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Abstract

The potato processing industry production has increased over the last few years with as much as 143% within 10 years; together with this there is also an increased growth in the import of frozen fries. This puts direct pressure on the processing companies to procure good quality potatoes at reasonable prices, in order to remain competitive. The aim of this paper is to develop a procurement marketing framework that will assist processing companies with the establishment of longer term contracts and relationships with producers as suppliers. This framework is constructed by evaluating the needs of producers, transaction costs, the profit margins, price risks and incentives such as Decision Support Models.

Keywords: potatoes, marketing, processing companies, South Africa

1. Introduction

The potato processing industry production has increased over the last few years with as much as 143% within 10 years; together with this there is also an increased growth in the import of frozen fries. This puts direct pressure on the processing companies to procure good quality potatoes at reasonable prices, in order to remain competitive. Given this, the producers on the other hand, have different marketing channels to choose from, namely table potatoes and processing potatoes. Meaning that the processing companies also have indirect competition from other marketing channels.

Table potatoes have a spot market governance structure where the prices for the potatoes are set on an organized market structure, namely: Local Fresh Produce Markets. In terms of processing potatoes, the governance structure is a contract structure, which uses a Decentralized Individual Negotiation (DIN) price discovery model where the prices are negotiated directly between the processing company and the producer. This means that the table potatoes (spot market) have a variable price and the processing potatoes (contract market) have a fixed price within a specific season.

Given all of this and the fact that the potato processing market is a fast growing industry, processors are struggling to procure sufficient quantity and quality potatoes from producers due to indirect competition and imports.

2. Procurement marketing

Procurement and marketing as a holistic picture is becoming increasingly important. Procurement is increasingly regarded as a strategic function in the business environment (Lamming and Cox 1995; Gadde and Håkansson, 2001; Trent, 2004; Axelsson et al., 2005; Monczka et al., 2005; Hardt et al. 2007; Piercy 2009; Sheth et al., 2009). Various authors as indicated above, have done work on this subject; Koppelmann was the only author to develop a theory.

According to Koppelmann (2003) there are a few aspects that make procurement difficult, amongst others: costs, prices, time, innovation and acceptance. With a free market system and

globalisation, the competition between businesses is increasing. This means that processing companies must keep their costs as low as possible. If a company can obtain economies of scale, costs can be decreased and a final product can be provided to the consumer or the next person in the value chain for a more reasonable price and the processing companies can be competitive.

One of the problems regarding agricultural raw materials is the volatility in supply. Furthermore, South Africa does not have import tariffs on frozen fries, which allows the import of frozen fries into South Africa at relative low prices, compared to the domestic products. Another important factor in terms of the procurement of raw materials is the window of procurement. Potatoes are grown in different regions at different times in South Africa, which means that the processing company must have a comprehensive procurement management strategy.

Koppelmann (2003) identified certain theories that must be kept in mind with procurement marketing. The first theory is Coalition theory, the basic principle of this theory is that, if everyone within the business environment (staff, suppliers and directors) is satisfied, the business has long-term feasibility. The second theory is Incentive – Contribution theory highlighted by Figure 1.

According to this theory, buyers will always try to purchase at the lowest cost; however, the buyer must also provide the supplier with something to convince the suppliers to sell the produce. This theory is based on two aspects namely, the requirements and the performances. The importance of the requirement is to identify the objectives of both the supplier and the buyer and to determine what the mutual requirements are to satisfy these objec-



Figure 1. Incentive – Contribution theory within procurement marketing Source: Koppelman (1998)

tives. In terms of performances the question to be answered is: What incentives are in place for the supplier if the performance is up to standard and what are the benefits for the buyer?

The aim of this paper is to develop a procurement contract and to set up an procurement marketing framework, to assist processing companies with the establishment of longer term contracts and relationships. This framework is constructed by evaluating the needs of producers, transaction costs, the profit margins, price risks and incentives such as Decision Support Models.

3. Important aspects within procurement marketing

According to Rhodes et al. (2007) procurement is based on four pillars within agriculture: Risk, Profit, Transaction Costs and Governance structures. Various studies such as Strydom et al (2012 a, b, c) and Strydom and Grové (2012) examined all of these pillars and the following results were obtained.

3.1. Contractual agreements

Strydom et al. (2012 a) investigated the perceptions of potato producers towards the processing industry by means of investigating the advantages and disadvantages of the potato processing industry, as listed below in Table 1:

To enter any contract, a sense of trust is an imperative factor. This was proved by various authors such as: Tregurtha and Vink (1999), Masuku, Kirsten, Van Rooyen and Perret (2003). The grading system creates a lack of trust, mainly because the producers do not always agree with the grading results.

In order to determine prices, the processing companies make use of a Decentralized, Individual Negotiation (DIN) method. In order to facilitate this process, a price setting model was developed. The model can be used to determine price premiums that can serve as incentives for the production of potatoes of a sufficiently high quality required for the purpose of processing. Thus, it may form part of a marketing model in order to establish longer term contracts. Producers can also benefit from using the model in decision-making, since the model allows for price risk consideration when calculating potential gross income at the proposed contract price.

Table 1. Advantages and Disadvantages when delivering to processing companies

Disadvantages		
Disadvantages	Description	Rank*
Transport costs	That all the producers pay the same transaction costs	-20.00%
Holdback	There is a holdback fee until all the contracted tones are delivered (cash flow)	-26.67%
Other companies	Can only produce for the contracted company and not other companies (diversify risk)	-26.67%
Extension officer	The use of extension officers are responsible for additional costs (small producers)	-33.33%
Grading system	The grading system is not transparent	-53.33%
Cultivars	The processing companies only prefer certain cultivars	-53.33%
Harvesting teams	The harvesting teams of the companies are inefficient	-53.33%
	Advantages	
	Description	
Flat rate	Additional tones delivered after contract are priced at a flat rate	13%
Compensation	If the producer have diseases or production problems the processing company will assist	27%
Established	Some of the companies are well established	53%
Loyal experienced producers	Some of the companies have a loyal producers client base	53%
Logistics	Logistics are well organized which assist with the harvesting	67%
Extension officers	Extension officers assist in farming practices (large producer)	67%
Bulk transport	Bulk transport reduces transaction costs	80%
Processing	Processing capacity of plants are high which assist producers during harvesting	100%

^{*} Rank according to relevance and importance the more negative the value is the larger disadvantage of the factor the more positive the value is the larger the advantage. Source: Strydom et al., 2012 a

According to the Coalition Theory mentioned in section 2, everyone in the procurement channel must be satisfied in terms of the purchase agreements and processes. In order to satisfy this theory the advantages must be incorporated/complimented in the procurement contract and the disadvantages must be converted to advantages or excluded from the contract.

In terms of contractual agreements of processors it is also important to identify the target producers, in other words, what type of farm/producers characteristics are appropriate in terms of contractual agreements. Strydom et al. (2012 b) stated that in order to compile a procurement marketing strategy, it is important to know who will participate in a contract governance structure as used by processing companies. The characteristics were determined by using a questionnaire and the data analysis was done with a Principle Component Regression (PCR) combined with a Logit model. Shimi (2010) also used the same analysis in his study. The following characteristics were identified ranked from most important to least important according to probabilities with a minimum of 10% probability:

Table 2. Characteristics of contract potato producers

Variables	Probabilities
Produce at minimum risk	0.0166
Wants to obtain a minimum price (certainty)	0.019
Prefer channel with less marketing cost	0.0211
Wants a channel with a small negotiation period	0.0242
Wants to have less quality penalties	0.0353
Wants to obtain more market information	0.0478
Do not want to make use of own transport	0.0625
Only marketing channel available without additional on farm investment	0.0712
Frequency of contacts between buyer and producer must be smaller	0.0755

Source: Strydom, 2012b

All of the abovementioned characteristics can be used in order to establish procurement marketing strategies and to improve the current contracts. These characteristics are not only the identification of a target market, but it is also an identification of certain features that can be used as motivation within the procurement marketing plan. Processing companies can use these characteristics in order to determine/approach possible new producers.

3.2. Transaction costs

The potato industry is divided into two main marketing channels, namely: Table potatoes and processing potatoes. These two channels have different production and marketing processes after the harvesting of potatoes, creating a difference in transaction costs.

Strydom et al. (2012 c) calculated the magnitude of transaction costs for both of the above-mentioned marketing channels. The following were evaluated: different attributes of transaction costs, namely: physical asset specificy, human asset specificy, uncertainty, frequency as well as other proxies that represent transaction costs. All of these attributes had a transaction cost with a statistical significant difference except for human asset specific.

Overall the contract market had the lowest transaction costs in terms of these attributes; however, there were some attributes where the spot market had lower costs than the contract market.

It was concluded that the spot market has the highest transaction costs, which makes the contract market the transaction cost-minimising governance structure. This was also proved by Jordaan (2010) and Milagrosa (2007). The transaction costs were determined for the producers, thus, what is the producers' transaction costs in terms of different marketing channels? This is very important in terms of marketing procurement as explained by Koppelman (2003) in Figure 1. However, it is important to mention that the processing industry have high transaction costs in certain categories. This gives an opportunity to processing companies to evaluate these high transaction costs and then to decrease it with new strategies.

3.3. Profit margins

It is imperative that producers evaluate which marketing channel provides the best profit margins. This forms part of the producers' requirements within the Koppelman (1998) procurement theory. According to Strydom and Grové (2012) it is difficult to compare the two channels, mainly due to the fact that the production process of the two channels differs. If the additional costs, namely packaging and marketing costs, are converted to the same basis, the processing potatoes realize a higher price for the producers than the table potatoes.

The table potato cultivars also have a higher yield than the processing cultivars. In order to compare the two channels one must first calculate the Gross Production Value (GPV). The GPV¹ is calculated according to a yield of 42 tons/ha for processing potatoes and 50 tons/ha for table potatoes. In order to make it easier to choose between the two channels a Cumulative Distribution Function of the historic GPV's of five years for both channels were calculated and illustrated in a graph.

According to the CDF calculated in Figure 2 the processing potatoes has an 86% chance of obtaining a higher GPV over the period analyzed than table potatoes up to a benchmark of R82 000/ha. The GPV is used as a measure of profit margin due to the fact that all other costs for both the marketing channels are the same and this means that the GPV will be the determining factor in terms of profit.

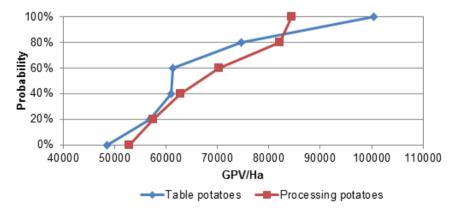


Figure 2. Cumilative Distribution Function of GPV for table and processing potatoes (2005-2010) Source: Strydom and Grove, 2012

Production costs of both channels are the same value

3.4. Price risk

According to Malan, Louw and Blignaut (2010) effective budgeting and financial bookkeeping are not the only requirements of managing a profitable agricultural business. Agriculture is a high risk business and the decision environment changes on a daily basis. This is why risk management is extremely important to producers.

According to Strydom and Grové (2012) in terms of production risk between the two channels, the risk is the same for both. Both channels are potatoes and both need the same growing standards (moisture, heat units etc.). However, in terms of price risk there are large differences. The table potato market is subject to a spot market, meaning high variability in prices as mentioned earlier, whereas the processing industry has a fixed price contract with possible price deduction.

This is important to contract producers as they do not want a maximum price with deduction for quality, sizes, etc. They want a minimum price with possible price premiums for quality as confirmed by studies. In terms of obtaining the best prices over time, the CDF is used as explained in Figure 2 with processing potatoes having the highest probability of obtaining higher prices. The question remains: what must the producers' yield difference be between table potatoes and processing potatoes given the price risk and producers' risk aversion levels, in order to justify the producers' risk appetite?

Strydom and Grové (2012) determined this by means of calculating a utility weighted breakeven, given a scenario of 42 ton/ha for processing and 50 tons/ha for table potatoes. The utility weighted break-even indicated that neutral risk-averse producers must at least produce 41.25 tons/ha in order to justify processing potato production instead of table potatoes; whereas highly risk-averse producers must at least produce 39.4 tons/ha. The differences in yield range from 8.7 up to 10.7 for a risk-averse producer. This will give the producer an indication of target yields according to the producers' risk-aversion levels.

4. Procurement marketing framework

4.1 Transaction costs

Figure 3 is a graphical explanation of the procurement marketing framework in terms of transaction costs. Each type of transaction cost is evaluated by means of giving it a current (Status Quo) rating. This rating ranges from 1-10 with 1 = very poor and 10 = very good, relevant to the table potato market. Also included into the framework is relative importance (%) ranging from 0% to 100%, with 0% = not important and 100% = very important. This indicates, in terms of the processing companies overall objectives, how important is this specific attribute. The relative weight is then calculated by means of multiplying the importance with the current rating. The relative weights of all the transaction costs must add up to 100%. With the evaluation of the example it is clear that there is a need to re-evaluate the procurement strategies that influence the following: Uncertainty, Other (negotiation) and Human specificy.

The next indicator is the overall weight of the specific procurement framework, which is a sum of all the indexes within transaction costs. This index will be used in the main framework (as discussed later in the paper).

After the quantifying of the framework, strategies must be developed in order to improve the specific framework. However, it is important to mention that the processing industry also has high transaction costs in certain categories. This gives an opportunity to processing companies to identify and evaluate these high transaction costs and then to decrease it with new strategies. New incentives are needed in

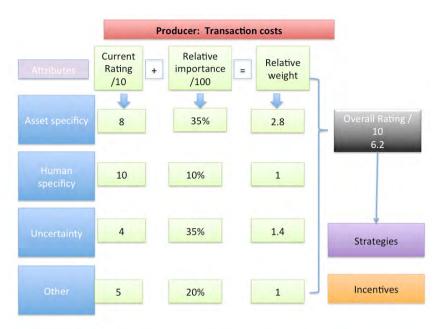


Figure 3. Procurement marketing framework – Transaction costs

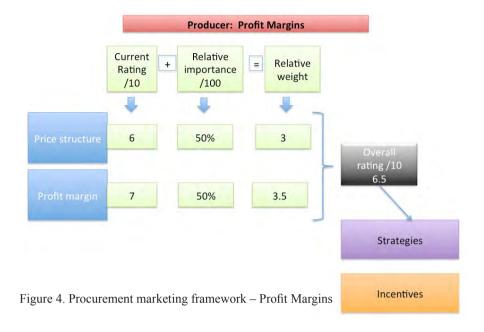
order to facilitate the negotiating process. Furthermore, uncertainty also poses a problem: this must be corrected by means of re-evaluating the contractual agreements and as stated previously, provide producers with a minimum price with premium options and not maximum price with deductions.

To summarize this, the following strategies must be used:

- Incentives: Develop a price-setting model that reduces negotiating time and reduces uncertainties. Within this model risk probabilities can be calculated (not covering direct allocatable costs), and the change in risk probabilities due to a change in quality premiums. This means that the price-setting model reduces negotiating time and reduces uncertainty regarding price premiums and probabilities.
- The forming of alliances between producers (group negotiating) can assist producers with the
 negotiating process. However, this must be done according to the rules and regulations of the
 Competition Commission Act.
- The processing company must start with a marketing campaign emphasising the low transaction costs of producing potatoes for processing and with this strategy attract new producers.

4.2. Profit margins

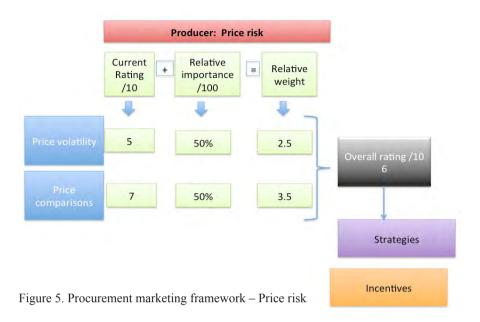
Figure 4 explains the procurement marketing framework in terms of profit margins for producers. The same methodology as with the transaction costs was used in order to set up a framework. The price structure received a relative weight of 3 and the profit margins a relative weight of 3.5, both of these sub-headings need some improvements.



- Develop a decision-support model: within this model the producers can compare the two
 channels profit margins according to the producers' specific conditions and risk appetite. This
 will assist the producers with the decision- making regarding the different marketing channels and it will also assist the processing company with the procurement marketing and price
 negotiation and contracting.
- In terms of strategies, the processing companies can make use of price premiums in the contract and not deductions, to attract new producers.
- The processing companies already provide the farmers with better seed prices, meaning the
 processing company buys the right quality seed in bulk and sell it to the different producers
 at a discounted price. The processing companies can examine the possibility to applying this
 method to other inputs such as fertilizers and chemicals.

4.3. Price risk

The price risk framework was based on price volatility and price comparisons between the different marketing channels. In terms of price volatility the table potatoes have a high volatility whereas the processing industry does not have a quantifiable volatility (Du Preez and Van Zyl, 2010, Du Preez and Grové 2011, Strydom and Grové, 2012). However, there are small changes in prices due to quality penalties within contract prices. Within the framework there exists a need to evaluate the price volatility. This example clearly explains the relevance of the framework. If the industry were evaluated in terms of price risk, the conclusion would have been that the industry is better off than table potatoes in terms of price volatility; due to the fact that it makes use of a purchase contract, which is a fixed price mechanism and not subject to spot price movements. However, this is untrue due to the fact that quality penalties are one of the reasons for increasing transaction costs (Strydom et al. 2012 c).

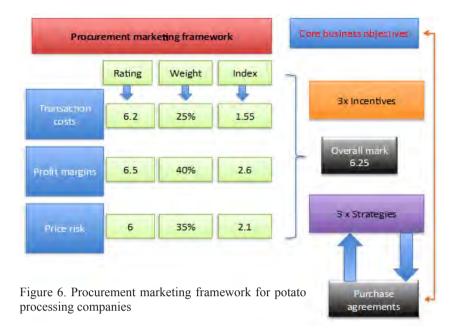


- In terms of incentives, a Decision Support Model (DSM) can be used as explained previously.
 This DSM calculates the probability of the processing industry obtaining higher prices as well
 as the break-even utility for various risk-aversion levels. Not only does it assist the producers
 with their decision- making; it also reduces their transaction costs in terms of negotiating,
 marketing time and uncertainty.
- Processing companies can use the DSM as an assisting tool for producers and to form part
 of the negotiating process. The DSM can also be used as a marketing initiative, indicating to
 producers the benefits of producing processing potatoes.
- The utility break-even yields will also assist processing companies in explaining the differences in yields. For example: The yield difference can be up to 10.7 ton/ha and it will still be worthwhile for a risk-averse person to produce processing potatoes.

4.4. Proposed procurement marketing framework

After the completion of the elements of the main framework the framework itself can be completed. The main framework makes use of the same methodology as the previous evaluated frameworks (4.1 - 4.3); however, within the main proposed framework there is a purchase agreement focus (contract) as well. In this framework it is clear that much of the procurement marketing focus must be on the benefits of profit margins (index of 2.6). The other two pillars however, namely transaction costs and price risk, must improve in order to gain importance. The strategies and incentives of the previous framework must be combined into a procurement marketing strategy. The importance of the main framework is in the purchase agreements (contracts) since this is the chosen governance structure used by processing companies and serves as the link between producers and processing companies.

The strategies decided on must reflect the needs of the producers. This is why it is important to evaluate the target market (contract producers). If the processing companies know the characteristics of the contract producers they can develop their contracts according to the needs of the



company and the producers. It is also important to keep in mind that the strategies must satisfy the contract specification, but vice versa, the contract must also facilitate new strategies.

It is essential to keep in mind that the procurement marketing process is not all about the producers; the processing company also have certain core business objectives that must be satisfied. This means that the business objectives must be in line with the contractual agreements and the strategies developed.

In terms of the purchase agreements the following strategies/adjustments are recommended:

- Employ a third party grading company outside the processing company to create trust in grading and which will determine the price premiums. The producers as well as the processing company must then pay this grading company on a 50/50 basis. This is mainly done to share the advantage and to build trust.
- Another strategy can be to obtain a second opinion. If a producer's freight is rejected, a sample of the freight must be couriered to an independent grader in order to confirm the results. If the results are the same and the load is rejected, then the producer can pay the costs associated with this second opinion. This method can lead to a hold-up of a minimum of three hours, since the sample must be couriered. In the transaction cost section, contact and negotiation were identified as low transaction costs; such a strategy can increase some of the transaction costs; however, it could also reduce the uncertainty attribute of transaction costs.
- Another step will be for the processing companies to be more informative on their grading procedures. Processing companies, most of the time, have measures in place to ensure that there is no above-normal variation in the grading of a producer's product. The producers do not know of these procedures and must be informed. All of the abovementioned factors will increase trust. This will also satisfy the characteristic of market information and reduces the uncertainty attribute in terms of transaction costs.

In terms of long-term contracts with producers experiencing quality problems, the processing
plant must attempt to find an alternative use for these potatoes instead of rejecting it. This can
be in the form of using it; if not for frozen fries but then as potato pieces in one of their other
products, such as mixed vegetables or wedges.

The cultivar specification mentioned by Strydom *et al.* (2012 a) can be a problem, for the reason that some of the less preferred cultivars by processing companies are highly related to the fresh produce market (for example Up-to-date). Two scenarios can be examined:

Scenario 1 – High prices in the table potato market (at the time of harvesting) relative to processing contract prices, and the producer planted a multi cultivar such, as Up-to-date.

Since the producer has already signed a contract, the producer cannot benefit from these high prices in the fresh market. Thus producers will try to get the contract terminated, which creates a procurement risk for processing companies.

• Processing companies can structure minimum price contracts implying that the price can increase as the fresh produce market price increase. This implies that the processing company can make use of a formula price setting model (Rhodes et al. 2007). Thus, if a producer delivers the produce; the producer receives the fresh produce market price, calculated relative to the processing industry. The problem is that it increases the risks of the processing company, such as price risk and variability. In order to do this, processing companies must only implement this strategy with long-term contracts.

Scenario 2 – The prices at the fresh produce market is not that high and a producer planted a cultivar only used in the processing industry.

If the producer has grading problems and the potato load is rejected by the processor, then the producer must sell the potatoes on the fresh produce market, which is the alternative market. The specific cultivar is not that popular in the fresh produce market, resulting in an unattractive price to producers, along with the costs such as bagging and transport (mostly on contract bases). If the producer planted the multi cultivar, the risk will be much lower due to the higher popularity.

- If processors want to establish long-term contracts they must prevent/decrease these risks
 for the producer. If producers have grading difficulties with their produce the processing
 company must try to use the potatoes and not just reject the freight on delivery at the plant
 as explained previously.
 - In terms of the negotiation of contracts, it is suggested that processing companies use the example of the USA as explained by Larson (2009), namely to establish a farmer producers' association that elects a president representing them who negotiates prices with the processors. This will decrease transaction cost in terms of negotiation.
 - In terms of procurement marketing the processing companies must evaluate the disadvantages and make use of the abovementioned strategies in order to enhance contracting, which will have a direct effect on the procurement marketing.

5. Conclusions

The potato industry in South Africa is important to the agricultural processing sector. The last decade saw a substantial increase in the volume of potatoes that was processed into frozen fries – from 70 000 tons in 1997 to 170 000 tons in 2007, which reflects a growth of 143% (Potato SA, 2009). Thus, frozen fries are becoming increasingly important as a final product within the potato industry of South Africa. South African potato producers have two main marketing channels. Firstly, the normal fresh market which is defined as the spot market. The second channel is

the processing market, which can be divided into two sub-sectors, namely frozen fries and crisps. This channel is known as the contract market.

The problem is that processing companies do not get enough potatoes from producers in order to satisfy the demand for the final product. This means that procurement marketing (backwards marketing) is struggling. In agri-business procurement marketing is extremely important, mainly because if the company does not receive the raw material (commodities) it cannot produce the final product and run the processing plant at optimizing levels.

In an agricultural environment procurement marketing is based on four pillars: transaction costs, risk, profit margins and contractual agreements. These four variables are the most important variables when producers choose between two marketing channels. The question is: how do the two channels compare regarding each variable from the perspective of producers and what possible strategies can be developed from these variables in order to compile a procurement framework for processors?

The procurement marketing framework assists processing companies with these answers; the companies can also on a regular basis evaluate the current state of business according to the framework. The processing companies must make use of the incentives (models) created in order to launch marketing campaigns for procurement contracts of potatoes. These incentives must also be used in order to satisfy strategies and targets set out in the framework. They can also make use of the framework developed in this research, as a blueprint for developing a marketing procurement plan. The framework has various advantages, amongst others:

- Better quantification of focus areas,
- Set of guidelines to assist with strategy formulation and strategy revaluation,
- Efficient tool to capture progress on procurement marketing,
- Flexible in terms of developing new incentives and strategies,
- Alignment of producers and processing company objectives.

However, it is important to keep in mind that the processing company has certain core business objectives that must be satisfied as well. The framework with the strategies must be in line with the core business objectives. The framework will also only be successful with proper research and an efficient implementation plan. The implementation plan must have targets, objectives and evaluations that is measurable. Thus, there is a need for a proper developed implementation plan for this specific framework.

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