3. Will Stimson continue the collaboration and investments in the Ngulia project in the future?
4. The employees, apart from you, working with this project at Stimson, what positions do they have/what are their tasks within the firm?
5. Has Stimson gained something from investing in this project?
6. Does Stimson see potential in this pilot program regarding commercialization? Please explain why or why not.

7. Project Ngulia related questions
8. What is your main purpose when working with the project Ngulia?
9. What are the general goals for the project Ngulia?
10. What vision do you have for the project? How do you communicate this vision?
11. What are your future prospects for the Ngulia projects? How and when would you estimate the project Ngulia to be completed?
12. How long is the time span for project Ngulia?
13. Explain what the tasks distribution looks like within the project?
14. How do you communicate with all the involved parties? What communication channels?
15. What are your tasks when you are located at Tsavo West National Park?
16. Do you act as a communication channel between the customer and the partners? In this case, Tsavo West National Park and the knowledge transferring companies acting as partners.
17. How are the financial means that the project received used?
18. Can you estimate what the maintenance cost for the project Ngulia is?

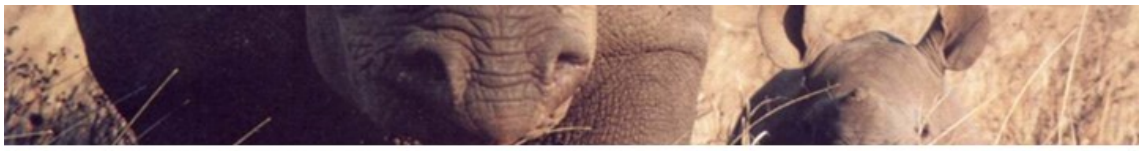
19. What resources and activities are the most costly?
20. How much capital is needed to complete the project?
21. What other organizations or companies do you view as competitors?

1. Have you encountered similar “overall-protection-solutions” before?
2. Which parks are most suitable for a solution offered by project Ngulia and other “total solution” projects?
3. What way would you say is the best way to reach out to parks regarding these projects?
4. If we can not legalize the trade of horn what is the best solution?
5. Do you think the spread of this ”total solution” would be a success?
6. Do you think it will become harder to find funding for these projects, have you seen an increase in the interest in this matter from western worlds.
7. What do you think projects could do further to advance the protection and stop the illegal trade?
8. Do you think one could develop this projects and also start including the protection of other animals, not only rhinos?
9. Do you think that this kind of project can help promote the legalization of the rhino horn market? In that case, how?
10. How dependent are the terrorists from the income of the poaching? Won’t they find other ways of funding their illegal actions?
11. Would you say that corruption is one of the main issues why this is yet a problem, hence no legalization of the rhino horn for example?
12. How much does rhino reserves monthly pay to protect rhinos?
13. What value does a solution like e.g. Project Ngulia give to a country, e.g. Kenya?
14. Would you be able to estimate how many black rhinos that are owned privately?
15. Do you know if there are any researches done on how much a rhino is worth?
16. Would you possibly know anyone at WWF that we can contact that we can interview regarding the preservation of the rhinos?
17. Would you perceive this project as sustainable as realistic solution to the problem of rhino killing?

1. What initial incitement did Saab AB have when joining and contributing to the project Ngulia?
2. What is the main reason why Saab AB is still a part of the project today?
3. What does Saab AB contribute to the project?
4. Will Saab AB continue the collaboration and investments in the Ngulia project in the future?
5. How does the communication between Saab AB and the Ngulia project work? What communication channels are used?
6. Does Saab AB have any contact with the Tsavo West National Park with e.g. the rangers?
7. The employees working with this project at Saab AB, what positions do they have/what are their tasks within the firm?
8. Has Saab AB gained something from investing in this project?
9. Does Saab AB see potential in this pilot program regarding commercialization? Please explain why or why not.
10. How has the involvement in this project affected the employees at Saab? Would you see this as goodwill act within the company? Do you see any positives effect within the company related to the project?

Appendix 6. Business Plan Project Ngulia

BUSINESS PLAN
PROJECT NGULIA



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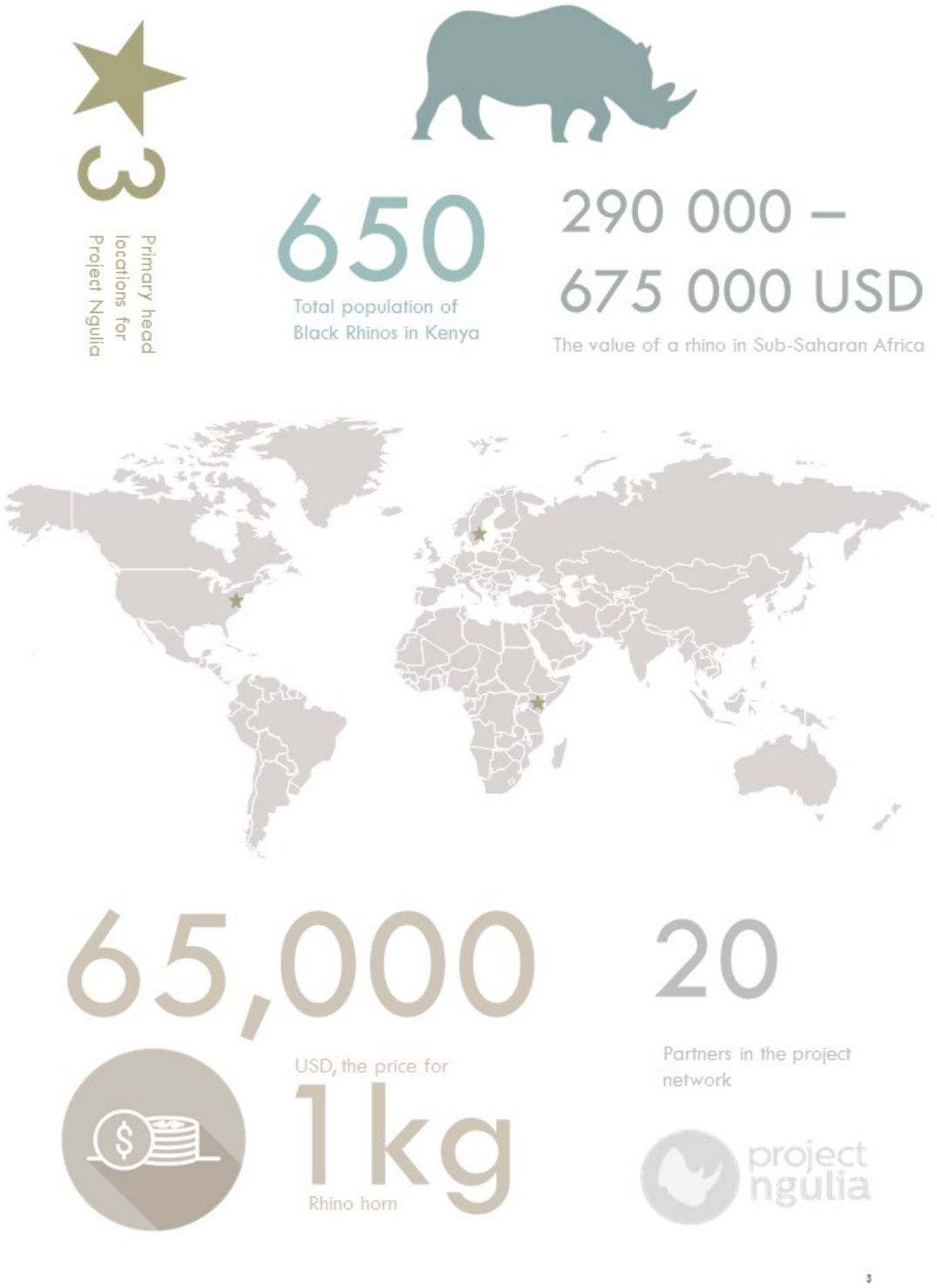
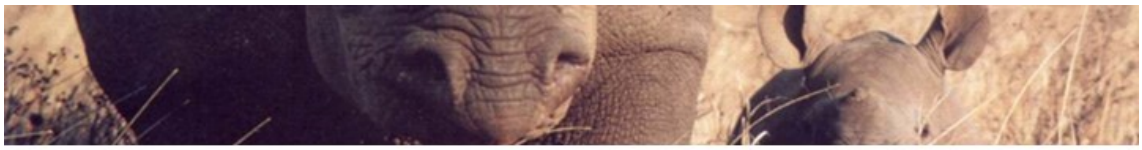

3
Primary head locations for Project Ngulia
650
Total population of Black Rhinos in Kenya
290 000 – 675 000 USD
The value of a rhino in Sub-Saharan Africa
65,000
USD, the price for
1 kg
Rhino horn
20
Partners in the project network
project ngulia
3



PURPOSE/NEED

Poaching is not a new phenomenon. In fact, poaching of the Black rhino was already a critical problem in the late 1900's (Tatham et al., 1989). Studies show that over the 10-year period between1970 to 1980 the African continent saw a decrease of fifty thousand in the Black rhino population. More remarkable is the price increase that has evolved during these years, where higher demand and decrease in supply has been main factors to the development. In the late 80's the average price for one kilogram of Black rhino horn was 650 USD, however, recent valuations have shown that the horns are worth 65 000 USD per kilogram on the illegal market. This has made the Black rhino hom one of the most valuable animal resources to be illegally traded (Douglas et al., 2014).

In Kenya, the population of Black rhinos has decreased from 20 000 to 650 in a period of 40 years. At this rate, the Black rhino will be no more but a memory in Kenya in less than two years.

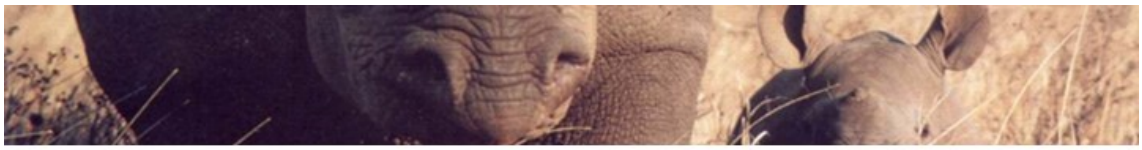
The demand on rhino hom mainly comes from Asia and in e.g China the horns are an ingredient in traditional medicine (Assam, 2016). In Vietnam the horns are said to cure cancer and other severe diseases. It has however been proven that rhino horn has no medical effect as they simply consist of keratin, which also is the main component in human hair and nails. So in truth, an entire species stands on the brink of extinction for no other reason than a tradition of eastern medicine.

The immediate threat of extinction of the Black rhinos sparked the initiative Project Ngulia in 2013. The project is owned by Kenya Wildlife Service (KWS), but both Stimson Center and Linköping's University, as key partners, assists in implementing the concept. The project has attracted additional partners and today it consists of a team with several different organizations, who all share the attitude that it is a morally and environmentally right to take responsibility and preserve the Black rhino population. The project is based in Kenya, in a Rhino sanctuary in Tsavo West National Park.

The purpose of the project is:

"To restore the Black rhino population and strengthen security in the reserves in which they reside, so that a bio-diverse environment can emerge where man and animal can live in absence of mortal threat."

The project fights against the poachers and strives to rival them in their inventive ways of conducting their crimes. The project is more than just saving a species; it is a quest to outperform the organizations and people who do harm to others, and thereby making the world a safer place.



GOALS

"The overall goal of the pilot project is to deploy an impactful, cost-effective and bottom-up technological platform that secures the Ngulia Rhino Sanctuary in Tsavo West National Park. The technological solution will be scalable and replicable to other national parks in Kenya, and can address a wide range of natural resource and trans-boundary challenges"

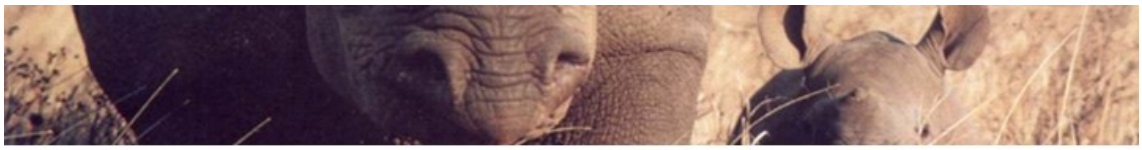
The objective is not solely to secure the Ngulia Rhino Sanctuary in Tsavo West national Park; the goal is to find a long term and sustainable solution, which is easy to implement. The key is to create a bottom-up developed toolbox, consisting of different security applications and devices, which is also able to offer outputs of single components to parks that do not necessarily need or want the all-inclusive toolbox. Furthermore, the project wants to offer a concept adapted for Kenyan culture and Africa, which will make the solution scalable and replicable within the area.

The purpose of finding a bottom-up solution that secures parks is to decrease the mentioned poaching and the illegal trade while simultaneously creating better work conditions for the park rangers. As rhinos are one of many factors that affect the tourism and hence the economy in Kenya, increased security and less poaching by implementing new technology will help the economic growth in Kenya.

The Progress Towards the Goals

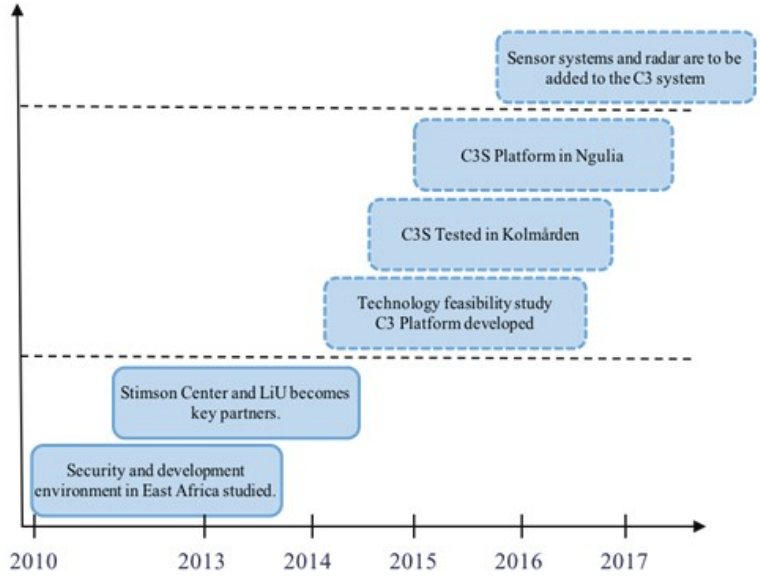
2010-2013:
An extensive analysis was conducted of the security and development environment in East Africa, focusing mainly on Kenya. The actors involved in the initiation of the project were The Stimson Centre, Kenyan government agencies and nongovernmental organizations, which all had a significant role in the progress. As the analysis had its foundation in East Africa with focus on Kenya, the solution was adapted to the culture in Kenya and similar countries.

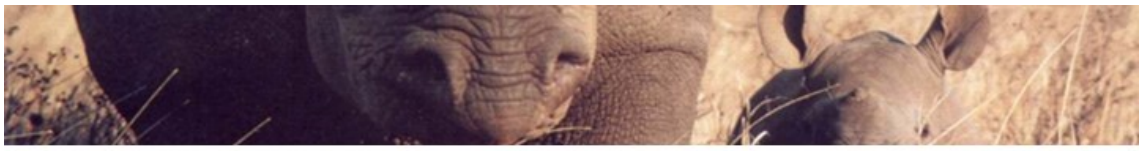
2014:
After a technological feasibility study at the Ngulia Rhino Sanctuary the pilot project plan was initiated. The first stage in the plan was to improve the ability to command, control and communicate, which is known as C3.



2015-2016:
A smartphone-based C3 software was developed with focus on creating a bottom-up solution. In the development process several visits were made in Ngulia and information from involved and affected people, such as commanders and rangers, was collected.
At the launch of the first version of the C3 system only a few rangers tested it and the continued progress and improvements was based on feedback from the rangers. After the improvements were made, the system was fully introduced for use by park rangers, commanders and research staff. The connectivity, which was necessary to ensure advanced technology usage, was improved further as Kenya's telecommunications company Airtel agreed to supply Sim Cards, airtime and data to the pilot project.
Simultaneously, the sensor systems are evaluated at Kolmården Wildlife Park in Sweden to see whether they are applicable in Ngulia or not. Sensor systems and radar for border security and intruder detection is included in the system. These systems become important factors in the goal of securing the Ngulia Rhino Sanctuary in Tsavo West National Park.

2016-2017:
The first sensor systems and radar for border and intruder detection, as well as area surveillance, will be added to the C3 platform. Several other sensor systems will also be investigated.





BENEFICIARIES

Project Ngulia has numerous beneficiaries, however, the rhinos, the national parks, Kenya, the tourists and the companies involved in the project are central.

Rhinos

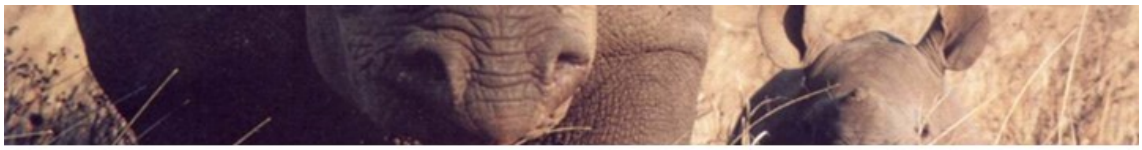
The Black rhinos in Kenya are threatened and in reality a dead rhino is worth more than one alive. The need of a higher security in the national parks is immense; else the Black rhino will go extinct. The Black rhinos are exposed to appalling animal cruelty when poachers fiercely remove the horns as a consequence of time pressure and the fact that if they extract the horn from the root the amount of horn extracted is maximized. One of the project's goals is to increase, but above all secure, the rhino population. This would generate a greater population of the species, which is good for biodiversity.

National parks

Africa is famous for its rich animal life; especially renowned and well regarded is the so-called Big Five. The Big five includes the rhino, the elephant, the leopard, the lion and the buffalo, and together they play a central part in the marketing of parks in e.g. Kenya. The value delivered from tourists will decrease in the absence of the rhino species in a park, and the decreasing number of rhinos has a huge impact on the national parks and its continued growth.

The cost of surveillance is an essential factor when discussing the sustainable development for the national parks as one of the largest costs is the protection and security. A private landowner spends up to 120 000 USD per year to protect the rhinos in the reserve (Hanks, 2016). This indicates that the costs to protect the rhinos are extreme and unsustainable. Despite the large amounts that are invested in security, poaching is still a problem. To be able to solve the poaching at a low cost, both in terms of investment and day-to-day operations, high efficiency solutions must be available.

Furthermore, the rangers that work in national parks are risking their own lives to protect the rhinos. In the last ten years, 1000 rangers were killed by poachers. The poachers are equipped with weapons and in reality they value the horn higher than human lives. With Project Ngulia in action the rangers are given the ability to communicate with other rangers and commanders, which increases the security and defense within a park.



Kenya

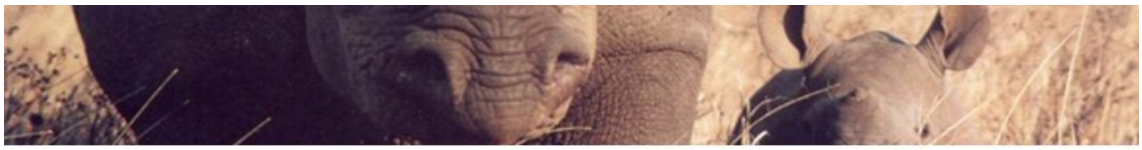
Common problems for developing countries are unemployment, low productivity, corruption, a weak resource base or potential resources being owned by large international corporations. Project Ngulia has a vision, not only to improve living conditions for rhinos, but also to improve the daily life of the population in Kenya and surrounding countries. An increasing tourism industry will lead to new work opportunities since the demand for accommodation, food, transport etc. will grow.

A large threat towards the security in Kenya is the terrorist groups; the trading of rhino horn and other illegal actions funds these groups.

To see economic growth in a country, innovation is key. When Project Ngulia developed the app helping the rangers to communicate, the Africa based community, iHub, has been in charge. This setup contributes to work opportunities in Kenya, and an exchange of knowledge can occur driving innovation and spurring growth.

Tourists

Annually approximately 1.5 million tourists visit Kenya and 15 percent of the GDP is linked to the tourist industry. With the increasing amount of poaching of rhinos, the country is becoming less secure. High security, being an important factor for tourists, has led to a lessened desire to travel to Kenya. Other incidents, like the terrorist attack against the shopping mall in Nairobi 2013, have had a negative effect on the tourist industry, and the number of tourists has decreased after the attack. When the rhinos become more rare, the price to view a rhino will increase. Since the goal of Project Ngulia is to reduce poaching, a safer environment for tourists can be accomplished. Hopefully the work of Project Ngulia might also lead to a more secure overall environment in Kenya, making Kenya a more attractive location for tourists.

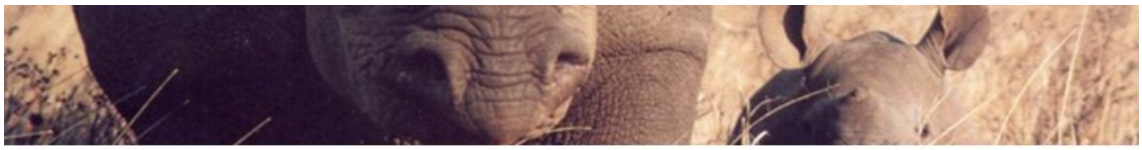


Project Partners

Project Ngulia has since the start in 2013 been in contact with different companies and organizations to obtain both knowledge and funding. One of the greatest incentives for companies to get involved in environmental and social projects is CSR. Since Ngulia is encouraging both social and environmental responsibility in Kenya, it becomes a suitable project to support when creating a CSR plan for a company. When initiating collaborations the organization gets the right to use the brand of Project Ngulia as an exchange/yield for the resource that they contribute with.

The interaction with other organizations and companies generates an exchange of knowledge and a network that can be useful in future projects or businesses.

Whilst being a partner of the project, companies have the chance to develop and test a new product, which later on can be commercialized on the open market. By testing a product through an environmental project instead of introducing it in the traditional way, the risks can be decreased. The motive to do work in this way is that if the testing would fail, the investment can still be seen as successful and a positive outcome can be justified as a charity or CSR.



STAKEHOLDERS

The owners of the projects, the project coordinators, all the partners, the competitors and Tsavo West National Park act as stakeholders. Seen from a larger perspective one can also say that the community and government in Kenya, tourists and poachers, among others, will also be affected by the outcome of the project and are also viewed as stakeholders.

Project Coordinators

Fredrik Gustafsson, who is professor in sensor informatics at Linköping's University, leads the technical research team and is responsible for management and supervision of technical development plus the system integration. Potential partners in the technology area are organizations that Gustafsson finds suitable in the way that they can add value to the project. The development of the concept is not affected too much of what partners can offer, instead it is based on what is thought to be the most suitable solution.

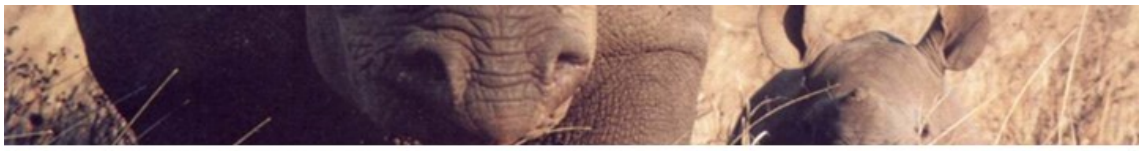
Johan Bergenäs whom works at Stimson is responsible for overall strategy and relations with project stakeholders, as well as replicating and scaling the project with assistance from partner organizations. Bergenäs works towards other countries, multilateral organizations, peer NGOs and the private industry. In his work he engages with other communities as the technical and training approach has applications in both agriculture and protection of critical infrastructures and national borders.

Partners

Partners supporting Linköping's University to implement Project Ngulia are: Kolmården, airtel, iHub, HiQ, SAAB, Superfly.tv, Mowana Media, Nokia, Vinnova, GPS Perimeterlarm, Termisk Systemteknik, Meteksan Savunma, UAS Forum Sweden, Mountaindog, Modio, FLIR, Flexenclosure, AXIS communications. The partners contributes with either funds, competence, technology or all three depending on what type of company it is and what technology or other competence the Project Ngulia is in need of. The partners differ in that way that the originate form different countries and varies in size; several of them are placed in Sweden or in Kenya.

Communication Channels

The communication channel between Project Ngulia and the partners are through Johan Bergenäs and/ or Fredrik Gustafsson. Communication between different partners is encouraged as they are collaborating in creating a concept for the project.



RESOURCES

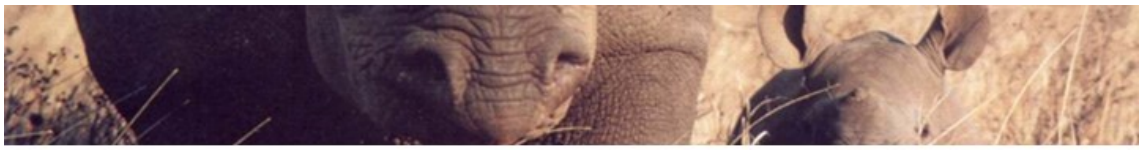
Project Ngulia is a unique combination of resources. Bergenäs and Gustafsson are the two entrepreneurial project leaders for the project. The project leaders have good relations with the people in Tsavo West National Park and have continuously visited the sanctuary in Kenya for updates and continuing the development. On site, tests together with park rangers, commanders and research staff have been performed, as mentioned in description of the projects goals.

A great advantage with Project Ngulia is the close collaboration with the people operating nearby the sanctuary. Airtel and the technology community iHub have made the bottom-up technology development possible. A closer development of the technology, which the rangers in Ngulia will use, have then been possible, which is of great importance since the technical solution must solve the prevailing problems.

The project has been featured in many media outlets and has had considerable publicity. The UN and the Word Bank, together with large newspapers such as New York Post, have all notified the project. Since 2014, it is part of the Clinton Global Initiative Commitment to Action.

Competence

The project is human capital-intensive. Partners, companies and organizations mentioned in the stakeholder chapter all contribute with various knowledge and resources, which together co-create a greater value. Most importantly, industry and research work alongside as high tech businesses and one of Sweden's largest technology universities, Linköping's University, combine contributions to accomplish the set goals. Examples of areas the different partners operate in are sensor manufactures, system integrators and retailers, companies with cyber-security knowledge and drone operations in Africa and media productions.



Technology

Pre-Project Ngulia the rangers used radio communication, which is an exposed form of communication that anyone could overhear. Their only tracking device was a dog and they used a wheel from a vehicle to smooth out the sand to be able to detect footsteps from potential poachers entering the border of the sanctuary. Additionally, they had limited access to vehicles and binoculars with night vision mode. In contrast, the poachers often have helicopters, night vision equipment and heavy weapons. Project Ngulia is actively working on creating a safer and more effective work environment for the ranger's.

The rangers have been equipped with cell phones containing the developed app and through the cloud-based-database, which hosts all information and communication, rangers can communicate with each other and their management. It is primarily an input device where the rangers can note their observations. The cloud-service enables them to navigate and see the position of all rangers via GPS technology. Additionally, it is possible to monitor where the animals have been observed during the daily patrolling rounds as photos can be uploaded and the reports automatically get geo-tagged. The commanders can see the positions of all rangers and vehicles. It is also possible for the rangers to observe and issue or receive security alerts. Data can be analyzed in real time and retrospect and commands can be sent directly to the rangers. Previously, the rangers used handwritten logs; this platform therefore enables rangers and commanders to have more effective communication.

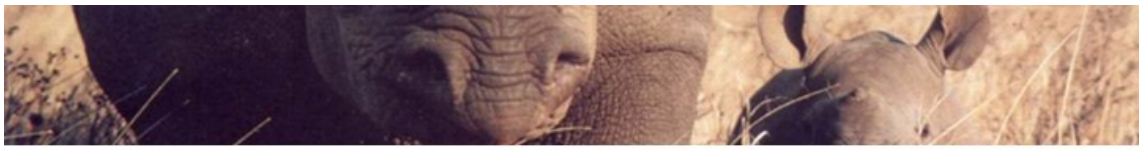
iHub is responsible for developing the design and interface used in the app, aiming to maximize the usage of the platform the company is also responsible for the training programs, where support and maintenance is in focus and is guided by Linköping's University. Linköping's University has developed the technical solutions, and the hardware consisting of well-tested mature technology. A good overall comprehensive view of the sanctuary is possible through smart algorithms that connect data from different sensors in the Ngulia Sanctuary with the reports written on the rangers' cell phones.

Future

Project partners are currently developing two different GPS devices to be able to obtain GPS positions of the rhinos. The primary one is a foot ring, which has been developed for this purpose, and is tested at Kolmården Zoo. The other device can be positioned, internally, in the thick skin on the rhino's neck. Beyond giving positions, this device might be able to give information about the animal's physical condition. Whether this type of tracking devices will be used on the animals in the future remains, however, it is uncertain and only time can tell. Challenges faced is that the batteries has limited life-length and the fact that it is very stressful for the rhinos to be tranquilized which is needed to immobilise them.

In future project phases, the C3 platform will contain sensor systems and radar for border and intruder detection as well as area surveillance. Smart algorithms can distinguish animals and humans and monitor movements. The radar systems will be able to detect a vehicle within a ten-kilometer radius and animals and humans within five kilometers. Under a two year time period a radar will be lent to the project from a Turkish radar company. This sort of hardware is expensive and the loan is generating great value to the Ngulia test site. In parallel, other sensor systems will be investigated, examples are: microphone networks, radio detection, fiber optics and laser barriers.

This pilot project will act as a toolbox and demonstration where other parks and organizations can replicate the scalable platform and use the technical tools that match their needs.

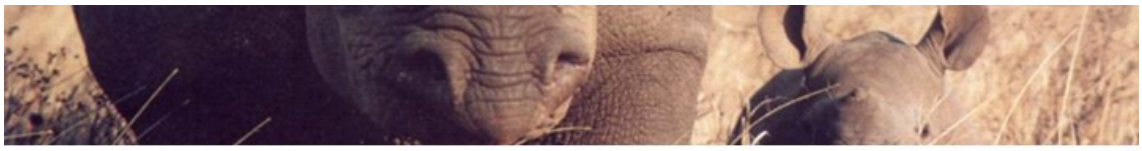


FUNDING

The financial means used to develop Project Ngulia is based on resources from partners within the project. It is central that the project is economically sustainable, and it is fundamental that the project is not dependent on large donations.

Time and knowledge is the main contribution partners have made and most have financed their work by themselves, as one part of their contribution. It is the partners' contribution of material, knowledge and time that has made the project possible. Although some hardware and software used in the project have been financed with donations.

The project received 180 000 USD to finance the phase where hardware was integrated in the C3 system. The rest of the funding comes from other contributing partners and consist of approximately 1,4 million USD – all which represent in-kind technical and human resource contributions. To achieve the goals for the project and add border and intruder detection as well as area surveillance, sensors and radar system is required and the investment will approximately reach 1,3 million USD – again in technical and human resource contributions.

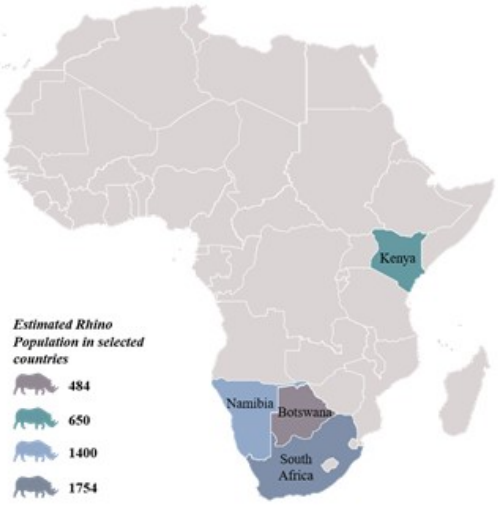


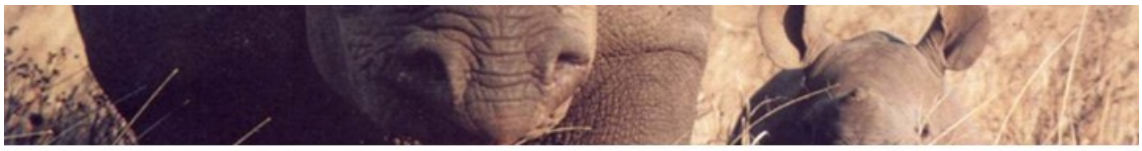
MARKET

The analysis focuses mainly on national parks/reserves, private parks and relocation programs containing and handling Black rhinos.

Research has been made in order to map out application areas outside of the Ngulia sanctuary where the concept of the project is viable. In order to make a correct analysis of the market, a macro-segmentation has been made where the research is limited to the segment with parks that have a presence of the Black rhinos. Only countries with a substantial Black rhino population have been taken into account. From this segmentation, Zimbabwe, Namibia, South Africa and Kenya are deemed to be suitable for the analysis.
Flowingly, segmentation on a micro level gives a more precise description of what different kind of habitats the Black rhino resides in. The three segments that are identified are national parks, private reserves and locations where rhinos are moved to in different relocation programs. These relocation programs move the rhinos to a safer environment, although there are no funding to support security at these new sites.

National Parks
In the existing national parks the security levels vary, however, some parks have immense amounts of resources at their disposal but the poaching does not seem to abate. National parks are normally owned and financed by the government. National parks are often open for tourists and are usually the highlight when visiting these countries. The current situation has made the rhino a rarity and it is found in very few places. Exact data on the whereabouts of all the Black rhinos is elusive. The numbers presented in this analysis are estimates which purpose is to give an idea of where they reside and where more security efforts are needed.





Kenya

Kenya is home to approximately 650 Black rhinos. The largest national park in Kenya, Tsavo West and Tsavo East with an area of 22 000 square kilometers, is facing severe difficulties in battling the poaching threat. There are several factors contributing to these difficulties. The infrastructure in the park, as in many other parks, is in poor condition which makes it hard to move around inside the park. The ranger force consists of some 300 rangers whom are responsible for the intensive protection zone.

Vehicles, fuel and ammunition are scarce and many outposts are in poor condition. A possible explanation for the severe situation could be the economic situation in Kenya with a current GPD per capita of 1588 USD compared to South Africa's which is 6354 USD. Listed below are examples of other national parks in Kenya whom which protect and conserve a Black rhino population:

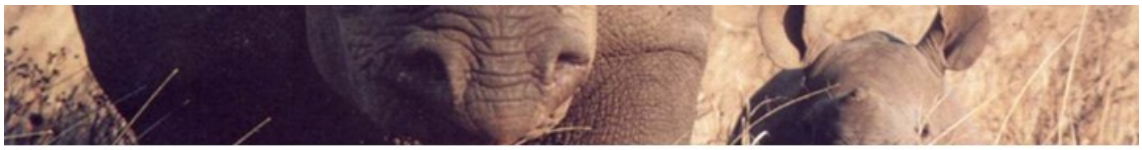
- Aberdare National Park
- Amboseli National Park
- Maasai Mara National Park

Fortunately, efforts in various sanctuaries in Kenya has managed to increase the population. This implies that the cost for protecting the rhinos will go up with the growing population meaning that there will be a need for effective but affordable solutions to security like the one presented in Project Ngulia.

South Africa

South Africa has got the largest population of Black rhino in the world amounting to around 2000, including those privately owned. The majority of the rhinos can be found in Kruger National Park (KNP). Compared to parks like Tsavo in Kenya, KNP has a more developed security system. KNP's security force consists of 550 rangers in total, scouting helicopters and sensor systems. All these preventive measures have not been as efficient as one could hope. In fact, 1175 rhinos were killed in South Africa in 2015, more than 500 in KNP. This brings into question the efficiency of the present security solutions and whether or not Project Ngulia offers a solution that is more resource efficient considering the enormous amounts of resources that are poured into the protection of KNP's wildlife.

There are other national parks in South Africa with black rhinos, like the Addo Elephant Park, Hluhluwhe and Pilanesberg National Park among others. However, none of these face the large amount of cases of poached animals that KNP does. This is mainly because Mozambique, one of the poorest countries in Africa, shares border with KNP making it accessible to the poor locals who get bribed by villains to kill the rhinos. The critical rhino situation occurring in South Africa at the moment is a combination of negative factors and it is unlikely that the Magoo Leah project alone will stop the poaching. To solve the problem with poaching South Africa needs to gain governmental support, support from locals and above or work with its border security and legislation. Project Ngulia has great potential in South Africa, but can't alone solve the problems with poaching and neither can any other security solution. The factors mentioned above are prerequisites for any kind of security solution to work. Fortunately for Project Ngulia, cost-efficient solutions will be always necessary as money is a scarce resource when handling wildlife preservation.



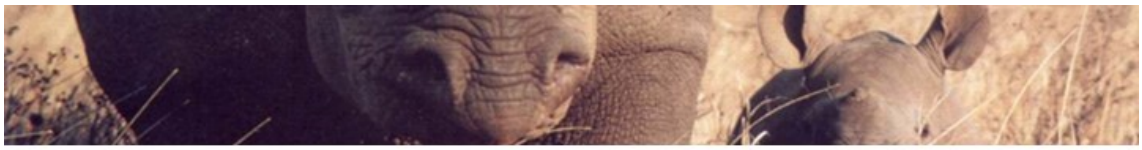
Zimbabwe

The majority of Zimbabwe's Black rhinos can be found on private land. On the state owned land, about 3000 square kilometers, only 39 out of Zimbabwe's 484 black rhinos lives. A more thorough analysis of private reserves, and thereby also most of Zimbabwe's Black rhino population, can be found in the analysis on that segment.

But the 39 black rhinos on state land are also in need of security. During 2014, "only" ten rhinos (Black and White) were killed by poachers. In the first half of 2015, 21 rhinos were killed by poachers. This shows a more than threefold increase in poaching numbers in Zimbabwe. Although efforts are made to make the surrounding society more involved in the preservation of Black rhinos, a proper security system is needed making the parks in Zimbabwe an interesting prospect for Project Ngulia's concept.

Namibia

Namibia has quite a large portion of the total amount of Black rhinos, about 28% which is approximately 1400. The Namibian Black rhino has actually been left alone for a long period of time, since 1994. This was made possible because the Namibian population understood the value of the rhinos through education. Additional effort included involving local communities which showed great results for the Namibian Black rhino. But as with so many other countries, poaching incidents are growing and may indicate a need for something more than just the efforts performed in the past to preserve the Namibian rhino. Since Namibia has come very far in their protection of rhinos, Project Ngulia could act as a complimentary security system that this cost efficient and bottom-up developed.



Private Parks

Private reserves are, as the name indicates, owned privately and are generally funded by the owner or/and by the revenues received from visiting tourists. However, some reserves are completely private i.e. not open to the public. These owners are, for obvious reasons, particularly careful with information leakage and do not want sensitive material to reach the public, regarding number of animals, especially rhinos and other resources that the farm possesses. Consequently, it has been difficult to locate data revealing the market size and the customer potential for Project Ngulia regarding private parks. To cover the knowledge window, the analysis has been constructed on collected data from renowned sources. The information stated in the section below is a confirmation that there is a need for a security reconstruction and revolution in private parks.

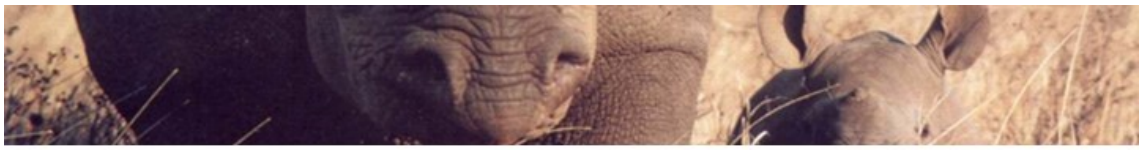
Today there are approximately 14 000 private parks in southern Africa. This is an indication of how large the potential market that Ngulia compete in is. Yet it is still difficult to define and describe the private parks as customers, for example in South Africa many land owners collectively removed their fences between themselves and Kruger National Park. This was meant to generate substantial revenues from hunting and tourism. One can see that the different customers have collided to one massive collaboration and it is challenging to picture how Project Ngulia would implement their security strategy in such a vast and complex customer environment. Nevertheless, this could also be a superior customer for Project Ngulia as it is solemnly one large area that should be secured.

Security is today one of the major expenses for a private reserve. An example that states the enormous security expenses is The Buffalo Dream Ranch, the worlds largest rhino farm. The farm has a total of 1261 rhinos. The cost for the security is approximately 210 000 USD per month, leading to an annual expense of 2,52 million USD. However, in 2015 the farm lost 17 rhinos and the owner is convinced that it is the lack in security that contributes to this, and that they are inside jobs. If Project Ngulia can deliver a bottom-up security technology for a reasonable price this could be a perfect customer to approach. The Buffalo Dream Ranch has the same goal as Project Ngulia, to save the rhinos from extinction and this could possible lead to a great collaboration if goals, needs and cost are met.

In South Africa alone there are approximately 10 000 private parks of which 330 have rhinos and together they act as home for 6200 black and white rhinos, which is equal to 33% of the total national population of rhinos. Together they spend an annual amount of 24,5 million USD on rhino security each year.

To accomplish the wanted security at these farms the money is used to buy; guns, uniforms, radio equipment, night vision equipment, vehicles and aircrafts. The market for security equipment is therefore immense and there is evidently a need for better security solutions to bring down costs.

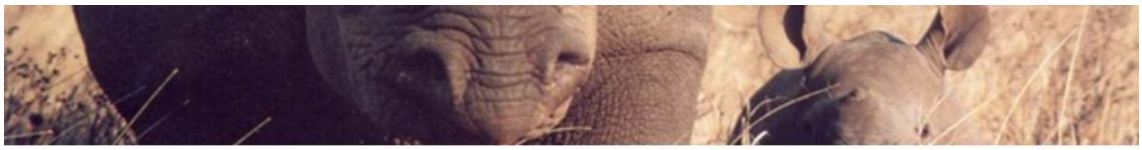
Private parks will be difficult to locate and market towards. When entering this segment Ngulia should highlight the fact that the technologies can be purchased separately as this is one of Ngulias competitive advantages. The cost should also be in focus when delivering information to private parks as this is the absolute main advantage. Due to the information stated above one can draw the conclusion that private parks suffer extreme expenses on security.



Relocation Programs

An alternative approach to the different security solutions available are the relocation programs. These programs take rhinos from areas with high poaching rates and move them to safer areas. One such program was initiated by Wilderness Safaris in 2001, where rhinos were moved to the Moromi Game Reserve in Okavango Delta, Botswana. The reserve is surrounded by water making it hard to access. The rhinos that are relocated to the Moromi Game Reserve can move over the water and roam free in a 30 000 ha area. This particular relocation program was dependent on the support it got from the government in Botswana as well as private sector safari companies and the department of Wildlife and National parks. The costs for the program is no longer carried by Wilderness Safaris as they were in the beginning. Instead, the private sector safari camps now cover the costs. The discussion about private parks above becomes equally relevant here.

Relocation programs moves rhinos to areas that are safer in terms of location and accessibility. However, there are rarely any actual security systems in place at these locations. This questions the long-term viability of the relocation programs as a sole solution. The new safer locations may provide shelter for some time, but as populations reduce elsewhere, the poachers attention will be turned to these relatively unguarded areas. Relocation programs, like the one carried out by WWF, only have funding to do the translocation meaning there is insufficient funds to guard the rhinos in their new habitat. This makes the relocation sites a prospect for Project Ngulia as it can offer a cost-effective security solution that can be afforded by the governments and/or private actors that becomes in charge of the rhino's safety at the new location. Project Ngulia has a solution that would work well in combination with relocation programs. Examples of relocation programs are The Black Range Rhino Expansion Project by WWF, The Botswana Rhino Project by Wilderness Safaris, Zambia Rhino Relocation by African Wildlife Services, The Rhinos Without Borders Crowd Funding Campaign by the Great Plains Foundation and Adsa.



Conclusion of the Market Analysis

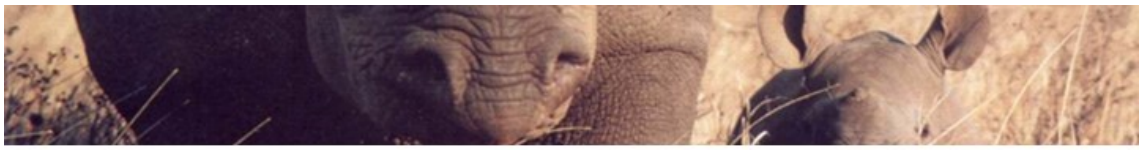
As indicated above, the needs differ from park to park. Fortunately, project Ngulia develops technologies that are compatible with, but not dependent upon each other. This creates a greater market potential within the different micro-segments. The technology offered can meet the needs in the different segments in different, yet uncertain, ways and the solution offered could be customized after suitability for the specific parks needs and demands. This will enable a larger market, as flexibility is a significant competitive advantage and will in that way satisfy more customers' needs.

When looking at national parks as potential customers the conclusion can be drawn that it will most likely be cost-effective for them to implement a security system of quality such as the one assembled by project Ngulia. This conclusion has been made when looking at KNP's security plan that is mentioned above, which makes one question the efficiency of the present solutions and whether or not project Ngulia offers a solution that is more resource efficient.

As mentioned in the private park chapter there are approximately 10 000 to 14 000 private parks in southern Africa, which implies that there is a potential large market that Project Ngulia could compete in. In the area close to KNP, the parks have removed their fences to create a collaboration and project Ngulia could see this collaboration as a great potential customer. A collaboration of so many parks and KNP could obtain a sustainable security situation if they all had the same cost-efficient solution, which could be provided by Ngulia. This could, in other words, be a superior customer for project Ngulia as it is one large area that should be secured where lots of communities and individuals are involved.

Another reason for Project Ngulia to enter the market segment containing the private parks is that the evidence that private parks spend a fortune on security today. It is also highly unlikely that parks will afford to replace an entire security system, but as Project Ngulia can deliver a bottom-up security technology for a reasonable price this could be a perfect customer to approach. The cost and flexibility should be highlighted when delivering information to private parks as this is the main advantage.

Looking at the market in South Africa as a whole, one realizes that the situation is severe and is a result of a combination of negative factors. The country needs to gain governmental and local support, and above all it needs to work with border security and legislation. Project Ngulia has great potential in South Africa, but cannot alone solve the problems with poaching and neither can any other security solution. The factors mentioned above are prerequisites for any kind of security solution to work. Fortunately for project Ngulia, cost-efficient solutions will always be needed as money is a scarce resource when handling wildlife preservation.



COMPETITIVE ANALYSIS

Competitive analysis

The following identification and evaluation aims to narrow the selection down to a few direct competitors and make a comparison of these projects and project Ngulia.

Competition identification

SMART

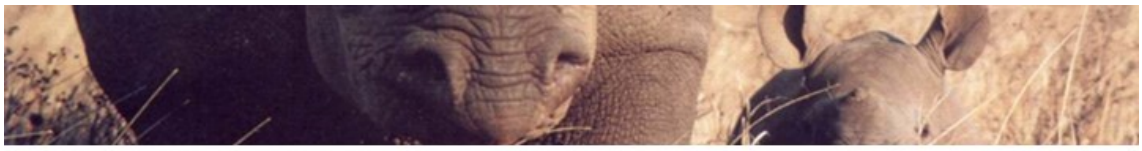
Launched in 2013, SMART (Spatial Monitoring and Reporting Tool) is a device that aims to simplify the work of wildlife rangers by analysing collected data. By using GPS locations from rangers' reports, SMART analyses the data to determine where poaching is most likely to occur. SMART is a free application and is being used by the WWF's Wildlife Tech Project and CITES MIKE (Monitoring Illegal Killing of Elephants) Program. The application has extended further and SMART also works as a communication tool to evaluate and implement best practice for planning done by rangers and wildlife managers.

Cybertracker

Cybertracker, like SMART, is a low cost application for computers and smartphones. The purpose of the application is to map out where poaching is more likely to occur using data from reports made by rangers containing not only information about the animals, but human activity and vegetation as well. The application has already found application areas in large parks such as Kreuger National Park and Enzemvelo KZN Wildlife Park.

Mataki

The aim of developing the Mataki device was to produce a low cost alternative to other collars available on the market. The lower price is not all that distinguishes this collar; it is also user friendly, can send data wirelessly and can be reprogrammed. The device has mostly been used on birds but is being tested on tigers in the Corbett National Park in India.



3D-horn Pembient

This project has a quite different take on the problem. Instead of trying to reduce the supply of rhino horns, this projects aims to increase the supply by making fake rhino horns by 3D-printing them. These horns are then to be sold primarily in east Asia and Vietnam. Research shows that as much as 45 percent of the consumers are willing to use fake horns instead. The Pembient project is funded by IndieBio which offers its start-ups $100 000.

WWF (Google)

WWF has a program which they call Wildlife Crime Technology project, which is a project that, by using modern technology, is creating an innovative conversion model against poaching. In 2012, Google's Global Impact Award funded the project with $5 million. The project is combining four different technologies, one of them being an RFID chip. These chips work as a part of a GPS surveillance system that tracks movement through the ground or through mobile sensors. The system, which is called the Falcon, is now in use in all rhino conservation parks in Namibia. In November 2015, WWF launched the "WILDLABS.NET: the conservation technology network". The purpose of this is to create a community with global users and other developers of technology based techniques for wildlife conservation.

Air Shepard & the anti poaching engine

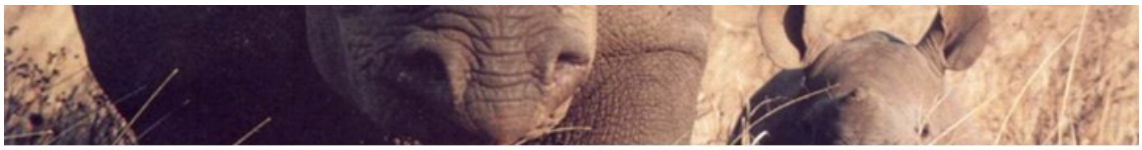
The Air Shepard initiative is a system combining the use of drones and a so-called anti poaching engine. This anti poaching engine is a mathematical algorithm able to predict where it is most likely that rhinos will be and thus a combination of the two technologies will make poaching much harder. Today the system is implemented at the province of KwaZulu-Natal in South Africa, a province that is home to over 2500 rhinos.

Peace parks foundation & the rhino protection program

Peace Park is a foundation that has been in action over 20 years (Peace Parks, 2016). The foundation is based solely on donations and aims to create a safe environment for Africa's wildlife and nature. In 2014, Peace Parks got involved as a part of the Rhino protection Programme. Rhino Protection Programme's collaborators are Ezemvelo KZN Wildlife, South African National Parks (SANParks), Peace Parks and South Africa's Department for Environmental Affairs. The project includes cutting-edge technology such as the project's own Geographic Information System (GIS). Peace parks are training the students at the Soutern African Wildlife Colleges to use this GIS technology in combination with other tools, such as GPS and other monitoring and evaluation systems.

Project Rhino KZN and ZAPwing

Rhino KZN project coordinates the work between NGOs, Ezemvelo KZN Wildlife and game reserves in the KwaZulu-Natal province in South Africa (Project Rhino KZN, 2016). The project is based on donations and includes several technical aspects such as thermal imaging units, ground-to-air radios, cyber-trackers, camera traps among other technologies. As a part of the Project Rhino KZN, project ZAPwing has four different manned aerial surveillance planes (ZAPWing, 2016). Projet Rhino KZN has got many beneficiaries including Tembe Elephant park and the Mkhuze game reserve in South Africa among others (Project Rhino KZN, 2016).



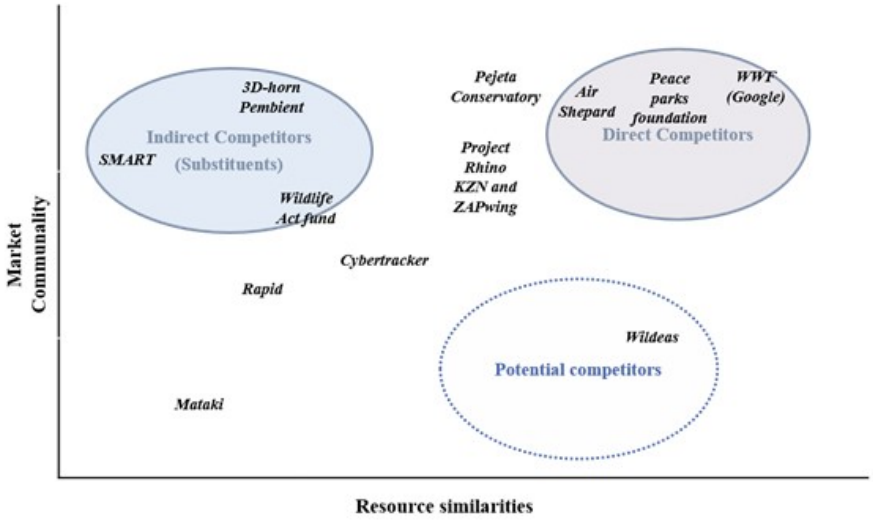
Airware & Ol Pejeta Conservatory

The Ol Pejeta conservatory is the largest Black rhino conservation site in east Africa, with over 100 Black rhinos Conservatory. The park has worked in collaboration with project Airware to develop a UAV that is well suited for conservation purposes. They have made sure that the UAV is user-friendly and has a well working autopilot that can be sent to different areas of the park using Google earth. Ol Pejeta also works together with Princeton University. The collaboration aims to develop the so called Hotspotter programme, a mathematical algorithm which can make identifications of animals on a film and categories them according to species. In addition to this the conservatory also employs infrared cameras, a small airplane, GPS-chip implanted in the horns of the rhinos, electrical fencing, armed ranger patrols and bloodhounds.

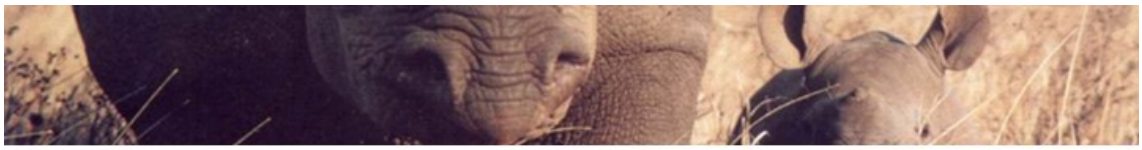
Wildeas

Wildeas is not so much a project, but more of a consultation company that combines security expertise with great technology know-how. They create customized models and strategies for protection of wildlife using state-of-the-art technology. When WWF:s Wildlife Crime unit needed to evaluate the most suitable drone, they hired Wildeas. Currently they are developing a test site in Africa, where new systems and technologies can be assessed and tested.

Mapping



A mapping based on the market communality/resource similarity grid.



Competitor evaluation

When making a competitive evaluation for a non-profit project, one must bear in mind the difference in the marketplace compared to a for-profit organization. Whereas the for-profit businesses compete in a marketplace where customer satisfaction drives the sales and the marketplace often has a diverse set of actors, the non-profit organization exist on a market close to being a non-market, or if you will, a grant-market. Despite that there is considerable value to be made from performing a competitive identification and a subsequent evaluation. The view from the general public has been adverse towards making a competitive identification and evaluation of non-profit projects, since it is somewhat counterintuitive to the sole purposes of most non-profit organizations.

Regardless of this view the value generated from making such analysis can be easily demonstrated. Firstly, to get maximal funding on a granted-based market, one must know the organisation's competitive advantage and how it differentiates from similar organisations. Secondly, if the project is to be commercialized in the future a competitor analysis is a must rather than an option.

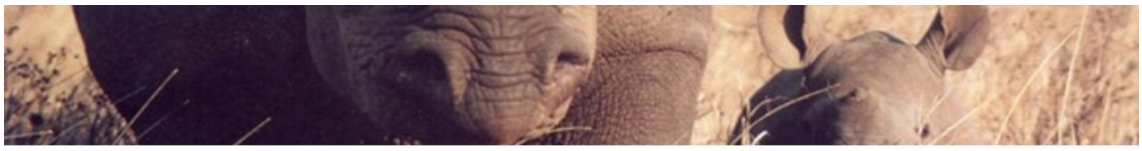
The consecutive ranking of the key competitors from the different categories has yielded the following results:

Indirect competitors	Smart / 3D-horn Pembient	None
Potential competitors	Wildeas	None
Direct competitors	Pejeta conservatory	Air Shepard/Peace Parks/ WWF
	Low	*High*
	Resource Equivalence	

This goes to show that the primary competition for Project Ngulia can be summarized to three different projects; Air Shepard, Peace Parks and WWF.

Competitive positioning and competitive advantages

The combination of attributes, which differentiates Project Ngulia from the listed competition, will be summarized in the following section. The resulting core offering will give an illustrative picture of what will be the key drivers for Project Ngulia.

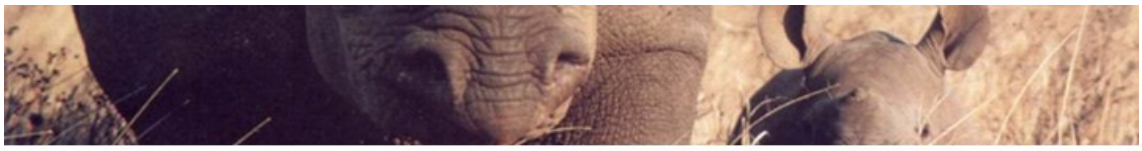


Competitive Position of the Direct Competitors according to McMillan (2009).

Criteria	Ngulia	Air Shepard	Peace Parks	WWF
Good location and logistical delivery system	✓	✓	✓	✓
Large reservoir of clients, community, or support loyalty group	✓	✓	✓	✓
Past success securing funding	✓	✓	✓	✓
Superior track record or (image) of service delivery		✓	✓	✓
Large market share of target clientele currently served	✓	✓		✓
Gaining momentum or growing in relation to competitors	✓			
Better quality service and/or service delivery than competitors	✓	✓		
Ability to raise funds, particularly for this type of program	✓	✓	✓	
Superior skill at advocacy	✓	✓		✓
Superiority of technical skills needed for the program	✓	✓		✓
Superior organizational skills	✓			✓
Superior local contacts	✓	✓	✓	
Ability to conduct needed research into the program and/or properly monitor program performance	✓	✓		✓
Superior ability to communicate to stakeholders	✓			
Most cost effective delivery of service	✓			

The benchmarking above demonstrates that Project Ngulia has some well-defined competitive advantages. The main core offering and advantages can be summarized in the following five qualities:

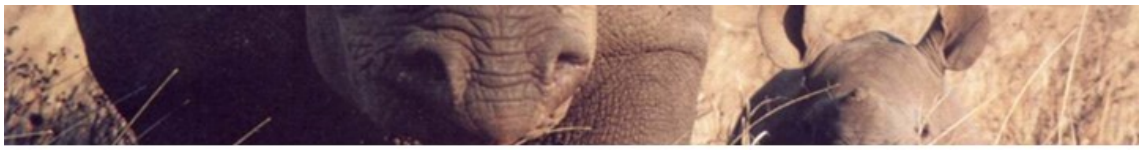
- Partnerships with both private and public institutions resulting in local know-how and financial strength.
- Strong technology competencies and a bottom-up technology approach leading to a well thought out strategy and a long-term holistic approach
- Engaged and competent management delivering superior ability to communicate the vision.
- A scalable solution which can be adapted to different purposes, making the Ngulia system accessible even for smaller parks with less means available
- Thorough business understanding generating an increased possibility to attract future partners and delivering value-add for both clients and partners



Conclusion of the Competitive Analysis

Looking at the direct competitors, it is clear that these are potentially viable solutions and could take market shares from Project Ngulia. Peace Parks does not pose an immediate threat to Project Ngulia. However, they do involve students to participate in training to use the project's technology, and as greater involvement of surrounding communities, as discussed previously, is fundamental to solve the poaching issue. But one could argue that students in Africa, seeing as only 36% have access to a secondary education, are not in an economically deprived state and involvement of poor surrounding communities should be prioritized. Involvement of students is still very useful as it spreads knowledge of the issue. Ngulia involves both surrounding communities as well as students making its competitive standpoint stronger than Peace Parks.

The greatest competitor to project Ngulia is WWF's Wildlife Crime Technology project. It will probably be easier for this project to gain recognition considering the fact that it was created by one of the world's well-known companies, Google. WWF's brand is also well known and has got a lot of media attention in social media. This recognition advantage combined with the technology used in the Wildlife Crime Technology project, which according to the comparison on previous page is accomplishing many of the criteria that Ngulia does, could make it easier for WWF to gain public support and gain funding. While Ngulia has got an advantage in technology and development terms, it lacks in media presence and recognition. As NPOs are dependent upon funding, gaining the trust of the public and potential contributors is vital. To be able to tackle the competitive threat that the Wildlife Crime Technology project poses, project Ngulia must increase its marketing efforts so that future funding and support can be secured.



RISKS

The software in Project Ngulia has managed to pass the technical stage and has had its first implementation, meaning that parts of the project has managed both the technical and the commercial risks of the process. Since the project at the moment is a non-profit driven the last step, economic success is not as important. However, should the project be made marketable this would result in an actual risk of economic failure.

Even if these development development hindrance is overcome, it does not mean that the onward process will be risk free. There are several aspects that might obstruct the project and these needs to be identified and addressed.

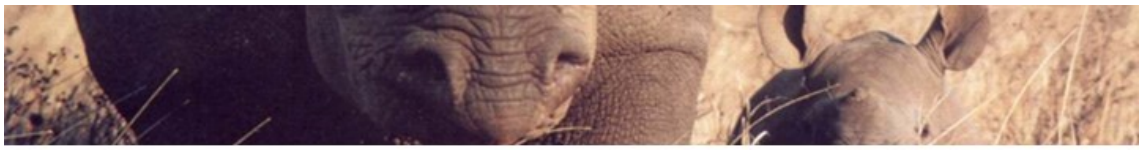
A micro-focused aspect of the risks connected to Project Ngulia is the situation where people actually might die if the technology and business idea around it does not work. When changing from the old, rural but well-tried methods, the implementation has to be seamless and overlapping. The guards are under a constant danger for their lives and should there be a problem with the app or other parts of the system this might in turn lead to an increased risk for the guards' lives. This risk can be categorized as a preventable risk and can be avoided completely by using the right routines and guiding people to make the right decisions when facing problems.

One of the major strategic threats is competition from other projects. The competition has been identified and evaluated in the competition analysis section resulting in the following ranking of most direct competition; WWF, Peace Parks and Air Shepard. Tackling this competition is an integral part of securing a stable future for the project. The overall procedure for avoiding this strategic risk will be to enhance the project's own advantage, continuously improving and differentiating the business model.

Non-profit organizations exist on a grant market, rather than a customer based market. One strategic risk for the project is therefore to not be able to secure future funding. Since the project has not been commercialized the future and development depends on companies, organizations and private donations. Should these flow of funding cease to exist the project would face the risk of not being able to continue its operations. Differentiating and developing their competitive advantage is one way to address this risk. Another way to differentiate is to use marketing and social media to enhance the general public's awareness of the project and thus make future funding less uncertain.

A risk with future implementations is that it can be hard to get the government´s support due to e.g. corruption. Since Kenya Wildlife Service, a government organization, is the project owner this risk will hopefully be bearable.

Another aspect of the threats of the projects includes the external risks of a deficit of demand. Although highly unlikely the poaching of rhinos might decrease dramatically. Perhaps due to legalization of trade of horn or other initiatives, this would of course make the technology and organization that the project delivers obsolete. This scenario is as mentioned highly unlikely and facing the risk of a situation where there is no market need is not one that needs mitigation to the same extent as other risks.



DISCUSSION

One of the project's strengths is the unique network of partners. During the few years that the project has been operating, over 20 different partners have been involved by contributing and supporting the goal to secure and save the rhinos. By combining knowledge from different fields, all involved can provide with front-edge-competence. Therefore the network, that has been created, is of high value, both for the project and each partner. The level of publicity that the project has had is of great advantage as greater coverage of the project's idea is essential for engaging and locating new and suitable investors and partners.

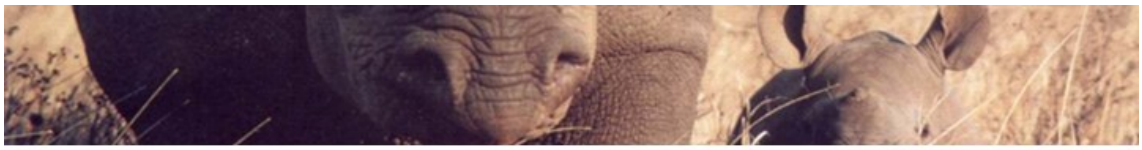
Compared to many competitors, Project Ngulia is is not funded on large donations, instead most of the funding comes from the large network of partners involved. To ensure fututre development and funding, which is needed to be a competetive solution even in the future, new partners are needed. In the Ngulia network, partners get the opportunity to work on business development and enter new markets at the same time as they can strengthen their company brand, enlarging the business network and improve the market presence. This strength is important for the project to empathize.

One of the vital factors to even be capable of creating a successful project against poaching of rhinos, is to make it economical sustainable for all kinds of potential customers. The initial investment can be adjusted by only applying solely one of the solutions innovated by the project e.g. if the most important thing for a customer is to keep the ongoing costs low, the communication application (the smartphone-based-software) could be implemented, since this do not require many resources after the implementation. The fact that one can pick and choose from the toolbox created by Ngulia, makes it possible for the cost to be adapted to the parks economical environment. Ngulia can offer a reliable and quality secured total solution or single tools to solve the customers security problems.

In the thesis *Strategic Planning of an Anti-poaching project in Sub-Saharan Africa* (2016), the value of a rhino has been estimated to 290 000 – 675 000 USD, based on the market value of the horn. Rhinos, and hence projects protecting the rhinos, are therefore an important resource for Kenya as a country and generates important incomes for economical growth.

The project is striving for a sustainable solution, hence the development and introduction of the application are done by close collaboration with rangers and also companies in Kenya. By using this approach, the project also contributes to the society by exchanging knowledge or creating new work opportunities.

One incentive partners have for contributing to Project Ngulia is that it is a respectable way to work with CSR questions. One partner has mentioned that being part of the project increases work motivation and is enormously popular among many employees.



Lastly there is the long term perspective to why companies, organizations and governments would want to invest in a project such as Ngulia. For the developing countries the level of overall stability and security is what will prosper growth and investments. As mentioned one key sources to the revenues for terrorist organizations is the illegal trade with wildlife parts. If these organizations' means are reduced they will have a harder time conducting their other operations. This in turn will hopefully lead to weaker terrorist organizations and as a consequence less attacks which will increase the attractiveness for investors to set up business in developing countries and gain the Kenyan tourism industry. The organizations do not solely invest in a social project, they are also helping in conquering an international safety threat. Additionally, the project leads to market development and acts like a case reference in a growing market which focuses on the protection of critical infrastructure.

Key arguments for Project Ngulia

- A unique partner network with front-edge-competence and commitment
- Knowledge diffusion and new markets for the involved partners
- Resources put into the project can be used in future projects or businesses and lead to a larger market presence
- Great branding opportunities for involved parties
- A large market potential due to the toolbox solution, where customers can buy the complete platform or separate parts that are needed
- Bottom-up development for a sustainable solution
- By involving the customer in the creation of the product, the project secures that customer satisfaction is reached.
- Quality insurance of the technology at the test site Kolmården Zoo before implementation in Ngulia

- The Black rhino population is endangered extinct
- Rhinos are important for the Kenyan tourism industry
- A decrease of wildlife trade will lead to a safer business environment in Kenya
- Using African partners leads to work opportunities in Kenya

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