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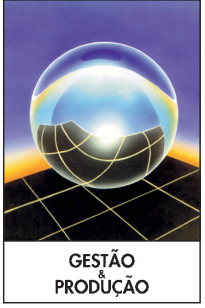

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Applying the operations strategy construct to rural grain-producing enterprises: a theoretical framework

Estratégia de operações: uma abordagem teórica quanto à aplicabilidade do constructo para empreendimentos rurais produtores de grãos

Camyla Piran Stiegler Leitner[1]
Alceu Gomes Alves Filho[2]

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Abstract: A firm's Operations Strategy is responsible for key decisions about the production function activity. Although a significant number of research studies have been conducted about this construct in industrial and service companies, only a few addresses the agricultural sector, specifically the grain production and export industry, which is an important contributor to the Brazilian economy. This study focuses on the operational decisions of grain-producing farms affected by the endogenous and exogenous factors of the grain supply chain. Based on a literature review of the operations strategy, this study aims to present conjectures relating the production decisions of grain-producing enterprises to their Operations Strategies. The results support the applicability of the construct to rural properties. Therefore, future research should address Operations Strategies in agricultural companies and the development/adaptation of tools and management methods applicable to such enterprises.

Keywords: Operations management; Competitive priorities; Strategic decisions; Farm; Soy.

Resumo: *A estratégia de operações (EO) é responsável por decisões chave das atividades desempenhadas pela função de produção, afim de alcançar a vantagem competitiva no mercado, sendo recorrentes as pesquisas sobre esse constructo nas áreas industrial e de serviços. Porém, a agricultura brasileira também promove bons resultados econômicos pela produção e exportação de grãos. No entanto, poucas são as pesquisas que permitem a compreensão das decisões operacionais frente aos fatores endógenos e exógenos da cadeia de produção de grãos e o impacto delas para o sucesso da organização. Dessa forma, objetiva-se, a partir de revisão bibliográfica, apresentar conjecturas e proposições relacionando as decisões de produção das propriedades produtoras de grãos à estratégia de operações. Observou-se que há aplicabilidade do constructo às propriedades rurais e, dessa forma, almeja-se contribuir com o campo teórico das EO e continuar as discussões a esse respeito, subsidiando novas pesquisas e o desenvolvimento/adaptação de ferramentas e métodos gerenciais aplicáveis a tais empreendimentos, dada a relevância socioeconômica da atividade agrícola.*

Palavras-chave: *Gestão de operações; Prioridades competitivas; Decisões estratégicas; Fazenda; Soja.*

1 Introduction

One of the Brazil's main economic activities, agribusiness has in recent years significantly contributed to the country's economic results. According to Barros & Adami (2013), the sector's export revenue reached US $59.7 billion in 2015, a two percent increase over the total reached in 2014.

The products accounting for the positive Brazilian trade balance are agricultural commodities. In the 2015/2016 harvest, for example, 186.4 million tons of grain (Following the classification of Brazil's National Food Supply Agency (CONAB), the term "grains" includes 14 cultivars: cottonseed, peanuts, rice, oats, rye, barley, beans, sunflower, castor bean, corn, soybeans, sorghum, wheat, and triticale) was produced in the country (CONAB, 2012). Of this total, 95.43 million tons were soybean,

[1] Universidade do Estado de Mato Grosso – UNEMAT, Avenida das Arapongas, 1384, Centro, CEP 78450-000, Nova Mutum, MT, Brasil, e-mail: camyla@unemat.br

[2] Universidade Federal de São Carlos – UFSCar, Rodovia Washington Luís, sn, CEP 13565-905, São Carlos, SP, Brasil, e-mail: alceu@ufscar.br

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and 66.97 million tons corn grain (1st and 2nd crops). Together, these crops represent 87.12% of the total national grain production, according to the Ministry of Agriculture, Livestock, and Supply (Brasil, 2014).

Beginning in the 1950s, the Brazilian government began investing in the evolution of the nation's agriculture. Over the years, this has led to breakthroughs in the performance of rural activity, driven by improvements in machinery, equipment, seeds, and planting techniques. The transformations resulting from this modernization have brought new demands to the management of agricultural properties, requiring producers to have an entrepreneurial mindset, focused on large-scale production, and giving rise to what Oliveira (2009) conceptualized as "a new production standard."

However, according to Crepaldi (2012), the management of rural properties in Brazil — whether small, medium, or large-scale — remains either stuck within traditional criteria, or shows an unacceptable performance pattern in a market economy with high income levels.

According to Nantes & Scarpelli (2012), little attention has been devoted to the new commercial and managerial reality in the most diverse areas of the rural enterprises, especially those related to production process, even though rural producers are aware of the importance of the production function in agricultural management, as Canziani (2001) emphasizes.

Canziani (2001) adds that the strategic decisions guiding the conduct and tasks in agricultural-rural production are delicate: any errors may lead to high financial expenditures, since agricultural production entails an irreversible process in which the failures of actions can only be perceived at the end of the harvest. It is in this context that the prerogative of Operations Strategies for rural properties is inserted.

The production or Operations Strategy should be understood as a set of policies, plans, and actions related to the operations function and aimed at supporting the company's competitive strategy. The main task of the Operations Strategy is to direct an organization in the assembly and alignment of productive resources, so as to execute the competitive strategy and achieve the desired results (Hayes et al., 2008).

This holds true in the agricultural context. Rural enterprises operate in a market that demands quality products and is impacted by constant changes, forcing them to make better decisions regarding operations that must be based on market knowledge (consumer, supplier, and competitors).

The motivation for the present study investigating the Operations Strategies of rural enterprises is twofold. First, there is a scarcity of studies about the management practices, strategies, characteristics and adherence to management practices for these organizations, as mentioned by Camargo et al. (2012), Kingwell (2011) and Lopes et al. (2011). The second motivation is Tanure et al.'s (2009) findings about rural producers' limitations: empiricism in decision-making, a restricted view of actual production objectives, and failure to understand rural enterprises as a system inserted in an environment that conditions their operation.

The study of Operations Strategy is commonly divided into two topics: strategy content, which addresses "what" will be decided; and strategy process, which explains "how" the decisions will be used. The content of operations strategy, the focus of this study, is concerned with the competitive priorities and decisions made in the structural and infrastructural areas of the operations (Hayes et al., 2008). Voss (1995) explains that there is a hierarchical logic in the content of the operations strategy: the targets of the operations (competitive priorities) are the guides of the structural decisions, and these in turn guide infrastructure decisions.

The objective of this article is to relate the concepts of Operations Strategy content to activities and decisions related to the management of rural property operations, demonstrating that the Operations Strategy construct has applicability to these enterprises.

To this end, the paper discusses the main concepts of Operations Strategy and its various aspects. Next, the new requirements for rural properties vis-à-vis the evolution of Brazilian agriculture will be presented. Finally, we will share conjectures about the operational strategy framework for rural properties.

2 Methodological procedures

In order to propose some conjectures about Operations Strategies in rural properties, we chose to conduct a qualitative study of a narrative review of the literature. It is an appropriate method to describe and discuss the development or state of art of a given subject, from a theoretical or contextual viewpoint (Rother, 2007, p. 1), without establishing rigorous and replicable methods for reviewing the literature. Vosgerau & Romanowski (2014) affirm that the narrative review is constituted of a broad analysis of the literature, but the sources of information, the method used to search for references, and the criteria for evaluation and selection of the studies are not explicit: they are established by the author's interpretation and critical analysis.

This article has an exploratory nature and adopts the theoretical-conceptual method, which according to

Miguel (2011), is a discussion based on the analysis of literature, resulting in a survey of a series of relevant points on the subject researched. It intends to illustrate the applicability of Operations Strategy concepts to rural properties, initiating discussions to be investigated in future studies that investigate the operationalization of the notes presented here.

The survey of the articles indexed in the Scopus, Science Direct, and IBCT databases that address Operations Strategy was carried out during the months of May and June of 2014, having as the reference period the last 10 years. We used the indexing terms: i) "production" and "strategy", "operation", and "strategy", to search for the construct "Operations Strategy"; and ii) "competitive priorities" to search for the construct "Competitive Priorities". As a criterion for inclusion of publications, it was necessary that the selected expressions be in the "title" and "keywords" fields, and we excluded duplicate articles (indexed in more than one of the mentioned databases) and those that did not present the inclusion criteria.

After selecting the articles, the process of searching the literature on rural properties was started. *A priori*, an advanced search was conducted in the "Google Academic" database, since the intention was to collect material that dealt with the characteristics of Brazilian rural properties. In addition, research was conducted at the Brazilian Digital Library of Theses and Dissertations. In both databases, the indexers used were: "property" and "rural", "farms", "production", and "grain", in the title and subject. To the selected texts we added the books *Agroindustrial Management* and *Fundamentos do Agribusiness*, which help characterize rural properties and grain production.

In addition, three visits were made to an agricultural property that grows soybean and corn, in order to describe their production processes and to relate each stage of the process with the Operations Strategy variables. This was possible after direct observations and interviews with managers.

After the readings and the visits, we highlighted the most relevant aspects considered, both of the Operations Strategy theme and of the theory on rural properties, so that it would be possible to establish some propositions relating the two constructs presented in the course of this article.

3 Production strategy concepts or operations

As stated earlier, the operations strategy is one of the functional strategies of the organization and guides the company in the assembly and alignment of resources, thereby supporting the implementation of the competitive strategy Hayes et al. (2008).

The first approaches to operations/production strategy function are found in Skinner's (1969) studies, in which the author cautions that the operations sector has to cease being merely reactive and operational, insofar as the nature of its decisions lends a more strategic aspect to its function. It is therefore necessary to devise strategies for operations.

Slack & Lewis (2009) consider Operations Strategy as the decisions patterns that determines the long-term capabilities of the operations function, reconciling the requirements of the market with the company's operational processes and resources, so that they provide a solid basis for the organization's sustainable advantage.

The company is therefore required to share its direction, market goals, and objectives with the operations function, so that there is an "agreement" between the parties for coherent actions. Such coherence requires that

> […] operations be designed and managed in such a way that their actions and attributes are in accordance with the needs of the organization and the sister functions (Hayes et al., 2008, p. 51).

The need for coherence mentioned by the authors is derived from the pressure arising from radical changes in markets, technologies, and socio-economic issues that affect operations systems and management practices. Organizations are required to clearly and coherently articulate their Operations Strategy to provide long-term support to competitiveness, as mentioned by Dangayach & Deshmukh (2000).

3.1 Competitive priorities

Competitive priorities are a consistent set of parameters that the company has to value in its production process, based on what is expected by the market and what competitors are practicing.

Dangayach & Deshmukh (2000) argue that a set of tasks must be performed by the operations function in order to support the business strategy, noting that the relative emphasis given to each of these tasks represents the competitive priorities of the operation. Prahalad & Hamel (1990) add that evaluating these priorities will indicate the "strategic intent" of the operation and provide a foundation for testing competitive and functional strategy choices.

Wheelwright & Hayes (1985) define priorities as cost, quality, delivery, and flexibility. Based on Gavronski's (2009) explanations about the variation in the use of competitive priorities in the business sector, this study chose to work with

the following competitive priorities: cost, quality, flexibility, and environmental protection. These will be detailed next.

Cost: Ward & Duray (2000) posit that this competitive priority aims to reduce production costs. Thus, productive processes need to be based on three classical concepts mentioned by Pires (1995): economy of scale, experience curve, and productivity.

Quality: The competitive quality priority has two main aspects: the quality associated with the process and the quality associated with the product. In order for products and services to meet customer expectations, product execution errors must be avoided. This point is made by Greasley (2007), who mentions that from the process point of view, quality is related to the suitability of the product and the specifications required.

Flexibility: Garvin (1993) presents an expanded view, understanding flexibility as the ability of a given productive system to respond to internal variables (lack of adequate raw material, machine and equipment breakage, supplier failure) and external ones (new consumer needs, technological advances, increasingly fast delivery requirements), among others.

Environmental Protection: The emerging concern for the environment, according to Corbett & Van Wassenhove (1993) and Jabbour et al. (2012), has become important for operations, due to the relationship between operational decisions and environmental aspects. According to Angell & Klassen (1999), some operations actions cause environmental impact, and therefore, "it is (managers') duty, at least partially, to consider the environment in the definition of their strategies".

Finally, it is important to reinforce the understanding that competitive priorities can guide the allocation of relevant resources in various areas of operations, so that the objectives of the operations are achieved (Ahmad & Schroeder, 2002; Boyer & Lewis, 2002).

Boyer & McDermott (1999) add that the determining factor for achieving the desired results is not the competitive priorities chosen by the company, but how they are worked out (our emphasis) to form a consistent set of decisions that underpin the strategy. These decisions will be addressed next.

3.2 Structural and infrastructural decisions

According to Dangayach & Deshmukh (2000), in order to achieve capacity improvements in operations (competitive priorities), decisions about productive operations are needed. Wheelwright (1984) proposed dividing decision categories (our emphasis) into structural and infrastructural decisions.

Gonzalez (2008) comments that this categorization of the Operations Strategy decision areas was well received by the scholars in this field, who began to adopt them in their own research, and add, reduce, or replace some of these areas.

Hayes & Pisano (1996) consider that the structural and infrastructural decision categories are the means for implementing a competitive strategy, and also serve to guide and foster the development of new desirable capacities. Chart 1 presents the description and possible decisions in each area of the structural and infrastructural decision categories.

In presenting the concepts and description of each strategic decision area, it is important to mention that decision categories do not exhaust the list of issues that should be taken into account when defining strategies for operations (Pires, 1995).

Designing an effective Operations Strategy is an arduous task, since it is influenced by a variety of variables, both internal and external to the organization, according to Fine & Hax (1984). Considering these factors in developing the strategy requires following the negotiations among the external forces and strengthening the internal relationships with the other organizational functions.

When discussing the Operations Strategy for rural properties, it is necessary to understand the agricultural sector, as well as the operation of the properties and their internal and external relations, which is presented below.

4 Brazilian agriculture and the new requirements for rural property

The expansion of Brazilian agriculture was influenced by global conditions and phenomena. Taking advantage of the increasing demand for grain stocks destined for animal fodder in the North American and European markets, the Brazilian government created a set of actions to compete in this market. One was to stimulate the development of research to provide new technologies (in cultivars, machines, planting technology) to the field (Teixeira et al., 2012; Sampaio et al., 2011).

Sologuren (2004) affirms that the adoption of these new technologies allowed for the effects of scale and gains in efficiency, leading to an increase in agricultural operations and directly influencing the

Chart 1. Areas of the types of strategic decision.

AREA	DESCRIPTION
STRUCTURAL DECISIONS	
CAPACITY	Analyses related to what, how, and how much will be produced, based on market need and available technological possibility.
FACILITIES	The size of the industrial plant, the geographical location of the business, the production processes, and the degree of specialization/focalization of production resources.
TECNOLOGY	The type and degree of production process automation, material handling, and decisions that specify how the different stages of the process are connected.
VERTICAL INTEGRATION	Decisions about what will be produced internally, what will be obtained from third parties, and what will be contracted with suppliers.
INFRASTRUCTURE DECISIONS	
QUALITY MANAGEMENT	Establishes policies and quality management system. Criteria for entry inspection of materials, production line failures, and supplier evaluation are addressed.
HUMAN RESOURCES	Establishes human resources policies.
PLANNING AND CONTROL OF OPERATIONS	The company's organization to forecast and schedule resources in production.
ORGANISATION	The definition of the number of hierarchical levels of the company, structure of the production sector, level of centralization, leadership style, work organization, etc.
RELATIONSHIP WITH SUPPLIERS	The types of relationships that the company has with its suppliers.

Source: Based on Hayes & Pisano (1996).

sector's competitiveness. Allied to the technological factor, the expansion of land for agriculture leveraged the country's economic development. Bernardes (1997) notes that the government promoted the development of new areas in Brazil's savannah with financial incentives and access to land, which led farmers to move to new agricultural frontiers in the Central Plateau and the Amazon.

In these regions, grain production was strengthened by the use of technologies that enabled the adaptation of crops to climate, soil, and relief, as well as efficiency gains in planting and harvesting. The 1980s witnessed a boom in soybean and other grain operations on the so-called "new agricultural frontier." The state of Mato Grosso, for instance, had a production increase of approximately 264% over a ten-year period (1985–1995). The positive results of this new Brazilian agricultural phase were associated with large production of commoditized products—mainly maize, soybeans, and sugarcane—by middle- and large-sized properties using technology to enable high productivity and large-scale commercialization.

Oliveira (2009) and Araújo (2007) consider that the rural scenario was restructured due to its inclusion in the industrial production circuit, which made agriculture dependent on relations with other sectors to guarantee the production, processing, and distribution of food (Batalha & Silva, 2012).

According to Araújo & Costa (2005), the growing interdependency between the agricultural sector and other economic activities led to the emergence and use of the concept of Agribusiness. John Davis e Ray Goldberg define the term as:

> […] the sum of production operations and distribution of agricultural supplies; production operations in agricultural units, storage, processing and distribution of agricultural products and items made from them (Davis & Goldberg, 1957 apud Batalha & Silva, 2012).

The image of agriculture changed, becoming part of a broader sector (agroindustrial system), which includes the input industries, rural producers, agroindustries, and distribution/marketing companies.

Given the multiplicity of agribusiness relations, levels of analysis are established for a better examination of the agroindustrial system. In order to analyze the units that ensure the functioning of the system, we use the lowest level of analysis (but not less important), called socio-economic production units (SEUs), according to Batalha & Silva (2012).

4.1 Rural property: characteristics relevant to management

According to Batalha & Silva (2012), the SEU of the rural macro-segregation of an agroindustrial production chain, or rural enterprise, was defined.

Despite being the lowest level of analysis within the agroindustrial system, a USEP has the capacity to influence and be influenced the entire system, according to Batalha & Silva (2012).

Crepaldi (2012) as a unit of production with the capacity to influence and be influenced by the agroindustrial system. This latter may include agricultural, livestock, or forestry crops for the purpose of obtaining income and providing raw material for other organizations. The rural enterprise literature presents several classifications and characterizations.

The discussions proposed in this paper are pertinent both for rural enterprises in transition and for modern rural enterprises, according to the classification of Nantes & Scarpelli (2012).

Silva (1997) found that producers who chose to implement these changes were faced with new challenges to negotiate and manage their production, which required efficient management of the production unit.

Just as in industrial and service companies, the management of resources is determinant for the success of rural enterprises. Marion & Segatti (2005) mention that whereas management assists producers in their decision-making, managerial efficiency can drive business success.

However, Nantes & Scarpelli (2012) affirm that rural enterprises face specific managerial difficulties related to climate change, the seasonality of operations, the biological cycle of plants and animals, the perishability of products, and the performance achieved by the enterprise. Marion (2010) adds the difficulty of standardizing agricultural activities.

For these reasons, Cella (2002) points out that administrative skills enable rural producers to manage well, define strategies, analyze problems, and build good interpersonal relationships. Zylbersztajn & Neves (2000) added that the organizational complexity of rural enterprises is increased due to the need to manage decisions about various controllable and non-controllable factors, and the high competitiveness of the environment.

4.2 Agricultural production and its peculiarities

According to Araújo (2007), agricultural production comprises the set of activities developed in the field, ranging from soil preparation, cultural treatment, harvesting, transportation, and internal storage to administration and management within the productive units.

These activities are performed on the property, based on decisions that take into account the following factors: i) production, i.e. climate, soil characteristics, biological species, pests, defenses, seeds, machinery, agricultural zoning; ii) people, i.e. training, working hours, safety and hygiene, education; and iii) structure, i.e. the size of the area, geographical location, and storage capacity. These factors and many others can overload the producer and hamper the achievement of the company's results.

However, Paula & Favaret (2000) and Nantes & Scarpelli (2012) point out that there is a complicating factor in commodity production: the need for constant cost reductions and economies of scale, which can be achieved through sound decisions in all aspects of the activity.

The operational competitiveness of Brazil's grain production—with soybean being the main export commodity—relies on a large area, cheap labor, high technology use, scale of production, and the availability of capital (Pinazza, 2008).

In addition to these positive aspects of the Brazilian scenario, an alternative found by Mato Grosso grain producers to minimize the impacts of the complicating factors listed above, and mentioned by Nantes & Scarpelli (2012), was multiproduct production, with two harvests in the same agricultural year (Osaki, 2012).

Zen et al. (2005) explain that, when diversifying the area of cultivation, the producer aims to reduce the inherent risks of production, since revenue fluctuations can be reduced to create a more stable cash flow. In addition to this economic issue, diversification is also triggered by technical issues, by seeking to reduce damage caused by pests and diseases, to maintain soil fertility, and to prevent erosion (Osaki, 2012).

However, Osaki (2012, p. 230) states that

> […] reducing risks by diversifying crop products is not a rule and it is necessary to use managerial tools that allow the producer to choose the best products to make up the agricultural production set and determine the proportion that translates into higher return and lower risk.

Given the complexity mentioned by Zylbersztajn & Neves (2000), and the impact of management on rural enterprises noted by Debertolis et al. (2005) and Marion & Segatti (2005), studies aimed at understanding rural enterprises and propositions for them are fundamental. Nantes & Scarpelli (2012) add that the choice of strategic alternatives appropriate to rural enterprises requires identification of their potentialities and deficiencies, seeking to integrate them with the requirements of the agro-industrial system.

5 Operations strategy in the agricultural context: initial conjectures

The Operations Strategy construct developed by Skinner (1969) is a well-established concept in industries and services (sectors in which the theory showed applicability). Researchers have considered it pertinent to observe the adaptability of the same to rural businesses.

Considering that rural properties produce within the same standards of business rationality, possessing common objectives and problems similar to any other company, as Alencar & Moura (1988) have shown; and understanding that the literature approaches the strategy of operations as a set of principles driving the decision-making process on productive operations, it is possible to make initial assumptions in an attempt to adapt the concept of Operations Strategy to rural enterprises.

The motivation for this approach is the economic significance of grain production chains for the country, together with the understanding of the importance of rural macro-segregation for these chains and the scarcity of studies related to management, strategic positioning, and management of the productive process of agricultural enterprises.

Busch & Bain (2004) state that because globalization affects agribusiness in many ways, companies need to have strategies that support their competitiveness in the global marketplace. Miller et al. (1998) corroborate this idea, arguing that the new scenario requires farms to elaborate business strategies, associating new plans with combinations of product, market, and finance structure.

Before discussing the Operations Strategy of grain-producing rural properties, we must understand that these are products of the commodity type (primary products that, due to their demand in international trade, are priced according to the main markets). In commodity markets, the price of the product is fixed: that is, the aggregation of value to the product has no reason to exist.

Mintzberg (1988) comments that the competitive strategy of commodity companies must be based on leadership in cost, without reducing prices. Gonçalves (2005) complements this by stating that these companies compete on low production, handling, distribution, and transportation cost.

The alternative used to lower production costs is to invest in technologies to increase productivity (and thus gain in economies of scale). According to Osaki (2012), these investments are related to the acquisition of machinery, introduction of new cultivars, use of new chemicals in pest and disease management, and other farming practices.

Owing to the "open-sky factory" characteristics of agribusiness units (Osaki, 2012) which develop one or more activities, other conditions interfere with the production Operations Strategies of rural properties. External conditions include soil conditions, climate, topography, and availability of labor. Internal conditions can be the profile of the producer (willingness to take risks, preferences, and network) and its resource constraints (land, capital, and labor).

These characteristics characterize rural activity as a segment in which there is a great occurrence of emergent strategies, with decisions that are unscheduled, unstructured, and rarely arising from others (Rathamann et al., 2007).

However, Nantes & Scarpelli (2012) argue that, faced with the search for competitiveness, rural properties need new models for the managerial and operational standard, considering the consumer as the main agent that defines quality standards, and reducing production costs as to improve their results.

Pinazza (2008) adds that there is little planning of actions; management tools for decision making (what, how much, and how to produce) are little used; and there is little knowledge about marketing. The situation is aggravated when the producer chooses to produce conventional commodities at the expense of transgenic ones, due to the high costs of production associated with the latter.

Based on the concepts of operations strategy, which according to Hayes et al. (2008) is formed by the competitive priorities and the decisions made in the structural and infrastructural areas of the operations, some conjectures are presented below.

5.1 Competitive priorities

Ferraz et al. (1996) show very well the competition patterns in the commodity market, the main sources of competitive advantages, and the competitive environment of these products.

The instability of the commodity market requires the producer to efficiently manage the agricultural business, whose fundamental principles are to minimize costs, optimize the use of productive space, and increase productivity levels (Dall'Agnol et al., 2010). In this context, Chart 2 presents the conjectures regarding the competitive priorities of grain-producing agricultural operations.

5.2 Structural and infrastructural decisions

As mentioned before, the properties producing these commodities for the grain market must make strategic decisions, observing the following factors: climate, natural resources, market seasonality,

Chart 2. Competitive priorities in grain production.

PRIORITY	DESCRIPTION	REFERENCES
QUALITY	Grain quality is associated with the biological, chemical, and physical characteristics of these products influenced by edaphoclimatic factors. **Actions**: Choice of the seed to be planted and correct execution of the activities of pre-planting, planting, cultural treatments, and harvest are reflected in the quality of the crop.	Diehl & Bacchi (2006).
FLEXIBILITY	Product diversification in rural properties is a consequence of the attempt to reduce the cost of investment in the machinery park, fixed expenses with labor, and other administrative expenses for *n* activities of the farm. **Actions**: crop rotation and market analysis to follow the demands and offers of the products, and to remain aware of market oscillations and climatic changes .	Silveira (2004), Osaki (2012).
COST	Concern accentuated by the high standardization of commodities, added to the high demand for these products. Effective management is required through consistent information that helps in decision making. **Actions:** implementation of more flexible management practices and investments in process improvement..	Ferraz et al. (1996).
ENVIRONMENTAL PROTECTION	Reducing environmental impacts has become a barrier to entry of agricultural products into the external market, so it must be addressed to ensure the competitiveness of commodity operations. **Actions:** Changes in the productive process, introduction of integrated organizational practices.	Sporleder & Boland (2011).

Source: Adapted from Ferraz et al. (1996); Osaki (2012); Sporleder & Boland (2011); Silveira (2004) and Diehl & Bacchi (2006).

product perishability, and culture cycle, according to Osaki (2012). However, Canziani (2001) argues that decisions related to factors internal to the property, especially those related to the operationalization of the production process, are also determinant for the competitiveness and longevity of the rural enterprise.

It can then be considered that decisions in the structural and infrastructural areas are established so that the results expected by the producers are achieved. This statement corroborates the definition of the categories of structural and infrastructural decisions of the operations strategy, proposed by Hayes & Pisano (1996), according to which they are the means for implementing a competitive strategy, also serving to guide and foster the development of new desirable capacities.

Osaki (2012) highlights that a producer's uncertainty in operations-related decisions often arises from the need to coordinate its activities to produce more than one type of product. Such choices revolve around activities to maintain or replace; increases in production (leases) or area (land acquisition); or purchase or rent of machines.

Moreover, the adoption of modern machines and equipment requires training the labor force to use them. The remuneration of professionals qualified for this is directly proportional to their knowledge and ability (Hirakuri & Lazzarotto, 2011).

The review of the Operations Strategy literature shows that the issues related to producing more than one product, mentioned by Osaki (2012), are pertinent to the category of structural decisions: capacity, facilities, and vertical integration. The statements about staff training and remuneration made by Hirakuri & Lazzarotto (2011) refer to infrastructural decisions. Chart 3 presents some activities of the grain production process, as well as the decision areas corresponding to each process decision.

It is understood that all the activities mentioned in Chart 3 are fundamental to the results sought by the producer. Associated with the statement by Ferraz et al. (1996) that rural properties should have excellence in planning and control of productive processes—which has been corroborated by various arguments presented throughout this article—it is evident that the Operations Strategy adheres to the management of rural properties and can be used to support the actions of producers.

The concepts/characteristics of competitive priorities and structural and infrastructural decisions, and their respective understandings for grain production, are presented in Chart 4.

Chart 3. Grain production activities and related decision areas of the operations strategy.

	ACTIVITY	FUNCTION	PC OPERATIONS	DECISION AREA	INTERFERENCE
PRÉ-PLANTING	Product type definition.	Determines what to produce, based on the market, production capacity, climatic conditions, and soil analysis.	Cost, flexibility, delivery, environmental protection.	Capacity.	Technology, planning and control of operations, vertical integration, relationship with suppliers.
	Definition of area in hectares to be cultivated.	Determines the areas of planting, quantity of machines, labor, and inputs	Cost, flexibility, environmental protection.	Capacity.	Facilities, planning and control of operations.
	Definition of the variety of seed to be cultivated.	Establishes the varieties of seeds based on the adaptation of these to the characteristics of soil, precocity, productivity, resistance to extreme weather patterns, etc.	Quality, cost, flexibility.	Capacity.	Facilities, planning and control of operations.
	Definition of agricultural inputs.	Establishes the inputs needed for production, based on the variety of seed chosen and the relationship with the supplier.	Quality, cost, environmental protection.	Relationship with suppliers.	Planning and control of operations, capacity, technology, quality management.
	Definition of human resources.	Analyzes the number of employees required for each activity vs. the number of employees available to the process.	Cost, flexibility.	People management.	Planning and control of operations, capacity, organizational structure.
PLANTING	Soil preparation.	Ensures ideal soil conditions for the planting stage. Actions are defined based on the type of product to be produced and on the soil analysis.	Quality, cost, environmental protection.	Planning and control of operations.	Capacity, facilities, technology.
	Preventive maintenance.	Minimizes breakage during planting.	Quality, cost, delivery, flexibility.	Planning and control of operations.	Technology, Quality Management.
	Planting start date.	Adheres to the legal determination that stipulates a better planting season to reduce production losses due to climatic risks.	Delivery, environmental protection, flexibility, cost.	Planning and control of operations.	Capacity, Quality Management.
	Planting sequence.	Analyzes area size vs. quantity of machines and labor, and soil characteristics. It seeks to reduce costs of movement and wear/breakage of machinery.	Cost, Delivery, environmental protection, flexibility.	Planning and control of operations.	Capacity, facilities, technology, Quality Management.

*In rural enterprises that have their own storage facilities. Source: Authors.

Chart 3. Continued...

	ACTIVITY	FUNCTION	PC OPERATIONS	DECISION AREA	INTERFERENCE
CROP HANDLING	Control of pests, diseases, and weeds.	Defenses are applied to avoid reducing the incidence of pests in the crop.	Quality, cost, environmental protection.	Quality management.	Capacity, Planning and Control of Operations.
CROP HANDLING	Application of fertilizers (cover and leaf).	Fertilizers are applied to improve crop productivity.	Quality, cost, environmental protection.	Quality management.	Capacity, Planning and Control of Operations.
HARVEST	Verification of plant physical characteristics and moisture content of grains.	Color, leaf fall, and stage of maturation/drying of the plants, and the moisture content of the grain, are visually verified.	Quality, cost.	Quality Management.	Capacity Planning and control of operations.
HARVEST	Grain harvest.	Grain is harvested from the field.	Quality, cost, delivery.	Planning and Control of Operations.	Technology, capacity, quality management.
STORAGE*	Processing and storage of grain	Harvested grains are stored and processed.	Quality, cost, delivery.	Capacity.	Planning and Control of operations, technology, quality management.

*In rural enterprises that have their own storage facilities. Source: Authors.

Chart 4. Comparative framework for the concepts of Operations Strategy content established in the literature, and respective understandings regarding agricultural production.

COMPETITIVE PRIORITIES		
ITEM	**THEORETICAL FRAMEWORK FOR INDUSTRY AND SERVICES**	**CONJECTURES ABOUTGRAIN PRODUCTION**
QUALITY	Aesthetic characteristics of products.	Physical-chemical-biological characteristics of grains.
FLEXIBILITY	Increase in volume produced (according to customer demand or request).	Flexibility of product with multiproduct production in one year/harvest.
COST	Reduction of operating costs.	High-scale production and seed productivity used.
ENVIRONMENTAL PROTECTION	Protection and care for the environment.	Crop rotation, no-tillage, triple washing, and reverse logistics of pesticides packaging.
STRUCTURAL AND INFRASTRUCTURAL DECISIONS		
ITEM	**THEORETICAL FRAMEWORK FOR THEORY INDUSTRY AND SERVICES**	**CONJECTURES ABOUT GRAIN PRODUCTION**
CAPACITY	Size of production unit, machinery ownership, adjustments to demand.	Based on the area available for planting (owned or leased), and the variety of products and types of seeds to be used.
FACILITIES	Geographical location, product specialization, supply and distribution logistics.	Standardized product, poor logistics.
TECHNOLOGY	Machinery, equipment, management, information systems.	Mechanization of planting, cultural dealings, and harvesting.
VERTICAL INTEGRATION	Subcontracting, outsourcing, domain over more than one segment of the supply chain.	Large companies that plant, store, market, transport; subcontracting.for harvests.

Source: Authors.

Chart 4. Continued...

STRUCTURAL AND INFRASTRUCTURAL DECISIONS		
ITEM	**THEORETICAL FRAMEWORK FOR THEORY INDUSTRY AND SERVICES**	**CONJECTURES ABOUT GRAIN PRODUCTION**
QUALITY MANAGEMENT	Product planning, process control, final product inspections.	Grain quality control, input applications, productivity gain, product inspection processes.
HUMAN RESOURCES	Compensation policies, training, organizational climate, compliance with safety standards.	Recruitment of temporary labor during harvesting periods, technical training, NR 31.
OPERATIONS PLANNING AND CONTROL	Production schedules, scheduling change flexibility.	Planning year/crop, routing of fields for planting, redefinition of programming due to non-controllable variables (climatic, biological).
ORGANIZATION	Delegation of functions, hierarchical levels.	Centralized, few hierarchical levels.
RELATIONSHIP WITH SUPPLIERS	Selection of suppliers, types of relationships, agreements and partnerships.	Financing of operations, training partnerships.

Source: Authors.

It can be observed from the conjectures presented in Chart 4 that the strategic concept of operations can be applied to rural grain-producing properties, taking into account the specificities of the sector, whose characteristics largely differ from operations performed in industries and services (and for which the theory has already shown applicability).

6 Final considerations

Given the specificities of the current agribusiness context, the theoretical-practical gap in the management of agricultural properties makes the strategies and methods used, and the contents proposed, inadequate for the managerial problem of this type of enterprise (Romeiro, 2004).

The economic-financial ratios achieved by Brazilian agriculture and their relevance in the global context, require research from the most diverse areas of knowledge. Souza (2010) states that given the significant increase in grain operations such as those related to soybeans—and their consequent economic impact—studies on strategies, optimization and allocation of resources, organizational efficiency, and improvement of decisions are important.

However, the management of the rural enterprise is insufficiently addressed in the literature. Studies about management tools such as product definition and production process (set of practices and resources required), quality systems, and operations planning and control are incipient.

Because surveys of Scopus, Science Direct, and IBCT found no study addressing this topic, even though Operations Strategy is a well-established concept in the industrial and service sectors, we decided to carry out a study that could indicate how the theoretical construct of Operations Strategy could be adapted and applied to rural companies.

The present research, which involved visits to an agricultural property and interviews with some of its directors, aimed to illustrate and describe the production activities, and then classify them into the Operations Strategy decision areas, which was the basis for the proposals made.

We observed that the concept of Operations Strategy can be applied to rural grain-producing properties, and adaptations are necessary depending on the specificities of the sector. Its application in companies in the agricultural supply chains can bring significant economic benefits since, as Batalha & Silva (2012) argue, efficiency cannot be achieved in the system if there is no efficiency in all the units that are part of it.

The study and discussion of Operations Strategies, considering the problems existing in the producing properties, should promote the advance of theoretical-empirical knowledge, as well as increasing the performance of the grain production chains.

It should be emphasized that this article was limited to presenting how the concepts of Operations Strategy (disseminated in studies on industries and services) can be used in studies of grain-producing properties in the Brazilian context - characterized by large properties that employ advanced technology and engage in large-scale production. It is therefore recommended that further studies be developed to test the claims made here, which will increase the knowledge about the Operations Strategies of agricultural properties.

Also, a study about Operations Strategies in family agriculture properties could allow, for example, the indication of similarities and differences in relation

to what was proposed in this article. New studies are needed to analyze the pattern of changes in agricultural holdings and the interference of strategic choices and organizational performance.

The main empirically-observed aspects, as well as their theoretical counterpoints, can culminate in the emergence of new studies, and perhaps a line of research, on Operations Strategy in agricultural properties (of different agricultural complexes, enterprises at different development stages, of various sizes and structure, etc.).

References

Ahmad, S., & Schroeder, R. G. (2002). Dimensions of competitive priorities. *Journal of Applied Business Research*, 18(1), 77-86.

Alencar, E., & Moura, J. A., Fo. (1988). Unidades de produção agrícola e administração rural. *Informe Agropecuário*, 14(157), 25-29.

Angell, L. C., & Klassen, R. D. (1999). Integrating environmental issues into the mainstream: an agenda for research in operations management. *Journal of Operations Management*, 17(5), 575-598. http://dx.doi.org/10.1016/S0272-6963(99)00006-6.

Araújo, D. L. No., & Costa, E. D. F. (2005). Dimensionamento do PIB do agronegócio em Pernambuco. *Revista de Economia e Sociologia Rural*, 43(4), 725-757. http://dx.doi.org/10.1590/S0103-20032005000400006.

Araújo, M. J. (2007). *Fundamentos de agronegócios* (2. ed.). São Paulo: Atlas.

Barros, G. S. C., & Adami, A. C. O. (2013). *Exportações do agronegócio batem novo recorde em 2012, mesmo com queda de preços* (pp. 10). Piracicaba: Escola Superior de Agricultura "Luiz De Queiroz". Recuperado em 10 de setembro de 2017, de http://cepea.esalq.usp.br/macro/

Batalha, M. O., & Silva, A. L. (2012). Gerenciamento de sistemas agroindustriais: definições, especialidades e correntes metodológicas. In C. M. O. Batalha (Ed.), *Gestão agroindustrial* (3. ed., pp. 2-62). São Paulo: Atlas.

Bernardes, J. A. (1997). As estratégias do capital no complexo sojífero. In *Annales del 6 Encuentro de Geógrafos de América Latina* (pp. 1-10). Buenos Aires. Recuperado em 10 de setembro de 2017, de http://observatoriogeograficoamericalatina.org.mx/egal6/Geografiasocioeconomica/Geografiaagricola/382.pdf

Boyer, K. K., & Lewis, M. W. (2002). Competitive priorities: investigating the need for trade-offs in operations strategy. *Production and Operations Management*, 11(1), 9-20. http://dx.doi.org/10.1111/j.1937-5956.2002.tb00181.x.

Brasil. Ministério da Agricultura, Pecuária e Abastecimento – MAPA. (2014). *Exportação brasileira 2013 - Soja e Milho*. Brasília.

Busch, L., & Bain, C. (2004). New! Improved? The transformation of the global agrifood system. *Rural Sociology*, 69(3), 321-346. http://dx.doi.org/10.1526/0036011041730527.

Camargo, P. R., Figueiredo, D. N., Silva, P. N. G., Limas, C. E. A., & Callegari, O. M. (2012). A importância do conhecimento administrativo na atividade agrícola: um estudo de caso da Fazenda São Carlos localizada no município de Balsa Nova - PR. In *Anais do Congresso Internacional de Administração* (pp. 1-10). Ponta Grossa.

Canziani, J. R. F. (2001). *Assessoria administrativa a produtores Rurais no Brasil* (Tese de doutorado). Universidade de São Paulo, Piracicaba. http://dx.doi.org/10.11606/T.11.2001.tde-28042004-105912.

Cella, D. (2002). *Caracterização dos fatores relacionados ao sucesso de um empreendedor rural* (Dissertação de mestrado). Universidade de São Paulo, Piracicaba. http://dx.doi.org/10.11606/D.11.2002.tde-23072002-162811.

Companhia Nacional de Abastecimento – CONAB. (2012). *Acompanhamento da safra brasileira: grãos, décimo segundo levantamento, setembro 2012*. Brasília: CONAB. Recuperado em 12 de janeiro de 2013, de http://www.conab.gov.br/OlalaCMS/uploads/arquivos/12_09_06_09_18_33_boletim_graos_-_setembro_2012.pdf

Corbett, C., & Van Wassenhove, L. (1993). Trade-offs? What trade-offs? Competence and competitiveness in manufacturing strategy. *California Management Review*, 35(4), 107-122. http://dx.doi.org/10.2307/41166757.

Crepaldi, S. A. (2012). *Contabilidade rural* (7. ed.). São Paulo: Atlas.

Dall'Agnol, A., Lazarotto, J. J., & Hirakuri, M. H. (2010). *Desenvolvimento, mercado e rentabilidade da soja brasileira* (Circular Técnica, 74). Londrina: EMBRAPA.

Dangayach, G. S., & Deshmukh, S. G. (2000). Manufacturing strategy : experiences from select indian organizations. *Journal of Manufacturing Systems*, 19(2), 134-148. http://dx.doi.org/10.1016/S0278-6125(00)80006-0.

Debertolis, A. J., Aleixius, M. L., & Dossa, D. (2005). *Trabalhador na administração de propriedades em regime de economia familiar* (2. ed.). Curitiba-PR: SENAR.

Diehl, D., & Bacchi, M. R. P. (2006). Relações de preços nos mercados interno e internacional de soja e derivados. In *Anais do XLIV Congresso Brasileiro de Economia, Administração e Sociologia Rural* (pp. 1-21). Fortaleza: SOBER. Recuperado em 10

de setembro de 2017, de http://ageconsearch.umn.edu/bitstream/148203/2/682.pdfBACCHI;BACCHI

Ferraz, J. C., Kupfer, D., & Haguenauer, L. (1996). *Made in Brazil* (pp. 39). Rio de Janeiro: Campus.

Fine, C. H., & Hax, A. C. (1984). Designing a manufacturing strategy. *Robotics and Computer-integrated Manufacturing*, 1(3-4), 423-439. http://dx.doi.org/10.1016/0736-5845(84)90032-2.

Garvin, D. (1993). Manufacturing strategic planning. *California Management Review*, 35(4), 85-106. http://dx.doi.org/10.2307/41166756.

Gavronski, I. (2009). *Estratégia de operações sustentáveis produção, suprimentos, logística e engenharia alinhados com a sustentabilidade corporativa* (Tese de doutorado). Universidade Federal do Rio Grande do Sul, Porto Alegre. Recuperado em 10 de setembro de 2017, de http://www.lume.ufrgs.br/handle/10183/15843

Gonçalves, J. (2005). Construção de estratégias competitivas no setor de commodities: reflexão a partir do setor de suco de frutas brasileiro. In *Anais do XLIII Congresso da SOBER* (pp. 1-16). Ribeirão Preto: SOBER. Recuperado em 10 de setembro de 2017, de http://www.sober.org.br/palestra/2/408.pdf

Gonzalez, C. (2008). *Contribuição do sistema de gestão empresarial (SGE) à efetivação da estratégia de produção* (Dissertação de mestrado). Universidade Federal de São Carlos, São Carlos. Recuperado em 10 de setembro de 2017, de http://200.136.241.2:8080/jspui/handle/1/1973

Greasley, A. (2007). *Operations management*. London: SAGE Publications. Recuperado em 10 de setembro de 2017, de http://books.google.com.br/books?id=7m8VJP0I_ksC

Hayes, R. H., Upton, D., Pisano, G., & Wheelwright, S. C. (2008). *Produção, estrategia e tecnologia: em busca da vantagem competitiva* (pp. 1-384). Porto Alegre: Bookman. Recuperado em 10 de setembro de 2017, de http://books.google.com.br/books?id=OoiDX5Io_RYC

Hayes, R., & Pisano, G. (1996). Manufacturing strategy: at the intersection of two paradigm shifts. *Production and Operations*, 5(1), 25-41. http://dx.doi.org/10.1111/j.1937-5956.1996.tb00383.x.

Hirakuri, M., & Lazzarotto, J. (2011). *Evolução e perspectivas de desempenho econômico associadas com a produção de soja nos contextos mundial e brasileiro*. Londrina: Embrapa Soja. Recuperado em 10 de setembro de 2017, de http://garoupa.cnpso.embrapa.br/download/Doc319_3ED.pdf

Jabbour, C. J. C., Maria da Silva, E., Paiva, E. L., & Almada Santos, F. C. (2012). Environmental management in Brazil: is it a completely competitive priority? *Journal of Cleaner Production*, 21(1), 11-22. http://dx.doi.org/10.1016/j.jclepro.2011.09.003.

Kingwell, R. (2011). Managing complexity in modern farming. *Australian Journal of Agricultural Research*, 55(1), 12-34. http://dx.doi.org/10.1111/j.1467-8489.2010.00528.x.

Lopes, F. F., Bara, J. G., & Simprini, E. S. (2011). Planejamento e gestão estratégica de empreendimentos rurais como estabelecer a visão e o direcionamento estratégico do empreendimento rural. *Revista Coopercitrus*, 296, 46-48.

Marion, J. (2010). *Contabilidade rural: contabilidade agricola, contabilidade da pecuaria, imposto de renda: pessoa juridica* (11. ed.). São Paulo: Atlas.

Marion, J., & Segatti, S. (2005). Gerenciando custos agropecuários. *Custos e Agronegócio*, 1(1), 2-8. Recuperado em 10 de setembro de 2017, de http://www.custoseagronegocioonline.com.br/numero1v1/Gerenciando_custos.pdf

Miguel, P. A. C. (2011). *Metodologia de pesquisa em engenharia de produção* (2. Ed.). Rio de Janeiro. Elsevier Brasil.

Miller, A., Boehlje, M., & Dobbins, C. (1998). *Positioning the farm business*. West Lafayette: Department of Agricultural Economics, Purdue University. Recuperado em 10 de setembro de 2017, de https://www.agecon.purdue.edu/cab/research/articles/Positioning%20the%20Farm%20Business.pdf

Mintzberg, H. (1988). Generic strategies: toward a comprehensive framework. *Advances in Strategic Management*, 5(1), 1-67.

Nantes, J. F., & Scarpelli, M. (2012). Elementos de gestão na produção rural. In M. O. Batalha (Ed.), *Gestão agroindustrial* (3. ed., pp. 629-664). São Paulo: Atlas.

Oliveira, F. (2009). *Ocupação, emprego e remuneração na cana-de-açúcar e em outras atividades agropecuárias no Brasil, de 1992 a 2007* (Dissertação de mestrado). Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba. Recuperado em 10 de setembro de 2017, de http://www.teses.usp.br/teses/disponiveis/11/11132/tde-14042009-084343/

Osaki, M. (2012). *Gestão financeira e econômica da propriedade rural com multiproduto* (Tese de doutorado). Universidade Federal de São Carlos, São Carlos. Recuperado em 10 de setembro de 2017, de http://www.bdtd.ufscar.br/htdocs/tedeSimplificado//tde_busca/arquivo.php?codArquivo=5418

Paula, S., & Favaret, P., Fo. (2000). *Panorama do complexo soja* (pp. 35). Rio de Janeiro: BNDES Setorial. Recuperado em 10 de setembro de 2017, de http://www.bndes.gov.br/SiteBNDES/bndes/bndes_pt/Institucional/Publicacoes/Consulta_Expressa/Setor/Agroindustria/199809_5.html

Pinazza, G. G. M. (2008). *Análise da competitividade da cadeia produtiva da soja no Brasil vis-à-vis os demais*

países exportadores sul-americanos (Dissertação de mestrado). Universidade Federal de São Carlos, São Carlos. Recuperado em 10 de setembro de 2017, de http://www.bdtd.ufscar.br/htdocs/tedeSimplificado//tde_busca/arquivo.php?codArquivo=1905

Pires, S. R. I. (1995). *Gestão estratégica das operações*. Piracicaba: Unimep.

Prahalad, C., & Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, 68(3), 79-91.

Rathamann, R., Hoff, D. N., Dutra, A. S., Padula, A. D., & Dessimon, J. (2007). Uma proposta de estrutura analítica sistêmica para o estudo da decisão nos agronegócios. In *Anais do XLV Congresso Brasileiro de Economia, Administração e Sociologia Rural* (pp. 1-19). Londrina: SOBER. Recuperado em 10 de setembro de 2017, de http://www.sober.org.br/palestra/6/72.pdf

Romeiro, V. M. B. (2004). *Gestão da pequena unidade de produção familiar de citros: uma análise dos fatores influentes no sucesso do empreendimento do ponto de vista do produtor de Bebedouro (SP)* (Dissertação de mestrado). Universidade de São Paulo, São Carlos. Recuperado em 12 de março de 2013, de http://www.teses.usp.br/teses/disponiveis/18/18140/tde-07012003.../Tese.pdf

Rother, E. T. (2007). Revisão sistemática × revisão narrativa. *Acta Paulista de Enfermagem*, 20(2), v-vi. http://dx.doi.org/10.1590/S0103-21002007000200001.

Sampaio, L. M. B., Sampaio, Y., & Bertrand, J. P. (2011). Fatores determinantes da competitividade dos principais países exportadores do complexo soja no mercado internacional. *Organizações Rurais & Agroindustriais*, 14(2), 227-242. Recuperado em 10 de setembro de 2017, de http://www.redalyc.org/pdf/878/87823628007.pdf

Silva, J. G. (1997). O novo rural brasileiro. *Revista Nova Economia*, 7(1), 43-81. Recuperado em 10 de setembro de 2017, de http://www.geografia.fflch.usp.br/graduacao/apoio/Apoio/Apoio_Valeria/Pdf/O_novo_rural_brasileiro.pdf

Silveira, D. C. (2004). *Proposta de um modelo de avaliação de desempenho de cadeias produtivas agroindustriais: estudo da cadeia da soja no Brasil* (Dissertação de mestrado). Universidade Federal do Rio Grande do Sul, Porto Alegre. Recuperado em 10 de setembro de 2017, de http://www.lume.ufrgs.br/handle/10183/5691

Skinner, W. (1969). Manufacturing: missing link in corporate strategy. *Harvard Business Review*, 47(3), 136-145.

Slack, N., & Lewis, M. (2009). *Estrategia de operações* (2. ed.). Porto Alegre: Bookman. Recuperado em 10 de setembro de 2017, de http://books.google.com.br/books?id=O4N99vFBugAC

Sologuren, L. (2004). *Integração vertical, grupos estratégicos e competitividade: o caso do sistema agroindustrial da soja* (Dissertação de mestrado). Universidade Federal de Uberlândia, Uberlândia. Recuperado em 10 de setembro de 2017, de http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:INTEGRA%C3%87%C3

Souza, W. (2010). *Gestão estratégica das operações de soja em Mato Grosso com o uso dos mercados futuros e de opções* (Tese de doutorado). Escola Superior de Agricultura "Luiz de Queiroz", Universidade de São Paulo, Piracicaba. Recuperado em 10 de setembro de 2017, de http://www.teses.usp.br/teses/disponiveis/11/11132/tde-14122010-081715/

Sporleder, T. L., & Boland, M. A. (2011). Exclusivity of agrifood supply chains: seven fundamental economic characteristics. *The International Food and Agribusiness Management Review*, 14(5), 27-52.

Tanure, S., Machado, J. A. D., & Nabinger, C. (2009). Técnicas de gerenciamento e suporte à decisão em unidades de produção agropecuária. In *Anais do XLVII Congresso Brasileiro de Economia, Administração e Sociologia Rural* (pp. 1-17). Porto Alegre: SOBER. Recuperado em 10 de setembro de 2017, de http://www.sober.org.br/palestra/13/239.pdf

Teixeira, B. E. S., Cunha, I. M. M., & Terra, A. (2012). A expansão da fronteira agrícola da soja no município de Santarém (PA) e suas transformações socioespaciais. In *Anais do XXI Encontro Nacional de Geografia Agrária*. Uberlândia: Universidade Federal de Uberlândia. Recuperado em 10 de setembro de 2017, de http://www.lagea.ig.ufu.br/ xx1enga/anais_enga_2012/eixos/1282_1.pdf

Vosgerau, S. R. D., & Romanowski, J. P. (2014). Estudos de revisão: implicações conceituais e metodológicas. *Revista Diálogo Educacional*, 14(41), 165-189. http://dx.doi.org/10.7213/dialogo.educ.14.041.DS08.

Voss, C. (1995). Alternative paradigms for manufacturing strategy. *International Journal of Operations & Production Management*, 15(4), 5-16. http://dx.doi.org/10.1108/01443579510083587.

Ward, P., & Duray, R. (2000). Manufacturing strategy in context: environment, competitive strategy and manufacturing strategy. *Journal of Operations Management*, 18(2), 123-138. http://dx.doi.org/10.1016/S0272-6963(99)00021-2.

Wheelwright, S. C. (1984). Manufacturing strategy: defining the missing link. *Strategic Management Journal*, 5(1), 77-91. http://dx.doi.org/10.1002/smj.4250050106.

Wheelwright, S. C., & Hayes, R. H. (1985). Competing through manufacturing. *Harvard Business Review*,

63(1), 99-109. Recuperado em 10 de setembro de 2017, de http://scholar.google.com/ scholar?hl=en &btnG=Search&q=intitle: Competing+Through+Manufacturing#2

Zen, S., Bragato, I. R., & Spers, E. E. (2005). Diversificação de atividades como gerenciamento de risco na agricultura. In *Anais do XLIII Congresso da SOBER* (pp. 1-16). Ribeirão Preto: SOBER. Recuperado em 10 de setembro de 2017, de http://www.sober.org.br/palestra/2/662.pdf

Zylbersztajn, D., & Neves, M. (2000). *Economia e gestão dos negócios agroalimentares*. São Paulo: Pioneira.