



PERFORMANCE INDICATORS: A PROPOSAL FOR FAMILY-RUN LIVESTOCK FARMING UNDER THE CONCEPTUAL FRAMEWORK OF THE SUSTAINABLE BALANCED SCORECARD

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Abstract

Objective: Build a matrix of indicators, according to the conceptual perspective of the BSC, adapting to the dimensions of sustainability related to family ranching

Methodology: A qualitative approach was used, carrying out a bibliographic and documentary study, in addition to interviews with rural producers and specialists on the subject.

Originality: Historically, there is a lack of tools and management methodologies for the work context, especially in view of the new environmental and sustainability requirements. Thus, the work contributes to mitigate this gap in the context.

Main results: The work generated a proposal / matrix with sustainability indicators for family livestock. Matrix composed of 28 indicators distributed in the four dimensions (environmental, economic, productive and social) of sustainability.

Theoretical/methodological contributions: The main methodological contribution was to describe the process of how to propose a matrix of indicators, using planning tools such as the SWOT matrix and the BSC. Producers and specialists contributed to the construction of the SWOT matrix, later also contributed to the construction of the indicator matrix, in order to tend to the SWOT matrix.

Social contributions/to management: As a social contribution we can mention the issue of the matrix of indicators being supported by the four dimensions of sustainability. For management, the matrix itself, in addition to the specifications of each indicator, which can enable better management of family ranching properties.

Keywords: Performance indicators. Cattle farming. Family farms. Sustainability.

INDICADORES DE DESEMPEÑO: UNA PROPOSTA PARA PECUÁRIA FAMILIAR SOB A ÓTICA CONCEITUAL DO BALANCED SCORECARD SUSTENTÁVEL

Resumo

Objetivo do estudo: Construir uma matriz de indicadores, conforme a ótica conceitual do BSC, adaptando às dimensões de sustentabilidade relacionadas à pecuária familiar.

Metodologia/abordagem: Utilizou-se uma abordagem qualitativa, realizando um estudo bibliográfico e documental, além de entrevistas com produtores rurais e especialistas no tema.

Originalidade/Relevância: Historicamente existe uma carência de ferramentas e metodologias de gestão para o contexto do trabalho, em especial frente as novas exigências ambientais e de sustentabilidade. Assim, o trabalho contribui para mitigar esta lacuna no contexto.

Principais resultados: O trabalho gerou uma proposta/matriz com indicadores de sustentabilidade para a pecuária familiar. Matriz composta por 28 indicadores distribuídos nas quatro dimensões (ambiental, econômica, produtiva e social) de sustentabilidade.

Contribuições teóricas/metodológicas: A principal contribuição metodológica foi descrever o processo de como propor uma matriz de indicadores, utilizando-se ferramentas de planejamento como a matriz SWOT e o BSC. Produtores e especialistas contribuíram para a construção da matriz SWOT, posteriormente

também contribuíram para a construção da matriz de indicadores, de forma a tender a matriz SWOT.

Contribuições sociais / para a gestão: Como contribuição social podemos citar a questão da matriz de indicadores estar apoiada nas quatro dimensões de sustentabilidade. Para a gestão, a própria matriz, além das especificações de cada indicador que pode viabilizar uma melhor gestão nas propriedades de pecuária familiar.

Palavras-chave: Indicadores de desempenho. Pecuária de corte. Produtor familiar. Sustentabilidade.

INDICADORES DE DESEMPEÑO: UNA PROPOSTA PARA LA GANADERÍA FAMILIAR BAJO LA VISTA CONCEPTUAL DEL PUNTUACIÓN EQUILIBRADA SOSTENIBLE

Resumen

Objetivo: Construir una matriz de indicadores, según la perspectiva conceptual del BSC, adaptándose a las dimensiones de sostenibilidad relacionadas con la ganadería familiar.

Metodología/enfoque: Se utilizó un enfoque cualitativo, realizando un estudio bibliográfico y documental, además de entrevistas con productores rurales y especialistas en el tema.

Originalidad/Relevancia: Históricamente se carece de herramientas y metodologías de gestión para el contexto laboral, especialmente ante los nuevos requisitos ambientales y de sostenibilidad. Así, el trabajo contribuye a mitigar esta brecha en el contexto.

Principales resultados: El trabajo generó una propuesta / matriz con indicadores de sostenibilidad para la ganadería familiar. Matriz compuesta por 28 indicadores distribuidos en las cuatro dimensiones (ambiental, económica, productiva y social) de la sostenibilidad.

Aportes teóricos/metodológicos: El principal aporte metodológico fue describir el proceso de cómo proponer una matriz de indicadores, utilizando herramientas de planificación como la matriz SWOT y el BSC. Productores y especialistas contribuyeron a la construcción de la matriz DAFO, posteriormente también contribuyeron a la construcción de la matriz de indicadores, con el fin de tender a la matriz SWOT.

Contribuciones sociales / para a gestão: Como contribuição social podemos citar a questão da matriz de indicadores estar apoiada nas quatro dimensões de sustentabilidade. Para a gestão, a própria matriz, além das especificações de cada indicador que pode viabilizar uma melhor gestão nas propriedades de pecuária familiar.

Contribuciones sociales/para la gestión: Como contribución social podemos mencionar el tema de la matriz de indicadores que se sustenta en las cuatro dimensiones de la sostenibilidad. Para la gestión, la propia matriz, además de las especificaciones de cada indicador, puede permitir una mejor gestión de las propiedades ganaderas familiares.

Palabras clave: Indicadores de rendimiento. Ganado vacuno. Productor familiar. Sostenibilidad.

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Introduction

There is a rise in the number of organizations that, confronted with a scenario of competitiveness and surrounded by uncertainties, search for methods and techniques to help in the management process (Munaretto, 2013). Relevant literature claims that it is possible to face the difficulties in this picture with the use of planning tools as a way to keep these businesses afloat. As such, to remain in the market, it is necessary that administrators make use of the best techniques to determine their organizational performance, and that the results are in accordance with the strategies employed by the organization (Martins, 2006; Ribeiro, 2009; 2013; 2018).

Planning is considered an important aspect of management for both urban and rural entrepreneurship, because it allows administrators/producers to follow and make decisions about their business activities based on concrete data obtained through organizational performance indicators (Martins, 2006). Munaretto (2013) endorses this line of thought, claiming that any performance evaluation system should incorporate a set of indicators, always with the aim of aligning those activities with the organization's goals.

To the National Foundation for Quality ("Fundação Nacional para Qualidade", FNQ, 2017), the existence of a system of organizational performance indicators makes it possible to carry out a careful analysis about the management's effectiveness and, consequently, of its results. Among other tools meant to determine strategies, the Balanced Scorecard (BSC) can be used as a support for the manager in the decision-making process, in order to improve business performance. The BSC can lead to an efficient learning process, as it integrates the strategic structure of the organization in a cyclic, open manner. Thus, it is considered a flexible system, adaptable to the needs of any enterprise, regardless of its size and activities (Vigné, 2011; Montenegro & Callado, 2018).

Working with organizational management in rural, family-run livestock farms is not a simple task. Most properties lack the habit of registering, archiving and consolidating important data, which makes it harder for the producer to come to know their property thoroughly (Martins, 2006). Despite its economic relevance, the family-run livestock farm needs, by its very nature, to keep the activity only as a means of supporting themselves, their family, and to settle property expenses (Ribeiro, 2009).

Oaigen et al. (2014) argue that the importance of family-run livestock farms can be proven by the complexity behind their administration, by the diversity among these organizations and especially by the amplexity of their commodity chain. According to Silva et al. (2014), extensive cattle farming prevails in the west and south of Rio Grande do Sul, a practice historically linked to the native Pampas plains. In the north of the state, dairy farms are prevalent, as an activity dependent on grain silage, readily available in the region. However, Marques (2010) has pointed out that both kinds of farming in these regions have been presenting unsatisfactory indicators, which cannot guarantee attractive prospects for producers.

As previously stated, family-run livestock farms are a predominant form of business in Rio Grande do Sul, and for that reason extremely important to the state's economy. Still, it is evident that many such producers lack the appropriate knowledge to properly manage rural properties; add to that a dose of misinformation about technical aspects and the market, and they might wind up with a low rate of productivity (Ribeiro, 2009; Bezerra, 2013).

Due to their relevance, producers involved in family-run livestock farming need (just like any other organization) an evaluation model for their own performance, in order to use the resulting information to enhance their control systems, to make continuous improvements, to upgrade their administration process, and to better formulate business strategies (Martins, 2006; FNQ, 2017).

Summing up the considerations above, we have, on one side, the difficulties concerning the current competitive scenario among organizations, with the use of indicators as a means to improve management, in regards to sustainability (in a general sense). On the other hand, in face of the demand to offer better managerial tools to cattle farm administrators, we present the following research question: *How can we develop a matrix of performance indicators directed to family-run cattle farms, in order to support the producers in their decision-making process, with the aim of improving the administration of their properties?*

In this essay, we intend to collaborate to the answer to this question by building a matrix of indicators, under the framework of the BSC, adapting the dimensions originally proposed by it to dimensions of sustainability, as related to family-run livestock farming.

In this way, this essay will contribute to the refinement of the decision-making process of these producers. By selecting an alternative, the administrator will be able to determine whether the organizational aims were met. With the help of an indicator system, the decision-making process can become more accurate. Caravantes, Panno and Kloeckner (2005) bring to attention the fact that the actions of an administration involve decisions such as what will be produced, how this production will take place, and the choice of consumer market.

SWOT matrix and the BSC

The SWOT matrix is a managerial tool used in several organizations (Oliveira & Batista, 2017; Pereira *et al.*, 2017; Cavalcanti & Guerra, 2019; Souza, 2020) which enables the choice of an adequate strategy, through a critical evaluation of the organization's internal and external environment. Authors such as Martins and Turrioni (2007) assert that the SWOT is important for the decision-making process, and that it is often used as an analysis model for organizational scenarios. It is also believed to be a vital foundation to establish business strategies, seeing as the union between qualifications and opportunities are what determines the position of the organization within its environment, and considering that the first step to the implementation of the BSC is clarifying and translating the organization's strategic vision.

Thus, the SWOT can have a fundamental role, contributing to the development of a set of strategies, while also being a pillar in the implementation of the BSC, as the indicators reflect the matrix's content (Martins & Turrioni, 2002; Castro et al., 2007; Flores et al., 2009).

Therefore, in order to define strategic objectives for the use of the BSC, it is necessary to first carry out a joint analysis of the organization's purposes and aims, and their alignment to both its internal and external environments. To Martins and Turrioni (2002) and Flores et al. (2009), among others, it is essential to clarify the organization's strategic vision, establishing its positive and negative aspects, and taking an intersectional approach to the data initially collected by the SWOT matrix, using it as a support for the future application of the performance indicator candidates.

The BSC methodology has the primary aim of aligning strategic planning to organizational objectives, and it can and should be adapted to the reality of each organization as indicated by its creators (Kaplan & Norton, 1997; Vigné, 2011; Montenegro & Callado, 2018). This claim is corroborated by many studies developed in recent years, such as those regarding adaptations to organizations like municipal governments and other public offices, both urban and rural enterprises or even non-profit, non-governmental organizations (Rosado; Lobato & Müller, 2011; Ahlert, 2015; Costa & Oliveira, 2015; Villela; Rezende & Domingos, 2015; Barros & Wanderley, 2016; Brum et al., 2017).

Following this trail of thought, the original framework proposed by the BSC was adapted to include social, economic, environmental and productive dimensions. Three among these new dimensions (social, environmental and economic) were developed by the Food and Agriculture Organization of the United Nations (FAO, 2018), and later supported by authors such as Sachs (2004), Elkington (2012), Barbieri and Cajazeira (2010). The fourth dimension (productivity) is linked to performance indicators used in cattle farming (Tanure et al., 2012).

Kaplan and Norton (1997) also recommend that the first step to implementing the BSC be the determination of a strategic vision. As such, SWOT analysis can play a central role in the process, contributing to the development of organization approaches, becoming a key tool to make the implementation of the BSC methodology easier.

Martins and Turrioni (2002) corroborate to this claim by asserting that, in order to establish an effective system of strategic management, it is necessary to make use of SWOT analysis to evaluate the internal and external parameters that influence the organization's growth and survival, connecting them with those set up within the BSC's framework. The process would show which performance indicators truly reflect the organization's reality, being adapted to its needs.

Moreover, authors such as Sachs (2004), Elkington (2004), Barbieri and Cajazeira (2010) and Tanure (2012) state that sustainability pillars are complementary for systems as well as organizations. Considering this, it is indispensable that the producers understand the nature of their business, their position in the market, and that they are able to define their own strategies. Thus, they should come to know the impacts their organization might make on the environment and on society.

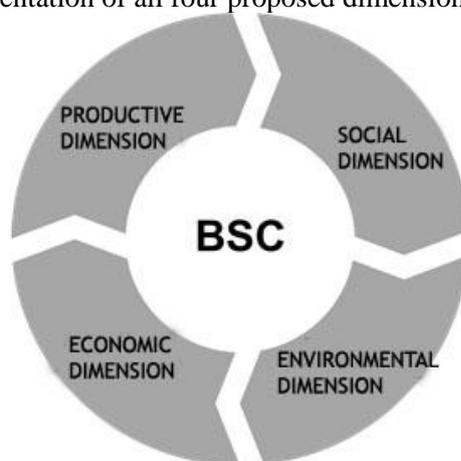
Using indicators within family-run cattle farming

In order to achieve a harmonious development — that is, sustainable —, an organization should act in such a way that the three pillars recommended by the FAO may coexist and interact among themselves. Family-run cattle farming often faces the challenge of increasing the herd's productivity without sacrificing sustainability, all the while worrying about natural resources and the organization's impact on the environment.

Small, family-run cattle farms still require strategies that allow for productivity gains, with an increase in fertility, average daily gain, carcass weight, stocking rates, or even gains per area. These aspects, when satisfactory, are reflective of greater productive effectiveness, with vertical expansion (Barbosa et al., 2010; Brum et al., 2017). The producer should be able to position themselves better in the market through an improved understanding of their property, while also drawing a strategy that makes it possible to achieve all the factors that serve as a measure for results, creating value for all those involved in the organization (Rabelo, 2012).

Hence, it is essential to make use of indicators that can measure factors that show the administrator the development of their property/activity in relation to productivity. Along these lines, with the support of studies carried out by Brum et al. (2017), we understand and consequently adopt productivity as the fourth dimension in our model, in order to answer the question behind this research, the building of performance indicators within the framework of the BSC (Image 1).

Image 1 – A representation of all four proposed dimensions, integrated in action



Source: Elaborated by the authors.

The BSC is a methodology for evaluation of organizational performance, which, throughout the years, has been used constantly in urban business models. However, due to intrinsic differences in actions, structure, involved parties and objectives between urban and rural enterprises, it must be adapted to fit a rural business model.

So it can be used correctly in relation to family-run livestock farms, the methodology BSC must contemplate metrics regarding the dimension of sustainability. It follows that a rural enterprise intending

to align itself with new market tendencies must carry out its social function, respecting the environment in which it exists, while also favoring satisfactory financial results and without sacrificing the maximization of production, in order to fully endorse the property's development.

Methodology procedures

We developed this research based on a qualitative approach (Yin, 2005). The framework of the ensuing investigation was built as it was applied to the research's very nature (Marconi & Lakatos, 2011). Regarding strategies, we have carried out a bibliographic and documental review (Fonseca, 2002).

Table 1 shows all the procedures used in the process. We had to resort to scientific essays, undergraduate and master theses, dissertations, books and reports, among others, in order to collect data relevant to the study's progression. During the process of data collection, we made use of techniques such as the previously mentioned bibliographic and documental review and in-depth interviews (Bardin, 2011).

Table 1 – Procedures used during research development

Stage	Activity	Period	Participants	Objectives/Results
01	Updating SWOT matrix model developed by Moreira et al. (2015) - Interviews	Aug/2018	Interviewee N° 1 (E1): Professor at UNIMPAMPA. Extension Officer at the Riograndense Association for Technical Assistance and Rural Extension Enterprises (EMATER-RS). Work experience in the area of Agronomy, with an emphasis in Rural Extension and Development. Developed several studies about the alterations in the gaúcho pampas, especially about the reality of family-run livestock farms and agrarian modifications to the region.	Updating and validating the matrix developed in 2015.
02	Carrying out in-depth interviews with Interviewee N°2. Afterwards, resuming discussion about the matrix with E1.	Aug/2018 Sep/2018	Interviewee N° 2 (E2): Researcher at the Brazilian Agricultural Research Corporation (EMBRAPA), working mainly in researches in the areas of Agroecology and Endogenous Development. Afterwards, another interview with E1.	Revalidating SWOT matrix. Afterwards, legitimizing possible differences in point-of-view with E1.
03	Review of relevant literature in search of references to build performance indicators related to cattle farming. Bibliographical and documental review.	Aug/2018 to Dec/2018	Authors	Obtaining technical support for the use of proposed indicators and their scope of action. <ul style="list-style-type: none"> ▪ Dissertations – Ribeiro (2009); Munaretto (2013); Moreira (2002); Müller (2003). ▪ Theses - Fernandes (2017); Fevorini (2010); Canziani (1997); Souza (2013); Ahlert (2015); Bandeira (2017). ▪ Essays and reports - Brum et al. (2017); IBGE (2014; 2017); EMBRAPA (2005; 2018); EMATER (2018); NESPRO-UFRGS (2013; 2018); ABIEC; (2017; 2018); FAO (2018); FNQ (2017); IPEA (2012);
04	Defining a strategic profile, using the SWOT matrix. Bibliographical and documental research.	Dec/2018 Jan/2019	Authors, verifying compliance with the SWOT matrix	After consolidating the SWOT matrix, finding theoretical contributors to determine indicators and the four dimensions used in the model (social, environmental, economic and productive). Defining a strategic profile to support the proposed indicators.
05	Proposing indicators. Bibliographic and documental research.	Jan/2019	Authors	Defining the proposed indicators, in a way as to answer the aims set by the research questions, while adhering to previously proposed dimensions.
06	Validating proposed indicators. Interviews.	Mar/2019 Apr/2019	Specialists. E1 and E2 along with: Interviewee N° 3 (E3): Coordinator of the Environmental Thematic Group of Rede Leite and extension officer at EMATER-RS; Interviewee N°4 (E4): Member of the Rede Leite program Social Thematic Group; Interviewee N°5 (E5): Coordinator of the Rede Leite Forages and Animal Feeds Thematic Group (productive) and researcher at EMBRAPA.	Verifying and adapting the proposed indicators. Legitimizing indicators with the help of specialists.

Source: Elaborated by the authors.

Interviews are seen as one of the main techniques for data collection, and may be defined as face-to-face conversations between the researcher and the interviewee, within a specific framework to obtain information about the desired subjects. Among many methods of interviewing, in order to properly achieve the research’s objectives, we chose to apply the in-depth interview method, using a

guide (script) as a basis (Malhotra, 2006). We sought to glean the interviewees' individual views, while allowing ourselves the liberty of using and including new questions whenever we identified the need for such (Rosa, 2006; Ribeiro, 2008; Flick, 2013).

Gil (1999) asserts that interviews can be arranged in four classifications: informal, focalized, scripted and formalized. In accordance with the guide we used in our interviews, we preferred the scripted method, which presents a certain degree of structure, guided by a roster of topics of interest that the interviewer wants to explore. In this kind of interview, the interviewer asks few questions directly, leaving the interviewee to speak freely, as they cover the scripted subjects. We carried out eighteen interviews; fourteen of them with specialists, and four of them with producers. The interviewees were identified in our research with the capital letter 'E' (for "entrevistado", interviewee in Portuguese), alongside a correspondent number, from E1 to E13. Interviewees nº 1 (E1) and nº 2 (E2) were interviewed more than once.

As a script for the interviews carried out with E1 and E2, we used the SWOT matrix developed by Moreira et al. (2015), using its elements as a way of questioning and understanding each component of said matrix, looking for its meanings and the rationalization behind those (stage 1). In the following interviews, during the stages of developing, reviewing, validating, and assigning importance to indicators, we used the aforementioned indicators as proposed, with its elements aligned by dimension.

The interviewees were chosen due to convenience and accessibility to (Appolinário, 2006; Malhotra, 2006; Gil, 2010), as we searched for specialists who had experience working with cattle farming and producers who fit the criteria for family-run livestock farms as defined by the Brazilian government (Ribeiro, 2009; Fernandes & Miguel, 2016; Andreatta; Waquil & Miguel, 2016).

As for determining how many interviewees we should procure, Appolinário (2006), Malhotra (2006) and Gil (2010) assert that the researcher does not need many interviewees, as long as they are representative of the topics of interest. The interviewees should be able to offer the information the researcher requires (Gil, 1999; Godoi & Mattos, 2006).

Data analysis

We used the content analysis method to evaluate the results of the research. It is a classic procedure used to examine texts of all kinds (Bardin, 1977; Flick, 2013). We chose this specific method considering the diversity among the interviewees' areas of work and research, as well as the nature of the bibliographic and documental literature we used.

To Bardin (2011), content analysis can be described as an assortment of techniques stemming from communication analysis, aiming to obtain, through systematic and objective procedures of description, indicators that allow researchers to infer knowledge related to the conditions of production and reception of the studied messages. According to the same author, content analysis can be employed

in three fundamental stages: a) pre-analysis, b) material exploration, and c) treatment of results. Table 2 shows the stages we have followed to analyze the collected data:

Table 2 – Categories used for data analysis

Table 1 Counterpart	Stage objectives		Categories for analysis
Stage 1	Stage 1	Updating the matrix developed in 2015	Mention of elements in the SWOT matrix. Strengths, weaknesses, opportunities and threats. Each mention and relevant for allocation in one of these categories was registered as an update in the matrix.
Stage 2	Stage 2	Validating the SWOT matrix with another interviewee	Mentions of elements in the SWOT matrix. Strengths, weaknesses, opportunities and threats. Each mention relevant for allocation in one of these categories was registered as a validation of the matrix.
Stage 3	Stage 3	Obtaining theoretical support for the use and the scope of the proposed indicators	Mentions of indicators in literature. Search for performance indicators which might be employed in family-run cattle farms models within said literature.
Stage 4	Stage 4	Developing a strategic profile	Mentions of elements in the SWOT matrix and of indicators in literature. Analysis and interpretation of the SWOT matrix. After stages 1, 2 and 3, seeing which themes showed up were more frequent and relevant for the development of a strategic profile.
Stage 5	Stage 5	Developing a proposal of indicators	Indicators relevant within the context of the study. Building a proposal of indicators based on stages 3 and 4.
Stage 6	Stage 6	Validating the proposal of indicators	Trustworthiness; relevant information; adequate language.
Stage 7	Stage 7	Validating suggestions for alterations	Trustworthiness; relevant information; adequate language.

Source: Elaborated by the authors.

Results and their respective analysis

In order to continue the research done by Moreira et al. (2015), it was necessary to update the SWOT matrix already developed by these authors. Thus, in 2018, we carried out an interview with the purpose of updating this matrix. We used the matrix itself as a script for the interview, discussing each of its thirty-three elements — these being nine strengths and eight weaknesses within the internal environment, and nine opportunities and seven threats within the external environment.

The second interview was carried out with the objective of legitimizing the updated SWOT matrix; we included the meanings and justifications behind the changes so E2 would be able to properly validate it, and so we would be able to identify any divergences between their point-of-view and E1's. The matrix kept all of its thirty-three elements.

After analyzing the assertions of E1 and E2, we realized that, in general, the two of them agreed with the SWOT matrix composition, thus making it credible and allowing a deeper understanding of each element within the matrix. Table 3 shows the results of the interviews carried out with E1 and E2, after the updating and validation of the SWOT matrix elements.

Table 3 – SWOT Matrix for family-run cattle farms, updated and validated

	Positive Factors	Negative Factors
Internal Factors	<i>Strengths</i>	<i>Weaknesses</i>
	<ul style="list-style-type: none"> ✓ Land ownership; ✓ The tradition behind the activity; ✓ Cattle ownership; ✓ Being familiar with all activities; ✓ Cleaner producing process; ✓ Types of handling; ✓ Workforce composed of family members or neighbors; ✓ Activity working as a form of survival for the family and for traditions in general; ✓ The possibility of choosing when to sell the product. 	<ul style="list-style-type: none"> ✓ Indirect sales; ✓ Standards are not regular enough; ✓ Activity working as a form of survival for the family and for traditions in general; ✓ Not using external inputs; ✓ Requires the stocking of animals; ✓ Problems with inheritance; ✓ Not using information technology; ✓ Lack of accessible workforce.
External Factors	<i>Opportunities</i>	<i>Threats</i>
	<ul style="list-style-type: none"> ✓ Basic product stands out in relation to other regions of the country; ✓ Basic product stands out due to inadherence to modern producing processes; ✓ Cleaner producing process might make the producers stand out; ✓ The native fields make the product unique; ✓ Valorization of the region's potential due to the use of the native fields; ✓ Ability of protecting the region; ✓ Ability to approach the productive chain without commitments; ✓ Ability to add new technologies to the productive process; ✓ Ability to use new sources of information technology. 	<ul style="list-style-type: none"> ✓ Inadequacy of public policies; ✓ Producers not acting in a rationally economic way; ✓ Little in the way of politic representation; ✓ Little in the way of representation within professional corporations; ✓ Lack of access to public resources such as education and health; ✓ Advance of other, more profitable activities; ✓ The search for academic graduation or other kinds of opportunity might get in the way of the business's natural inheritance process.

Source: Elaborated by the authors.

In this way, we were able to build a strategic profile in order to define the indicators, supported by the analysis of the internal and external environments of family-run cattle farms, starting from the sorting of the elements within the matrix to the four dimensions of sustainability.

Developing a strategic profile and map for family-run cattle farms

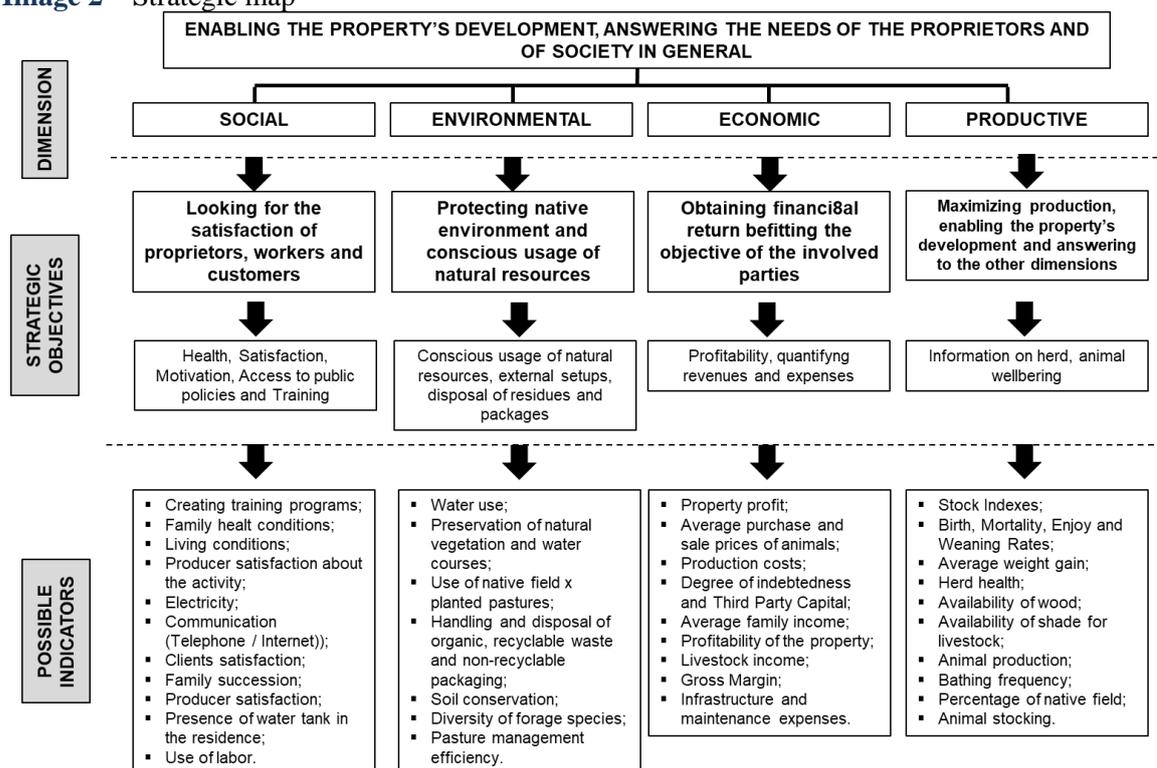
Building a strategic profile is a process that begins with the definition of the general objectives of an organization, which can then be unfolded into specific or categorized objectives (Pizzinato et al., 2015; Ribeiro, 2016). Thus, with an understanding of the external and internal environments approached by the SWOT matrix, it became possible to delineate the strategic profile of the typical family-run cattle farm. Based on the analysis and interpretation of the SWOT matrix, we could ascertain the main objective to be enabling the property's development, answering the needs of the proprietors and of society in general.

With the main objective as a starting point, we were able to list, in accordance with the dimensions of sustainability, specific objectives related to each dimension, and the unfolding of those objectives resulted in our proposed sustainability indicators.

The first dimension of sustainability is the social, and it is linked with aspects such as the wellbeing and appreciation of the parties involved in the activity. The second is the environmental, and it seeks to reestablish a commitment with the rational usage of natural resources. The third is economical, connected to production, distribution, and consumption of goods and services (FAO, 2018). The fourth dimension (Barbosa et al., 2014; Brum et al., 2017) is related to productivity and is not among the pillars proposed by the FAO; however, we understand that it works as a complementary dimension, dealing with more detailed questions, which affect the property directly.

After outlining the strategic profile, we were able to list some characteristics that we believe are essential to define performance indicators. In building a strategic map (Image 2), we were able to identify the possible indicators, and, as such, to evaluate the strategy's execution and, consequently, the achievement of the main objectives.

Image 2 – Strategic map



Source: Elaborated by the authors.

Within the environmental dimension, the strategic objectives proposed are the protection of the native environment and the conscious usage of natural resources. However, in order to accomplish them, it is necessary to understand how the producer uses the natural resources within their property; how they make use of external inputs; and how they dispose of residues and packages. To measure the achievements in this area, we propose the usage of performance indicators that offer information about water use, the existence of areas dedicated to environmental protection (vegetation and water streams), the usage of native fields versus planting pastures, as well as the handling and disposal of organic residues, and recyclable and non-recyclable packages, among other aspects.

As for the economic dimension, we propose that the strategic objective be to obtain financial return befitting the objectives of the parties involved in the activity. This dimension has to do with the organization's profitability and the quantifying of revenues and expenses. In order to meet this objective, we suggest the use of indicators that measure the organization's profits; the average prices of buy/sale; production costs; degree of indebtedness and third-party investment; the family's average monthly income; and expenses with infrastructure and maintenance.

Now, to accomplish the aims set by the productive dimension, that is, to maximize production and, as such, enable the property's development and answer the demands of the other dimensions, we need specific data about the herd and the cattle's mental welfare. We propose to measure this by collecting information about stocking rates; the cattle's birth, death and weaning rate; the cattle's average weight gain; the herd's welfare; and the availability of wood and shade within the property.

Performance indicators need to be meaningful in order to be implemented, as well as practical, consistent, coherent and responsive to changes in weather and system. They also need to be easily measurable (Neely, 1998; Moreira, 2002; Deponi, 2002; Müller, 2003; Munaretto, 2013).

This set of indicators needs to offer support for administrators during the decision-making process. As previously stated, they should not become a tool for controlling the organization's processes; they should be used as a form of identifying signs (positive or negative), as a possibility for further education and learning, and also as a form of communication, be it external or internal.

The first proposal of indicators was the by-product of the previous stages; that is, of the consolidation of the SWOT matrix, the delineation of a strategic profile, and the consideration of indicator candidates. In order to formulate the initial proposal, we have reviewed literature concerning the proposal of such indicators, like the study carried out by Brum (2017). By the end of our first meeting, in January 2019, we were able to list 48 types of indicator, categorized by dimension.

The final version of the proposal (Table 4) forwarded to specialists assembled 28 elements: nine within the social dimension, four within the environmental dimension, six within the economic dimension, and ten within the productive dimension.

Table 4 – Performance indicators

	<i>Indicators</i>		<i>Indicators</i>
Social Dimension	<ul style="list-style-type: none"> ▪ Health; ▪ Satisfaction; ▪ Public policies; ▪ Training; ▪ Family inheritance; ▪ Access to information; ▪ Taking part in community activities; ▪ Access to education; ▪ Access to the property. 	Environmental Dimension	<ul style="list-style-type: none"> ▪ Soil conservation; ▪ Water availability; ▪ Handling of organic and inorganic residues; ▪ Conservation of native woods.
Economic Dimension	<ul style="list-style-type: none"> ▪ Registers; ▪ Owning land vs renting land; ▪ Use of technologies; ▪ Degree of indebtedness; ▪ Family income. 	Productive Dimension	<ul style="list-style-type: none"> ▪ Adjusting stocking rates; ▪ Animal nutrition; ▪ Improvement in zootechnic rates; ▪ Motivation; ▪ Animal mental health; ▪ Free-range livestock; ▪ Prominent animal specimens; ▪ Animal welfare; ▪ Standardizing herd; ▪ Undesirable vegetation.

Source: Elaborated by the authors.

Our proposal of performance indicators was categorized considering each dimension of sustainability; before they could be sent for evaluation, the indicators had to be classified within specific dimensions, with related questions and answers. Like this, we made it possible for the specialists to achieve a better understanding of the elements.

Validating the proposal of performance indicators

To validate our proposed indicators, we went to five specialists, two of which we had interviewed previously (E1 and E2) during the first two stages of this research. The other interviewees, here referred to as E3, E4 and E5, are members of Rede Leite (“Milk Network”), and specialists in research development with family-run agricultural farms in Rio Grande do Sul, within dimensions of sustainability.

Interviewees E1 and E2 received, by email, the whole matrix of indicators, with all four dimensions. Interviewees E3, E4 and E5 were sent the indicators relevant to their specialties; that is, the ones whose research falls into the social pillars received the indicators related to the social dimension, the ones whose research deals with the environmental were forwarded environmental indicators, and so on and so forth.

The specialists’ opinion allowed us to refine the indicators and to formulate a layout for presentation, considering the possibility of using it as a tool in future research, in order to collect data. At this occasion, we were also able to align each general indicator with the more specific ones, and the questions related to each of them.

By concluding this stage of our research, making our choice of indicators legitimate and adjusting them in accordance with the interviewees’ suggestions, we became able to move towards the next step: the attribution of priority to each indicator. We will assign them grades, and, as follows, list them in order of importance, while also taking into account the specialists’ opinions.

Final considerations

The main aim of this research was to build a matrix of indicators, following the BSC framework, while adapting its original proposal of dimensions to a model more related to the cattle farming business and to a new tendency of sustainability. In order to properly accomplish this, we needed theoretical support, obtained through bibliographic and documental review, so we could comprehend the relevant aspects of building an indicator — like which stages should be followed to determine an indicator successfully, which characteristics are essential in performance indicators, and which function indicators perform, among others. As we have mentioned in the essay, the building process should begin by analyzing the organization’s external and internal environment using a SWOT matrix.

Our current proposal of a matrix of indicators of sustainability for the family-run cattle farm consists of twenty-eight indicators organized in four dimensions of sustainability. These dimensions are the social, the environmental, and the economic, as recommended by the FAO (2018), and the productive, endorsed by Barbosa et al. (2010) and Brum et al. (2017).

Still regarding the proposed indicators, there are some aspects within each dimension worth pointing out.

Within the social dimension, besides indicators such as health and education, other helpful elements that stand out are the access to public policies, training programs, information and participation in community activities, and the situation of inheritance. Through these indicators, we can state an interest in a systemic perspective of the livestock farming business, and in the medium and long-term observation of an organization, vital for collecting accurate data on matters such as training and inheritance.

The indicators within the environmental dimension signal the extreme concern with natural resources, such as soil and water.

Within the economic dimension, aside from traditional indicators such as the degree of indebtedness, the property's ownership, and the family's income, there is also a new element referring to the use of technologies, evidence of adequacy to new parameters of administration.

The indicators related to the productive dimension confirm (as supported by bibliographic and documental review) historical concerns centered on productivity. One such indicator that stands out in that aspect is the one about "undesirable vegetation". Less observant readers might think this indicator could (or should) be in the environmental dimension category, but the presence of undesirable vegetation affects the productive dimension.

Making a systemic comprehension of their own property possible for cattle farmers with family-run businesses might help them to position themselves more efficiently in the market. They should be able to determine strategies in ways that enable the measuring of results, and to generate revenue for all parties involved in the organization, while supported by parameters that allow for improvement of processes and of the final product, as well as the verification the presence of bottlenecks.

In answering the research question and proposing a matrix of indicators, this paper contributes to the administrator's management, offering more support for their decision-making process. This support will facilitate the qualification of business systems, thus enabling the achievement of the organizational aims.

Another contribution of this essay was the detailing of the procedures and results during the building process of a set of indicators. We had the help of specialists, academics and producers, who engaged with the proposals and the suggested tools in several different ways. The use of the SWOT matrix and the BSC offered legitimacy to the results.

A suggestion for further research would be the relevance of the usage of these indicators while monitoring activities in rural properties, in such a way as to set up a practical demonstration of this model in action.

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