Ostrich Farming Business Planning
Planning Profitable Ostrich Farming from ‘Farm to Plate’

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Introduction
Ostrich farming opened up to the rest of the world several decades ago. To date progress is slow in transitioning from farmers selling stock to new farmers to becoming a serious commercial livestock production industry. During the period those involved have learned many lessons. One of the most important lessons is the need for excellent planning prior to commencing the new business to ensure there is a complete understanding of all elements.

There are many areas of the ostrich business to enter from managing breeders, selling eggs, day old chicks, providing an incubation service to farmers, finishing birds for slaughter to operating all stages of ostrich farming from breeders to finished birds. Other areas of the production chain are slaughtering, processing, and marketing ostrich products. No matter where the business is positioned within the production chain, this book is an essential read.

As the reader progresses through they will learn how to identify the many elements that need consideration and costing when building a Business Plan. The reader will learn how the Business Plan is made up of a number of elements that are interdependent on each other.

As the above illustration shows, there are a number of elements of a Business Plan that interrelate. The first element is to know the market and the demands of that market...that is the Marketing Plan. The Operational Plan will map out how the business intends to ensure it achieves the objectives and finally enables development of the Financial Plan that establishes how much will it cost, will it be profitable and if so when does it move into profitability.

However, first it is necessary to understand the Industry as it is today, the current size and structure and the areas still open to development that potentially offer great opportunities.
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Chapter 1: A Brief History of Ostrich Farming

The domestication of ostrich started in the Eastern Cape, South Africa in the early part of the 19th Century. Ostrich feathers were in demand as a high value fashion item.

Soon after, the Oudtshoorn area of the Klein Karoo region in the Western Cape developed large farms through the introduction of barbed wire fencing and lucerne fields. This meant that ostrich feathers could be harvested annually rather than shooting birds for a single crop of feathers. The first exports commenced in 1838 but it took until 1863 for the industry to become truly organised. Feathers were regularly selling at more than £12 per lb (454g). To put this figure in perspective, a school teacher then rarely earned more than £100 a year. The farmers became extremely wealthy, building large homes that became known as “Feather Palaces” Figure 1.

Figure 1 – An Ostrich Feather Palace at Safari Ostrich Show Farm, Oudtshoorn, South Africa

By 1913 ostrich feathers had become the 4th largest export from South Africa behind Gold, Diamonds and Wool. During this period ostrich were exported to Australia and the United States. With nearly all commercial shipping diverted to the war effort at the outbreak of World War One (WW1) and the advent of the motor car, the demand for feathers stopped almost overnight heralding the worldwide collapse of the ostrich industry. With this collapse the ostrich in Australia were released into the wild.

Ostrich farming in South Africa only got started again after the end of World War Two (WW2). To add value to the birds, they started to market the skins. Ostrich leather became another high value item, selling at high value and low volume. A single channel co-operative, The Klein Karoo Kooperasie (KKK), marketing system was established in 1959. Under this system only the co-operative could market ostrich products. Farmers had to sell their birds to the co-operative. Any farmer found marketing ostrich or their products without going through the cooperative was severely punished. They built the first abattoir in 1964 and a tannery in 1970. Prior to the building of the tannery, skins were sent to England for tanning. The single channel marketing was abolished in November 1993.

The co-operative’s philosophy was to maintain production at very low levels to maintain a high price for the skins. The farmers unable to join became frustrated at this control forcing the development of ostrich farming first in Zimbabwe and in South West Africa, which became Namibia in 1990 when it gained independence from South Africa. These areas, along with eggs and birds smuggled out of South Africa supplied foundation stock that was exported to the rest of the world.

A major drive to develop ostrich production outside South Africa started towards the end of the 80’s. The industry was marketed on promises of high returns based on business models starting ostrich farming to sell eggs, chicks and/or birds to other farmers.
There are 4 clearly identifiable phases that the industry has passed.

**Phase 1: Initial Development of Industries with full infrastructure**
This phase includes countries that had full infrastructure for production, processing and marketing with commercial scale capacity. Countries included here are South Africa, Israel, Zimbabwe and Namibia. Israel’s entry into the industry was the first outside South Africa in modern times. During this period Zimbabwe and Namibia were also exporting eggs, chicks and breeder birds to support the development discussed in Phase 2. Eggs, chicks and adult birds were also exported from Tanzania and Kenya.

**Phase 2: The first countries importing foundation stock outside Southern Africa and Israel**
This phase includes the first countries to import foundation stock from their original countries, which included stock taken from the wild. Countries included in this group are USA, Canada, Australia and New Zealand, UK and Northern Continental European countries such as The Netherlands, Denmark, Germany and France. Other importers of stock during this phase were China, Japan, Malaysia, Thailand and Philippines. These countries imported a diversity of genetics not only from Namibia, Bophuthatswana and Zimbabwe but also from Tanzania and Kenya. South Africa was unable to export fertile eggs and live birds until 1998. However, there were many reports of illegal exports from South Africa, prior to the change in legislation. During this period it was impossible to identify the genetic origin of the birds.

**Phase 3: Phase 2 countries selling to more countries new to ostrich**
The countries listed in Phase 2 failed to successfully move from importation of foundation stock to commercial production. As a result they sold their stock onto new countries and accompanied by the same errors in production advice. The first recipient countries were Spain, Portugal, Italy and Greece in Europe and then onto Brazil and Argentina. Stock from these areas also moved into Eastern Europe and the Middle East. At the same time stock moved to Mexico, Peru, Colombia, Venezuela and Chile. Nowadays stock is moving into Nigeria and other North African countries, Pakistan and other areas still working to establish commercial poultry production.
## Phase 4: Industry in Contraction

Obtaining accurate production data is challenging, but a review of the last meaningful table published illustrates why this is.

<table>
<thead>
<tr>
<th>Country</th>
<th>1993(^1)</th>
<th>1999(^2)</th>
<th>2002(^3)</th>
<th>2004(^4)</th>
<th>2007(^5)</th>
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<tr>
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<td>%</td>
<td>Slaughtered</td>
<td>%</td>
<td>Estimated</td>
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<td>72,000</td>
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</tr>
<tr>
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<tr>
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<tr>
<td>TOTAL</td>
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<td>100%</td>
<td>455,000</td>
<td>100%</td>
<td>563,000</td>
</tr>
</tbody>
</table>

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1. Asia: All Asian countries, including China, Japan, Indonesia and Malaysia  
2. Australasia: Australia and New Zealand  
3. Bophuthatswana: The independent homeland of South Africa that became part of South Africa in 1994 with the New South Africa  
4. Europe: For full list see: [http://www.world-ostrich.org/member/news57sup.htm#13](http://www.world-ostrich.org/member/news57sup.htm#13)  
5. Middle East: Includes the whole region.  
6. Namibia: Namibia only  
7. North America: Canada, USA, Mexico and all countries north of the Panama Canal.  
8. South Africa: South Africa only  
9. Southern Africa: Zimbabwe and Botswana  
10. South America: All countries South of the Panama Canal.  
11. Other: Any not included in the above  

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5. Estimates from current information  
6. The only way to achieve more accurate information is for members to set up systems in their own countries to be able to report meaningful results.  
7. Estimates from current information
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As at 2012 the industry is in a poor situation, with limited, if any slaughter activity in most areas. Several hundred birds per annum at the most in some locations. What about the Phase 1 countries?

There are still some birds slaughtered in South Africa – probably around the 100,000 level per annum - as slaughter numbers have reduced steadily over the past 10 years. There are a number of reasons for this. One is several outbreaks of Avian Influenza that have resulted in the inability to export meat, which is a major source of revenue. The South African producers have failed to modernise their production systems with the result that they have failed to reduce their costs of production. This results in uncompetitive meat production when measured against the costs of mainstream meat products. The ostrich leather market virtually collapsed in recent years as a result of the inconsistencies in quality and supply from all sources.

The political situation in Zimbabwe has prevented Zimbabwe’s production from developing its potential. Israel's production failed when there was an outbreak of avian influenza in their poultry flocks preventing them from exporting their meat. Their industry had no local meat consumption as ostrich is not kosher, but ostrich is acceptable to consumers who require Halaal certification.

Phase 5: Time now to capitalise on lessons learnt
At this point in time (2012) it is necessary to observe the development of the established commercial meat production species: pig, poultry (mainly chicken but with turkey, duck, guinea fowl and other poultry becoming players), along with cattle, sheep and goat as the mainstream current competition to ostrich meat. Not only does ostrich have to compete for shelf space in super markets for mainstream meat types but also other speciality meat types such as venison, emu, wild boar, kangaroo, rabbit and crocodile.

The important factor in favour of ostrich is their ability to produce meat protein at similar feed efficiencies and therefore cost as pig and poultry. South Africa, the dominant producer of ostrich, remains working with outdated systems that continue to fail their producers. These outdated systems were passed onto the new developing countries.

Over the past few decades, pig and poultry production has become extremely efficient in their production methods. For example in broiler production the growing chick spends 25% less time on the farm to reach the same weight than it did 25 years ago. In the same 25 years ostrich has gone through these various phases.

These 25 years have provided the opportunity to gain experience and prove the potential that under the right management systems, ostrich can reach the same slaughter weight in less than ½ the accepted time. It now requires adoption of the knowledge learnt and implemented on a large enough scale to ensure it is commercially viable before it is too late.
Chapter 2: Why Did Ostrich Farming Develop?

What was the driver for developing ostrich farming around the world? As discussed in Chapter 1: A Brief History of Ostrich Farming ostrich farming in South Africa was confined to members of the cooperative under single channel marketing legislation until November 1993. The initiative to sell ostrich to the rest of the world was created in an effort to break the monopoly by generating production outside South Africa. Ostrich leather was the driving product at the time. In order to increase revenue, the Israeli industry recognised the value in the meat to increase bird revenue and commenced marketing the meat.

The South African industry feared industrial levels of production to supply a vibrant meat market as they believed this would impact on the prices achieved for the skins. At the time skins were achieving in excess of US$40/square foot – the equivalent gross revenue of some US$600 per slaughter bird. Prior to deregulation of the South African industry, the meat from ostrich was considered a low value byproduct sold only for going into processed meats. The quality at that time was questionable and in the low volumes then produced, expensive to market.

Low fertility and hatchability, combined with high levels of chick mortality and low meat yields, resulted in unacceptably high costs of ‘units’ of production and therefore the need to protect the artificially high prices received for ostrich leather. A number of such references have been made in various South African industry reports referencing these facts\(^{ii}\). Reference is also made to the lack of any genetic development in 150 years of the history of commercial ostrich production\(^{iii}\).

Subsequent experience working with ostrich demonstrated the diversity in genetic performance and the potential for ostrich to become an extremely efficient converter of food to meat protein, when farmed under commercial conditions. So what is the market potential for meat production?

![Figure 5 - Global Meat Consumption by Meat Type](image)
Figure 5 is taken from data presented in a paper written by Dr. Thomas Elam where he discusses the ever increasing demand for meat protein and illustrates the projected growth to 2025. Reasons for the rapid increase are a combination of population increase and improving wealth. This graphic clearly illustrates the percentage increase in Pig and Poultry meat consumption by comparison to the ruminant species. This is a reflection of the significant improvements in costs of production in recent decades as a direct result of improvements in diet, management techniques and genetics. Ostrich have the potential for similar improvements in productivity and costs of production.

Another benefit that ostrich has to contribute to the meat protein supply is the fact there is a large population base unable to consume pigmeat for religious and/or other reasons. Therefore ostrich provide an alternative option to increase variety for these population groups. Ostrich meat makes excellent hams, bacon and other meat products commonly associated with pig meat.

Figure 6 illustrates clearly the increase in pig and poultry consumption as a percentage of all meat consumed. When produced on a commercial scale utilising sound management systems ostrich meat can be as competitively produced as pigmeat and poultry meat, thus providing additional choices to consumers.
Chapter 3: Defining the Ostrich Farming Value Chain

Michael Porter was the first to clearly define the importance of identifying the Value Chain to support the development of a business plan and assist in the development of the business model most suitable for the business.

The value chain identifies the generic value-adding activities of the business. When building the Business Plan it is important to identify the activities essential to developing the value of that business. The costs and value drivers are identified for each value activity. Establishing and analysing the value chain framework of a business is a powerful management tool for strategic planning. Its ultimate goal is to maximize value creation while minimizing costs and avoiding erosion of value.

Figure 7 - Simplistic Ostrich Value Chain

Figure 7 - Simplistic Ostrich Value Chain is a simplistic analysis to illustrate stages of ostrich production that add value from the starting point of production to the point where the consumers pay for the end product. The end goal is access to a consumer who wants the end product at a quality they demand, a price that is acceptable to them but still profitable to produce.

When discussing the Value Chain, it is necessary to define the difference in a ‘Value Chain’ and a ‘Supply Chain’ as these can be confusing, but the difference is significant.

A ‘Supply Chain’ is where each element of the process to the end consumer is defining their section of the process. In a ‘supply chain’ each business along that chain are price takers. They purchase their inputs at the lowest market price and sell at the best price achievable. There is no collaboration, communication or working to set standards to produce a consistent product. Buyers will purchase on the open market.

Figure 7 and Figure 8 illustrate clearly how each stage of the production chain is interdependent on the each other at every stage of the process. It is clear how each activity relies on its previous activity in the chain. So when ostrich farmers do not fulfil their obligations to processors the processors cannot fulfil their orders.
The following are examples experienced over the years of ostrich industry development and are contributing factors for the failure for the industry to yet develop to its potential:

- Farmers booking slaughter slots and then failing to deliver
- Farmers signing contracts and then signing further contracts for the same birds when a better offer comes along, so failing to deliver on the first contract
- Variable meat yields – ranges as low as 18kgs of boneless meat to as greater than 40kgs boneless meat reported by processors. It takes more than double the number of slaughter birds to achieve the same saleable meat. Planning production is clearly challenging with these ranges of meat yields.
- Variable meat quality

A ‘Value Chain’ is where there is collaboration between all processes in the supply chain to ensure that there is no leakage of value through poor performance of one link in that chain. A ‘Value Chain’ is an alliance of enterprises collaborating vertically to achieve a more rewarding position in the market by developing systems to overcome the above mentioned issues.

Figure 8 lays out the activities and manufacturing processes involved in ostrich production from farming to processing and manufacture. The items that may be traded between farmers and the products the industry must sell to end consumers to feed value back to all the activities during the production processes.

Another strong reason to develop the ‘value chain’ approach, when ostrich farming, is the ever increasing requirement for full traceability. Vertical integration can be achieved either by single companies having total control of all aspects or through the ‘value chain’ approach were each sector remains independent, but yet interdependent businesses working in collaboration with a common goal. That common goal optimises the value for all in the chain.

Feed ingredients are included at the top of the ostrich business chain (Figure 8) to illustrate their importance in the whole production process. Failure in any of those ingredient quality and/or poor formulations of rations will impact the profitability of every activity throughout the chain.

When developing the business plan, it is necessary to define the product the business plans to produce, know the demand for that product and establish the supply and distribution chain to access the market. If there is no chain in place, the Business Plan must include putting it in place. Do not assume that someone else/another company will put that in place as that will not happen unless it is clearly part of a collaborative plan put together by a group. Failing to pay attention to this detail is a major cause for failure of the industry to develop to date.

Here is an example of the importance of knowing the supply chain. One consideration may be to incubate eggs as the core business. However, no matter how perfect the equipment and infrastructure, for the business to be successful, there must be a consistent supply of quality eggs. There must also be a ready market for the hatched chicks. If the business plan maybe to incubate on contract for a negotiated fee or may decide to purchase eggs and sell chicks. Whichever, ensure supplies are reliable and the customers have reliable avenues to remove those chicks once they are market ready. Many businesses have failed as a result of failing to identify these facts prior to making the investment. Other specialty areas are chick rearing, finishing birds for slaughter or breeding only to supply eggs and/or day old chicks into the system. The same principles apply – ensure that there is a full chain in place before investing in just one sector.

If the business plan is to go into all areas of ‘Ostrich Farming’ then there must be an outlet for the slaughter birds. This includes breeders (including genetic improvement) incubation, chick rearing and finishing slaughter birds rather than specialisation in any one area. At this point of the industry there are no specialist genetic companies as seen in the pig, poultry and beef industries.
Moving onto processing the same principles apply. Ensure there is a supply of slaughter birds to keep the abattoir commercially viable. Processing includes all of the following activities:

- slaughtering birds
- deboning the carcass
- value adding the meat (portioning, ready meals, hams, bacon etc)
- skin tanning
- manufacturing leather goods
- cleaning and dying feathers
- manufacturing feather products

The ostrich has a unique fat pan that carries other manufacturing opportunities once consistent quantities of a fat that are produced.

As can be seen, individual businesses can develop independently but these individual businesses can only succeed if they have a reliable supply of raw product and an outlet for their finished stock.
Chapter 4: Feasibility Studies and Industry Strategic Analysis

The modern ostrich industry started outside South Africa around 25 years ago. It started with great interest and excitement. During the 1990s, while the industry was developing, there were a number of industry meetings and studies carried out at industry level. This chapter will cover 2 key studies.

Feasibility Studies

November 1998 saw the publication of ‘Ostrich Farming: A review and feasibility study in the EU’. This study was carried out by John Adams and Brian J Revell, from Harper Adams Agricultural College in England, to assess the viability of ostrich farming in the EU. At the time the industry was at the cusp of moving forward to commercial production. Reading this study it will become apparent that many of the aspects identified that required addressing were also identified by the participants of the Strategic Analysis 6 months later as discussed below.

An important aspect that this study identified was the pyramid selling schemes that drove the industry in these early days. Farmers were selling to new farmers but there was limited infrastructure development. There were a few companies that did set up slaughter facilities with the intention of developing markets, but it was quickly discovered that the birds were not achieving their production potential and more money could be made by selling onto newcomers than putting these birds into the slaughter market. It notes that in 1998 prices for selling birds into the ‘breeder market’ collapsed significantly changing the economics and dynamics of the industry.

Ostrich Industry Strategic Analysis

In 1998, 5 years after deregulation of their industry, the South African industry held a Logical Framework Approach session held over 2 days to strategically analyse where their industry was and what was required to move this industry forward. The following year the now defunct International Ostrich Association (IOA) carried out a similar exercise on the International Industry.

Both sessions were facilitated by Prof. Luc D’Haese (Prof. of Economics - University of Gent, Belgium) and assisted by Prof. Johan van Rooyen (University of Pretoria and the South African [SA] Agriculture Business Chamber) and Mr. Dirk Esterhuizen (SA Agricultural Business Chamber).

A number of people from many of the countries involved in the industry at the time were actively involved in the IOA’s 2 days session that took place in Pretoria.

Figure 9 - IOA Members entering Incubation Facility in Israel - 1998
Ostrich Farming Business Planning

Reviewing the report of this meeting 14 years on is a great reminder to how important this process was, especially for any prospective newcomers to the industry, whether starting ostrich farming, processing, manufacturing or marketing today. The process clearly identified problems that needed addressing. History has illustrated the challenges to achieve as an industry and how accurate many of the findings of this meeting were. It requires individual commercial operations to take on board the issues and implement them in their own businesses as well as the industry associations implementing those identified as industry infrastructure requirements.

The following is a summary of those findings written at the time:

The strategic planning process is split into 4 sections:
1. An environmental analysis
   SWOT – Methodology
2. Logistical Framework Analysis
   Identification of the Problems to build a problem tree, considering all the negatives participants could identify.
3. Strategy Analysis
   Discussion and analysis of the problems and the activities required to overcome those problems.
4. Action Plans
   Development of the plans to address the issues identified

ENVIRONMENTAL ANALYSIS
All delegates were invited to write at least one powerful statement of what they believed to represent the Strengths, Weaknesses, Opportunities and Threats of the industry. The statements identified are obviously too many to report in detail, but included such items as:

Strengths = Healthy Products, Quality Products, Product Range
Weaknesses = Inconsistencies, Poor Health of Livestock, Distrust
Opportunities = Large Market Potential, Growth Potential, Niche Markets
Threats = Animal Rights, Poor Quality Products, Low Efficiency

PROBLEM FOCUS
Each thought presented was analysed in detail to establish the route problems along with “the cause and effect” of each problem. At all times every aspect of the industry was considered and how they interrelated to each other.

It became clear that Industry Immaturity resulting in Undeveloped Markets was the core problem that required addressing. The causes could be clearly defined into 4 Sectors:

- Product Inconsistency - Production and Processing
- Logistical Distribution - Transport and Distribution
- Confusing Messages to Consumer - Lack of Standards and An Uneducated Market at all levels of the production chain.
- Weak Institutional Environment - At Governmental level and National and International Association Level.

How were these conclusions reached? It was clear to see how all these sectors relate to the immaturity of the industry and interrelated.
PRODUCT INCONSISTENCY - at Producer Level
Low skill levels, inappropriate production systems and a general lack of nutritional technology were identified as major contributing factors. These factors were identified as clearly contributing to the poor quality birds seen on slaughter lines. These birds demonstrated the poor health status that contributes to the low production levels, inefficiencies and poor product quality resulting in the inconsistencies identified.

Examples:
- Inexperienced nutritional technology leading to very low production levels that impact on the viability, product quality and consistency
- Poor transportation of birds leading to hide damage

PRODUCT INCONSISTENCY - at Processing Level
Low skill levels, inappropriate production systems and a general lack of processing (meat, hide etc) technology were also identified at production level.

Examples:
- The method of hide removal, treatment and storage as a result of inexperience have led to many hides being worthless
- Poor slaughter techniques, lack of maintenance of the cold chain, poor hygiene practices that resulted in short shelf life.

LOGISTICAL DISTRIBUTION PROBLEMS
Whether it is getting slaughter birds to the abattoir, breeder birds to a different continent, raw hides to the tannery, frozen meat by sea, fresh meat by sea or air - all have their unique logistical problems. These problems are learnt only in practice and it was accepted that errors will and had been made, from which lessons were learned. It does not matter if the problem is a producer error or shipper error, the result impacts on the quality of the product and the credibility of the supplier is compromised. There is always the risk that a major problem may occur that can have an impact on the industry.

Examples:
- A shipment of birds from the UK to New Zealand resulted in deaths in the birds. This incident created bad publicity at the time - but lessons were learned to ensure such a tragedy would not be repeated.
- Airlines may not always take sufficient care over the maintenance of the cold chain - if this is not identified it can impact on the shelf life of the meat.

CONFUSING MESSAGES TO END USER
As ostrich is a new industry it was understood that there was a lack of product knowledge from producer level right through the chain and as a result the market was confused with differing information.

Examples:
- Dark and light coloured muscles being accepted as normal and/or age or genetic related, when the cause is nutritional.
- Genetic influences on hides have been taken as caused by age at slaughter
- Less tender meat cuts being sold as Filet quality

WEAK INSTITUTIONAL ENVIRONMENT
The problems were identified at two levels – Governmental and Industry Level
Governmental Level
As a newly farmed species the participants identified that there were no regulations in place and the problems this causes. These have to be developed and this takes time as there was no information available to draw upon. The lack of such directives has led, in some cases, to short cuts being taken by some traders in order to survive.

Examples:
- No protocols in place for importation of Birds, Meat or Hides. Each country had to define their requirements imposing delays and other problems when importation first requested
- Health Certificates had to be drawn up with few or no references available - creating delays.
- Ignorance leading to unnecessary and confusing legislation such as the Dangerous Wild Animal Act imposed on UK producers and interpreted differently by each region.
- Repackaging and Cross Border smuggling has resulted in severe meat quality problems - this would be eliminated if all borders were open

Industry (Association) Level
The lack of standards combined with the lack of use or misinterpretation of those standards that were in place was identified as a contributing factor to the inconsistencies experienced. A lack of integrity and distrust between players were also identified as real problems.

Examples:
- It was recognised that different muscle names are used for the same muscles by different countries and that as most of the meat was traded internationally, this has caused considerable confusion in the market place as the International Numbers assigned to each muscle have not been used.
- Interpretations of Hide Grading used were inconsistent.
- No available guidelines were available to enable new buyers to identify a quality breeder bird resulting in the buyer dependent totally on the salesperson for guidance
- Many producers remain unpaid in a number of regions in the world

STRATEGY ANALYSIS
From The Problem Analysis it was possible to define some clear Objectives to Develop the Market for Ostrich Products. Having identified the negatives it was then time to identify the positive actions required to develop positive strategies and how to implement them. The following requirements were identified:

- To positively influence the International Institutional Environment.
- To transmit clear messages about the Industry and its products to the end user.
- To promote an improved logistical system, including transportation and communication networks.
- To deliver a consistent product to the market.

These were developed into 4 clearly defined projects:

- To establish a set of Product Standards and Codes of Conduct.
- To establish Communication.
- To develop IOA Policy Statements.
- To develop a Strategy for Promotion of the Ostrich Industry.

The following were the strategies agreed requiring development

Strategy 1 - Standardisation in the Industry
Strategy 2 - IOA Lobbying
Strategy 3 - Informing the End User
Ostrich Farming Business Planning

Strategy 4 - Improved Logistic Systems for the Ostrich Industry
Strategy 5 - Product Consistency in the Ostrich Industry
Strategy 6 - Promotion of the IOA as an important industry role player

Figure 10 - IOA Meeting Israel - 1998

ACTION PLANS
The implementation will start with the IOA secretariat developing an Action Plan and Budget to be completed within 2 months.

RESULT
The IOA secretariat closed shortly after this and the action plans were never implemented by the International Ostrich Association, local associations or industry participants. This has led to the general failure of participants at all levels.

Industry Standards
Both the Feasibility Study and the conclusions of the Strategic Analysis mentioned above identified the need for industry standards and improved channels of communication.

With the lack of progress of the IOA, which was effectively a one man association that failed to offer general meetings for re-elections, this led to the foundation in 2002 of the World Ostrich Association (WOA) to offer a world voice as opposed to a strictly South African voice. By this time the industry was contracting further. With a contracting industry, the WOA operates with limited resources to maintain communication channels. The association developed the following basic standards and publications that are available on their web site:

- Carcass Grading
- Meat Quality Guidelines
- Meat Yield Classifications
- Ostrich Performance Benchmark Targets
- Leather Grading
- Skin Quality Guidelines
- Welfare Standards

The standards and guidelines are important for producers and processors as well as buyers of the products.

The WOA also produces monthly newsletters that discuss news from within the industry and issues from other species that influence the markets in which the industry operates.
Chapter 5: The Ostrich Production Value Pyramid

The Value Pyramid was used by a speaker from the KKK during a presentation at the international industry strategic analysis referenced in the Ostrich Industry Strategic Analysis discussed in Chapter 4. The opening speaker was suggesting that it was important to keep the price of the product high in the same manner that DeBeers had maintained the high value of diamonds over the decades. He explained how they achieved this by very strict control over the supply of product to the consumer. His value pyramid was only the blue portion in Figure 11.

Of course that discussion related to the value of the skins. The fear was witnessing ostrich become a high volume, industrial meat production industry where the meat and skins would become commodities and thus perceived low commodity value. Which business model creates real value, sustainable employment with ability to grow the business and industry over the years?

![Figure 11 - Ostrich Value Pyramid](image)

The area in blue in the pyramid illustrates the value Pyramid as presented by National Ostrich Processors of South Africa (NOPSA) and discussed above. It illustrates the high value achieved when volume is low and how value reduces when volumes increase. At the bottom end products are sold as a commodity where any competitor can undercut prices.

The way to increase volume but also maintain value is through differentiating the product to encourage buyers to come to this business rather than a competitor. The following are examples of ways to provide product differentiation.
Ostrich Farming Business Planning

**Quality Marks and Standards:**
These include membership of certification schemes such as:

**Welfare and Industry Body Schemes:**
- welfare schemes e.g. Freedom Food
- certification schemes run by the industry bodies e.g. Beef & Lamb New Zealand
- special standards e.g. Kobe Beef

**Country or Region of Origin:**
- Red Tractor Scheme assures certain welfare standards as well as guarantee raised in UK
- Canadian Salmon, Cold Water Prawns, whilst not certification schemes, they indicate source of supply.
- Melton Mowbray Pork Pie and Champagne are examples of produce that the region of production has created very specific differentiation with the regional name protected by law when marketing.

The American Ostrich Association is developing various assurance schemes and certification of Country of Origin.

**Best Practice vs Good Practice:**
- Best Practice is leading edge thinking, practically applied which brings competitive advantage
- Good Practice is established wisdom, widely applied and often embodied in law, codes of practice or assurance schemes. Good Practice is valuable and important but is becoming too common to bring competitive advantage.

A practical example in meat production of Good Practice and Best Practice is the introduction of Vitamin E Beef. When this technology was first introduced those that implemented Vitamin E technology to control meat colour had the competitive advantage producing better meat colour with a longer shelf life. Today that has become common good practice in beef production. It is available in Ostrich production, but not yet implemented as common practice.

There is a cost to implementing these various quality marks and standards, costs that are more easily met when working with sufficient volume, which should more than cover those additional costs.

**Branding**
Developing a corporate brand is also a mechanism to increase value, but to achieve added value, the brand must stand out from the rest to ensure they generate product differentiation.
Chapter 6: The Products and Their Value

The Financial Cycle
Where the business is positioned in the market will define the product. Figure 8 illustrates the various sources of revenue achievable from an ostrich business. Before investing, it is essential to define clearly where to position the new business within the industry.

When positioning the business within the supply chain, the products identified in blue in Figure 8, are those products that are adding value within the supply chain. Any business focusing on those products is totally dependent on others for the successful marketing of the end products, hence the benefits of working within a value chain environment. The products in dark pink in Figure 8 represent the core products and those in pale pink are other products. All products in these sectors are areas providing the revenue that supports the production process.

Ostrich has been domesticated (farmed) for nearly 200 years, but only recognised as a significant supplier of meat protein for 2 decades. Experience has shown that the industry is currently in that “chicken and egg” situation and which comes first. Figure 12 compares two scenarios of the financial cycle - both scenarios illustrate the importance of investment capital when starting the business. The question: which is the primary requirement to finance the cycle – “Is it production or is it marketing”?

Investing today in mainstream livestock production, it is possible to purchase proven production stock and turnkey infrastructure. When farming on a small scale there will be sufficient people also farming on a small scale to enable supplies of feed, veterinary support and in most cases established paths to market. The product is generally known and the task of the farmer is to establish which of the established routes to market they will use. Ostrich is a new commercial livestock production industry and this creates certain challenges that need to be recognised and understood when starting an ostrich farm or entering any other stage of the production chain.

The modern livestock production environment and markets introduce further challenges as many markets today require a certain minimum volume of supply. With livestock, every additional day the animal is on the farm once it is market ready increases the production costs thus reducing the profit potential. Therefore, it is necessary to have the market established before entering production so the animals can move off the farm as soon as they are ready. With a new industry such as the ostrich industry, the budgets need provisions for delays in slaughter.

When entering production to manufacture widgets it simply requires the correct materials at the right price and the manufacturing equipment to produce those widgets at a commercial price. Provided the
production line is set up correctly, from day one it is possible to produce the manufactured product to the standard and volume required and it is ready for sale. If the market is not quite established, then surplus widgets can be stored or the production line can be slowed. In contrast, entering production with livestock there is an essential production cycle requiring time to produce the offspring and grow those offspring — this time with requires a heavy demand for working capital to develop. The aim is to finish the animal in as few days as possible.

When the product is sold revenue flows into the business thus enabling the cycle to start again. Further investment capital maybe required to grow the business if revenues are insufficient. Returning to the financial cycle - which comes first? Is it production that the business then hopes to find a market for or is it the marketing so the business only produces to supply that market? There is clearly a fine balance required when building a new livestock industry.

**What are the Products?**

Figure 8 on page 12 illustrates the many different products throughout the production chain, but which product drives the industry?

As discussed in Chapter 1: A Brief History of Ostrich Farming the industry was initially established for the production of feathers. Post WW2 this transitioned to leather, but the leather was produced for a very limited market.

![Figure 13 - Comparative Ostrich Growth Curves](image)

When produced correctly, ostrich are capable of significantly increasing their meat yields from the current low levels averaging around 25kgs of meat per bird. Figure 13 compares the current average growth rates to a scientific projection of genetic potential and a farmer bench mark trial that proves the accuracy of the scientific projection. The bulk of the difference in weight will be additional meat yield, provided the feed program is correct and correctly managed.

It is this additional meat yield combined with the reducing value of the skin that results in the increase in the value of the meat as a percentage of total bird revenue as illustrated in Figure 14 below.
Clearly, when 70% of the revenue is taken from the Meat, meat is the driving product. Meat is not subject to fashion in the same way skins and feathers are. There is also evidence that the oil (made from the fat of ostrich) has significant market potential. Once regular meat sales support regular slaughter, then the oil products can be developed and markets established.

Ostrich skin buyers have complained in past years of the variability of the leather and the instability of supply. As volume increases, prices may be lower than prior to deregulation, but they will become more consistent; greater consistency in supply and quality will enable manufacturers to develop more products and increase their marketing budgets.

Ostrich feathers are variable depending on the part of the body they grow and the maturity of the birds they are harvested from and to some extent the prevailing climatic conditions. Today, the feathers are harvested after slaughter, with the exception of some South African farms that still harvest the large fashion feathers from breeder birds. These are clipped in a humane manner once mature, they are not plucked. The body feathers of slaughter birds make excellent feather dusters. The larger wing feathers of good quality have a number of uses, both in feather dusters and used by the entertainment industry and carnivals.

Meat is clearly the driving product, with the skins, oil and feathers all valuable by-products to increase the total revenue of the bird.
Chapter 7: The Marketing Plan

The Marketing Plan is the foundation of any Business Plan. The Marketing Plan identifies the market, establishes the product(s), identifies the selling prices and sets the direction of a business.

The Marketing Plan drives the process including production since without reliable production there is no business. This is particularly relevant with ostrich as poor production continues to be the major block to market development and profitability throughout the industry.

The Marketing Plan consists of a number of components, including:

- **Situation Analysis** which includes:
  - the market analysis that must demonstrate clearly that management understand the market the business is targeting
  - the SWOT analysis that identifies the Strengths, Weaknesses, Opportunities and Threats
  - the competitive analysis to demonstrate an understanding of the market the business is entering and the competition (competition from within the industry and/or other livestock industries)

- **Marketing Strategies** that establish
  - the Mission Statement of the business
  - Clearly identify the products the business will focus on:
    - genetics [ostrich eggs, chicks, breeders]
    - slaughter birds
    - products of the birds [ostrich meat, ostrich feathers, ostrich skins]
    - A combination of all
  - marketing and financial objectives
  - market focus
  - product positioning
  - market research

- **Financials, Budgets and Forecasts** that illustrate:
  - break even analysis
  - sales and expense forecasts and illustrate how the sales and expense link to strategy and the contribution margin
    - For ostrich farming this section will need to establish the bird production assumptions and seasonal flow of production
- Controls that
  o Sets the implementation milestones
  o the marketing organisation
  o controls and contingency planning
- Customer Demand to demonstrate:
  o Pricing
  o security of supply
    ▪ safety
    ▪ ability to deliver
    ▪ consistency of product
    ▪ quality of product

As mentioned above, the Marketing Plan lays out the foundation and direction of the business. Once completed, it is then possible to develop the strategies on how to fulfil that marketing plan.

The Operational Plan lays out how to achieve the production to support the marketing plan. With ostrich, the Operational Plan must show how to minimise risk, optimise profits and most important ensure regular production flow.

The Development Plan lays out the steps and timelines required to meet the requirements of the Operational Plan.

The Financial Plan establishes the capital investment required, cash flows and time taken to profitability. To achieve this it is essential to understand the production flow, time taken from slaughter to receipt of revenue and so on. This topic will be the subject of individual articles.

The Marketing Plan of any business based on ostrich, no matter where that business is positioning itself in the market place, starts on the farm. Farm production controls supply, quality of that supply and uniformity of that supply. Those aspects control compliance with any quality marks and farm assurance schemes demanded by the buyers and/or regulatory authorities.
Chapter 8 – The Operational Plan

“No Raw Material, No Industry”...this was a statement made by the frustrated manager of a major South African tannery at the 2nd South African industry conference in 2002. At the time production was falling making it challenging for those marketing the products to grow their sales.

The operational plan needs to identify the risks and set out the strategies the farming and other processes in the business must follow.

As referenced earlier, it is important to know one’s market prior to starting ostrich farming, or any activity within the ostrich production chain, as the market the business is servicing determines the systems incorporated into the farming practices. The Operational Plan identifies the requirements and defines the strategies required to achieve those requirements. The following are areas that the operational plan must clearly define the strategies required to achieve the objectives.

Supply:
Strategies to ensure a reliable supply require production systems to achieve:
- Reliable egg production
- Reliable hatchability of those eggs
- Minimal chick mortality
- Programmed slaughter dates, to know exactly when those birds will leave the farm. Producers must meet those slaughter dates and the abattoirs must honour them.
- Slaughter plants and processors must be sure they have a secure supply of slaughter birds with adequate meat yields and consistent quality

Standards:
Establish the standards demanded by the buyers (See Quality Marks and Standards:) and the requirements of those standards:
- Examples of these are:
  o Good Agricultural Practices such as GlobalGAP
  o Hazard Analysis and Critical Control Points (HACCP)
  o Welfare Standards such as RSPCA Freedom Food or Certified Humane
- Will the business operate to Good practice and/or Best Practice or?
  o If so, establish the management strategies to meet the criteria
Ostrich Farming Business Planning

- Slaughter Plants and processors need to not only establish the requirements of their buyers but also ensure the farmers supplying their raw material meet those requirements.
- What are the traceability requirements
  o Today many markets demand full traceability to individual animals and farm

The Operational Plan should first highlight the inherent risks to the business and then put in place steps to mitigate those risks. Once the marketing plan is complete, the next step in developing a business plan is to determine the strategies on how to achieve those demands or any process within the production chain. This is achieved by carrying out a risk analysis.

A good place to start would be to work with Figure 8 starting at the top and working down. Consider every aspect that needs consideration. At the top of the list are the various feed ingredients. What happens if the right quality feed ingredients are not available? The answer will be an impact on bird production, impacting feed conversion, delaying days to slaughter and profit margin on bird production. Then ask what strategies are required to ensure the business sources the right quality feed ingredients to minimise that risk. Do this with every process carried out en route to the customer.

Development of a Hazard Analysis Critical Control Points (HACCP) plan operates along similar principles in the manufacturing process. The idea of the HACCP plan is to identify the hazards and then establish the procedure to minimise those risks.

Included in the Operational Plan will be the Veterinary Health Plan xvii.

Payment Systems
How the farm production is paid is an important part of the Business Plan. Understanding the different methods of payment will impact on the production strategies and the potential profitability of the business. This is as important to the farmer as it is to the processor.

Over the years payment systems have varied considerably. If the new business is selling to a slaughter plant/processor, then it is the Operational Plan that must understand the buyer terms and payment system. If the new business is for a slaughter plant, then they need to be clear on the payment system they propose when paying their farmer suppliers. This is especially important at this stage of the industry when there is no genetic improvement programs developed and tremendous variations experienced in meat yields. There are a number of different payment methods:

**Slaughter Bird – based on live or deadweight:**
- Liveweight is based on the weight of the bird prior to slaughter
- Deadweight is based on the weight of the bird after slaughter and generally weighed as the bird is bleeding out or post bleeding

Under this scheme the farmer is paid a price per bird. Over the years this has proved unsuccessful for many reasons and rarely used today. Payment on a kg per bird basis is of little use in determining the meat yield or quality, unless all farmers are rearing to the same standards. Some birds carry an extensive amount of fat and others no fat. Genetics are also extremely variable at this time. As the ostrich skin is paid on a grading system, there is no way to assess the quality of that ostrich skin while the bird is alive. This method of farmer payment does not reward the quality bird adequately.

All other payment systems currently used separate the skin and the carcass for assessing the value of the farmer payment. The skin may be retained by the farmer to sell directly or the slaughter facility will pay the farmer. If the farmer is planning to sell the skins directly, they must know their market prior to slaughter to ensure they are removed to the specifications of their buyer as not all buyers require the same.
In some slaughter facilities where volume is sufficient, the ostrich feathers will be valued independently, but usually they are included in the price paid to the farmer for the carcass and ostrich meat. When volume is low, it is not usually possible to commercialise the feathers or only retaining the very best.

Figure 17 illustrates just how the processing costs per kilo of boneless meat are reduced when the meat yields increase. Understanding these principles is critical to commercial success of the producer and processor.

**Carcass weight:**
Payment by carcass weight maybe a set amount at the same weight per kilo for all birds, or it may be split into different weight classifications for a tiered payment structure. The latter is preferable as it is much fairer to the good farmer and for the processor as it encourages production of birds carrying higher meat yields, which are cheaper to process when processing costs are measured on a per kilo basis.

**Boneless meat yield:**
This payment is based on the weight of the saleable meat removed from the carcass. If offered payment in this way, ensure there is a very clear definition of all that is included and how it is calculated. Payment on boneless meat yield should also have a weight/yield classification system to support a tiered payment structure. This tiered payment structure passes on savings made in the processing back to the farmer producing the better quality bird to support and encourage quality production.

Figure 18 shows 3 carcasses. The left hand carcass yielded 38% more meat than the carcass in the middle thus earning 38% increased meat revenue and will have cost the same to slaughter and process on a per bird basis, but reduced cost per kilo of meat. The carcass in the middle was finished in 20% fewer days, thus costing less to reach slaughter.

The carcass on the right is still warm and thus showing the silvery colouration but included as this carcass illustrates a very different fat colour and distribution. That yellow colouration of the fat is a clue to nutritional problems that are known to impact on the taste and quality of the meat. Note also how the fat on the carcasses on the left hand side is not only white in colour but also clearly defined.
In addition to a payment structure based on yield classification, carcasses should be graded for quality. Grading will consider Bird Age, Fat Colour, Muscle Coloursation, Heart Condition, Liver Condition, Presence of any Disease and any other condition that is not acceptable – such as bruising as a result of poor transport conditions. The World Ostrich Association (WOA) has examples of an Ostrich Meat Grading system \(^xviii\) and Ostrich Yield Payment Classification system.\(^xix\) The WOA also has available Skin Grading guidelines for both raw skins\(^v\) and finished skins\(^xx\).

A fair payment system is essential to ensure the success of ostrich farming and encourage ostrich farmers to produce quality birds to optimise their revenue potential. A fair payment system is also important to the processor. It not only encourages birds of the right quality, it is also a marketing tool for the finished products. This is particularly important while the industry remains immature as failure to deliver and delivering mixed quality continues to block growth of the industry.

The Operational Plan should identify the risks and detail the processes to mitigate those risks. The role of management is to put in place management practices to mitigate those risks.

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\(^v\) Raw is the word applied to skins before the tanning process. Curing the skin is usually carried out immediately following slaughter by the slaughter facility. Curing is simply the process of cleaning and salting the skin. There are various methods used to cure skins, so it is essential to know the curing system required by the buyer. Volume often determines the method. A raw skin can also be called a cured skin or salted skin.
Chapter 9 – The Development Plan

The Marketing Plan has identified the target markets for the business. A well structured Operational Plan has clearly laid out the processes required and the infrastructure needed to put in place those processes. Now is the time to construct the Development Plan.

To build the Development Plan successfully it is necessary to define a number of activities such as:

- Management Structure
- Understand and set production assumptions
- Speed of growth of business
- Size and scope of business
- Develop Timelines for each activity
- Product Development
- Development of Infrastructure
- Source of Foundation Livestock/Eggs
- Identify Potential Joint Venture Partnerships
- Establish Strategic Partnerships
- Develop Training Program

The various activities required to transition the Development Plan will need to be identified. These activities are important to both the farmer and the processor to understand their influence on delivery of a quality end product. The following are examples of the activities:

- Feed Program to include such things as:
  - Rations Requirements
  - Ingredient Sourcing
  - Feed Manufacture
  - Distribution
- Breeder Farm
- Incubation
- Chick Rearing and Finishing
- Biosecurity Considerations

How will the birds be?
- Slaughtered
- Processed

What transport requirements are there for the business?
- Feed
- Management and Staff
- Birds

What equipment is required?
- Incubators
- Tractors
- Feeders
- Farm Equipment

Labour Requirements:
- Management
- Full Time Staff
Ostrich Farming Business Planning

- Part Time Staff
- Seasonal Staff

The Marketing Plan should have identified the final products, the Occupational Plan describes the infrastructure and processes required, the Development Plan needs to clearly define the time line to build the infrastructure and provision of any equipment.

The above are just ideas of the many aspects that need consideration when building the Development Plan.

Driving the timescale are the key performance indicators, which make up the production assumptions in the financial budgets:

- Eggs Laid Per Hen
- Eggs Set \(^8\)
- Fertility
- Hatchability
- Chick Mortality
- Mortality 3-10mths
- Length of season
- Percentage of total eggs budgeted eggs laid each week

Ostrich breeder hens have the genetic potential to produce 80 plus eggs per season and there are records for higher numbers recorded that indicate the production potential under the right conditions. However, when starting production today it is essential to be extremely conservative on the production assumptions when developing the Business Plan. Until the business is able to confirm improved production under their management systems, it is best to assume only 10 chicks per hen per annum over a limited season as this remains the current norm.\(^x\) Table 1 provides an illustration of the impact of the key performance indicators and their influence on total production.

<table>
<thead>
<tr>
<th>Key Performance Indicators</th>
<th>40</th>
<th>45</th>
<th>50</th>
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<td>70</td>
<td>75</td>
<td>80</td>
<td>85</td>
<td>90</td>
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<tr>
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<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
<td>90%</td>
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<td>92%</td>
<td>93%</td>
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<tr>
<td>Hatchability</td>
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<td>80%</td>
<td>85%</td>
<td>90%</td>
<td>92%</td>
<td>93%</td>
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<tr>
<td>Chick Mortality</td>
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<td>15%</td>
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<td>8%</td>
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<td>63</td>
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</table>

It is important to remember that currently there are no proven breeder livestock in any country. These tables illustrate the production potential achievable under optimum management systems. Any business plan must recognise that it will take time to progressively improve these key performance indicators when developing their production assumptions in the financials of their business plan. It is impossible to achieve the top performance at day one with the current stock available.

\(^8\) There are a number of reasons an egg may not be set, some examples: eggs broken, too large, too small, not formed correctly, out of season
Chapter 10 – The Financial Plan

Once the markets the business is targeting are clearly identified, the Operational Plan has quantified the various activities required to deliver the product to that market, the Development Plan is in place to set the requirements and time lines, it is then possible to develop the financial budgets.

The following are examples of financial considerations budgets need to consider. When considering it is important to maintain focus on the primary product with the secondary revenue streams seen only as a bonus that should not interfere with management decisions required in optimising the profitability of the primary product.

Financials
- Capital Investment Asset Schedules
- Income and Expenditure Statements
  o These show the revenue streams
  o The direct costs
  o The indirect costs
  o The Gross & Net Margins
- Balance Sheet
- Identify the time to profitability
- Cash Flows

Driving these financial budgets are the following assumptions examples:

Production Assumptions
- Farm Production Assumptions:
  o Eggs laid per mature hens (number)
  o Eggs laid per first season hens (number)
  o Eggs Set in incubator (percentage)
  o Fertile Eggs (percentage)
  o Hatchability of eggs incubated (percentage)
  o Chick Mortality (percentage)
  o Mortality 3-10mths (percentage)
  o Length of season (days)
  o Age in Days at slaughter
  o Weight at slaughter
  o Feed consumption per day during growth
- Processing Production Assumptions
  o Liveweight
  o Carcass Weight (percentage of Liveweight)
  o Boneless (saleable meat expressed as a percentage of either liveweight or carcass weight)
  o Fat weight (percentage of liveweight and/or carcass weight)
  o Feather weight (per bird)
  o Skin Size
  o Skin Grade
Revenue Assumptions

- Revenue Assumptions for the Farmer
  - Payment basis
    - Liveweight
      - With or without meat grade classifications
      - With or without weight/age classifications
      - With or without skin grades
    - Carcass weight
      - With or without meat grade classifications
      - With or without weight classifications
    - Skin grade
    - Feather quality

- Revenue Assumption for the processor examples:
  - Sales of filet quality meat without value adding
  - Sales of steak quality meat without value adding
  - Sales of off cuts...etc
  - Sales of by-products
    - Skins
    - Fat
    - Blood
    - Bones
    - Feathers
  - All of the above are offering further business opportunities for specialist businesses not covered in this document.
**Cost Assumptions:**

- **Variable Farm Cost Assumption examples:**
  - Feed Costs
    - Ingredients
    - Manufacturing
    - Delivery
    - Wastage
  - Wages and Salaries
  - Utilities (heat, light and water)
  - Veterinary
  - Chick/Bird Identification
  - Bird Transport
    - within farm
    - to slaughter
  - Other bird sundry costs

*Figure 20 - Examples of Capital, Fixed and Variable Costs*

*Figure 21 - Transport*
Variable Processing Costs depend on whether processing is carried out under:
- Contract for the farmer who then sells finished products or
- Processor buys in birds to then sell on...or
- Vertically integrated company/co-operative
  - Slaughter Costs
  - Tanning Costs
  - Marketing Costs

Fixed Cost Assumptions
- Land/Property Rental and/or Mortgage
- Administration
  - Wages and Salaries
  - Utilities
  - Rates and Taxes
  - Communication
  - Repairs and Maintenance
  - Marketing

The items listed are examples – every business will have different costs to consider depending on their local jurisdiction.

The financials should be designed to run sensitivities to enable management and investors to test the changes when any one and/or a combination of those assumptions are changed.

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1. Page 14, 15: *Investigation by the Ostrich Section 7 Committee into the effect of deregulation on the South African ostrich industry.*
4. Meeting Growing Meat Demand While Protecting Our Environment to be a Challenge, December 2003: [http://www.hudson.org/index.cfm?fuseaction=publication_details&id=3254&pubType=HI_Articles](http://www.hudson.org/index.cfm?fuseaction=publication_details&id=3254&pubType=HI_Articles)
5. Competitive Advantage: Creating and Sustaining Competitive Performance – Michael E Porter