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A Model for Strategic Analysis in Wood Treatment Companies

Um modelo de análise estratégica em empresas de tratamento de madeira

Un modelo de análisis estratégico en empresas de tratamiento de madera

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Abstract

Agribusiness is related to the economic vocation of Brazil due to climate, soil, water abundance, favorable relief, and the high insolation index with luminosity throughout the year. The productive chains in this segment represent approximately 30% of the gross domestic product, which makes Brazil the largest producer and exporter of different products of animal and plant origin. Forestry with planted forests makes Brazil the world's largest producer and one of the main exporters of pulp, being Mato Grosso do Sul State a major producer with the highest growth of planted eucalyptus forests in the last 10 years. Academic studies available in the literature related to economic and managerial aspects do not cover more specifically small and medium rural properties that have been dedicated to forestry, especially to wood treatment and its strategic aspects. This study aims to propose a model for the analysis of strategic positioning in wood treatment companies. Methodologically, it is a non-probabilistic and intentional for convenience, exploratory and qualitative single case study. Interviews, visits to the company, and consultation of management and accounting documents were used as an instrument of data collection. Techniques already consolidated in the literature and market, such as Pestel analysis, Porter's five forces, and SWOT analysis were used for conducting the strategic positioning analysis. The analysis results, however, are presented by means of a complete mapping of strategic positioning of the studied company and its strategies for the differentiation of its products and the effort to consolidate brand in an agricultural commodity. Study limitations are related to the difficulty of using it in other companies of the same business segment since it is a single case, but this fact does not invalidate the academic contributions. In this sense, new research lines are presented as the possibility of mapping brand consolidation in a forestry commodity and using forest residues

from wood harvesting.

Keywords: Agribusiness; Forestry; Wood treatment; Strategy.

Resumo

O agronegócio está relacionado com a vocação econômica no Brasil em função do clima, solo, abundância de água, relevo favorável, alto índice de insolação com luminosidade em todo ano; sendo que as cadeias produtivas deste segmento representam aproximadamente 30% do Produto Interno Bruto, que faz do país um grande produtor e exportador de diversos produtos de origem animal e vegetal. As florestas plantadas fazem do país um grande produtor mundial e uns dos principais exportadores de celulose, sendo o Estado do Mato Grosso do Sul um grande produtor e apresentam-se com o maior crescimento de florestas plantadas de eucalipto nos últimos 10 anos. Os estudos acadêmicos disponíveis na literatura que tratam de aspectos econômicos e gerenciais não abrangem com maior especificidade as pequenas e medias propriedades rurais que tem se dedicado a silvicultura, em especial no tratamento de madeira e seus aspectos estratégicos. Este artigo tem como objetivo específico propor um modelo para análise do posicionamento estratégico em empresas de tratamento de madeira. Metodologicamente, trata-se de um estudo de caso único, não probabilístico e intencional por conveniência, exploratório e qualitativo; como instrumento de coleta de dados utiliza-se de entrevistas, visitas à empresa e consulta aos documentos gerências e contábeis; para realização da Análise do Posicionamento Estratégico utiliza-se técnicas já consolidadas na literatura e no mercado como: Análise Pestel, Cinco Forças de Porter e Análise Swot. Metodologicamente elaborou-se um mapeamento completo do posicionamento estratégico da empresa, de suas estratégias; com os dados coletados com entrevistas em profundidade e analise de conteúdo. As limitações do estudo estão relacionadas com o fato de ser um caso único, que dificulta sua utilização em outras empresas do mesmo segmento empresarial, mas que não invalidam as contribuições acadêmicas e novas linhas de pesquisa se apresentam como: mapear a consolidação de marca em uma *commodity* da silvicultura, aproveitamento dos resíduos florestais da colheita da madeira.

Palavras-chave: Agronegócio; Silvicultura; Tratamento de Madeira; Estratégia.

Resumen

La agroindustria está relacionada con la vocación económica en Brasil debido al clima, suelo, abundancia de agua, relieve favorable, alta insolación con brillo durante todo el año; y las cadenas productivas de este segmento representan aproximadamente el 30% del Producto

Interno Bruto, lo que convierte al país en un importante productor y exportador de diversos productos de origen animal y vegetal. Los bosques plantados convierten al país en un importante productor mundial y uno de los principales exportadores de celulosa, siendo el Estado de Mato Grosso do Sul un gran productor y presentando el mayor crecimiento en bosques plantados de eucaliptos en los últimos 10 años. Los estudios académicos disponibles en la literatura que abordan aspectos económicos y gerenciales no cubren con más especificidad las pequeñas y medianas propiedades rurales que se han dedicado a la silvicultura, especialmente en el tratamiento de la madera y sus aspectos estratégicos. Este artículo tiene el objetivo específico de proponer un modelo de análisis del posicionamiento estratégico en las empresas de tratamiento de la madera. Metodológicamente, es un estudio de caso único, no probabilístico e intencional por conveniencia, exploratorio y cualitativo; como instrumento de recolección de datos, utiliza entrevistas, visitas a la empresa y consulta de documentos gerenciales y contables; para la realización del Análisis de Posicionamiento Estratégico se utilizan técnicas ya consolidadas en la literatura y en el mercado, tales como: Análisis Pestel, Cinco Fuerzas de Porter y Análisis Swot. Metodológicamente, se elaboró un mapeo completo del posicionamiento estratégico de la empresa, de sus estrategias; con los datos recolectados con entrevistas en profundidad y análisis de contenido. Las limitaciones del estudio están relacionadas con el hecho de que se trata de un caso único, lo que dificulta su uso en otras empresas del mismo segmento de negocio, pero que no invalidan los aportes académicos y se presentan nuevas líneas de investigación como: mapeo de la consolidación de marca en una producto de la silvicultura, uso de residuos forestales de la extracción de madera.

Palabras clave: Agroindustria; Silvicultura; Tratamiento de la madera; Estrategia.

1. Introduction

Forest ecosystems contribute effectively to soil conservation, water regulation, and generation of at least 10 million direct jobs, although global forest cover consists of 93% of natural forests and only 7% of planted forests Sloan & Sayer, (2015). The global market for wood and related products represents, according to Kohl, et al., (2015), more than 450 billion dollars per year in the international economy, and between 150 and 200 billion dollars per year, are related to international trade, with approximately 410 million people in forestry-related activities worldwide. In addition, 1.6 billion people in the forest production chain depend on forests, their products and related services. In 2015, 184 countries accounted for

93.5% of the global area occupied by forests and their economic, which used to be in different regions and had several economic purposes, varying according to the forest and economic characteristics of each region (Kohl, et al., 2015).

According to Keenan, Reams, Freitas, & Grainger, (2015), from 1990 to 2015, forests around the world had their area reduced in 3%, which means a reduction from 4.1 to 3.9 billion hectares in this period, but with an expansion in Europe, North America, and South and Southeast Asia. For these authors, planted forests increased from 168 to 278 million hectares from 2010 to 2015, with Brazil showing an increase in the area occupied by planted forests and a decrease on its natural forests in this period. Planted forests provide about two-thirds of the world's industrial wood, even accounting for less than 10% of the vegetation cover (Sloan & Sayer, 2015).

According to Payn, Carnus, Freer-Smith, Kimberley, & Kollert, (2015), in 2012, wood production from planted forests was close to 200 million m³ in South America, followed by Asia with 151 million m^3, North and Central America with 104 million m^3, and Oceania, Europe and Africa, with 47 million m^3. In addition, these authors observed that the main producing countries were the United States, Brazil, China, India, Chile and Canada, when it is considered the same period. Due to its fast growth, natural and commercial rotation, and multiple applications, the area occupied by eucalyptus and *pine* forests in Brazil totaled 6.6 million hectares in 2013, with 76.6% of this area with eucalyptus in its various uses (Simões, 2014).

According to the Brazilian Foundation for Sustainable Development (FDBS) Valverde, Miranda, Souza, & Vasconcelos, (2012), the forest-based sector in Brazil contributes with almost 52 billion reais to the gross value of production and 7.5 billion reais in taxes, generating more than 2 million direct and indirect jobs, and more than 9 billion reais for the trade balance surplus. *Pine* and eucalyptus are the most planted trees in Brazil. Due to the progress of research on eucalyptus, its plantations have multiplied in an expressive way, replacing old plantations, even pine's, which still has the second position in the ranking of the planted area Valverde, Miranda, Souza, & Vasconcelos, (2012).

According to the Brazilian Association of Forest Plantation Producers ABRAF, (2013), *pine*'s planted area is concentrated in the South region (79.8%) due to edaphoclimatic conditions and the close location to the main wood's processing centers, with Paraná State leading this ranking with 31.9% of the total planted area, followed by Santa Catarina State (31.1%). Pine is native to North and Central America, and most of the species *Pinus elliotti* and *Pinus taeda* was originally planted in the Brazilian's South region from 1940 onwards.

Later, it spread throughout the country with the introduction of tropical pines. The main uses to wood are lumber, civil construction, pulp and paper, laminates and Medium Density Fiberboard (MDF).

The total area of planted forests in Brazil, according to the Report of the Brazilian Tree Industry IBÁ, (2016), totaled 7.8 million hectares in 2015, with eucalyptus occupying the largest area (5.6 million hectares), being located mainly in Minas Gerais (24%), São Paulo (17%), and Mato Grosso do Sul (15%). According to this Report, the increased eucalyptus area in the last five years was 2.8% per year, with Mato Grosso do Sul State standing out by planting 450,000 hectares in this period. Pine represents the second largest tree species planted in Brazil, occupying 1.6 million hectares and being concentrated in Paraná (42%) and Santa Catarina (34%). In addition, from these 7.8 million hectares of trees planted in 2015, 34% are destined to pulp and paper segment, 29% are represented by independent producers, who invest in forest plantations for commercializing in natura wood, and 14% are destined to charcoal production (IBÁ, 2016).

The Brazilian forest industry is globally recognized for its high productivity, measured by the wood volume incremented per area each year, which is due to investments in the forest management and mainly due to climatic conditions of plantation areas. In 2015, the average productivity of 36 m^3/ha/year of eucalyptus and 31 m^3/ha/year of pine placed Brazil at the top of the world ranking of productivity (IBÁ, 2016).

According to the Brazilian Pulp and Paper Association BRACELPA, (2014), the forest sector accounted for 6.7 billion dollars in exports in 2013, being the main destinations of the Latin America, China, and Europe. Moreover, considering the Brazilian imports in this sector, the trade balance was favorable to Brazil in 4.7 billion dollars. In 2015, export revenues from the planted forest sector reached 9.0 billion dollars and imports were 1.9 billion dollars, with a record in trade balance surplus, being the main export destinations of forest products the Europe (30%), China (27%), United States (19%), Latin America (16%), and other countries (13%) (IBÁ, 2016).

Forestry in Brazil is important for job creation and income generation since this sector employed directly 540,000 people (IBÁ, 2016). Thus, it is estimated that the total number of direct and indirect jobs in the entire production chain generates approximately 3.8 million jobs and an income generated for employees in the order of 10 billion reais.

Mato Grosso do Sul State is an important frontier for the expansion of planted forests in recent years. According to (IBGE, 2019), the eucalyptus' planted area, in 2014, was 1,117 millions hectares, representing 15% of the total planted area in Brazil. Eucalyptus is used as

raw material for supplying other three economic sectors: pulp and paper industry, charcoal industry and sawmills; with the pulp industry having the highest relevance in terms of volume (Fagundes & Schimidt, 2011).

According to Spotorno, (2010), the Brazilian Midwest, especially Mato Grosso do Sul State, shows significant potential for generating economic benefits from the production and planted forests' process, mainly taking into account the eucalyptus. This potentiality, according to Fagundes & Schimidt, (2011), results from a higher productivity gain of eucalyptus in relation to other species, especially pine. The authors also pointed out that eucalyptus productivity reaches 41 m^3/ha/year of forest increment, with a potential to reach 70 m^3/ha/year, values much higher than any other plant species.

This study aims to propose a model for the analysis of strategic positioning in wood treatment companies, using as basic methodology a single and exploratory case study in a company located in Mato Grosso do Sul State, with vertically integrated forests located at Inocência. This company's choice took into account the strategic and marketing efforts to differentiate its products. In order to identify the relevant factors that the company must observe in its strategic positioning, market segmentation, and product diversification, Swot and Pestel analyses were used in this study. In addition, studies with an emphasis on this subject are scarce, which reinforces the importance of this research from the basic aspects of relevance, complexity and originality.

2. Methodology

The research was carried out with a qualitative approach in all aspects. According to Godoy, (1995), a qualitative research starts from flexible hypotheses and it is concerned with obtaining data or evidence that deny or confirm preliminary assumptions. It also starts from broader and more specific focus of interests that, in the course of the investigation, help to build a bottom-up process from the data.

Still according to this author, in the development of a qualitative research, there is the generation of a great work methods' diversity, styles of analysis, and presentation of results by different considerations regarding the subjects.

According to Silva & Niyama, (2011), a qualitative research has a great flexibility, remaining the commitment of presenting theoretical clarity and methodological posture. It also allows the researcher to capture the participants' point of view and perform tests with the informants, with a continuous validation process.

The qualitative, quantitative or mixed methods must be adopted in accordance with the research purpose, seeking to meet and adjust its problems. In addition, this methodological design in the empirical study is a great concern for any researcher who wants to achieve scientifically important goals (Câmara, 2013).

According to this author, the methodological structure must be rigorously planned and consider ethical aspects, requiring an extra attention regarding the opinions of organization's respondents when obtaining the data.

The in-depth interview was a methodological choice for data collection in the field, being conducted with two partner-owners and the operational manager of the company by using the theoretical framework of Sampieri, Collado, & Lucio, (2003), Cooper & Schindler, (2001) and Creswel, (2014) through semi-structured and structured forms.

In addition to the in-depth interview, a wide consultation was carried out in secondary data provided by the company, such as management reports, operational database, cost sheets, price tables, advertising material, bylaws, among others, in accordance with the theoretical framework for case study of Gil, (1999) and Yin, (2015) and theoretical aspects of (Creswel, 2014).

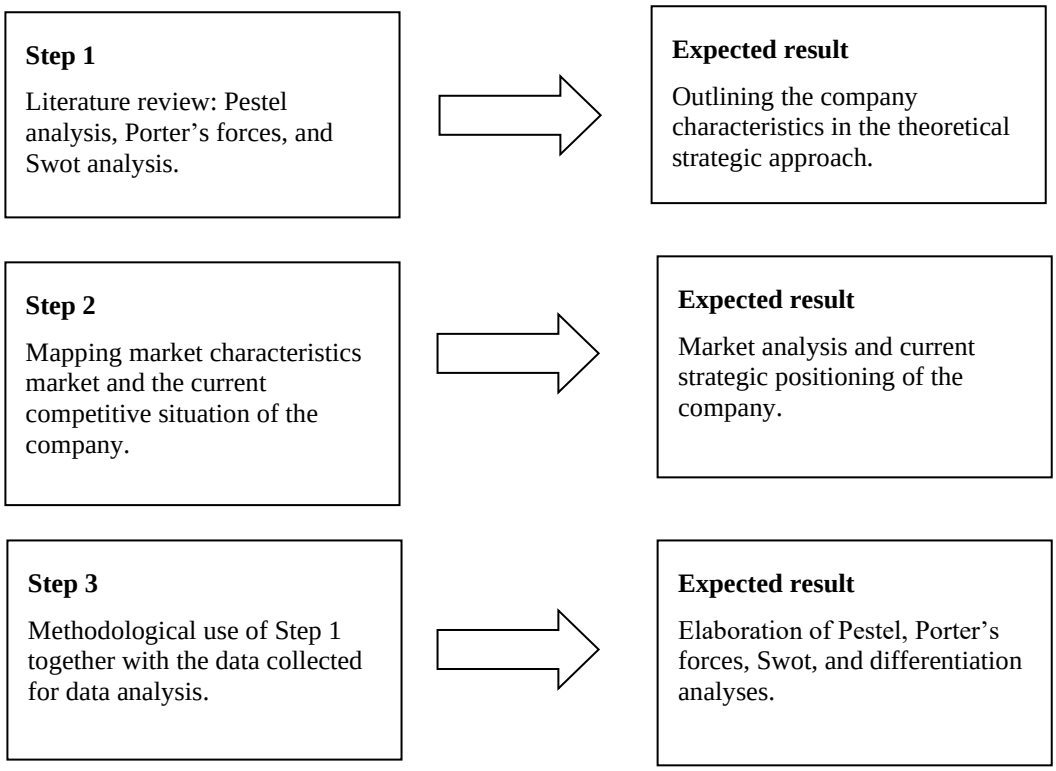
Finally, in the methodological stage for data collection, a visit was carried out to the focus company located in Inocência - MS, following the methodological precepts of Yin, (2015), in which the production systems were observed, with annotations, photographic records and filming.

All the data collected in the qualitative research rigorously followed the theoretical reference of a content analysis, with the theoretical precepts of Godoy, (1995), Bardin, (2011) and Câmara, (2013). This analysis was elaborated following the steps recommended by Bardin, (2011):

1) Elaboration of a pre-analysis in which a categorization of the obtained data was performed.
2) Exploitation of material for data encoding.
3) Treatment and result for inference and interpretation of data collected and obtained.

Figure 1, presents a methodological scheme of the case study, with each step and expected results.

Figure 1: Methodological scheme of the research.



Source: Prepared by the author.

These three steps in the methodology can best be described as:

Step 1. In order to carry out the case study of a single company, a macro-environmental and sectoral diagnosis with prospecting strategic scenarios becomes relevant, and a qualitative and descriptive exploratory approach will be carried out according to the recommendations of Gil, (1999) and Yin, (2015). Selecting strategic management tools for this report as the most appropriate: Pestel analysis, Porter's five forces and Swot analysis, in addition to a differentiation approach. As a starting point, a broad literature review of these previously chosen tools will be carried out by searching in the literature for all the conceptual aspects and those focused on the agribusiness chains where the company object of this technical report is inserted. It is expected to achieve an outlining of the company characteristics compared to the theoretical aspects researched and reviewed in the literature on competitive and strategic aspects.

Step 2. Mapping the characteristics of the wood market in which the company operates, addressing regional aspects, characterization of marketed products, distribution channels, business aspects, etc. In addition, mapping of the current competitive situation of the

company with its main competitors, products and different approaches. The data will be collected through structured interviews with two partners and the operational manager of the company by using previous protocols with structured and semi-structured questionnaires. Moreover, a documentary analysis will be carried out by analyzing management reports, bylaws and advertising material. Finally, a field visit is planned at the facilities of Company A (fictitious name for the study focus company), where the operational activities, forests and wood treatment unit are located, for a direct observation, photographic, filming records and notes. As a result of this methodological step, it is expected to achieve a broader and more complete analysis of the company's strategic positioning by characterizing the company actions and those of its competitors, as well as the forces that are operating in the market.

Step 3. This methodological step provides for the treatment of the collected data and, together with any theoretical reference, the data analysis based on content analysis following the methodology of Bardin, (2011) and using three basic steps: pre-analysis, categorization and coding, and data processing. It is expected to obtain in this step the Swot analysis, Pestel analysis and differentiation for Company A.

The detailed characterization of Company A will be described in more detail in item 4.1.1.

3. Bibliography

3.1 Pestel analysis

Pestel analysis is a tool based on macro-environmental factors and assumes that the business success of a company must be understood and studied after being analyzed and comprehended the information related to the external environment of the organization Gupta, (2013). This type of analysis aims to help a company to understand and react to changes in its external environment, being synthesized by Gupta, (2013) as follows:

P refers to political factors, i.e. aspects inherent to State's interventions in the economy, licensing and governmental controls that may exist.

E deals with economic factors, i.e. macro and micro aspects that impact the external environment related to the type of demand, eventually seasonal, climatic factors and others.

S are for social, cultural and demographic factors of the external environment and their relevant impacts on the human factor and their relations.

T are for technological factors understood as infrastructure, innovations and their impacts related to the involved technology.

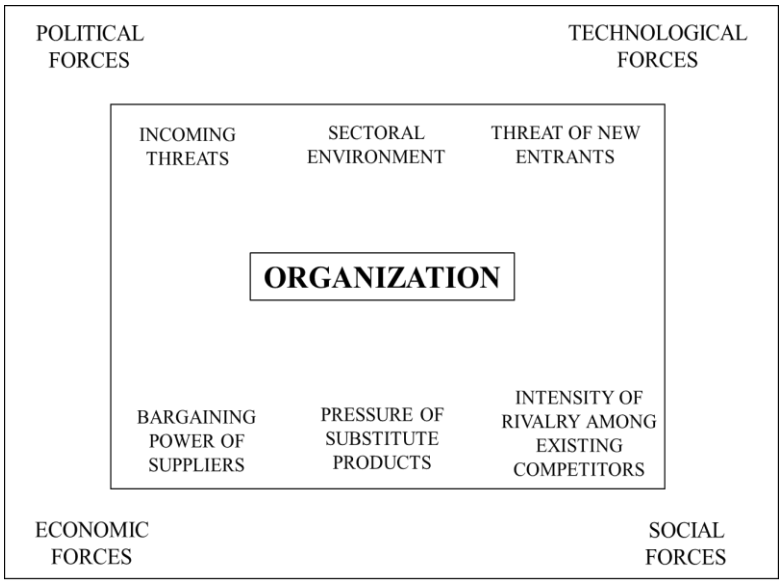
E refers to ecological and environmental aspects inherent to the company in its residues and impacts caused to the environment due to its activities.

L is related to the legislation at different levels (federal, state and municipal), such as environmental licensing, patents, operating authorization, etc.

According to Guo & Nunes, (2007), the Pestel Analysis is a panoramic photo that helps the company to evaluate and understand its external environment, providing a generic view that needs a better detailing for applications in the practical circumstances that the company will face. For Wright, Kroll, & Parnell, (2006), the technological forces refer to innovations and scientific improvements that offer opportunities and threats to organizations. These changes vary from one market to another, which enables more dynamic and nimble markets to gain greater benefits.

Changes in the market have become more dynamic because of technological advances, being an increasing challenge for companies to follow these changes Bethem, (2004). In addition to the influence on the market structure, technological factors also have influenced managerial and operating processes of a company (Chiavenato & Shapiro, 2009). Figure 2 shows the forces in the external environment of organizations.

Figure 2: List of forces in the external environment of organizations.



Source: Adapted from Wrigth et al. (2006).

By analyzing the Figure 1, it is evident that the organization is situated in the middle of several forces and factors that influence or are influenced by it.

3.2 Porter's five forces

The strategic tool called Porter's five forces is originated from the work of Michael E. Porter, who related a company to its environment. This tool is the essence in the formulation of a competitive strategy, standing out in this environment, the organizations that the company competes with: its competitors.

Porter, (1989) brings to the academic debate the company's relationship with its environment as the essence of the competitive strategic formulation. According to the author, the environment in which organizations compete with their competitors has its roots in the economic structure of a market that is influenced by five competitive forces for the success and profit of any organization, namely:

Potential entrants – entry of new companies into a given market, which, consequently, influences sales prices, costs and profitability.

Substitute products – represents the threat of loss of profit and participation in the market of a company due to the appearance of products that can perform the same function in consequence of the best cost-benefit ratio.

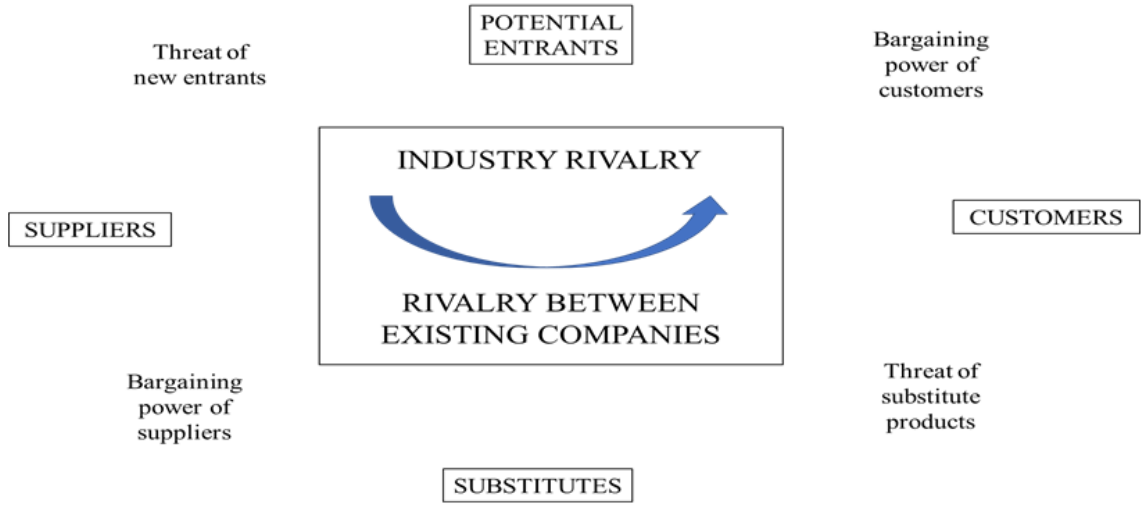
Power of customers – represents the influence that customers can exert on a market, either by forcing prices down or by demanding better quality or more services.

Power of suppliers – the strength that suppliers can exert over a market, either by pushing prices up or by reducing the quality of goods and services offered.

Rivalry between competitors – represents the influence that a company can exert on another competitor due to its way of acting in the market, which can force a reduction of prices or an increase in the demand and the level of differentiation in a product.

Figure 3 shows the main relationships of Porter's five forces and shows the threats and bargaining power in the production chain.

Figure 3: Main relationships of Porter's five forces.



ENVIRONMENT	POSITIVE POINTS	NEGATIVE POINTS
Internal	Strengths	Weaknesses
External	Opportunities	Threats

Source: adapted from Porter (1989).

3.4 Qualitative risk assessment

According to Ricci, Sagan, & Whipple, (1984), the concept of risk can be understood as a danger, the probability of a misfortune or undesired outcome. In this sense, risk management can be understood as the systematic process of identifying, analyzing, and responding to project risks, seeking to take advantage of opportunities for improvement whenever possible even though the risk management in projects involves some processes:

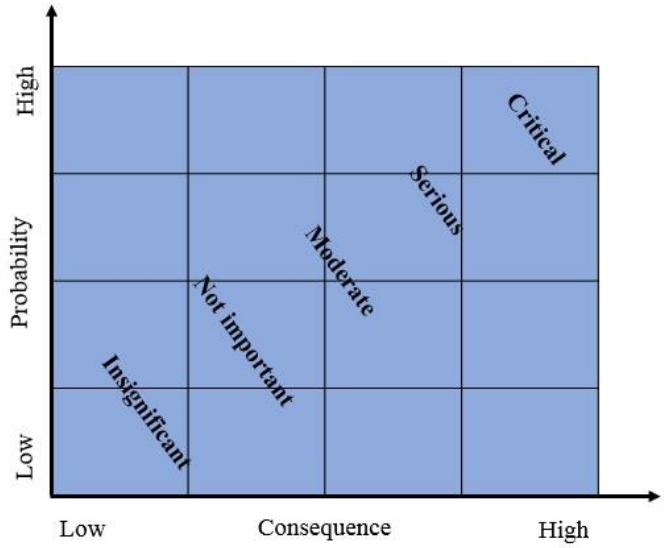
i. Identification of risks: the main risks and whether they are internal or external, as well as the acceptable limits of each one and how they can affect the project.
ii. Development of the reaction to risk: mechanisms to create contingency plans for identified and evaluated risks aiming at eliminating or minimizing their impacts.
iii. Risk control: establishing a process to identify, evaluate and develop responses to risks inherent in the project so that it is always ready to be used and implemented.

Several ways of measuring risks have been developed, most of them depending on probability and loss. In this sense, a requirement for the use of measures of higher risk is that the potential loss is quantifiable in a single dimension. The techniques used in the assessment

of risks are classified into two basic categories: quantitative and qualitative. The qualitative techniques use the descriptive method, in which subjective words indicate the level of risk, such as high, medium and low risk. On the other hand, quantitative techniques transform qualitative subjectivity into a numeric or monetary value, which indicates the level of risk (Souza, 2010).

According to Sotille, Menezes, Xavier, & Pereira, (2010), qualitative measurement requires accurate and non-biased data, which involves examining any measure of understanding the risk, quality, reliability, and integrity of the available data. The different levels of risk can be evaluated qualitatively in a matrix mapping, according to the value of the negativity of the result and its probability and frequency of occurrence Porthin, (2004), according to Figure 4.

Figure 4: Risk matrix.



Source: Risk matrix Porthin, (2004).

Risk matrix indicates that, the closer to the upper right corner more risk is, and the more critical is its representativeness; being a good technique for its fast identification, helping to determine the focus for future analyses. The graphical visualization allows risk management with the aim of moving the risks towards the lower left corner, thus reducing the probability of undesired results by attenuating the seriousness of consequences. According to Porthin (2004), the use of this matrix is convenient since in many situations risks can lead to several serious consequences, being the least critical risks the most probable.

The quantitative method in human sciences brings risks and benefits to the researcher. In this case, quantifying means to mobilize a system of mathematical measures for a set of

relatively abstract properties using a system to be chosen as a reference for measuring certain phenomenon or approach (Falcão & Régnier, 2000).

Still according to these authors, the idea of quantifying covers a set of procedures, techniques and algorithms that are intended to help the researcher to extract from the data the subsidies to answer the established questions. Thus, quantifying requires categorizing and measuring, which normally does not present in a linear and sequential way since it requires that the obtained results can lead the researcher to modify the categories or even the initial model.

4. Discussion and Data Analysis

4.1 Presentation of the case of Company A

4.1.1 Characterization of the analyzed company

The eastern region of Mato Grosso do Sul State has its economy based on extensive livestock. This macro-region is denominated as Bolsão do MS and included the municipalities of Aparecida do Taboado, Paranaíba, Selvíria, Cassilândia, Inocência, and part of Chapadão do Sul.

The company object of this research is located in Inocência - MS, 65km from the municipality's urban area and 60km from Cassilândia - MS. It is a family's company, which had been exploring the property for more than 30 years with livestock. Seeking for a diversification, its owners idealized adding value to the economic occupation of the farm by planting eucalyptus and integrating it with wood treatment to meet the regional demand for wood's constructing fences and corrals. The eucalyptus plantation's beginning was in 2008, and a special attention was given to the cultivation of a species destined to the production of fence posts. In this sense, the species *C. citriodora* was chosen, since it is already recognized by consumers as the one that presents a higher durability and robustness for constructing fences.

Eucalyptus plantation's planning has been staggered since 2008 to meet the demand that occurs over time. Thus, the initial schedule of annual planting was approximately 50 to 80ha of forest, which facilitated forest's implantation and its management, as well as a scheduled harvest. At the same time, the farm's owners began to prepare in 2009 a project for installing a wood treatment unit by requesting the environmental licensing in Mato Grosso do Sul State and purchasing the industrial equipment. The wood treatment unit started its

operation in 2014 after all operating licenses are strictly within the environmental and fiscal legislation.

The geographical delimitation of the area of influence of the wood treatment unit and forests are shown in Figure 5. This area is located in Mato Grosso do Sul State, very close to the borders of the states of Goiás, Minas Gerais and São Paulo.

Figure 5: Localization map of the Company A.

Source: Map Data Google (2018).

Currently, Company A has its Forest Production and Treatment Unit for producing posts of different sizes for fence construction, meeting the regional demand within a radius of approximately 250km. However, the company meets the demand of other regions of the state Mato Grosso do Sul, Goiás and São Paulo.

4.1.2 Pestel analysis

Pestel analysis complements the different aspects analyzed in the SWOT analysis as it seeks to identify all relevant aspects of the business macro-environment, especially favorable or unfavorable aspects, as follows:

Political: <u>Favorable</u>

1) There is no political-governmental action at any level (federal, state and municipal) that could hinder or help the company. In this sense, this factor is FAVORABLE.

2) There is no prospect of creating restrictive legislation in the forestry production chain. FAVORABLE.

3) Existence of a very strict legislation to use native wood, which is an important competitor to the company. FAVORABLE.

Economic: Predominantly favorable

1) Existence of financing for planting forests with terms of up to eight years and a grace period for payment and low rates. FAVORABLE.

2) The company needs to maintain a strict control of its costs to achieve a competitive cost advantage in the market. UNFAVORABLE.

3) There is no seasonality in demand or in wood production. FAVORABLE.

4) There is no competitor installed within a radius of 200km. FAVORABLE.

5) Use of the existing infrastructure in the farm where the company is installed, reducing fixed costs. FAVORABLE.

Social: Predominantly unfavorable

1) There are restrictions in workforce available in the region, mainly specialized, such as tractor drivers, machine operators and people for forest management. UNFAVORABLE.

2) There is no necessary amount of houses for the families' dwellings in the farm, but only lodgings, which makes it difficult to fix families in the farm and increase employee turnover. UNFAVORABLE.

3) High job creation for the main activity in the region, the livestock. FAVORABLE.

Technological: Favorable

1) Wood treatment is carried out with a very simple and easy-to-use technology. FAVORABLE.

2) The technology used for wood treatment is well established and the emergence of a new technology that may influence on cost and quality is unlikely. FAVORABLE.

3) The eucalyptus that was used as a raw material is easy to grow and resistant to natural pests since it is an exotic tree originating in Australia. FAVORABLE.

4) Eucalyptus plantation systems are easy to implement and the logistic systems of harvesting and wood handling before and after treatment are quite simple and without operational complexity. FAVORABLE.

Ecological: Predominantly favorable

1) The product used for wood treatment (CCA, chromated copper arsenate) is highly toxic and requires strict control of use and disposal. UNFAVORABLE.

2) Need for registration and delimitation of the native environmental reserves of the farm as a barrier to entry of competitors. FAVORABLE.

3) The company's products are produced from planted and renewable forests. FAVORABLE.

4) The renewable forests' planting is perceived by the society as environmentally correct and has a positive image. FAVORABLE.

Legal: <u>Predominantly unfavorable</u>

1) Tax on circulation of goods, transportation and communication services (ICMS) on interstate transfers, reducing the company's competitiveness in other states. UNFAVORABLE.

2) Government oversight rarely happens because of the distance between farm and city. FAVORABLE.

3) Existence of a vacuum in the tax legislation on wood taxation, which may generate future tax liabilities. UNFAVORABLE.

4) Forestry production chain is workforce-intensive and even complying strictly with labor legislation, there is a hidden tax liability difficult to measure in future claims. UNFAVORABLE.

5) Requirement of an operating permit in Mato Grosso do Sul State, which must be requested only by a legal entity, raising the business tax burden. If an individual taxpayer could request it, tax burden would be lower. UNFAVORABLE.

6) High level of bureaucratic requirements in Mato Grosso do Sul State for forestry activities, such as presentation of the eucalyptus plantation plan with location in maps, harvest plan and other requests, always with penalties for not providing the information, increasing costs, bureaucracy and the operational difficulty for the company. UNFAVORABLE.

Therefore, Company A presents in its strategic mapping a very FAVORABLE situation, standing out technological, economic and environmental factors, which represent aspects with a high relevance for the analyzed business. Table 1 presents a synthesis of the Pestel analysis.

Table 1: synthesis of the Pestel analysis.

FACTOR	ASPECT	RESULT
1. Political	Legislation and government action	FAVORABLE
2. Economic	Financing, seasonality, and costs	FAVORABLE
3. Social	Workforce, qualification, and infrastructure	UNFAVORABLE
4. Technological	Available technology and production systems	FAVORABLE
5. Ecological	Chemicals and residues	FAVORABLE
6. Legal	Oversight, taxation, and bureaucracy	UNFAVORABLE

Source: Prepared by the author.

The synthesis of the Pestel Analysis presented in table 1, presents itself as an important mapping of the various strategic factors of the company, but it is necessary to complement it with Porter's forces.

4.1.3 Porte's five forces

According to the theoretical model and Porter, (1989), the forces acting on the competitors mapped to Company A in the context of strategic determination are presented as:

Bargaining power of suppliers: Company A does not have suppliers of its main raw material (eucalyptus' wood from the species *C. citriodora*) since the forests belong to the company and are integrated into the wood treatment unit, which represents a competitive advantage for the standardized supply guarantee. This characteristic still brings an additional benefit of reducing logistical costs of supply and handling of raw material, which is also a competitive advantage of costs. Another product that was used in wood treatment is the chemical called Chromed Copper Arsenate (CCA), which is absorbed by the wood after the vacuum in the treatment autoclave. The main supplier of Chromed Copper Arsenate (CCA) is a large company located in São Paulo, with no other suppliers available in the regional market. This represents a great bargaining power of this supplier since the input prince does not have a flexibility negotiating nor it is possible to carry out a quotation with competing companies. Finally, this input for wood treatment represents approximately 30% of the final cost of the treated wood, which is a high bargaining power for this supplier.

Bargaining power of customers: The company's final customers are farmers who use the products for constructing and renovating cattle containment fences and, in a lesser extent, to construct corrals and other improvements on the same farms. These customers represent a very broad universe of farmers, who normally carry out an exhaustive wood price quotation before deciding on the purchase. Thus, Company A must always fix prices at the same level as its competitors. Until the company begins its activities, only a sales channel

composed of agricultural products stores located in the cities of the Bolsão do MS supplied this market. Thus, Company A found many difficulties to use this sales channel, mainly due to the existing relationship between those companies and their traditional wood suppliers from other regions. In this sense, there was a strategic innovation of Company A, which sought to differentiate the sales channel, making direct sales to farmers, adding services by delivering on their farms.

Thus, by using a direct sales channel with consumers, an important link was removed from the wood production chain: the distribution channel of agricultural products stores. The direct sales to the final consumer are made with outsourced sellers paid only with a variable commission of 5% of the gross sales, with the price fixed at the level of the competitors, which removes from the customers their bargaining power. In addition, product delivery differentiates the wood of Company A from the competitors. Finally, bargaining power of customers is quite significant, but the company's strategy of fixing its prices at the level of competitors and aggregating delivery services virtually cancels the bargaining power of its customers.

Threat of substitute products: There are substitute products for constructing cattle containment fences, but the factors costs and legal restriction inhibit them. Native trees would be the main substitute product with price competitiveness with treated eucalyptus. Native woods from aroeira and other species have always been used in livestock for constructing fences, but currently, the environmental legislation prohibits their use. Only in very special situations, the farmers can request an environmental license for cutting these trees even if they are in their property and it is for their own use. There are very strict environmental legislation and inspection by the environmental police, with very high fines and environmental criminalization.

This legislation makes it difficult to use this type of native wood, which has always been a natural competitor of planted forests. Another potential competitor is concrete and cement posts, but they cost much more than wood and it is hardly used. Although cement and concrete posts have higher stiffness, a higher rate of breakage is observed during their use for cattle containment fences when compared to wood.

Electric fences may be potential threats, not as a substitute product, but rather another way of containing cattle, reducing the amount of wood to be used in fences. However, it presents a series of operational and restrictive problems, such as difficulty in access to electric energy and the use of batteries which need to be periodically checked, falling of woody material of native trees, interrupting the energy and its own fragility of construction. Electric

fences are used marginally in intensive livestock grazing systems, and it is not a characteristic of this region. Thus, the threat of substitute products is practically non-existent in the wood market for the construction of cattle fences.

Threat of new entrants: New entrants to wood market in the area in which Company A has been active are a constant threat. New entrants coming from other regions to compete in the same regional market have a competitive disadvantage because they have higher costs due to the distance, which leads to an additional cost of transportation. Even if they could use the distribution channel composed of agricultural products stores already established in the region, there would be a margin loss. Other potential entrants are possible wood treatment companies that may be able to settle in the region, but, at a first moment, they would have difficulty to obtaining wood to supply their treatment units since planting their own forests would require a minimum of six years until the first harvest, which would be an important barrier of entry. This threat of new entrants will always be present, but it is not a threat that cannot be faced and neutralized by Company A.

Rivalry between competitors: There is an effective rivalry among the competitors of Company A in the wood marketing of eastern Mato Grosso do Sul State, with a fierce dispute over prices. In this sense, the company must always adjust the prices according to its competitors and keep its competitive advantages of delivery and wood quality mainly because all customers make a prior price quotation before buying wood. This rivalry exists between Company A and agricultural product companies of the region. In order to neutralize this competition, Company A has been striving to consolidate its brand by keeping its prices at the same level as its competitors, adding the service of delivering the wood to farmers, in addition to maintaining a flexibility in the negotiations to buy and sell products.

4.1.4 SWOT analysis and risk assessment

SWOT analysis is a very simple and easy-to-understand tool to synthesize internal and external factors of the company, being presented as strengths, weaknesses, threats and opportunities, as shown in Table 2.

Table 2: Strengths, weaknesses, threats, and opportunities of the company.

STRENGTHS	WEAKNESSES
Quality of products	Cracks in wood
Reliability	Workforce difficulties
Warranty	Delay in deliveries
Delivery to the customer: CIF	
Flexibility to negotiate	
Direct distribution channel with consumer.	
OPPORTUNITIES	**THREATS**
New markets in others regions	New competitors in the region
New products such as charcoal and firewood	Competitors with another distribution channel
Brand consolidation	New competitors from others regions

Source: Prepared by the author.

Finally, it is important to quantify the Pestel, SWOT and Porter's five forces analyses since it improves the perception of the business risk assessment. As a theoretical reference, the Porthin's risk matrix adapted by the author was used by performing a probability correlation versus consequence and quantifying the relevance, as shown in Table 3.

Table 3: Quantitative risk assessment.

PROBABILITY × CONSEQUENCE	QUANTITATIVE RISK ASSESSMENT
Insignificant	0.00 to 0.20
Not important	0.21 to 0.40
Moderate	0.41 to 0.60
Serious	0.61 to 0.80
Critical	0.81 to 1.00

Source: Prepared by the author and adapted from the risk matrix (Porthin, 2004).

Thus, a minimally quantifiable risk assessment can be made by using Table 5. For this, the highest critical risk is considered as 1.00 and the lowest risk is considered as 0.00. From there, a scale is constructed to deduce the risk for each of the factors analyzed in the Pestel, Porter's five forces and SWOT analyses. In addition, in the calculations for the business risk assessment, any type of weighting in the different evaluations was used, but only a simple arithmetic mean. Table 4 below presents a business risk assessment.

Table 4: Business risk assessment.

PESTEL		PORTER'S FIVE FORCES		SWOT	
Aspect	**Perception**	**Aspect**	**Perception**	**Aspect**	**Perception**
Political	0.8	Entrants	0.7	Strengths	0.7
Economic	0.8	Substitutes	0.8	Weaknesses	0.5
Social	0.4	Customers	0.5	Opportunities	0.7
Technological	0.8	Competitors	0.4	Threats	0.6
Ecological	0.9	Suppliers	0.5		
Legal	0.5				
MEAN	**0.700**		**0.580**		**0.625**
GENERAL MEAN					**0.635**

Source: Prepared by the author based on field data.

Table 4 allows a better quantitative visualization of a business risk assessment. The average indicator of 0.635 indicates a positive perception above the average, i.e. the enterprise has 63.50% of positive aspects in a scale of 100.

5. Final Considerations

This research presents the position of a model for strategic positioning analysis in wood treatment companies based on the case study carried out in a vertically integrated forestry company that cultivates eucalyptus, treat its wood and produces wood posts for farmers of the region of Bolsão do Mato Grosso do Sul. In Swot analysis of Porter's five forces, the strategic positioning of Company A takes into account its strengths, weaknesses, opportunities and threats. Company A started its activities very recently, but with a previous planning and the beginning of planting its own forests to guarantee wood supply with quality and integrated to the industrial treatment unit, which is a competitive advantage when compared to its main competitors. In addition, the aggregation of services, such as product delivery on the farms of final consumers, negotiation flexibility to buy and sell wood are also competitive advantages that enhance their strengths.

The innovation of carrying out direct sales without the participation of an important link in the productive chain (agricultural companies of the region) makes it possible to add an economic margin of retail to the company and establish its prices at the level of competitors, with a higher margin and consequent profitability.

The Pestel analysis carried out allows a broader view of the competitive environment and its positioning in political, economic, social, technological, ecological and legal aspects,

with a very favorable situation, standing out following factors: economic – profit margin above competitors in the market in which it operates; technological – use of a simple technology with no great innovations that can change the balance between quality and costs in the medium term; ecological – the very essence of a business that plant forests in degraded pastures has a very positive image in society in the aspects of sustainability, being an ecologically correct activity.

In addition, according to Porter (1989), the importance of a selling company in identifying the value added in the buyer's production chain and performing the delivery on the properties of its customers are relevant aspects to differentiate products. These aspects bring to Company A an appropriation of margins higher than those of its competitors since its product is a commodity. This process has already been happening through the sustainability of sales, identified in the repetition of purchases by customers and especially because wood is not a product of continued use in livestock, such as a mineral salt that cattle consume every day.

This study, by addressing a single case with qualitative research techniques, has all the restrictions determined by Yin (2015) and should not be extrapolated for other situations. However, it can certainly contribute to the academic knowledge since it is a study on the strategic positioning of a commodity producing company that has been using concepts and techniques to differentiate itself with innovation in its distribution channel.

As a suggestion of new lines of complementary research, it is indicated the mapping of the entire production chain of this vertically integrated business by measuring the margins of each stage of the production chain and their added value more effectively and quantitatively.

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