Assessing the financial viability of mechanisation at a poultry processing plant

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Abstract:

Mechanisation is the process where replaces human labour in production processes. The process of mechanisation is being speeded up by the fourth industrial revolution and many companies are starting to mechanise their production lines, not to lose their competitive advantage over their competitors.

The purpose of this study was to determine, whether it would be financially viable for a specific poultry processing plant to invest in mechanisation. The research was completed in a case study format, where the different costs associated with mechanisation and the company's current labour-intensive process were compared to each other. This was done to determine what process would be more financially viable for the company.

The results of the study were that it would not be financially viable for the company to invest in mechanisation currently because it would be more expensive on a monthly- and yearly basis than their current process. The recommendation was made that the study should also be done if they increase their production capacity, for which the machines and equipment that they will be investing in, will already have the production capacity.

Keywords:
Mechanisation. Automation. Manual labour. Fixed costs. Variable costs. Cost savings. Additional costs.

TABLE OF CONTENTS

Table index

Chapter 1 – Introduction

1.1 Introduction to the study

The Fourth Industrial Revolution is currently in full swing, and great strides are being taken in the advancement in technology. According to Klaus Schwab, “we stand on the brink of a technological revolution which will fundamentally alter the way we live, work, and relate to one another” written in an article of the *World Economic Forum* (Schwab, 2016). Schwab also concludes that humankind does not yet know how to respond, but that the response to the revolution must involve all stakeholders, including public and private sectors.

New emerging technologies which include, among others, the development of artificial intelligence, big data analysing, blockchain and 3-dimensional printers, are the key drivers of the Fourth Industrial Revolution (McGinnis, 2018). All of these technologies can improve effectiveness and efficiency in the workplace, possibly replacing humans and labour which cannot perform the tasks with the same accuracy and speed. Artificial Intelligence is teaching machines to think just like humans (McGinnis, 2018), but they will be able to do it faster and more accurately than humans because of the computing power behind their thinking. Machines and equipment are changing the workplace and industries as they used to know it. According to the strategic business and technology advisor at Sales Force in McGinnis’s article, the Fourth Industrial Revolution will reshape the future of work and it is the responsibility of the companies to ensure that their employees focus on continual learning and development to stay relevant (McGinnis, 2018).

Justin Lokitz, a blogger for *Business Models Incorporated*, who also holds an MBA, is certain that “robots will replace humans for many jobs” in the workplace, just as equipment on farms replaced horses and humans during the industrial revolutions (Lokitz, 2020). Humans will, however, still be the key to create and deliver value as the old business models will no longer be viable and new innovative strategies will have to be created, which is something that computers cannot do at this point.

Matshepo Seholoho quoted *Statistics SA* in his article, that South Africa’s unemployment rate stood at 29.1% at the end of the fourth quarter of the 2019 fiscal year (Sehloho, 2020). Accenture conducted a study to estimate how many jobs could be lost due to

automation, and the final result was that an estimated 5.7 million jobs could be lost in South Africa alone, over the next couple of years (Mabasa, 2019). This equates to 35% of the present jobs in South Africa (Mabasa, 2019). This will mean that automating industries in South Africa will lead to greater job losses and this will eventually equate to negative growth in the economy due to the decrease of job opportunities and personal income.

1.2 Background to the study

CC Chickens is a company of which the main activity is the processing of poultry meat, or in more basic terms, a chicken abattoir. The holding company (CC Holdings) was founded in 1998, as can be seen in Appendix A, after a group of chicken (broiler) farmers decided to start their own abattoir instead of slaughtering their chickens on their own farms. CC Chickens (Pty) Ltd was then established in 2001, as can be seen in Appendix B, as the main trading company, and therefore the company on which the research will be focused.

CC Chickens is located in Kroonstad in the Northern Free State, according to its website (Anon., 2020). It was decided to position the abattoir relatively central to most of the farmers, as it would be less expensive to transport the live birds to the most central location. The property on which the abattoir is currently trading was also for sale at that moment in time. CC Chickens Properties was then established to buy the property and develop the necessary infrastructure to slaughter 5 000 chickens a day, as confirmed with the current Managing Director, Mr. A. Esterhuizen.

The holding company has nine shareholders in total, as can be seen in Appendix C, of which eight are active farmers and contract growers for the company. Two additional contract growers who do not own any shares in CC Chickens, which brings the total contract growers to 10.

As mentioned above CC Chickens started out slaughtering only approximately 5 000 chickens a day back in 1998, but the company has grown, expanded, and developed its infrastructure and production capabilities over the years. CC Chickens currently

slaughters an average of 50 440 chickens a day in a normal 9-hour shift, as can be seen in Appendix D, but is not limited to the approximately 50 000 chickens a day. They regularly slaughter 60 000 chickens a day with some overtime needed from the employees, without putting too much strain on the production line or the employees. They have slaughtered 70 000 chickens a day on 3 occasions due to unforeseen production needs.

The company's medium-term strategic vision is to be able to slaughter 80 000 chickens on average every production day. The company will not be able to increase the size of the factory or the production areas, as it will need longer conveyors and will therefore increase the production time of each chicken and decrease efficiency in the production line. This implies that the company will have to increase its efficiency and line speed of production to be able to handle the 60% increase in production.

As has been established, machines and equipment are more effective than manual labour, and CC Chickens will have to introduce more machines into its production line and mechanise some parts of the production. There are several options for how this mechanisation can be done, and they all differ in terms of how much manual labour will be reduced with the introduction of these machines and the financial costs of these machines.

As discussed, there are several options to solve this problem, that have resulted in the following problem statement.

1.3 Problem statement

CC Chickens will need to start mechanising parts of its production lines, to remain competitive with regards to production rates and food hygiene. The problem is that mechanisation can be very expensive and capital intensive, and CC Chickens will have to determine whether it would be financially viable and -sustainable for them to invest in mechanisation, rather than to continue with its current labour-intensive practices.

South Africa's unemployment, with a rate of 29.1% *Stats SA* (Sehloho, 2020), is a major concern for government and businesses alike. The reason for this is that the larger the country's unemployment rate is, the fewer people there are to contribute, stimulate or grow the economy.

Therefore, the problem is that CC Chickens will need to start automating certain parts of its production line, for them not to lose their competitive advantage or fall behind their competitors with regards to technological advancements. But there is also the possibility that certain employees might have to be retrenched because of machines which will replace them in the production line to meet certain production efficiency targets.

CC Chickens will also need capital investments to increase the production line capabilities and mechanising some part of the production line. There are different options on how the production line can be developed and enhanced to increase efficiency in the production line.

The two biggest constraints to CC Chickens, with regards to the mechanisation of its production line, will be the availability of financing and capital, and the possibility that some of the current employees might have to be retrenched since they will be replaced by machines.

1.4 Objectives of the study

1.4.1 Main objective

The main objective will be to draw a comparison between the cost of manual labour (its current production costs) and the expected costs when they mechanise large components of its production line. The study will determine if it would be financially viable for the company to mechanise components of its production line. The study will also take into consideration what the human impact will be in terms of creating or minimising job opportunities, and what the financial capabilities of the company are in terms of capital expenditure and investments.

1.4.2 Secondary objective

1.4.2.1 Literature objective

The main objective of the literature study is to determine what previous literature studies have mentioned about automation and mechanisation versus manual labour - and labour-intensive processes. Other necessary parts will also be expanded on, such as the effects of imports on the poultry industry and the current capabilities of the poultry processors in South Africa. This will be necessary to motivate why CC Chickens will want to expand its daily production rate.

The Fourth Industrial Revolution and technical advancements will then be discussed, as well as the effects that they have in the workplace as they know it. The reason why people are being replaced by machines and computers in the workplace will also be a discussion point.

The current economic situation, together with the expectations of the economy and the poultry industry will also be addressed. South Africa's high unemployment rate cannot be ignored in this study because job opportunities will either be created or destroyed. The newly introduced Minimum Wage Bill and the shortage of skills in South Africa both have effects of the poultry industry. Worker unions have had a big say in the way business has been done over the last couple of years, and they might have a problem with possible retrenchments due to mechanisation.

1.4.2.2 Empirical objectives

The main objective of the empirical study is to determine the financial costs, savings of automation, as well as the additional costs which will be attributed to mechanisation, to be able to draw a comparison between them based on their financial costs per kilogram of meat that is produced.

In this section, all of the calculations will be made to determine what the financial impact is of mechanisation, and whether it will be financially viable for CC Chickens. Some of the calculations which will be needed will be named, but are not limited to the following calculations:

- Cost of the machines and equipment
- Financing cost attributed to the procurement of the machines and equipment
- Depreciation of the machines and equipment
- Anticipated costs of maintenance on the machines and equipment
- Employee wage and training costs which will decrease with automation
- Comparison between the costs of the machines and equipment against the costs of employees
- Additional costs in electricity for the additional machines and equipment

After all of the calculations have been made, a comparison can be drawn between the savings and additional costs attributed to mechanisation. From there, a recommendation can be made on the findings of the study and if it would be financially viable for the company to mechanise.

1.5 Research methodology

1.5.1 Literature study

For this study, Google Scholar, which “provides a simple way to broadly search for scholarly literature” according to its website (Anon., n.d.), was used for the bulk of the literature review research. Google Scholar was used to work through research, that was previously done on the different subject matters.

The reason why Google Scholar is used as the main search engine is that previous scholarly literature can be accessed conveniently from one place and the research is recent and updated with what is happening in the different areas of research (Anon., n.d.).

The NWU Library can also be used to retrieve previous research on the different subjects which will support the literature reviews, statements and comments.

1.5.2 Empirical study

1.5.2.1 Research design

The research will apply to one company and its current operations and production capabilities. Therefore, the research design is in a “Case Study” format. According to Explorable, a case study can be defined as follows:

“Basically, a case study is an in-depth study of a particular situation rather than a sweeping statistical survey. It is a method used to narrow down a very broad field of research into one easily researchable topic.” (Shuttleworth, 2020).

The advantage of a case study is that it narrows the study down to only the mentioned company, which is CC Chickens. All of the data and information that were collected are only applicable to this one company. Therefore, the results of the study cannot be extrapolated to the entire poultry processing industry and will only apply to one company.

According to Shuttleworth, a case study will especially be used in fields of research such as social sciences, psychology and ecology (Shuttleworth, 2020). A case study is the best type of research design when a researcher wants to test whether a theoretical model can be used in practice and real-world situations. In this study, the financial viability of mechanisation will be tested for the specific company.

1.5.2.2 Population

The population of the study will be limited to CC Chickens employees and suppliers. CC Chickens employed 438 people as of 30 September 2020, but only certain managers and directors will be directly consulted. The following suppliers were approached to provide quotations for the necessary machines and equipment, for the mechanisation process:

- Rusandus
- Bizerba SA
- Marel Poultry
- Foodmate
- Acepak

Of the abovementioned suppliers, four are South African companies and Foodmate is situated in the Netherlands. Foodmate was recently used to provide equipment that automated the largest part of CC Chickens evisceration department. The evisceration department is the part in the production line where the intestines are removed and sorted. Therefore, they will be approached again to send quotations, as they have all of the necessary equipment to mechanise the process as far as possible.

Certain employees of CC Chickens were consulted to gather an understanding of its business and production processes. Not one employee was asked the same set of questions, as the questions were asked only to gain knowledge and insight into each department.

All of the information that was gathered, was secondary data, as the data was in the form of financial reports and management statements, that provided the actual figures that were used in the study to determine the costs and savings of mechanisation.

1.5.2.3 Collection of data

Consultations were conducted with the relevant directors and managers, to gain the necessary knowledge and insight, to get a better understanding of CC Chickens production process. The following employees of CC Chickens were consulted:

- Albie Esterhuizen (Managing Director)
- Belinda Jordaan (Financial Director)
- Michiel Coetzer (Maintenance Manager)
- Willie Griesel (Production Manager)

To first get a better understanding of the current production outlay, a walkthrough of the abattoir was arranged. After the walkthrough had been done, consultations were conducted with the above-mentioned employees.

The financial information that was needed for the study was obtained from Belinda Jordaan in Microsoft Excel format. It was the financial management statements for the first 7 months of its financial year which will end on 28 February 2021. This historical financial data was used to perform calculations, and to determine the different costs, which will be simplified back to cost per production kilogram output. This was the best way to compare the different costs to each other and to determine if mechanisation is financially viable for the company.

Quotations from the supplier for the necessary machines and equipment are also included in the study in the appendixes because the cost of capital was brought into consideration when the different calculations were compiled.

1.5.2.4 Analysis of data

All of the data and information that were retrieved from the consultations and necessary documentation, were processed so that only the necessary information is used for the empirical study. This information was used in the calculations and projections of the financial costs and comparison.

As mentioned in the objectives of the empirical study, the following calculations are the primary costs which will be attributed to the final financial cost consideration:

- Cost of the machines and equipment
- Financing cost attributed to the procurement of the machines and equipment
- Depreciation of the machines and equipment
- Anticipated costs of maintenance on the machines and equipment
- Employee costs which will be decreased if an employee is replaced by machines
- Comparison between the costs of the machines and equipment against the costs of employees
- Additional costs in electricity for the additional machines and equipment

The calculations were not limited to the above-mentioned, and there will be other necessary calculations that might not apply to all of the options.

A conclusion was then reached and recommendations were made based on the calculations and the costs, where the final recommendation was made based on the direct comparison between the savings and additional costs of mechanisation.

1.6 Limitations of the study

The study was only focused on one company, CC Chickens, as a study based on the whole poultry processing industry would be far too extensive. Therefore, the results of this study cannot be generalised for the industry as a whole, as each company's strategic objectives and production line might be different from the others.

The study was done in a case study format, and therefore the sample size will be very small because consultations were only done with employees of the identified company and substituted with calculations from the case study.

1.7 Summary

Technological advancements are changing the workplace as they know it, and the effects of the disruptions that it is causing can no longer be ignored. Research has suggested in the future, the majority of all task hours relating to work will be done by machines.

In this chapter, it was discussed why such a study is necessary and how technology is playing a much bigger role in businesses today. CC Chickens needs to stay competitive and should not be caught out by technological advancements, that their competitors might be adapting. The problem is that other businesses might be adapting and mechanising its production lines, whilst gaining a competitive advantage over CC Chickens.

The challenge is that they want to mechanise its production line, but the objective of this study is to determine whether it will be financially viable for them to introduce more machines into its production line before they just blindly start to invest in mechanisation and then start to lose money.

The research will be completed in a case study format, where the results will only be limited to CC Chickens.

In the following chapter, previous literature on the different topics of the study will be reviewed to determine what studies have already been completed, and what was the results of those studies. These results of previous studies can then be used in this study to further motivate the results.

Chapter 2: Literature review

2.1 Introduction

In the literature review component of the research, previous research and literature on the different subjects will be scrutinised and reviewed to obtain knowledge of previous research on the different topics, and the problem statement of the proposed research.

During the literature review, research will be done on literature that is available on the current state of the poultry industry and then in South Africa specifically. There are also currently many debates on automation vs. manual labour with machines that are starting to take over large components of production lines, with the poultry industry also being included.

Unemployment is a significant problem in South Africa, with a very high unemployment rate and the lack of skilled workers in South Africa. The South African poultry industry has been hit hard with poultry meat being imported into the country for less than what local producers can produce for, forcing the local poultry producers to lower their selling prices and profits with that.

A Minimum Wage Bill has been introduced recently in South Africa, which increased local wages, as well as production costs. The South African poultry industry is dependent on maize prices because it is the largest input price in the feed that the broiler chickens consume, which will increase the cost of growing the chicken if the maize prices increase. Drought in South Africa will lead to increases in maize prices because of the drop in supply that is caused by drought and weaker growing conditions for the maize.

The country recently went into a national lockdown to try and curb the spread of the COVID-19 virus, and the effects on the economy were devastating, affecting all economic sectors. The effects of the lockdown are still to be determined, but it has led to resistance to capital expenditures because of the economic uncertainties.

There are is also employment challenges in South Africa, that make labour practices much more challenging. This includes factors such as labour unions and strikes, which can negatively affect production, as well as the scarcity of skilled workers in South Africa.

Technological advancements are bringing large scale changes to business as we know it and more production lines are being automated, which mostly leads to better effectiveness and efficiency in production lines.

All of the above-mentioned topics will be discussed in the chapter.

2.2 The poultry industry

Poultry refers to domesticated birds such as chickens, ducks, turkeys, etc. that are generally known and valued for their meat and eggs. Poultry meat is the largest source of protein in the human diet across the world (Nkukwana, 2018). Out of all of the poultry breeds, chickens are the most common of the avian birds, accounting for 63% of the total poultry population (Nkukwana, 2018). The reason why poultry meat is the largest source of animal protein for human consumption, is because of its higher growth rate, compared to other animal proteins, and lower production and input costs.

South Africa is the largest poultry producing country on the African continent. The poultry industry in South Africa employs more than 108 000 people directly and indirectly through its value chains (Nkukwana, 2018). In the agricultural sector, the poultry industry accounts for 16.9% of the total GDP, making it the largest segment in the sector. Out of the total animal gross product value, 42.8% is derived from the poultry sector (Nkukwana, 2018).

Despite the above-mentioned statistics on how large the poultry sector is in South Africa, the country's supply is yet to meet its demand, with South Africa remaining a net importer of chicken meat. Poultry meat is imported at costs that are lower than what local companies can produce because South Africa needs to import some of the feed inputs, whereas countries such as Brazil and the United States receive subsidies for inputs like cereal grains and oilseeds (Nkukwana, 2018).

The largest poultry producers in South Africa are Astral Foods and RCL Foods. Astral Foods processes approximately 4.395 million chickens per week under its 4 brands, which is Festive, Goldi Chicken, Mountain Valley and Country Fair (Astral, 2020). RCL Foods, is a group of companies, of which Rainbow Chickens is its biggest poultry brand. According to Rainbow Chicken's website, they are the largest processor and marketer of chickens in South Africa (RCL Foods, 2020), which will mean that they produce more products than Astral Foods.

According to SAPA's (South African Poultry Association) production report for June 2020, an average of 20.139 million broilers was produced per week, which will give Astral and Rainbow a total market share of more than 43.6%, making them the largest role-players in the South African poultry industry.

2.3 Automation vs. manual labour in general

In many different economic sectors, machines are replacing humans in production lines. The Fourth Industrial Revolution is disrupting labour markets, due to the technological advancements that are being made in robotics and machines, which can now adapt and learn themselves through artificial intelligence (De Pasquale, 2018). Employees from Marriot voted to strike in the United States due to possible technological advancements that might mean that they would be replaced by machines and computers (De Pasquale, 2018). The president of the union that was authorised to arrange the strike, had the following response "You are not going to stop technology. The question is whether workers will be partners in its deployment or bystanders that get run over by it".

In an article posted on *Techacute*, the writer states that he is a supporter of automation that supports people, but not automation that replaces people (Isak, 2017). Automation, according to Isak, should be pursued to free up workers and give them more time to focus on other segments of the business and to realise their true potential, instead of wasting their true potential and value by them having to perform manual labour tasks. Industries where the demand for their service or product will increase, if their production increases,

can expect to employ more people, even if they automate their processes and production lines (De Pasquale, 2018). This is because the market size will expand through the higher output and increase in production, which will be needed for the increase in demand, which will create more job opportunities, instead of decreasing it.

Many job opportunities have indeed been lost due to machines that are replacing human manual labour, and there will be many more job opportunities which will be lost in the future due to automation. But, increases in overall efficiency and productivity in the workplace, will lead to more job opportunities in other fields of work, which will need original and creative thinking, and a personal touch. Automation should not be seen as something that should be feared, but rather embraced to create a better world for all.
People are currently accounting for 71% of the total hours that are worked in major industries, with machines making up the remaining 29% (Shaban, 2018). It is estimated that by 2022, only 58% will be worked by humans, and the remaining 42% by machines, an indication that a lot of job opportunities might be lost due to the automation of certain processes. This will not be the case, according to Shaban. Shaban admits that 75 million jobs will be lost by 2022 due to automation, but 133 million job opportunities will be created due to the new division of labour which will develop between machines and people. Therefore, 58 million jobs will be created by automation, and not lost.

2.4 Automation vs. manual labour in the poultry industry

The world's population is increasing steadily every year, and it is projected that by 2050, the total population will increase to 9.1 billion people (Nkukwana, 2018). Food production is estimated to increase by 70%, to meet the nutritional needs of the increased population. Poultry meat remains one of the most affordable sources of animal protein because of the lower input costs associated with producing the birds, as well as the rate at which these birds grow when compared to other sources of animal protein.

To meet these new demands for food, production potential should be increased in processing facilities. At CC Chickens, they process 50 000 chickens on average a day, which means that in an 8-hour shift, 6 250 chickens should be processed every hour and

more than 104 chickens every minute. This is an incredible rate at which the chickens should be processed, and CC Chickens is small in comparison to companies such as Astral Foods.

The need for higher quality meat is also increasing and the safety regulations when it comes to handling meat are getting stricter (Harris, 2012). Food and safety regulations are very specific when it comes to poultry meat, and the less the meat is handled by people, the better the hygiene of the product will be. To achieve the increasing demands of production and the acceptable quality control during slaughtering, more companies are turning to automation and machines in their processing lines (Harris, 2012).

A large part of the profitability of poultry processing plants is determined in its yields and quality of their portions. If too much meat is left on the bones, then the yield percentages will decrease for production, meaning fewer products to sell. Poultry companies can also increase their selling price for portions if they are of better quality and hygiene. Automated systems can reject products that do not meet the correct quality standards, or which are not within specified parameters, such as weight. All of these tasks would normally have to be done as a separate department in a processing facility, but machines have allowed these functions to be part of other departments' normal flow of products, without holding up the production line (Harris, 2012).

Overall, it seems that the poultry industry is leaning more towards automating its production lines, to meet increased production demands, as well as stricter safety and hygiene regulations and protocols. Indirect job opportunities can be created, where the manual labour of humans will be replaced. The machines which will now be doing the manual labour of the humans, will need to be serviced and maintained by humans, and there are certain parts of poultry production lines that still cannot be automated, like the hanging of the live birds on the production line.

2.5 Unemployment in South Africa

South Africa has had problems with unemployment for a couple of years, and the COVID-19 pandemic and the resulting national lockdown, is only worsening the problem. Before the national lockdown was implemented, South Africa's unemployment rate had increased to 30.1% in the first quarter of 2020, which was 7.1 million unemployed people at that stage (Businesstech, 2020). Even before COVID-19 and its effects, the unemployment rate was predicted to rise due to low economic growth in South Africa.

In the second quarter of 2020, the period where the national lockdown was implemented, another 2.2 million jobs were lost (Stats SA, 2020), which should have increased the unemployment rate. The unemployment rate is calculated by comparing the number of employed people, against people who are unemployed and actively seeking employment. People can also be classified as not economically active, which will exclude them from the unemployment calculation. The total number of economically inactive people increased by 5.6 million people over the first 2 quarters of 2020 in South Africa (Stats SA, 2020). These economically inactive people will rely on government grants for income, which will increase the burden on the government's budget, and the economy as a whole because these people are not actively participating in the economy.

2.6 Skills needed in the poultry industry

With the automation of production lines, manual labour is becoming less in demand because it can normally be completed by unskilled workers. With the automation which will be replacing many manual labour jobs, employees must gain other skills if they still want to be employed at the companies that are replacing them. If employees want to work themselves up to supervisor level and beyond, they will have to obtain knowledge of the following departments (MyMajors, 2020):

- Production and Processing
- Mechanical
- Administration and Management
- Personnel and Human Resources

- Engineering and Technology
- Computers and Electronics

The above-mentioned skills are in high demand in the poultry sector, and even in other production-focused industries.

Production and Processing: This refers to the knowledge of production processes, production costs, raw material, and how to maximise the effectiveness and efficiency of a production line.

Mechanical: Knowledge of machines and their design and uses, and how to repair and maintain them.

Administration and Management: To know management- and business processes which will include principles such as resource allocation, leadership techniques, strategic planning, and coordination of people.

Personnel and Human Resources: This skill refers to the knowledge of procedures that have to do with personnel training, labour relations and negotiations, personnel recruitment, and personnel information systems.

Engineering and Technology: Knowledge of practical applications of technology and engineering science to apply principles and procedures when it comes to the design and production of the machines in the production line.

Computers and Electronics: This is to have knowledge of computer hardware and software and how to implement it into business processes.

All of these skills are well sought after in the poultry industry because these skills normally come with a skilled worker. Skilled workers will be the first people to be employed if machines replace labour workers due to automation because these machines and equipment will have to be maintained and repaired.

Soft skills are also needed in the poultry industry and are more difficult to evaluate. To stay relevant for other positions or opportunities, employees must learn to be proficient in the following soft skills (Doyle, 2020):

- Communication
- Critical thinking
- Leadership
- Positive attitude
- Teamwork
- Work ethics

2.7 Economic challenges in the poultry industry

2.7.1 Importing of poultry meat

Over the last couple of years, we have heard the term “dumping” a lot on the news, when it comes to importing chicken meat. The local poultry industry has been put under much pressure because chicken meat is being imported at lower prices than what they can locally produce, and the selling prices of local suppliers needed to be adjusted downwards to remain competitive. According to Francois Baird in an article written in *Biz News*, imported chicken meat accounts for 30% of the local meat market and therefore resulted in the loss of thousands of job opportunities (Lowman, 2019).

Brazil is the largest exporter of chicken meat in the world (Phakathi, 2019) according to Izaak Breitenbach, the General Manager of the South African Poultry Association. They also receive financial incentives to export meat and in Europe, farmers receive subsidies to encourage poultry production.

South African farmers do not have the financial support from the government and farming conditions also make it a lot more difficult and more expensive to produce chicken meat at the same prices as it can be imported. Maize is the biggest cost driver of chicken production cost, as it forms 60% of the total feed costs, and South Africa has had below-average rain over the past couple of years, which increased maize prices and therefore, also directly the increase in production costs of chicken meat.

With the increase in production cost, and the decrease in selling prices due to cheaper meat being imported, the poultry industry as a whole has been going through tough economic conditions and this resulted in job opportunities being lost. If the South African government can put the necessary measurements in place to curb poultry meat imports, then 30 000 jobs can be created instantly according to SAPA (Phakathi, 2019).

2.7.2 Minimum Wage Bill

CC Chickens employs more than 400 people, all of whom come from Kroonstad and the surrounding areas. More than 250 of their employees are unskilled workers, that are used in the production lines. They receive their basic training for the specific area that they will be working in when they do their inductions.

The work that they are doing, does not need specific skills or qualifications. They do not even have to be literate to fill those positions, and therefore they are paid minimum wage salaries and wages. If they are absent from work, a daily wage worker can be brought in and trained within 15 minutes.

With the introduction of the new Minimum Wage Bill that took effect on the first of January 2019 (Omarjee, 2019), it took all of their employees whose hourly wages were below R20 per hour, up to the R20 per hour mark as set by the new bill. This meant that more than 250 workers had an increase of between 10%-45% in their monthly salary, which was great for them, but it was a sizeable increase to their payroll costs, which increased drastically.

This had a reverse effect on what the government was aiming for with this bill. Instead of increasing the overall economic conditions of the workers, some had to be laid off because companies could not bear the new weight of their salary bills. More than 360 companies applied for exemptions from the minimum wage (Smit, 2019), or they would have to let workers go and scale down production.

So, the costs of hiring new employees have increased significantly and companies have put a halt on hiring. Thus, the new act has put jobs under threat and instead of stimulating economic growth through the increase of wages, they have created a climate where

people are losing their jobs because of the new and increased minimum wage. This increase makes it more attractive to business owners and managers to rather install machines which can do the same work better, and they can now pay off these machines quicker with the minimum wages that they do not have to pay.

2.7.3 Drought and increasing production costs

With the ever-changing weather patterns, South Africa seems to have drawn the short straw. It suffered its driest year in 30 years in 2015 according to the BBC (BBC, 2015) which greatly affected maize production. With the lower maize production, the price of maize drastically increased, along with the direct cost of feed for the poultry and whole meat industry.

Cape Town, a world-renowned city and big tourist attraction, nearly ran out of water in 2018, also highlighting the extreme weather conditions that South Africa is facing.

Yellow maize prices on 23 June 2017, reached a low of R1 834.00 per ton on the day, and the last price on 22 September 2020 that could be obtained from SAGIS (Sagis, 2020), was R3 280.00 per ton. That is an increase of more than 78% over the last 3 years.

According to the Automobile Association, diesel cost R9.26 per litre inland on the first of February 2015. On the 7th of October 2020, the price for a litre of diesel inland was R12.40 (Automobile Association, 2020). That equates to an increase of 34% in the cost of fuel alone. Diesel is used in their production to transport the chickens from the farms to the abattoir to be slaughtered, as well as in the trucks that deliver the meat to their customers.

The inconsistency of the Rand against the bigger currencies, the increases in electricity tariffs, and the underperformance of the government and state-owned entities also contributed to the increases in everyday production costs.

2.7.4 COVID-19 pandemic

The COVID-19 pandemic forced South Africa into a nationwide “lockdown” on the 27th of March 2020, with the idea of curbing the daily infection rate of the South African populace. However, the economic effect of the lockdown will be felt for many years to come. The South African economy was already under pressure after its 3rd consecutive quarter in a recession, when the lockdown was implemented (Naidoo & Yoo, 2020).

Economists of Bloomberg estimated that the South African economy can shrink between 7.5% and 8.0% by the end of 2020, according to Naidoo and Yoo in an article on *Biznews*, deepening the ongoing recession. The ongoing recession will be the longest downward economic cycle since the end of World War II (Naidoo & Yoo, 2020) and the GDP is only expected to increase by 3% in 2021, but only because of the decreased base which will be used from 2020.

Bloomberg economists state that South Africa has bottomed out from the sharp contraction in economic activity, caused by the nationwide lockdown and that recovery is underway (Naidoo & Yoo, 2020). But the recovery could have been a lot better if the government had deployed its stimulus package earlier, which could have saved hundreds of companies and thousands of job opportunities.

Load shedding is also a major infrastructure complication for the whole of South Africa, especially businesses.

In an assessment that was performed by UNDP Africa’s Morris Moma, South Africa’s GDP could take up to five years to recover from the effects of COVID-19 (Moma, 2020). This will only be recovered to the GDP figures pre-COVID-19, ignoring the growth that could have materialised in the 5 years that is lost. Poverty levels and the number of households living below the average poverty line will increase, with inequality levels only decreasing during the period where the effects of COVID-19 will be felt.

2.7.5 Resistance to capital investments

All of the above-mentioned issues have made investors and their shareholders wary of investing too much money in projects which will increase their production, as the losses that they can suffer will increase with the production increases.

They have a basic policy at CC Chickens to keep 6 months' worth of running costs invested in their bank account, should something happen which will halt their production completely. But if they want to expand and increase their daily production, they will have to tap into those funds to assist in the financing of their projects.

They recently spent a lot of money building a new holding freezer which can accommodate the volumes of chicken meat, if they increase their production to 80 000 chickens a day. The freezer is already built and paid for, but one of the municipalities sub-stations, that needs to supply us with the additional electricity needed to run the freezers, blew up midway through its construction and is not fixed to this day. This means that they have dead capital lying and waiting for their municipality to meet their end of their agreement.

It is events such as these that make their shareholder sceptical to take on new projects, not because they cannot achieve these goals set out for ourselves, but because of the incapability of government-managed organisations, such as their municipality. They are scared that they will end up with more capital that is dead and not working for us, which will be reliant on third parties and might be in that state for months or even years. That money is currently safer in the bank, where it earns interest at least.

The true economic effects of the COVID-19 pandemic are still yet to be fully determined, but it has affected CC Chickens projected profits very negatively, which will make the shareholders even more reluctant to invest in large capital expenditures until the profits return to their normal expected levels.

2.8 Employment challenges

2.8.1 Unions and strikes

Unions have become a prominent feature on the employment front, standing up for the rights of their members through certain actions and demands. These unions have become much more prominent over the last couple of years and they are widely marketed in the news, normally when arranging strikes or making demands.

The employees who chose to be members of a union are registered members with NUPSAW.

These unions will also become much more vocal when they heard that their members might lose their jobs or be replaced by machines. This will be one of the key considerations in my research to try and anticipate how the unions and workers might respond to each of the options which will be recommended.

CC Chickens had a situation in 2016, where their workers participated in an unprotected strike and tried to burn down their head offices because some were replaced by machines in the abattoir. Luckily for them, it was an unprotected strike and all of the participants were dealt with accordingly, leading to many dismissals.

The problem is that a protected strike, led by a union, might be very damaging to them financially if they are not able to slaughter. Their production is planned very specifically so that the chickens can be slaughtered at the right age and weight.

All of the possible saving that they might incur from replacing workers with machines, can be wiped out in a single week if they do not slaughter any chickens. So, this will be one of the key considerations for the research.

2.8.2 Skilled workers

The introduction of machines and new equipment will mean that skilled workers will have to be appointed to operate and maintain them.

There will be two problems with obtaining the skilled workers that are needed for this machinery:

Location of the abattoir: The abattoir is situated in Kroonstad in the Free State. There is nothing special about Kroonstad and it does not even have a mall. So, it is very difficult to convince a highly skilled worker to relocate to Kroonstad to come and work at an abattoir. Most of these skilled workers will be situated in cities where they have a better quality of life and everything, they need is available just around the corner.

So, attracting skilled workers is much more difficult for them because of the unattractiveness of the town itself. There will only be one other way to convince them to come and work in Kroonstad, which brings us to the next problem.

Salaries of skilled workers: Skilled workers will normally come with higher salary demands because of their qualifications and skillsets. This will be even more relevant if they have to move to Kroonstad. They will have to be convinced with a higher salary than what they expect to earn in the bigger cities because they will be downgrading in their quality of life to come and work with CC Chickens.

The whole idea of installing machines is to cut down operational costs in the long-run. But it does not justify mechanisation if the operations and the machines will end up costing the company more than the manual labour.

The company has recently begun to train their workers in poultry processing, which is a NQF level 2 accreditation, and it is recognised by AgriSETA, so they are receiving revenue for the training they provide.

They have also recently accredited their maintenance department, so they can offer learnerships in their trades.

The problem remains that workers use the company as a stepping stone to achieving their qualifications, and then move on to bigger companies or opportunities. It is very

difficult for a company like CC Chickens to retain skilled workers because they have a limited budget on salaries and cannot offer them the opportunities that they deserve.

2.9 Technological advancements

2.9.1 Automating production

The fourth industrial revolution is in full swing at this very stage, and computing power is doubling every two years, whilst the costs thereof are halved, according to Moore's law (Tardi, 2019). Machines are replacing humans in the workplace, as they are more efficient and reliable.

Big parts of the poultry industry in South Africa are looking to automate large parts of their production lines.

CC Chickens recently automated its whole EV department with machines and equipment supplied by Marel, which is a Dutch company specialising in poultry processing equipment. The new and improved EV room replaced 50 labour workers, who were transferred to other departments. It has a capacity of 9 000 birds an hour, in comparison to the line speed of only 4 800 when manually operated.

In a highly competitive industry, it is very important to stay up to date with the technological trends, otherwise competitors that do stay up to date, will find a competitive advantage over its company. They are unfortunate in that they are not just competing with the local competitors, but also with foreign competitors because of the big impact that imported chicken meat has on their industry.

Therefore, it is not a question of *if* they should start the process of automation, but rather *when* and *how* it can be done so that it does not affect their workers through retrenchments.

2.9.2 Better efficiency and effectiveness

AI (Artificial Intelligence) has improved the capabilities of computers and what people thought was possible. Machines are teaching and improving themselves, and can mostly do things better and faster than what they as humans are capable of. Machines can solve Rubik's cubes in 0.38 seconds (Stolzoff, 2018), while most humans do not even know how to. Machines are more accurate, stronger and faster workers than what humans will ever be capable of.

Most new advances in technology displace workers, and in many cases, that is exactly the point. Over the last 140 years of automating production, history has shown that more job opportunities were created, than jobs that were lost due to the mechanisations (Stolzoff, 2018).

A report by the *World Economic Forum* estimates that machines are currently doing 29% of all of the work. They estimate that this percentage will increase to 75% in 2025, leading to a loss of 75 million jobs in this 5-year period, but in the same period, 133 million jobs will be created, leading to an increase of 58 million jobs (Stolzoff, 2018). This projects exactly the opposite of the fear that machines will only lead to job losses.

Machines have unwavering focus (Cobalt, 2018) and they do not have thoughts which can wander and then cause a loss in productivity or even cause accidents. They also have perfect and objective recall of memories through data (Cobalt, 2018), whereas humans are very reliant on their brains to recall memory, where they tend to forget certain details that they do not find important enough.

Chapter 3: Empirical study

3.1 Introduction

The empirical study will be focusing on the most significant costs that are currently associated with the production process, as well as the projected costs if the company decides to introduce more machines and equipment into the production process through automation. The costs will be divided into four different sections, depending on what is expected to happen with the costs if the company decides to automate their production process:

- Fixed costs
- Variable costs which will not change with automation
- Current variable costs associated with manual labour
- Variable costs with automation

All of the above-mentioned sections will be broken down into smaller segments and explained in this chapter.

The four different sections can be divided into two different groups, namely irrelevant- and relevant costs. Irrelevant costs, in this case, will refer to importance to the company, such as the cost of the live birds, but which will be irrelevant to the study, and in this case irrelevant to automation. Irrelevant costs will not be affected by more machines that are introduced to mechanise the production line. Relevant costs, on the other hand, will be relevant to automation and will change if machines are introduced.

Irrelevant costs:

- Fixed costs
- Variable costs which will not change with automation

Relevant costs:

- Current variable costs associated with manual labour
- Variable costs with automation

3.2 Research methodology

If a company is involved in production and manufacturing, cost accounting is very important because the company needs to know and analyse whether they are making profits per unit that they are selling. In the case of CC Chickens, kilograms are their preferred unit in which they calculate and analyse their results. They pay for the live chickens per kilogram delivered to the abattoir, and they sell most of their products per kilogram, so kilograms are the obvious unit of choice for them.

At the time of the study, CC Chickens' 7-month management figures were finalised and ready to be used for the study. The 7 months will range from the start of their financial year, which was the 1st of March 2020, to the 30th of September 2020. The costs will be compared to their total production output weights because the costs of production can be directly linked to the total kilograms that are produced. We can then get a price per unit, or the price per produced kilogram to compare to the other costs and projected costs of automation.

The research method which will be used, will still be in a case study format, as the financial results will be focused only on CC Chickens, and the format will agree with the overall research method that is used for this study.

3.3 Action plan

CC Chickens converts all of their costs to Rand per kilogram to evaluate their costs every single month, and this will be the measurement unit in which the different options will be compared to one another.

The contract growers are paid for the live chicken weights that arrive at the abattoir. After the birds have been slaughtered, they bleed out and are de-feathered, which leads to a loss in kilograms and production weight because the blood and feathers cannot be sold and are seen as a condemned product that is written off.

The carcasses will then move on to the evisceration departments, where all of the intestines will be removed. Here more products, such as the milt and gall bladders, are removed and condemned because they are not fit for human consumption.

Their net production weight refers to the total kilograms of meat that were packaged to be sold. This is the most accurate variable for the company to use because it portrays the correct and true products that were finally produced to be sold.

Refer to the table below for the net production weights as received from CC Chickens:

Table 3.1 – Net production weight per month

Month	Net production weight (kg)
March 2020	2,168,530
April 2020	1,955,615
May 2020	2,125,771
June 2020	2,098,578
July 2020	2,454,455
August 2020	2,058,660
September 2020	2,129,709
TOTAL	**14,991,317**

All of the costs will therefore be reverted to Rand per kilogram, and the kilograms will be equal to the total of 14 991 317 kg, as shown in the table above. If the costs need to be compared to a monthly average, then the following weight can be used as a monthly average:

Total net production weight ÷ total months = 14 991 317 kg ÷ 7 months = 2 141 617 kg

3.4 Fixed costs

Fixed costs refer to costs which will not change from month to month, and are not dependent on how many chickens are slaughtered or how many slaughter days there are in a month. Therefore, the costs will be “fixed” every month, and it does not matter if the production line stays labour intensive, or is converted to a more automated process.

3.4.1 Rent expenditure

CC Chickens pays rent to CC Chickens Properties (Pty) Ltd, which is a subsidiary of the same holdings company, namely CC Holdings (Pty) Ltd. Even though the expenditure is inter-company related, it needs to be included because CC Chickens Properties could still have received rent for space if CC Chickens did not occupy the abattoir.

CC Chickens pays rent for three different premises to CC Chickens Properties. The 3 premises are as follows:

- The abattoir (26, 11th Avenue, Kroonstad, 9500)
- The head-office (1, 12th Avenue, Kroonstad, 9500)
- The marketing office (2, 14th Avenue, Kroonstad, 9500)

Each location's rent expenditure is different, depending on its size and the value of the property. The following rent is paid for each location each month:

Table 3.2 – Rent expenditure per site per month

Month	The abattoir	The head-office	The marketing office	Total rent expenditure
March 2020	R 303,000.00	R 4,840.00	R 4,840.00	R 312,680.00
April 2020	R 303,000.00	R 4,840.00	R 4,840.00	R 312,680.00
May 2020	R 303,000.00	R 4,840.00	R 4,840.00	R 312,680.00
June 2020	R 303,000.00	R 4,840.00	R 4,840.00	R 312,680.00
July 2020	R 303,000.00	R 4,840.00	R 4,840.00	R 312,680.00
August 2020	R 303,000.00	R 4,840.00	R 4,840.00	R 312,680.00
September 2020	R 303,000.00	R 4,840.00	R 4,840.00	R 312,680.00
TOTAL	**R 2,121,000.00**	**R 33,880.00**	**R 33,880.00**	**R 2,188,760.00**

The cost per produced kilogram for rent can be calculated as follows:

Table 3.3 – Rent expenditure per kilogram produced

Net production weight for 7 months	14,991,317 Kg
Total rent expenditure for 7 months	R 2,188,760
R/kg for rent expenditure	*R 0.15

CC Chickens, therefore, pays R0.15 of rent for every kilogram of meat that is produced.

3.4.2 Salaries

The salaries refer to the employees who get paid a fixed salary every month, irrespective of how many hours they work. There might be some small variances between different months, as certain employees are allowed to get paid for their overtime worked. Employees need to work 195 hours per month, and as soon as they exceed this number of hours, they will get paid for their overtime worked.

There are no fixed criteria that the salary costs can be compared, due to the salaries being fixed. Refer to the table below which will state this before-mentioned fact:

Table 3.4 – Cost of fixed salaries per kilogram

Month	Salaries - Cost to company	Nett production weight (kg)	Salary cost p/kg
March 2020	R 1,039,350	2,168,530	R 0.48
April 2020	R 1,001,347	1,955,615	R 0.51
May 2020	R 1,000,969	2,125,771	R 0.47
June 2020	R 1,024,541	2,098,578	R 0.49
July 2020	R 1,060,828	2,454,455	R 0.43
August 2020	R 1,069,565	2,058,660	R 0.52
September 2020	R 1,066,060	2,129,709	R 0.50
TOTAL	**R 7,262,661**	**14,991,317**	**R 0.48**

As can be observed in the table above, there are small variances every month of the salary cost when compared to the nett production weight every month, except for July 2020, which was much less expensive, due to the higher nett production weight for that month.

3.4.3 Cleaning

The abattoir needs to be deep-cleaned after every slaughtering shift because the abattoir is working with products that need to be consumed by humans and food safety is one of the abattoir's main responsibilities.

Not much would change in the cleaning process if more machines were to be introduced and the cleaning team would also not need more employees to finish their tasks. There

would be more machines that need to be cleaned, but it would not affect the workload of the current cleaning team.

The costs of cleaning material would be coupled with the number of times that it is needed to deep-clean the abattoir, which is every day after slaughtering. Therefore, the cleaning costs will be associated with the number of slaughter days.

The following table represents the total cleaning material costs of CC Chickens for the first 7 months of the 2021 financial year:

Table 3.5 – Cost of cleaning per month

Month	Cleaning material cost	
March 2020	R	232,424
April 2020	R	208,179
May 2020	R	193,215
June 2020	R	243,526
July 2020	R	243,888
August 2020	R	174,809
September 2020	R	266,912
TOTAL	**R**	**1,562,954**

The cost per produced kilogram for cleaning material can be calculated as follows:

Table 3.6 – Cost of cleaning per kilogram

Nett production weight for 7 months		14,991,317 kg
Total cleaning material costs for 7 months	R	1,562,954
R/kg for rent expense	R	0.10

3.5 Variable costs which will not change with automation

The variable costs will be mainly associated with total birds that are slaughtered in a month and the product mixture which will be produced in that month. The variable costs will not change since more machines will be introduced due to automation.

3.5.1 Cost of live birds

The cost of the live birds is the largest portion of the expenses for CC Chickens. The price that is determined and paid for the live birds comprises of the following elements:

- Feed cost
- Cost a day-old-chick
- Heating of the houses
- Labour and salaries
- Bedding in the houses
- Vaccines and medication
- Maintenance costs of the houses
- Cleaning and washing of the houses
- Electricity costs of the houses
- Administration and management fees
- Insurance costs
- Other costs associated with the houses

All of the above-mentioned costs are costs that are associated with the raising of the day-old-chicks on the farms in the chickens' houses until they are mature enough to be slaughtered and processed. This can be seen in a summary of CC Chickens' live bird costs for cycle 143 in Appendix E, which will be attached.

CC Chickens pays their contract growers according to the age of the live chickens, as well as their weight. The younger the chicken is, the better remuneration per kilogram the grower will receive. The live chicken purchase price is calculated in every cycle, where the new prices for feed and day-old-chicks are determined and included in the new price per kilogram. Refer to Appendix E, for an example of one of CC Chickens' live bird cycle costs per age and per kilogram.

The cost per kilogram is also associated with the weight of live birds, instead of the total produced kilograms.

Refer to the following table for the average purchase price of live birds per kilogram:

Table 3.7 – Cost of live birds per month

Month	*Nett Weight (kg)*	*Total chickens*	*Average kg per chicken*	*Live bird cost*	*R/kg*
March 2020	2,156,072	1,189,099	1.81	R 30,409,543	R14.10
April 2020	1,951,154	1,058,213	1.84	R 27,588,912	R14.14
May 2020	2,120,122	1,140,240	1.86	R 29,930,860	R14.12
June 2020	2,085,511	1,152,599	1.81	R 30,327,111	R14.54
July 2020	2,436,021	1,337,064	1.82	R 35,300,914	R14.49
August 2020	1,925,962	1,069,406	1.80	R 27,650,277	R14.36
September 2020	2,114,409	1,174,552	1.80	R 30,647,397	R14.49
TOTAL	**14,789,252**	**8,121,173**	**1.82**	**R 211,855,014**	**R14.32**

3.5.2 Packaging

The packaging materials that are used every month, will depend on the products and portions that are produced during the month. Certain product packaging costs are more expensive, depending on the needs of the customers. Fresh products will not be packed and frozen in separate plastic bags, but rather in bulk 10 kg bags and boxes, which will be more cost-effective.

Therefore, the packaging material costs are related to the product mix that is being produced, as well as the weight of meat that is processed and packed. Comparing the packaging material costs to nett production weight will not be the most accurate comparison, but will give a good indication of the average cost per kilogram produced.

Refer to the table below for the cost per kilogram of packaging materials and to prove the statement above:

Table 3.8 – Packaging cost per month

Month	Packaging material costs	Net production weight (kg)	Packaging cost p/kg
March 2020	R 1,209,059	2,168,530	R 0.56
April 2020	R 1,529,165	1,955,615	R 0.78
May 2020	R 1,489,154	2,125,771	R 0.70
June 2020	R 1,507,348	2,098,578	R 0.72
July 2020	R 1,656,039	2,454,455	R 0.67
August 2020	R 1,526,273	2,058,660	R 0.74
September 2020	R 1,447,483	2,129,709	R 0.68
TOTAL	**R 10,364,521**	**14,991,317**	**R 0.69**

3.5.3 Brine

Brine is a salt-water solution which can be injected into the chicken meat, to improve the taste of the meat, whilst acting as a preservative which will extend the shelf life of the product. CC Chickens sells the meat in three different categories:

- Fresh: this type of meat cannot be frozen before delivery to the client, but must remain below a certain temperature to still be fit for human consumption. This meat cannot be injected with brine.
- Frozen: this meat can be frozen, but it will not be injected with brine.
- Injected: this meat will first be injected with brine, and then frozen after the injection to ensure that the brine remains within the meat.

The amount of brine which will be used every month, will depend on the products that are ordered by the customers and what CC Chickens decides to produce. The cost of brine will also be compared to the net production weight, but it will not be a very accurate indicator for cost management purposes.

Refer to the table below for the cost per kilogram of brine mixture costs:

Table 3.9 – Cost of brine per month

Month	Brine costs	Net production weight (kg)	Packaging cost p/kg
March 2020	R 336,550	2,168,530	R 0.16
April 2020	R 247,091	1,955,615	R 0.13
May 2020	R 268,985	2,125,771	R 0.13
June 2020	R 506,416	2,098,578	R 0.24
July 2020	R 443,115	2,454,455	R 0.18
August 2020	R 428,132	2,058,660	R 0.21
September 2020	R 294,477	2,129,709	R 0.14
TOTAL	**R 2,524,767**	**14,991,317**	**R 0.17**

3.5.4 Transport costs of live birds to the abattoir

CC Chickens currently owns 5 trucks that transport the live birds from the farms to the abattoir. Each truck has the capacity of 1 000 crates, of which the normal capacity of a crate is 10 chickens, therefore 10 000 live chickens can be transported with every truck per trip. Sometimes the crates must hold more than 10 chickens due to production demands or logistical issues, but this will rarely happen, as it increases the number of birds that are dead on arrival and which equates to a loss for CC Chickens.

The cost of the transport of live birds is therefore associated with the number of birds that are slaughtered on a day or in a month.

The automation of the abattoir's production process will not lead to increases in transport costs of the live birds.

Refer to the table below for a summary of the average cost of transporting live birds to the abattoir, which will be measured against the number of live birds that are slaughtered each month:

Table 3.10 – Cost of live bird transportation per month

Month	Live birds transport costs	Number of birds slaughtered	Transport cost per bird
March 2020	R 573,932	1,189,099	R 0.48
April 2020	R 395,918	1,058,213	R 0.37
May 2020	R 548,704	1,140,240	R 0.48
June 2020	R 490,600	1,152,599	R 0.43
July 2020	R 584,641	1,337,064	R 0.44
August 2020	R 522,152	1,069,406	R 0.49
September 2020	R 706,953	1,174,552	R 0.60
TOTAL	**R 3,822,900**	**8,121,173**	**R 0.47**

As can be observed from the table above, the costs per month are not in line. This is because the diesel price fluctuates every single month and in certain months there is maintenance which will need to be done on the trucks and other expenses such as the procurement of new tyres and yearly licenses.

3.5.5 Distribution costs of the meat

CC Chickens' distribution department is outsourced to a company called Reinke Logistix, which handles all of its distribution and product transportation costs. Reinke Logistix has allocated 8 designated trucks ranging from 4 to 14-ton capacity which will only deliver goods to customers of CC Chickens. All additional meat which cannot be transported with the designated fleet, will be transported with Reinke Logistix trucks, and if they do not have any available, they will outsource it to other transportation companies.

The costs of monthly distribution will depend on the amount of meat that is being sold, as well as where the customers who will be receiving the meat are based. Johannesburg is situated approximately 200 kilometres from Kroonstad, whereas Cape Town is situated more than 1 200 kilometres away. So, if more products were to be sold in the Western

Cape and less in Gauteng, the distribution costs will increase due to the required distance that needs to be travelled.

The distribution costs can be compared to the total weight of products that were sold, but will not be a very accurate measurement for management accounting as the frequency of destinations will change every month.

Refer to the table below where distribution costs are compared to the total weight that was sold for that month:

Table 3.11 – Distribution cost per month

Month	Distribution costs	Weight of meat sold (kg)	Distribution cost per kg sold
March 2020	R 2,582,487	2,067,519	R 1.25
April 2020	R 2,101,836	1,559,088	R 1.35
May 2020	R 1,973,222	1,842,620	R 1.07
June 2020	R 2,186,688	1,997,364	R 1.09
July 2020	R 2,566,598	2,318,156	R 1.11
August 2020	R 2,405,193	2,012,099	R 1.20
September 2020	R 2,320,892	2,050,503	R 1.13
TOTAL	**R 16,136,916**	**13,847,349**	**R 1.17**

As can be seen in the table above, not one month's distribution cost per kilogram is the same as that of another because of the locations that have different costs allocated to them.

3.6 Current variable costs associated with manual labour

3.6.1 Wages and company contributions

Employees working on a wage basis, are paid for the number of hours that they work in a month. They get paid for every hour up until 195 hours. If they work more than 195 hours, they will be paid overtime. The total costs of wages can be compared to the number of slaughter days in a month, and then with the nett production weight for the month.

Refer to the table below for the wage costs per slaughter day comparison:

Table 3.12 – Cost of wages per month

Month	Wage - Cost to company	Number of slaughter days	Wage cost per slaughter day
March 2020	R 2,414,999	24	R 100,625
April 2020	R 2,185,820	21	R 104,087
May 2020	R 2,325,898	22	R 105,723
June 2020	R 2,274,798	23	R 98,904
July 2020	R 2,371,925	26	R 91,228
August 2020	R 2,355,673	21	R 112,175
September 2020	R 2,593,713	23	R 112,770
TOTAL	**R 16,522,825**	**160**	**R 103,268**

Refer to the table below for the wage costs per nett production weight kilogram:

Table 3.13 – Cost of wages per kilogram

Month	Wages - Cost to company	Nett production weight (kg)	Wage cost p/kg
March 2020	R 2,414,999	2,168,530	R 1.11
April 2020	R 2,185,820	1,955,615	R 1.12
May 2020	R 2,325,898	2,125,771	R 1.09
June 2020	R 2,274,798	2,098,578	R 1.08
July 2020	R 2,371,925	2,454,455	R 0.97
August 2020	R 2,355,673	2,058,660	R 1.14
September 2020	R 2,593,713	2,129,709	R 1.22
TOTAL	**R 16,522,825**	**14,991,317**	**R 1.10**

3.6.2 Training

Training is a very important activity for all employees. Regular training for all employees will ensure that they are aware of what is expected of them, and how to do their jobs most effectively and efficiently. All new employees will receive basic training in the following areas:

- Abattoir health and safety regulations
- Food safety regulations
- Quality control regulations
- Allergen awareness

After the new employees have completed their basic training programs, they will proceed to receive training in the specific areas where they will be working.

The cost of training can directly be compared to the number of employees and will be calculated below:

Table 3.14 -Number of employees per month

	Number of employees
March 2020	457
April 2020	434
May 2020	445
June 2020	444
July 2020	442
August 2020	442
September 2020	438

The sum of the number of employees, can be divided by the number of months, to obtain an average number of employees per month:

Table 3.15 – Average number of employees per month

Sum of number of employees	3,102
Number of months	7
Average number of employees per month	443

For the comparison which will be made further along in the study, it is important to determine the training cost per employee, and then the training cost per employee per kilogram produced.

Table 3.16 – Average cost of training per employee

Total cost of training for 7 months	R	328,282.27
Average number of employees per month		443
Cost of training per employee	R	740.80

Table 3.17 – Cost of training per employee per kilogram

Cost of training per employee	R	740.80
Net production weight for 7 months		14,991,317 Kg
Cost of training per employee per kilogram produced	R	0.00005

3.7 Equipment considered for automation

The author had a discussion with the following managers at CC Chickens:

- Willie Griesel (Production Manager)
- Michiel Coetzer (Maintenance Manager)
- Albie Esterhuizen (Managing Director)

It was determined that the following machines can be considered, to introduce into the production process to automate large segments of the production line:

- In-line labelling systems
- In-line weighing and knock-off system
- Automatic cutting system
- Automated box folding machines
- 4 x Multi-head weighers

The different machines and equipment as mentioned above will be further discussed in detail to clarify what their purpose will be in the production line.

Inline labelling system:

After the products have been packed in their bags, the bags will go into different size boxes, depending on what product is inside. The boxes will then go through a machine which will wrap the box with a plastic cover, to ensure that the product remains in the box during handling and transportation

CC Chickens currently uses 2 scales to weigh products and boxes and then label the boxes with stickers to identify what product is packed in the box, as well as the weight of the box in kilograms, the expiry date of the meat, and a barcode and serial number for identification and audit paper trial details. The weighing stations are operated by personnel, who will identify the products and then select the product on the computer. After the product has been selected, it will be weighed and if the weight is within the specified parameters, then the sticker will be printed and attached to the box.

The problem is that sometimes in production, too many boxes can come through to be weighed and labelled, and the employees that need to weigh the boxes, can only process

10 boxes a minute if they are working at maximum capacity. This will cause a bottleneck effect, which will halt certain departments down in the production line because the boxes cannot be weighed and labelled fast enough.

The inline labelling system is an automated weighing system which will weigh the boxes as they are approaching and then identify the boxes by a QR code which will be placed on the boxes in the packing area before arriving to be labelled. The computer will then identify the product, weigh it on the conveyer belt, and then automatically print the sticker and attach it to the box for identification. The inline labelling system producers claim that the system can process 90 boxes per minute on a single line.

Inline weighting and knock-off system:

Fresh meat products account for more than 20% of CC Chickens' product sales. The largest consumers of fresh meat will be QSRs (Quick Service Restaurants) such as KFC's, who need the products fresh, to process them further according to their customers' needs.

QSRs will normally request chickens or portions at a specific size or weight. QSRs sell their products at a certain price, for instance, KFC will sell its deep-fried drumsticks for one price to all customers, irrespective of the size of the portion. These QSRs still need to pay their suppliers according to weights so if the portions are too big, then the QSRs will be losing money because they are paying more for the product, but selling it at the same price.

The QSRs will normally request their products at a certain weight, preferably smaller so that they can maximise the profits. CC Chickens currently has only approximately 6 employees who will remove the chickens from the production line to weigh them, to determine if it is the right size for the fresh meat customers. If the chickens are found to be over- or underweight, then it will be returned to the production line for further processing into other products.

The problem is that the employees cannot keep up with the speed of the production line, and can be missing chickens that are the right size because they are busy weighing other

chicken carcasses. The suitable chickens that are the correct size, are then lost to the rest of the production line where they will be processed into other portions, which might be a lower selling price than the fresh meat, resulting in potential losses for CC Chickens.

The inline weighing and knock-off system is a system that is designed to weigh the chicken carcasses on the production line without stopping to weigh it. The parameters can be input into the computer as to how many carcasses will be needed at what weight, and then as soon as a chicken on the line is within the specified parameters, there will be hydraulic presses which will knock the specific chickens off of the production line, into specified bins to be packed. This system will ensure that chickens that might be more valuable in fresh products, do not pass further along the production line to be processed into other, less expensive products.

Automatic cutting system:

CC Chickens does not only sell whole chickens. Instead, they have a variety of different portions that they pack and sell. For them to have the different portions to be packed, the whole chickens need to be processed further and cut into the different portions to be packed and sold.

82 Employees who work in the packing area that is directly responsible for cutting up the birds into the necessary portions. These employees who cut the birds up with saws are also known as the cutters. The cutters will cut up the birds into the portions that are needed, as ordered by the customers.

The following portions are the most common products which will be packed and sold:

- Spatchcocks (Whole birds that are flattened/butterflied by removing the backbone)
- Breasts/Fillets
- Leg quarters
- Wings
- Drumsticks
- Thighs

The orders for the following day will be giving through to the production manager so that he can ensure that the necessary products are packed for the customers.

The problem with the cutting process is that it is currently very labour intensive and it is the most dangerous process in the whole production line, as the cutters are working with band saws, which can easily cause deep cuts if the employee is not careful. Most of CC Chickens' injuries on duty and first aid cases derive from the cutters, as they lose focus and then easily injure themselves. The cutters are issued steel gloves for their hands, to protect them from the blades, but the gloves are not always 100% effective, as the cutters still get injured sometimes.

The automatic cutting system is equipment that is designed to cut up the carcasses without any human interaction. The whole chicken will enter the machine on one side, and then the machine will cut up the carcasses into the different needed portions, as requested by the production manager. This will also decrease the physical human interaction with the meat, which will decrease the chances of the meat being contaminated and therefore increase the quality of the food safety.

Automated box folding machine:

The average weight of boxes to be sold by CC Chickens, is 10 kilograms per box. CC Chickens processed 14 991 317 kilograms of meat for the 7 months of their 2022 financial year, which is an average of 2 141 617 kilograms per month, which will be more than 200 000 boxes that need to be folded every single month. CC Chickens will slaughter at most 25 days in a single month, which will mean that at least 8 000 boxes will have to be folded every single slaughter day.

There is a machine which can fold these boxes automatically. The only input that needs human intervention, will be to feed the boxes in batches of 50 each into the machine, and then to relocate the boxes after they have been folded.

Multi-head weighers:

CC Chickens will pack its IQF (Individually Quick Frozen) products in specified weighted bags, for instance, bags of 2-kilogram wings or 5-kilogram leg quarters. At this stage, employees will pack each bag and then weigh it to see if it is at the needed and specified weight, which can take a long time as they will need to search for the correct size portions to get as close to the necessary weight as possible.

A multi-head weigher is a machine which will have multiple “heads” in which the products are stored. Each head will weigh the contents, and then the machine, having 8 different heads, will calculate which of the different heads will be combined close enough to the specified weight, and then dump its contents into the bags of the identified heads.

CC Chickens already has one multi-head weigher in its production line for its soup pack products. This machine also weighs the bags after it has been sealed to confirm its accuracy, and bags that are not within the specified parameters are discarded from the packing line, to be repacked.

CC Chickens will have to install 4 of these multi-head weighers in its packing area for the 4 different products that need to be packed as IQF products, namely:

- Wings
- Thighs
- Drumsticks
- Leg quarters

Each product will need its own multi-head weigher, as the machines cannot divide the different portions, and one machine will therefore pack mixed IQF bags, which is not a popular product for CC Chickens.

The abattoir is currently not suited for full automation of the production process, and even if most people are replaced by equipment and machines, later on, no process can be fully automated, as maintenance employees and quality control inspectors are needed.

The above-mentioned machines are what CC Chickens can currently introduce into their production line.

CC Chickens already started with the automation process before the study began, where they installed an automated evisceration department, which will be excluded from this study because the current costs and expenses already include the effects of the new evisceration department. The evisceration department is where all of the intestines of the birds are removed and sorted, from where some of the intestines, such as the livers, can be packed and sold. Other products, such as the milt and gallbladder, are unfit for human consumption and will be discarded.

Another possible automation which can be added in the future, will be automatic cut-up lines, where the machines will cut the portions instead of people. The reason why it cannot be considered right now is because the chickens that are slaughtered are not the same size, otherwise known as variable bird sizes. The automatic cut-up lines will have fixed positions, and if birds are too large or too small for the settings, then the portions will not be cut effectively and the product might not be very appealing to the customers.

3.8 Additional costs with automation

The following quotes have been received for the equipment and machines as mentioned and discussed above:

Table 3.18 – Quoted prices of machines

Equipment description	Quoted price (Excluding VAT)	Appendix attached
Inline labelling system	R 1,255,323	H
Inline weighing and knock-off system	R 13,688,669	G
Automatic cutting machine	*R 23,676,492	J
Automated box folding machine	R 899,266	K
Multi-head weigher	**R 4,288,078	I
Multi-head weigher	**R 4,288,078	I
Multi-head weigher	**R 4,288,078	I
Multi-head weigher	**R 4,288,078	I

*The automatic cutting machine was quoted in European Euro's at €1,193,131.00. The spot rate of exchange for the Euro to the Rand on 30 September 2020 was €1 = ZAR 19.844 (SARB, 2020). €1,193,131.00 x R19.844 = R23 676 492

**The multi-head weigher was quoted in European Euro's at €216 089.40. The spot rate of exchange for the Euro to the Rand on 30 September 2020 was €1 = ZAR 19.844 (SARB, 2020). €216 089.40 x R19.844 = R4 288 078

3.8.1 Electricity

CC Chickens currently pays the Moqhaka Municipality, which is their local municipality, R0.88 per Kw/H for their electricity. This is cheaper than domestic rates because CC Chickens is classified as a major electricity user, and therefore qualifies for bulk usage prices.

As confirmed with CC Chickens' Maintenance Manager, Michiel Coetzer, the necessary machines that were mentioned above, do not use too much electricity, and the hourly cost of electricity of the machines can be observed in the table below:

Table 3.19 – Cost of electricity per machine per hour

Equipment description	Electricity usage per hour (Kw/h)	Cost per Kw/h	Total electricity cost per hour
Inline labelling system	2.00	R 0.88	R 1.76
Inline weighing and knockoff system	5.00	R 0.88	R 4.40
Automatic cutting machine	5.00	R 0.88	R 4.40
Automated box folding machine	3.00	R 0.88	R 2.64
Multi-head weigher	3.00	R 0.88	R 2.64
Multi-head weigher	3.00	R 0.88	R 2.64
Multi-head weigher	3.00	R 0.88	R 2.64
Multi-head weigher	3.00	R 0.88	R 2.64
Totals	**27.00**	**R 0.88**	**R 23.76**

CC Chickens are slaughtered 25 days in a month at most, with the average slaughter shift lengths being 8.75 hours for 50 000 birds. The total cost of additional cost for electricity in a month for the new machines can be calculated as follows:

Table 3.20 – Additional cost of electricity per month

Average slaughtering hours per day		8.75
Total slaughter days per month		25.00
Total slaughter hours per month		218.75
Cost of additional electricity per hour	R	23.76
Total additional electricity cost per month	R	5,197.50

The comparison between automation and labour will be made on cost per kilogram produced, so the cost per kilogram can be calculated as follows:

Table 3.21 – Cost of additional electricity per kilogram

Total additional electricity cost per month	R	5,197.50
Average nett production weight per month		2,141,616.72
Cost of additional electricity per kilogram	R	0.002

The cost per kilogram of the additional electricity per kilogram is almost insignificant and will not affect the ultimate results of the comparison if it is included in the total additional costs of automation.

3.8.2 Maintenance costs

All of the equipment and machines will have to be maintained to ensure that they can operate at optimal effectivity and efficiency. This can be done by performing preventative and routine maintenance. After consultation with Michiel Coetzer, it was determined that the maintenance department of CC Chickens will have the capacity to perform routine maintenance of the equipment, without the need to appoint additional employees.

The additional costs will be incurred when the equipment has unexpected breakdowns and technical problems which will need to be fixed by specialists, which is more expensive than regular maintenance. Mr. Coetzer added that provisions for unexpected maintenance costs of machines can be calculated at 10% per year of the original cost price.

The table below will indicate the projected additional maintenance costs which can be expected with the new machines and equipment:

Table 3.22 – Additional maintenance cost per machine per year

Equipment description	Quoted price (Excl. VAT)		Expected maintenance cost (Quoted price x 10%) per year	
Inline labelling system	R	1,255,323	R	125,532
Inline knock-off system	R	13,688,669	R	1,368,867
Automatic cutting machine	R	23,676,492	R	2,367,649
Automated box folding machine	R	899,266	R	89,927
Multi-head weigher	R	4,288,078	R	428,808
Multi-head weigher	R	4,288,078	R	428,808
Multi-head weigher	R	4,288,078	R	428,808
Multi-head weigher	R	4,288,078	R	428,808
TOTAL	**R**	**56,672,061**	**R**	**5,667,206**

The additional expected maintenance cost will be converted into expected additional maintenance cost per kilogram produced, for comparison later in the study.

Table 3.23 – Additional maintenance cost per kilogram

Expected maintenance cost per year	R	5,667,206
Expected maintenance cost per month	R	472,267
Average nett production weight per month		2,141,617
Expected additional maintenance cost per kilogram	R	0.22

3.8.3 Finance costs

All of the machines will have to be financed by the bank, as CC Chickens does not have the capital available to buy these machines without creating concern for their cash flow. CC Chickens banks with ABSA and all of their loans are also with ABSA. Over the years they have built up a good credit record and can finance these loans at the prime rate of interest, which is currently 7% (Wonga, 2020).

CC Chickens will pay back their loans over 6 years, or 72 months to ease the burden on their cash flow.

The function on “Microsoft Excel” named “Loan Amortization Schedule” can be used to calculate the monthly repayments, as well as the total interest which will be payable over the 6 years. Refer to the tables below for each machine’s calculation of repayments and average interest per month:

Table 3.24 – Average interest costs per machine

	Inline labelling system	
Quoted price (Excl. VAT)	R	1,255,323
Loan amount (Incl. VAT)	R	1,443,621
Repayment per month	R	24,612
Total interest cost	R	328,465
Average interest per month	R	4,562

	Inline weighing and knock-off system	
Quoted price (Excl.VAT)	R	13,688,669
Loan amount (Incl. VAT)	R	15,741,969
Repayment per month	R	268,385
Total interest cost	R	3,851,746
Average interest per month	R	53,496

	Automatic cutting machine	
Quoted price (Excl. VAT)	R	23,676,492
Loan amount (Incl. VAT)	R	27,227,966
Repayment per month	R	403,661
Total interest cost	R	5,387,076
Average interest per month	R	74,820

	Automated box folding machine	
Quoted price (Excl. VAT)	R	899,266
Loan amount (Incl. VAT)	R	1,034,156
Repayment per month	R	17,638
Total interest cost	R	235,393
Average interest per month	R	3,269

	Multi-head weigher	
Quoted price (Excl. VAT)	R	4,288,078
Loan amount (Incl. VAT)	R	4,931,290
Repayment per month	R	84,074
Total interest cost	R	1,122,009
Average interest per month	R	15,583

The table below shows the sum of all of the average interest which will be paid for each set of equipment for 72 months or 6 years, which will be the average period that CC Chickens will pay back on the finance loans:

Table 3.25 – Average interest costs per machine

	Average interest per month	
Inline labelling system	R	4,562
Inline weighing and knock-off system	R	53,496
Automatic cutting machine	R	74,820
Automated box folding machine	R	3,269
Multi-head weigher	R	15,583
Multi-head weigher	R	15,583
Multi-head weigher	R	15,583
Multi-head weigher	R	15,583
Total	**R**	**198,482**

The table below shows the average cost of interest per kilogram of meat produced.

Table 3.26 – Average interest cost per kilogram

Average interest cost per month	R	198,482
Average nett production weight per month		2,141,617
Average cost of interest per produced kilogram	R	0.09

3.8.4 Depreciation and amortisation

CC Chickens has adopted an accounting policy where they allow their assets that are capitalised, to be depreciated over 10 years on a monthly straight-line method. They also allocate a residual value of 30% of the purchase value to their assets.

Therefore, their depreciation for an asset that is bought for R1 million will be calculated every month as follows:

[1 000 000 – (1 000 000 x 30%)] ÷ 10 years ÷ 12 months per year = R5 833 per month

The amount which will be deducted every month for depreciation for assets can be observed by the calculations in the table below:

Table 3.27 – Depreciation cost per machine per month

Equipment description	Quoted price (Excl. VAT)		Depreciation per month	
Inline labelling system	R	1,255,323	R	7,323
Inline knock-off system	R	13,688,669	R	79,851
Automatic cutting machine	R	23,676,492	R	138,113
Automated box folding machine	R	899,266	R	5,246
Multi-head weigher	R	4,288,078	R	25,014
Multi-head weigher	R	4,288,078	R	25,014
Multi-head weigher	R	4,288,078	R	25,014
Multi-head weigher	R	4,288,078	R	25,014
TOTAL	**R**	**56,672,061**	**R**	**330,587**

Table 3.28 – Depreciation cost per kilogram

Depreciation per month	R	330,587
Average nett production weight per month (kg)		2,141,617
Cost of depreciation per produced kilogram	R	0.15

3.9 Cost comparisons

The purpose of this study is to determine if it would be financially viable for CC Chickens to replace certain parts of their production line with machines and equipment, also known as mechanising. To assess the financial viability of mechanisation, there should be a common measurement which can compare the different options directly with one another.

In CC Chickens' study, that common measurement will be the cost per kilogram produced. The additional cost of mechanisation, will be compared to the savings in costs which will be attributed to mechanisation, such as fewer labour costs which will be needed.

Labour costs will be accountable for the largest savings when CC Chickens decides to mechanise. The author consulted with the following managers:

- Willie Griesel (Production Manager)
- Michiel Coetzer (Maintenance Manager)
- Albie Esterhuizen (Managing Director)

It was determined that, if the equipment as mentioned, will be introduced, it will replace the following number of employees in the production line:

Table 3.29 – Number of employees to be replaced per employee

Equipment description	Number of employees which will be replaced by the machine
Inline labelling system	8
Inline weighing and knock-off system	12
Automatic cutting machine	85
Automated box folding machine	8
Multi-head weigher	4
Multi-head weigher	4
Multi-head weigher	4
Multi-head weigher	4
Totals	**129**

With the number of employees that might potentially be replaced by machines, the potential additional costs and cost-saving can be calculated.

3.9.1 Cost savings with automation:

CC Chickens employees who will be replaced by the equipment, if they decide to continue with mechanisation, will all be employees who are paid minimum wage because the activities that they are performing, can be done by unskilled workers and are not very complicated and repetitive by nature.

The current minimum wage in South Africa is set at R20.76 per hour (South African Government, 2020). CC Chickens employees are expected to work 195 hours per month before overtime is paid. The following savings can be made on wages if CC Chickens decides to introduce all of the equipment:

Table 3.30 – Saving per kilogram on wages

Number of employees		129
Average expected hours per month per employee		195
Total hours per month		25155
Minimum wage per hour	R	20.76
Saving per month on wages	R	522,218
Average net production weight per month (kg)		2,141,617
Saving per produced kilogram on wages	R	0.24

CC Chickens also has a policy that it will contribute 3% of the employee's basic wage towards their retirement fund, and the company contributes an additional 2.77% of their basic wage, towards life cover, disability cover, and funeral plans for each employee every month. Then CC Chickens also pays 1% for SDL (Skills Development Levy) and 1% for UIF (Unemployment Insurance Fund) every month towards SARS (South African Revenue Service) as stated by law.

Additional to the above-mentioned costs, CC Chickens also needs to pay 2.67% of an employee's basic pay every year to the Compensation Fund, as insurance for employees who might get injured on duty. Therefore, the following additional costs to the company for every employee should also be considered:

Table 3.31 – Saving per kilogram on additional wage benefits

Retirement fund contribution		3.00%
Additional insurance contribution		2.77%
UIF contribution		1.00%
SDL contribution		1.00%
Compensation fund contribution		2.67%
Additional cost to company of wages		10.44%
Saving per month on wages	R	522,218
Savings on additional costs to the company	R	54,520
Average nett production weight per month (kg)		2,141,617
Saving per produced kilogram on additional benefits	R	0.03

The cost of training employees was calculated at R0.0005 per employee per kilogram produced, in section 3.6.2. The cost component of training will be shown in the table below:

Table 3.32 – Saving per kilogram on training

Cost of training per employee per kilogram produced	R	0.00005
Number of employees		129
Cost saving in training per employee per kilogram produced	R	0.01

The total cost saving per kilogram produced, if CC Chickens decides to invest in automation, can be seen in the table below:

Table 3.33 – Total savings per kilogram with mechanisation

Saving per produced kilogram on wages	R 0.24
Saving per produced kilogram on additional benefits	R 0.03
Saving per produced kilogram on training	R 0.01
Total savings on kilograms produced	**R 0.28**

3.9.2 Additional costs associated with mechanisation:

All of the additional costs were already converted into their costs per kilogram that are produced in section 3.8, and in the table below, the specific section will be mentioned for reference:

Table 3.34 – Total additional cost per kilogram for mechanisation

Additional cost class	Additional R/kg	Section
Electricity	R0.00	3.8.1
Maintenance cost	R0.22	3.8.2
Finance cost	R0.09	3.8.3
Depreciation	R0.15	3.8.4
Total additional cost per kilogram produced	**R0.46**	

3.9.3 Comparison

CC Chickens chooses to do all of their financial reporting, by converting their costs back to the price per kilogram produced. Therefore, all of the costs and calculations for this study were done and converted back to the price per kilogram produced, so that the different options can be directly compared to one another.

In section 3.9.1 the total costs which will be saved with the mechanisation were calculated, and the results were that R0.28 will be saved for every kilogram of meat that is produced to be sold.

In section 3.9.2 the additional costs which will be incurred with mechanisation were calculated, and the results were that CC Chickens will pay R0.46 more for mechanisation for every kilogram which will be produced to be sold.

The table below states the difference between the savings and the additional costs, and whether mechanisation will be less or more expensive than CC Chickens' current labour-intensive process:

Table 3.35 – Cost comparison of mechanisation

Cost saving per kilogram produced	R 0.28
Additional cost per kilogram produced	R 0.46
Rand per kilogram more expensive	**R 0.18**

As can be observed in the table above, mechanisation will be R0.18 more expensive than CC Chickens' current labour-intensive process.

3.10 Conclusion

During this chapter, all of the costs of production were analysed and presented to get a better idea of each cost, and how big the impact is of each cost on production. The costs were grouped into fixed and variable costs, with the weight that was produced being the variable.

The irrelevant costs of the study were firstly presented, such as fixed costs which will not change with the introduction of more machines. This included costs such as rent, fixed salaries, and cleaning costs. The irrelevant variable costs were then presented, for costs that are variable with the amount of meat that is processed but will not be affected by the introduction of more machines. These costs included the cost of the live birds, packaging materials, brine solutions, and then transport costs of the live birds and distribution costs of the final products.

The relevant costs to this study will change if more equipment were to be introduced, and the backbone of this was then calculated and presented. The variable costs which will change if more equipment is introduced, were the wages and the cost of training employees. These costs will also be where CC Chickens will be saving on costs if they decide to mechanise parts of their production line because employees will be replaced by the machines.

The next costs that were calculated, were the additional costs which will realise if they introduce more machines and equipment into the production line. This included costs such as additional electricity that the machines will use and the cost of maintenance of

these machines. CC Chickens will have to get external finance to procure the machines, and they will have to pay interest on those loans, as well as the depreciation of the asset every month that the machine is used.

The savings and additional costs of mechanisation were then compared directly to one another to determine whether mechanisation will be more or less expensive if CC Chickens decides to invest in mechanisation.

In the following chapter, recommendations will be made to CC Chickens based on the results of this chapter. The limitations of this study will also be discussed, as well as what possible studies and research can be actioned further, based on this study.

Chapter 4 – Recommendations

4.1 Introduction

In the previous chapter, the empirical study was conducted and completed to determine whether the mechanisation of CC Chickens' production line will be financially viable to the company. The results were that mechanisation will be more expensive for the company.

In this chapter, the results of the empirical study will be extended and extrapolated to monthly and yearly costs. Recommendations will then be made based on the results of the previous chapter and the empirical study. The limitations of the study will also be discussed, as well as the potential studies or further that which can be conducted based on the results of this study.

A conclusion on the study will then be included to give a broad-based summary of what was planned with the study, what research was done, and the final results of the study.

4.2 Results

Based on the results in section 3.2.3, it was determined that CC Chickens' production costs will increase by R0.18 per kilogram that is produced, and ready to sell. This calculation is based on CC Chickens' current approximate slaughtering average of 50 000 chickens per day.

According to the results from the empirical study, refer to the below table for the calculations of how much more expensive automation will be every month, and then over a year:

Table 4.1 – Additional cost of mechanisation per month and per year

Rand per kilogram more expensive	**R**	**0.18**
Average nett production weight per month (kg)		**2,141,617**
Mechanisation more expensive per month	**R**	**385,491**
Number of months per year		**12**
Mechanisation more expensive per year	**R**	**4,625,892**

According to the study, automation will be R385 491 more expensive every month, and R4 625 892 over one year. This is given that CC Chickens slaughters only 50 000 chickens per day.

All of the machines and equipment are engineered to handle line speeds which will allow CC Chickens to slaughter 80 000 chickens per day, with the machines that were included in this study. But the study can be expanded to calculate the effect on 80 000 chickens a day, but this will be included in further studies.

The goal of this study was to assess whether it will be financially viable for CC Chickens to automate certain parts of their production line. Based on the results of the research, the answer is no. It will not be financially viable for CC Chickens to mechanise parts of their production line, as it will be more expensive and not financially viable.

4.3 Recommendation

As was determined in the results, it will not be financially viable for CC Chickens to mechanise their production line and the recommendation will be based on these results.

The recommendation will be that they should not proceed to mechanise their production line if they will only be slaughtering 50 000 chickens a day because it will be more expensive and their profits will decrease monthly, as their production costs per kilogram will increase.

This is also a benefit for the current employees of CC Chickens if they do not decide to mechanise, as it will not be necessary for them to be retrenched and increase the country's unemployment rate.

It is recommended that they extend the scope of this study to 80 000 chickens per day, where it might be more viable then, as they will increase their nett production weight, where the costs of the machines will remain the same. The Rand per kilogram of produced meat will decrease with the dividing factor which will be increasing, therefore leading to less expensive production costs per kilogram.

4.4 Limitations of the study

The results of this study might not apply to other poultry processing plants or other industries, as it was a case study that was completed on a single poultry processing plant in Kroonstad, South Africa.

The study was limited to a single company and the financial results that they had for the first 7-months of their financial year ending 28 February 2021. These costs were also incurred and realised in the COVID-19 pandemic and the nationwide lockdown, that was implemented by the South African Government. These costs might have differed if it was a normal trading year without the economic effects of the pandemic.

The study was also limited to their current slaughtering capacity of 50 000 chickens per day, which they slaughter on average. The results will change if the total weight that is produced changes, which can make the cost of mechanisation less- or more expensive.

4.5 Further recommended studies

As the study was only limited to CC Chickens and their current 50 000 chickens that they slaughter per day, the study can be expanded to include other poultry processing facilities and can even be expanded to the entire poultry industry in South Africa.

The study can also be extended to determine the financial viability at CC Chickens if they decide to increase their daily average slaughtering. It is their medium-term vision to increase their production to 80 000 chickens per day, so the study can be extended to 80 000 to determine the viability of mechanisation then.

4.6 Conclusion

During this chapter, the results of the empirical study were expanded from the additional cost per produced kilogram, to determine what the additional costs will be monthly, as well as yearly. It was determined that it would not be financially viable for CC Chickens to invest in mechanisation, if they will only be slaughtering 50 000 chickens per day.

They were recommended to not continue with mechanisation of the production line, as it will not currently be financially viable for them to do so. The limitations of the study were also mentioned, as well as possible further studies that can sprout out of this research.

This was also the final chapter of the research and will be followed by the references and appendixes.

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Chapter 6: Appendixes

Certificate issued by the Companies and Intellectual Property Commission on Wednesday, February 12, 2020 11:00
Certificate of Confirmation

Companies and Intellectual Property Commission
a member of the dti group

Registration number	**1998 / 014653 / 07**
Enterprise Name	**CC HOLDINGS (PTY) LTD**
Enterprise Shortened Name	**None provided.**
Enterprise Translated Name	**None provided.**
Registration Date	**28/07/1998**
Business Start Date	**28/07/1998**
Enterprise Type	**Private Company**
Enterprise Status	**In Business**
Financial year end	**February**
Main Business/Main Object	
Postal address	**1 TWELFTH AVENUE** **KROONSTAD** **KROONSTAD** **FREE STATE** **9499**
Address of registered office	**1 TWELFTH AVENUE** **KROONSTAD** **KROONSTAD** **FREE STATE** **9499**
Location of Company Records	ALL COMPANY RECORDS **SUITE 204 NEDBANK BUILDING**

Certificate issued by the Companies and Intellectual Property Commission on Wednesday, February 12, 2020 11:00
Certificate of Confirmation

Companies and Intellectual Property Commission
a member of the dti group

Registration number	**2001 / 019640 / 07**
Enterprise Name	**CC CHICKENS (PTY) LTD**
Enterprise Shortened Name	**None provided.**
Enterprise Translated Name	**None provided.**
Registration Date	**20/08/2001**
Business Start Date	**20/08/2001**
Enterprise Type	**Private Company**
Enterprise Status	**In Business**
Financial year end	**February**
Main Business/Main Object	
Postal address	**POSBUS 9 WELKOM 9459**
Address of registered office	**1 TWELTH AVENUE KROONSTAD 9499**

CC HOLDINGS EIENDOMS BEPERK

Kworum - 25 % teenwoordig
Gewone aandeelhouers Resolusie 50 % +

Aandeelhouer	Aandele	
Dunfermline Boerdery Edms Bpk	19 850.00	22.18%
C & J Chicks Edms Bpk	12 600.00	14.08%
GGL Boerdery Edms Bpk	14 545.00	16.25%
Lena Boerdery Trust	12 000.00	13.41%
AS Roux Algemene Kontrakteurs	8 000.00	8.94%
Tradefair Two Edms Bpk	12 120.00	13.54%
Agri Chicks BK	1 640.00	1.83%
JC Coetzee	6 000.00	6.71%
Bermuda Braaikuikens	2 727.00	3.05%
	89 482.00	100.00%

Appendix D

CC CHICKENS GROEP
MAR 2019 - FEB 2020
BELANGRIKE SYFERS

CC CHICKENS:

	JTD	JTD-1	19-Mar	19-Apr	19-May	19-Jun	19-Jul	19-Aug	19-Sep	19-Oct	19-Nov	19-Dec	20-Jan	20-Feb
SLAGDAE	278	276	23	22	24	21	25	24	22	25	24	21	25	22
HOENDERS GESLAG PER DAG (GP syfers)	50 440	43 948	49 327	51 288	50 149	49 634	50 589	49 714	50 819	50 695	49 733	54 151	48 653	51 096
AANKOOPPRYS (GP syfers)	R 14.03	R 12.89	R 13.87	R 13.86	R 13.74	R 13.91	R 13.98	R 14.26	R 14.22	R 14.22	R 14.05	R 14.00	R 14.07	R 14.10
VERKOOPPRYS (GP syfers)	R 22.47	R 21.38	R 21.78	R 22.69	R 22.59	R 22.12	R 22.39	R 22.53	R 22.54	R 22.35	R 22.69	R 22.94	R 22.59	R 22.81
GEWIG (GP Syfers)	1.81	1.81	1.78	1.77	1.79	1.82	1.81	1.82	1.89	1.81	1.84	1.81	1.80	1.78

SIKLUS / CYCLE ESTIMATION		143
Hersiening / Revision:		143
Effective date:		2020/10/20
Growth Parameters	**Standard Performance**	
Cycle Length	49	days
Slaughter Age	33	days
Cycles per annum	7.42	per annum
House Size	1,594	m²
Placement density	22.320	birds/m²
Birds Placed per House	35,525	birds
Average Live Mass	1.782	kg
Feed Conversion Ratio	1.504	0
Total Mortality (%)	5.002%	%
Total Mortality (birds)	1,777	birds
Birds Slaughtered	33,749	birds
Total Live Mass Slaughtered	60,150	kg live mass
Feed consumed per bird Slaughtered	2,680	grams
Total Feed Consumed	90,438	kg
Day-old-Chick Cost	5.61	R
Fixed Grower's Margin	1.41	R/kg

		Begin	Eindig
	Slagdatums	2020/10/30	2020/12/18
	Plasingsdatum	2020/09/28	2020/11/12

STANDARD PRODUCTION COST

Item	Standard Cost at 33 days				
	Allocation	Cumulative	Cost/House	Cost/kg LM	Cost/Bird Placed
1. Feed	61.9%	61.9%	R 509,735.99	R 8.474	R 14.348
2. DOC	24.2%	86.1%	R 199,446.00	R 3.316	R 5.614
3. Heating	2.3%	88.5%	R 19,163.53	R 0.319	R 0.539
4. Labour	2.4%	90.9%	R 20,146.81	R 0.335	R 0.567
5. Bedding	2.5%	93.4%	R 20,660.92	R 0.343	R 0.582
6. Vaccines & Meds	0.6%	94.1%	R 5,161.68	R 0.086	R 0.145
7. Maintenance	1.1%	95.1%	R 8,685.53	R 0.144	R 0.244
8. Catching	0.0%	95.1%	R -	R -	R -
9. Cleaning & Washing	0.4%	95.6%	R 3,695.84	R 0.061	R 0.104
10. Electricity	2.1%	97.7%	R 17,657.80	R 0.294	R 0.497
11. Admin & Management	0.5%	98.2%	R 4,064.77	R 0.068	R 0.114
12. Insurance	0.4%	98.6%	R 3,275.24	R 0.054	R 0.092
13. Other	1.4%	100.0%	R 11,596.67	R 0.193	R 0.326
TOTAL COST	100.0%	100.0%	R 823,290.78	R 13.69	R 23.175

Feed & DOC	R	11.79	R	19.96
Farm Cost	R	1.90	R	3.212
Costs	**R**	**13.69**	**R**	**23.17**
Margin	R	1.41	R	2.39
TOTAL	**R**	**15.10**	**R**	**25.56**

FIXED GROSS	R	3.31	R	5.60

VOER / FEED	Code	Intake (g/bird)	%	Price / Ton	Weighted Price
Mafuta + Pre-Starter	LKBU831	280	10.4%	R 6,313.45	
Starter	LKBU832	470	17.5%	R 5,483.00	
Grower	LPBU833	900	33.6%	R 5,726.40	R 5,636.28
Finisher	LPBU834	450	16.8%	R 5,449.80	
Post-Finisher	LPBU835	580	21.6%	R 5,378.80	
TOTAL		2,680	100.0%		

SIKLUS	143	PRICE PER TON				
Telwiedre Elite 133	Voer	Actigen	Micofix Select	Coyden	Olaqundox 10%	Compound
Mafuta	R 6,885.00	R 63.20	R 83.00	R 36.00	R 30.80	R 0.00
Pre Starter	R 5,780.00	R 63.20	R 83.00	R 36.00	R 30.80	R 0.00
Starter	R 5,270.00	R 63.20	R 83.00	R 36.00	R 30.80	R 0.00
Grower	R 5,545.00	R 31.60	R 83.00	R 36.00	R 30.80	R 0.00
Finisher	R 5,315.00	R 15.80	R 83.00	R 36.00	R 30.80	R 0.00
Post-Finisher	R 5,280.00	R 15.80	R 83.00	R 36.00	R 30.80	R 0.00

PERFORMANCE				
Age (days)	Live Mass (kg)	FCR	Mortality (%)	PEF
31	1.639	1.476	4.698%	341
32	1.710	1.490	4.850%	341
33	**1.782**	**1.504**	**5.002%**	**341**
34	1.856	1.517	5.153%	341
35	1.931	1.531	5.305%	341
36	2.006	1.544	5.456%	341

STANDARD MEAT PRICE					
DOC (R/kg)	Feed (R/kg)	Other (R/kg)	Margin (R/kg)	TOTAL (R/kg)	incr
3.594	8.361	2.056	1.410	15.42	0.17
3.450	8.417	1.974	1.410	15.25	0.15
3.316	**8.474**	**1.897**	**1.410**	**15.10**	**0.00**
3.189	8.533	1.825	1.410	14.96	-0.14
3.071	8.592	1.757	1.410	14.83	-0.13
2.959	8.651	1.693	1.410	14.71	-0.12

BROILER STOCKING DENSITY							
GROWER	CYCLE	DOC PLACED	House Size (m²)	S/D (b/m²)	End Cycle 142	End Cycle 143	Cycle Length
TT	143	311,000	14,016	22.19	2020/09/17	2020/11/06	50
DU	143	336,000	14,400	23.33	2020/09/25	2020/11/13	49
HZ	143	97,000	4,140	23.43	2020/09/29	2020/11/17	49
BB	143	261,000	11,070	23.58	2020/10/05	2020/11/23	49
KW	143	207,000	9,720	21.30	2020/10/09	2020/11/27	49
AS	143	128,000	5,940	21.55	2020/10/13	2020/12/01	49
JCC	143	212,000	9,946	21.32	2020/10/17	2020/12/05	49
GG	143	336,000	14,760	22.76	2020/10/24	2020/12/12	49
MVM	143	216,000	10,080	21.43	2020/10/29	2020/12/18	50
	TOTAL	**2,104,000**	**94,072**	**22.37**			**49**
	AVERAGE:	**-**	***1,594***	***22.32***			

Appendix F

CC CHICKENS
SALARISSE
2021 FIN JAAR

	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20
COST TO COMPANY	R 3,786,522.28	R 3,245,564.43	R 3,356,272.00	R 3,331,350.00	R 3,581,276.00	R 3,436,765.84
OORTYD	R 503,183.34	R 262,061.50	R 334,245.77	R 289,347.12	R 393,915.48	R 424,742.39
AANTAL WERKNEMERS	457	434	445	444	442	442
PRODUKSIE GEWIG	2,037,622.06	1,889,306.71	2,025,396	2,014,878	2,392,456	1,943,303
KOSTE PER KG	**R 1.86**	**R 1.72**	**R 1.66**	**R 1.65**	**R 1.50**	**R 1.77**

Sep-20	TOTAAL
R 3,716,206.08	R 24,453,956.63
R 606,482.08	R 2,813,977.68
438	
2,014,758	R 14,317,720.12
R 1.84	**R 1.71**

RUSANDUS
RUSANDUS cc Reg. No: 2006/094073/23
Vat No: 4330244734 Export Code: 20587240
Banking Details:
Bank: STANDARD BANK
Branch: Eastgate Branch
Branch No: 018-505
Acc No: 02 264 885 2
Cell: +27 82 856 6662
Office: +27 16 341 2044
Fax: +27 86 527 5252
www.rusandus.co.za
Email: rusandus@mweb.co.za/sales @rusandus.co.za

- Technical Specifications:
- Stainless steel frame and motor
- Machine dimensions 1302 x 1000 x 1312 mm (LxWxH)
- Weight: approx. 100 kg
- By manual hanging after the water chiller or birds that came out of a crate, the hanger need to stretch the wings manually.

C01 1 STEEL CONSTRUCTION
Steel construction for supporting the overhead conveyor.
Square box profile 100x100

D01 1 FM SPARE PARTS
Starter critical spare parts.

D02 1 CIF COSTS
Based on:
1 by 40ft Container.
POL: Rotterdam.
POD: Durban, ZA
Delivered to site CC Chickens, Kroonstad Industrial Area.

D03 1 SUPERVISION
Foodmate to provide 2 supervisors for 7 days (inc travel days), who will supervise RUSANDUS installation team consisting of 2 welders / 2 fitters / 2 assistants / 1 electrician team) for the system. This includes destuffing the container on site, forklift, tools, travel, lodging for all.

SUMMARY:

Total Area A Chilling	**EURO 42,345.00**
Total Area B Weighing System	**EURO 571,102.00**
Total Area C Steel Construction	**EURO 68,000.00**
Total Area D Services	**EURO 76,710.00**
Total Quotation Price	**EURO 758,157.00**
Total Quotation Estimated Rand Price	**R 13,688,669.00**

The above-mentioned data as well as the layout of the offered equipment are based on general experience respectively. Information's, received by the client. According to local operating conditions and differences in bird´s size, the above data may differ. FOODMATE/RUSANDUS cannot be held responsible if the above data are not corresponding to the operating conditions. Livestock is not a uniform product.

SALES QUOTATION

BIZERBA SA (PTY) LTD

24 Falcon Lane, Lanseria Coporate Estate
Lanseria
www.bizerba.co.za
Tel: +27 (0)11 745 1940
Tax Reg No.: 4240265910

BIZERBA

Sales Quotation	
Document Date	: 16/11/2020
Document No	: 20201235
Sales Executive	: Johannes Theron
Customer Ref	:
Customer Vat No.	: 4410198511
Customer No.	: 1000450
Customer Name	: CC Chickens (Pty) Ltd

ITEM	DESCRIPTION	QTY	UoM	PRICE	DISC. %	NET PRICE	AMOUNT (ZAR)
Bizerba Software (Compulsary for Data Integration with Meat Matrix)Licence Fees is a Once Off Payment							
M003981	BRAIN2 Standard	1.0	CONF	10 300,00	50,00	5,150.00	5,150.00
M004700	BRAIN2 Capture	2.0	CONF	2 100,00	50,00	1,050.00	2,100.00
300060505200	Brain2 Installation	1.0	PCE	9 420,00	0,00	9,420.00	9,420.00
300060505202	Installation BRAIN2 Capture	1.0	PCE	1 875,00	0,00	1,875.00	1,875.00
M003995	BRAIN2 Safety_Service	2.0	PCE	1 100,00	50,00	550.00	1,100.00
M004701	BRAIN2 OEE	1.0	CONF	28 650,00	50,00	14,325.00	14,325.00

Subtotal	ZAR 1,255,323.48
Total VAT	ZAR 188,298.52
Total	ZAR 1,443,622.00

I trust the quotation is in order, however if you have any questions please do not hesitate to contact me directly.

Kind regards,

Johannes Theron
Mobile: 0822222126
Email: johannes.theron@bizerba.com

Remarks:

The quotation is subject to Bizerba's standard Terms & Conditions available @ www.bizerba.co.za

I, the undersigned hereby accept the above quotation and agree to be bound by Bizerba Southern Africa (Pty) Ltd standard Terms & Conditions.

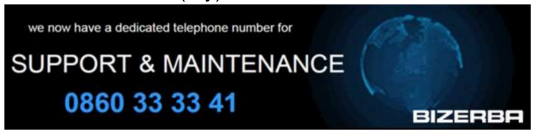
Quote Valid Until : 16/12/20

Date accepted : / /

Accepted by :

Signed at :

Signature :



Bank Details:
Bank: Nedbank
Account Number: 1075533929
Branch Number: 198765

marel
POULTRY

CC CHICKENS (PTY) LTD
12TH ROAD 1
KROONSTAD
9499 SOUTH AFRICA

Marel Poultry B.V.
Handelstraat 3, 5831 AV Boxmeer
P.O. Box 118, 5830 AC Boxmeer
The Netherlands

Telephone : +31 (0)485 586111
Fax : +31 (0)485 586222
Bank : Rabobank Utrecht
Account no. : 300 0241 34
Swift code : RaboNL2U
IBAN : NL93 RABO 0300 0241 34
VAT number : NL001901229B01

Invoice Original

Your reference	: O142315
Our reference	: PB/PN/413776
Direct line	: +31 (0) 485-586929
Fax direct	: +31 (0) 485-586488
E-mail	: Paul.nagels@marel.com
Date	: 15/05/2019
Subject	:

Please state upon payment	
Invoice number	PF413776
Accountnr.	17673

DELIVERY UNDER IRREVOCABLE DOCUMENTARY CREDIT NUMBER 175-01-0451510

NEW MAREL POULTRY PROCESSING EQUIPMENT
MHW SOUP PACK WITH ANCILLARY EQUIPMENT
AS PER ORDER CONFIRMATION 413776.1 (O142315) DATED 25/10/2018
CIF DURBAN PORT, SOUTH AFRICA (INCOTERMS 2010)

VALUE OF GOODS EXW BOXMEER	EUR. 212.814,40
FREIGHT CHARGES	EUR. 2.805,00
INSURANCE PREMIUM	EUR. 470,00
TOTAL VALUE CIF DURBAN (INCOTERMS 2010)	EUR. 216.089,40

COUNTRY OF ORIGIN : EUROPEAN UNION
CUSTOMS TARIFF NO. : 84385080
QUANTITIES OF THE GOODS : 1 CASE, 2 CRATE
CONTAINERNUMBER : MEDU3981799
SEALNUMBER : B1857677
TOTAL GROSS-/NETWEIGHT : 2200KG / 1930KG
SHIPPING MARK : CC CHICKENS KROONSTAD SOUTH AFRICA /ORDER 413776
PORT OF LOADING : ROTTERDAM PORT IN EUROPE
PORT OF DISCHARGE : DURBAN PORT, SOUTH AFRICA

"WE CONFIRM THAT ALL ITEMS COVERED BY INVOICE NO.PF413776 ARE NEW AND HAVE NOT BEEN FIELD TESTED AND HAVE NOT BEEN EXPOSED TO PLANT, SOIL OR ANIMAL AND MATERIAL DURING FACTORY TESTING."

BOXMEER, DATED 15/05/2019

P.J.W.M. NAGELS
SHIPPING EMPLOYEE

Marel Poultry B.V.

ADVANCING
FOOD PROCESSING

413776

Total Area price	A	Description (Chilling Area)	:	€	28.081,00
Total Area price	B	Description (Weighing System)	:	€	574.940,00
Total Area price	C	Description (Cut-up System)	:	€	305.170,00
Total Area price	D	Description (Breast Deboning System)	:	€	626.315,00
Total Area price	E	Description (Thigh Deboning System)	:	€	53.685,00
Total Area price	F	Description (Giblet Handling System)	:	€	13.685,00
Total Area price	G	Description (Steelconstruction)	:	€	34.735,00
Total Area price	H	Description (Maintenance Equipment)	:	€	14.265,00
		Quotation price		€	1.650.876,00
		Description (Spare parts)	:	€	49.095,00
		Description (Transport)	:	€	14.700,00
		Description (Supervision)	:	€	53.400,00
		Total quotation price		€	1.768.071,00

1. BUDGET PRICE STRUCTURE

EQUIPMENT	PRICE (EXCL. VAT)
Acepak TF Tray former	R 648 000,00
Ledge Fold system	R 65 000,00
Upgrade To Stainless Steel	R 60 000,00
Includes Robatech hot melt glue unit	
Additional Mandrill to run 585 mm x 368 mm x 116 mm high tray	R 60 000,00
EQUIPMENT TOTAL	R 833 000,00

2. ESTIMATED COMMISSIONING

LABOUR		DAYS REQ.	PRICE (EXCL. VAT)
INSTALLATION			
1	Technicians @R 6950 /day per technician	2	R 13 900,00
COMMISSIONING			
1	Technicians @ R6950 /day per technician	3	R 20 850,00
	ESTIMATED COMMISSIONING TOTAL		R 34 750,00

The above pricing is estimated and the actual work will be charged on a work done basis, by the hour, during normal working hours. All labour outside of these hours will be charged at time-and-a-half or double-time depending.

3. ESTIMATED TRANSPORT

ITEM(S)	PRICE (EXCL. VAT)
Transport to site Kroonstad - Acepak can Transport the machine or CC Chickens can do their own transport	R 22 800,00
Insurance	R 5 800,00
Protective Packaging	R 2 915,50
Rigging	not included
ESTIMATED TRANSPORTED TOTAL	R 31 515,50

All above costs are estimated from our transport brokers and will be confirmed on receipt of quotations from others.

TOTAL	**R 899 265,50** *

050-CC Chickens Pty Ltd 12 MONTHS REPORT (R534) PRINTED ON 29/11/2020 FOR 30/11/2020

MONTHS	DEC	JAN	FEB	MRT	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	TOTAL
TOTAL													
Salary				2765973.78	2746898.47	2819247.91	2826077.29	2865024.71	2785386.20	2781766.33			19590374.69
O/T 1.5				448226.56	174190.45	234414.93	195478.02	344249.71	370496.51	566618.95			2333675.13
O/T 2.0				54416.78	53493.96	97725.84	77904.49	15398.14	32670.65	23080.69			354690.55
O/T Sun				540.00	34377.09	2106.25	15964.63	34267.63	21575.23	16782.44			125613.27
Commis				197868.00	.00	.00	.00	.00	.00	.00			197868.00
Incenti				16500.00	15500.00	15000.00	15500.00	14000.00	14500.00	13250.00			104250.00
Night S				6800.00	24800.00	29850.00	30600.00	8100.00	8650.00	7900.00			116700.00
Taxi				3480.00	3480.00	3480.00	3480.00	3480.00	2910.00	2910.00			23220.00
ProdBon				14285.00	14285.00	15035.00	14185.00	14950.00	14010.00	13910.00			100660.00
LS Bon				.00	.00	.00	.00	6813.57	4770.00	95599.95			107183.52
Ann Lve				13484.41	15139.72	5532.03	9016.59	13492.81	10136.34	16489.61			83291.51
Term Lv				99745.17	1881.34	2525.18	3475.51	119925.71	39361.73	6134.69			273049.33
Standby				3400.00	3600.00	4000.00	4800.00	3600.00	4600.00	4400.00			28400.00
Telepho				1850.00	1850.00	1850.00	1850.00	1850.00	2150.00	2550.00			13950.00
Super A				4309.41	6809.41	6809.41	6809.41	6809.41	6809.41	6809.41			45165.87
Fuel				9337.26	9472.32	6875.44	8700.64	17530.41	8586.76	9109.88			69612.71
Back Pa				.00	2999.98	3200.00	7809.94	.00	.00	175.00			14184.92
Pack Al				2185.00	1595.00	2475.00	2035.00	2760.00	1765.00	2195.00			15010.00
TOT:EARN				3642401.37	3110372.74	3250126.99	3223686.52	3472252.10	3328377.83	3569681.95			23596899.50
*TOT:DED *				483956.21	361067.43	367057.78	363596.47	476835.56	396360.48	416328.74			2865202.67
*TOT:NET *				3158445.16	2749305.31	2883069.21	2860090.05	2995416.54	2932017.35	3153353.21			20731696.83
U.I.F.				29781.46	27204.45	28516.42	28232.95	29451.01	28988.68	30861.16			203036.13
SDL				35215.17	29883.81	.00	.00	.00	.00	34417.42			99516.40
Prov F				65040.02	65471.68	64996.90	66798.20	66940.93	66846.24	68692.46			464786.43
Cost				14084.26	12631.75	12631.75	12631.75	12631.75	12553.09	12553.09			89717.44
*TOT:CC *				144120.91	135191.69	106145.07	107662.90	109023.69	108388.01	146524.13			857056.40
TOT:COST				3786522.28	3245564.43	3356272.06	3331349.42	3581275.79	3436765.84	3716206.08			24453955.90
TOT:PERK				78706.64	76818.27	76343.49	77849.33	78287.52	78114.17	79960.39			546079.81
TAX:EARN				3633064.11	3100900.42	3243251.55	3214985.88	3454721.69	3319791.07	3560572.07			23527286.79
*TAX:DED *				190265.06	189332.93	188066.85	192767.24	193527.32	191511.46	198789.66			1344260.52
*TAX:NET *				3521505.69	2988385.76	3131528.19	3095356.49	3339481.89	3206393.78	3441742.80			22724394.60
*EARN 11 *				2763088.35	2610413.10	2621812.85	2613642.38	2670847.65	2670295.82	2622875.60			18572975.75
NO. EMP.				457	434	445	444	442	442	438			