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ANALYSIS OF THE IMPACTS CAUSED BY THE TRANSITION TO CIRCULAR BUSINESS MODELS IN THE DYNAMICS OF FAMILY SUCCESSION IN RURAL ENTERPRISES

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ANÁLISE DOS IMPACTOS OCASIONADOS PELA TRANSIÇÃO PARA MODELOS DE NEGÓCIOS CIRCULARES NA DINÂMICA DE SUCESSÃO FAMILIAR EM EMPREENDIMENTOS RURAIS

ANALYSIS OF THE IMPACTS CAUSED BY THE TRANSITION TO CIRCULAR BUSINES MODELS IN THE DYNAMICS OF FAMILY SUCCESSION IN RURAL ENTERPRISES

Dissertation submitted to the Postgraduate Program in Administration (PPGAdm) - Professional Master's Degree from the State University of Western Paraná as partial requirement for obtaining the **Master's degree in Administration**.

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PAULO CESAR DO AMARAL JUNIOR

Análise dos impactos ocasionados pela transição para modelos de negócios circulares na dinâmica de sucessão familiar de empreendimentos rurais

Dissertação apresentada ao Programa de Pós-Graduação em Administração em cumprimento parcial aos requisitos para obtenção do título de Mestre em Administração, área de concentração Competitividade e Sustentabilidade, linha de pesquisa Sustentabilidade, APROVADO(A) pela seguinte banca examinadora:

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Cascavel, 20 de dezembro de 2021

I dedicate this work to the greatest gift I once received, my family. Ocimara, Emanuel, and Mariana have shown great love by understanding my weekend absence. They have always been by my side, offering unconditional support during the important journey of the master's degree.

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ABSTRACT

A Circular Economy is an approach that has gained notoriety since 2010. It has reached relevance among the aspects that deal with sustainability due to the notorious engagement of political and economic agents from all continents. Its proposal advocates that new businesses in the design phase observe the maximum appreciation of natural resources and seek to close the circle by adopting asset sharing, waste re-signification, and symbiosis. At the same time, it challenges ongoing productive activities to transition to circular business models. Within the scope of the Circular Economy, the industrial sector achieves greater prominence due to its processing-oriented nature. However, other sectors such as primary production also present development opportunities. In this sense, rural producers, realizing the possibility of moving to the Circular Economy and combining economic and socio-environmental sustainability, seek new knowledge on the subject through congresses, courses, and training in the area. Some individuals walk this journey together with their children, successors of the business, a question that motivates the proposition of the present study, which included research with 30 rural producers who participated in a course that guides the transition to circular business models in agricultural establishments. Initially, three conceptual constructs were formulated from the theoretical basis to guide the data collection. The first deals with the transition to the circular business model and includes verifying the implementation of ten circular practices; the second construct addresses family succession dynamics; the third is associated with the impacts resulting from the transition to the circular business model on the family succession dynamics of the rural enterprises surveyed. The results were analyzed in stages. There were exploratory descriptive statistics, formulation of scores with a combination of variables, application of Cronbach's Alpha, Exploratory Factor Analysis, and Spearman's Test. It was found that when considering the ten circular practices listed, the investigated rural enterprises are in different stages of transition to the Circular Economy, with 27% being at an advanced level (High Quartile). It was noticed that rural producers who included circularity as a strategic element are associated with more advanced transition levels. Regarding the dynamics of family succession, it was found that 33% of the surveyed establishments are at an advanced level (High Quartile), that the transmission of power is programmed to occur when rural producers reach an age between 61 and 71 years and that there is no statistically significant correlation between the succession plan and the main manager's temporal expectation regarding the business. As the main result, it was identified that most rural producers perceived positive impacts on the dynamics of family succession caused by the transition of the business model, but that this finding did not obtain a statistically significant correlation.

Keywords: Circular Economy, Family Succession, Business Model, Agribusiness, Rural Manager.

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RESUMO

A Economia Circular é uma abordagem que ganhou notoriedade a partir de 2010 e alcançou relevância entre as vertentes que tratam de sustentabilidade em razão do notório engajamento de agentes políticos e econômicos de todos os continentes. A proposta dessa Economia apregoa que novos negócios já na fase de design observem a máxima valorização dos recursos naturais e busquem fechar o círculo por meio da adoção de práticas como compartilhamento de ativos, ressignificação de resíduos e simbiose. Ao mesmo tempo são desafiadas as atividades produtivas em curso a transitarem para modelos de negócios circulares. No âmbito da Economia Circular o setor industrial alcança maior destaque em razão de sua natureza voltada ao processamento. Entretanto, outros setores como o da produção primária também apresentam oportunidades de desenvolvimento. Nesse sentido, produtores rurais, ao perceberem a possibilidade de transitar para Economia Circular e combinar sustentabilidade econômica com socioambiental, buscam novos conhecimentos sobre a temática através da participação de eventos como congressos, cursos e treinamentos na área. Alguns trilham essa jornada juntamente com seus filhos - sucessores do negócio - quesito esse que motiva a proposição do presente estudo que contemplou investigação com 30 produtores rurais que participaram de um curso que orienta a transição para modelos de negócios circulares em estabelecimentos agropecuários. Inicialmente a partir do embasamento teórico foram formulados três constructos conceituais para direcionar o levantamento de dados. O primeiro trata da transição para o modelo de negócio circular e contempla a verificação sobre a implementação de dez práticas circulares. O segundo constructo aborda o status da dinâmica da sucessão familiar. E o terceiro está associado aos impactos decorrentes da transição para o modelo de negócio circular na dinâmica de sucessão familiar dos empreendimentos rurais pesquisados. Os resultados foram analisados em etapas. Houve emprego de estatística descritiva exploratória, formulação de scores com combinação de variáveis, aplicação do Alpha de Cronbach, Análise Fatorial Exploratória e Teste de Spearman. Foi verificado que, ao considerar as dez práticas circulares elencadas, os empreendimentos rurais investigados se encontram em diferentes estágios de transição para a Economia Circular, sendo que 27% estão em nível avançado (Quartil Alto). Foi percebido também que os produtores rurais - incluída a circularidade como elemento estratégico - estão associados a níveis mais avançados de transição. Acerca da dinâmica de sucessão familiar verificou-se que 33% dos estabelecimentos pesquisados se encontram em nível avançado (Quartil Alto), que a transmissão de poder está programada para ocorrer quando os produtores rurais alcançarem a idade entre 61 e 71 anos e que não existe correlação estatisticamente significativa entre plano de sucessão e expectativa temporal do gestor principal frente ao negócio. Como principal resultado foi identificado que a maioria dos produtores rurais percebeu impactos positivos na dinâmica de sucessão familiar ocasionados pela transição do modelo de negócios, mas que esta constatação não obteve correlação estatisticamente significativa.

Palavras-chave: Economia Circular, Sucessão Familiar, Modelo de Negócio, Agronegócio, Gestor Rural.

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SUMMARY

1 INTRODUCTION

Since the 1970s, the debates related to the planet's capacity to support the exploitation rate of natural resources in the face of the growing consumption of increasingly urbanized populations have grown worldwide. The waste of valuable environmental assets, mainly due to inadequate waste disposal, is in the main discussions list. This condition implies well-known consequences of the current production system, such as air pollution and soil and water contamination. In this context, different approaches have emerged, including some radical ones that advocate structural changes in production systems and chains, and others focused on mitigating and compensating actions for the externalities generated by production agents (Cechin & Veiga, 2010; Chaves Ávila & Monzón Campos, 2018).

In 2010, after 40 years of interactions, counterpoints, and disputes between economic agents, sectors, and countries, the term "Circular Economy" (CE) achieved prominence. Since then, it has inspired the implementation of practices and the construction of regulatory frameworks that challenge scientific and technological knowledge to "redesign" products, processes, and businesses, aiming at the strategic combination between value addition and socio-environmental balance (Muradin & Foltynowicz, 2019; Rodríguez Martín, Palomo Zurdo & González Sánchez, 2020).

According to Muradin and Foltynowicz (2019), the Ellen MacArthur Foundation was the organization that contributed the most to the conceptual diffusion of CE. It presents this approach as restorative and regenerative by intention and design to confer the greatest possible value and utility for products, components, and materials through the effective management of technical and biological cycles. This proposal is based on maximizing services and seeks to contribute to all dimensions of sustainable development (Cosenza, De Andrade & De Assunção, 2020).

Thus, it is worth noting that much of the attention of stakeholders and policymakers related to CE falls on industrial segments and governmental actions. However, observation and analysis in the rural business sphere are essential, especially considering Brazil, which reaches a position as a major world player in agri-food chains, standing out in the soybean, orange juice, sugar, coffee, beef, and chicken markets. These products contributed significantly to the record surplus in the Brazilian trade balance (over US$ 81.9 billion) generated in 2020 (Schneider, Cassol, Leonardi & Marinho, 2020; Maria, Amaral, Andrade, Avelar & Góes, 2021).

The historical economic contribution of Brazilian agribusiness has motivated the generation of a relevant number of studies on sustainability in the sector. However, from the CE point of view, further studies are still necessary - especially empirical studies (Sehem, Campos, Julkovski & Cazella, 2019).

An opportunity for development is associated with investigating changes in the perception of rural producers about the search for balance in productive activity. After the "green revolution," the logic of sustainability in agricultural production was more connected with family farmers, market niches, and small isolated initiatives (Moreira, 2000). In recent years, it has been noticed that medium and large rural producers have become increasingly interested in the topic and seek to broaden their understanding of sustainable production concepts and practices. This issue is related to the propositions of the Circular Economy, mainly due to waste management, energy, and the use of biological inputs. Two initiatives in the national scenario demonstrate this context: the launch of the National Bio-Inputs Program and the consolidation of the Associated Group for Sustainable Agriculture (GAAS - *Grupo Associado de Agricultura Sustentável*).

The National Bio-Inputs Program, which was launched in May 2020 by the Ministry of Agriculture and instituted by Decree No. 10,375/2020, aims to stimulate productive alternatives in agribusiness. This program considers the Brazilian mega biodiversity in animal or vegetal production systems. It is an initiative that contemplates the complexity of the theme, encompasses the processes, and does not restrict the concept to products. The aim is to leave room for the structuring to mature, as new challenges are transposed and can be inserted as a national context in the productive, marketing, and scientific practice (Gindri, Moreira & Verissimo, 2020).

This policy was launched to meet the demands of several economic agents of agribusiness, such as industries of biological products. Nevertheless, one aspect that makes it extremely relevant concerns the On-Farm concept that deals with the possibility of the production of inputs by the very rural producers (Gindri, Moreira & Verissimo, 2020). It is recognized that microorganism multiplication and application techniques can lower production costs and, at the same time, meet CE principles.

The National Bio-Inputs Program has mobilized and continues to mobilize the organized civil society linked to agribusiness. GAAS (Associated Group of Sustainable Agriculture) is an organization interested in this discussion - a movement that began in 2017 and currently brings together more than 600 farmers from all regions of Brazil (GAAS, 2021). The organization's mission is to "create an environment of integrated and sustainable

solutions to develop an agriculture with local and regional resources," that is, agriculture with adherence to the concepts of Circular Economy. The producers that are part of GAAS act to review the business model in their farms to avoid external input acquisition costs while promoting the valorization of natural resources. These situations imply sustainability benefits in the social and environmental dimensions (https://www.grupoagrisustentavel.com.br/, retrieved on November 02, 2021).

The rural producers linked to GAAS participate in interactions within the association and in events seeking to guide the transition to circular business models. An outstanding event in this context is the course Biological Dynamics and Plant Nutrition, formulated by the agronomist Dr. Celso Katsuhiro Tomita, which presents TMT Biotechnology. This proposal highlights the circularity potential in agricultural establishments and encourages the reuse of residues, the application of techniques for microorganism multiplication, and local natural resources. TMT Biotechnology is adherent to the precepts of the Circular Economy, as it seeks to close the circle in agricultural establishments to reduce or eliminate the use of agrochemicals, reduce production costs, and increase the environmental sustainability of production systems (https://www.coalizaoconsultoria.com/ retrieved on January 05, 2021).

The search for knowledge about topics related to the Circular Economy is an action of rural producers who have an initial interest in the transition since the investment of time and financial resources represent an exploratory and analytical phase related to the market and operational, financial, and social viability necessary to make a decision on the transition.

It is common for farmers in family businesses to involve people linked to the business in activities like this, especially the successor children. This situation was verified in the events promoted by GAAS and Biological Dynamics and Plant Nutrition course.

This observation raises questions to understand better the connection between two elements considered strategic in the scope of rural enterprises: the transition to a circular business model and the family succession dynamics.

Family succession is considered a relevant and conditioning element of rural business performance (Cardona & Balvín, 2014). Present in most farming establishments, it influences and can be influenced by the business model transition. The perspective of rural producers on the responsibility for the establishment's management is undoubtedly a strategic component (Mishra, El-Osta & Shaik, 2010).

Family succession dynamics in rural businesses involves issues such as information asymmetry, priority alignment among family members, selection of the ideal successor, and building protocols for intergenerational management (Michel & Kammerlander, 2015).

In this sense, while in the Agricultural Sciences perspective, Circular Economy and family succession imply paradigms related to production systems and processes, the attempts to go deeper are related to the management of rural businesses in the Applied Social Sciences. This is the paper's proposal as it seeks a better understanding of the influence of the transition to circular business models on the dynamics of family succession in rural enterprises.

1.1 RESEARCH PROBLEM

The research problem formulation considered relevant aspects of current events on the theme and the identification of gaps throughout the bibliographical survey conducted. Initial emphasis was placed on the importance of the Circular Economy.

The need to revise the production chains' economic flow to change it from linear to circular is currently visible. It is a reality given the realization that natural resources are not inexhaustible and that society is moving towards the sophistication of consumption as urbanization advances. (Cechin & Veiga, 2010). In this sense, the CE emerges as a proposal seeking to consider economic prosperity and does so by attempting to mitigate resource depletion (Cechin & Veiga, 2010; Muradin & Foltynowicz, 2019).

According to projections for the year 2050, the planet's demography is expected to reach 9.1 billion inhabitants, which will demand three times more resources than today (Consenza, De Andrade & De Assunção, 2020). This perspective has led to strengthening international agendas that propose sustainability goals to be observed by signatory countries and economic agents in general. One of the proposals is the 2030 agenda, which is a commitment signed by 190 countries and presents 17 Sustainable Development Goals (SDGs) (Silva, Shibao, Kruglianskas, Barbieri & Sinisgalli, 2019).

Another agreement signed by European Union countries defined that by 2030 product recycling must exceed 65% of all waste generated (Vargas-Sánchez, 2019). After 2020, this pressure was reinforced due to the COVID-19 pandemic effects and by water, energy, and supply crises in several countries.

Therefore, the CE presents itself as an adequate proposal for this time. The approach challenges creativity, science, and technology to maintain economic prosperity and value resources by closing the technical and biological circles (Scarpellini, Marín-Vinuesa, Aranda-Usón & Portillo-Tarragona, 2020). The transition from linear logic based on processing and generating waste (pre and post-consumption) to circular logic.

The transition agenda challenges all sectors of the economy, including those related to agricultural establishments (Ferreira, da Silva & Ferreira, 2017). Thus, the transition to CE depends on revising public policies and especially business models. In this sense, it is important to expand the understanding of how the transition to circular business models in agricultural establishments is carried out and how it impacts other strategic components.

In Brazil, besides the growth of academic literature on CE and international agreements, several movements highlight the topic's relevance. The National Bio-Inputs Program, the Associated Group for Sustainable Agriculture (GAAS) initiatives, and the Circular Economy 100 (CE100) Program confirm this premise. The latter was launched in 2015 and is a pre-competitive and innovative collaboration that brings together stakeholders from companies, governments, academia, and other affiliated organizations. It aims at the interaction of these actors to consolidate a "living laboratory" of transition towards CE in Brazil. This movement is also connected to the global initiative with the same name and is led by the Ellen MacArthur Foundation (EMF, 2017). The program members produced a study in 2017 that highlighted the initial vision for agriculture and biodiversity assets. Three transition opportunities were highlighted:

a) Amplifying existing efforts in regenerative business models in agriculture and biodiversity assets;

b) Stimulating the development of the nascent bio intelligence sector;

c) Leveraging digital technology to unlock CE potential in the bioeconomy.

The main mobilizers of the program understand that these opportunities must figure as a priority on the agenda of economic agents and policymakers connected to the sector (EMF, 2017).

The transition to the circular business model in rural enterprises draws managers' attention when agricultural input prices are high. Resigning waste and implementing biofactories within farms are opportunities to avoid costs (Decree n. 10.375, 2020). However, it demands an understanding of the elements that impact and are impacted by this movement.

In this sense, another relevant aspect is highlighted. As most rural enterprises are related to transgenerational succession, the business model transition depends on the action of the main parties within the family succession dynamics, which are the main manager and the successor. For Taylor, Norris, and Howard (1998), a rural family business is different from other types of businesses. It goes beyond the farming activity and is a family lifestyle based on beliefs about living and working on the farm. Children are born and consolidated as natural learners, understanding that the farm configures an indivisible physical asset. Most of the

time, it is the large fraction of family wealth that must be safeguarded (Mishra, El-Osta & Shaik, 2010).

Synchrony between the family development cycles and the growth of the rural business is crucial for continuity. Amidst the business model transition context, it is relevant to deepen the challenges and opportunities generated in the succession dynamics (Mishra, El-Osta & Shaik, 2010). This is true because every strategy component is associated with the quality of family relationships, values, training, and experience of the parties involved (Ghee, Ibrahim & Abdul-Halim, 2015).

Taylor, Norris, and Howard (1998) state that the relationship between business and family dynamics is complex and cannot be understood without understanding the family that created it. This perspective reinforces that the transition to a circular business model is a new creation and is closely connected to the profile and conditions of the family that proposes it.

Family businesses have unique strategic resources compared to other company types, given that they are related to strong commitment, shared values, trust, culture, and reputation (Bocatto, Gispert & Rialp, 2010). The gaps verified during the bibliographical survey are enlisted to finalize the systematization of the research problem.

Concerning CE, studies have been identified that deal with standardizations (Muradin & Foltynowicz, 2019; de las Heras, 2016), wood industry analysis (Carballada, 2020), global threats regarding waste recycling (Lett, 2014), solid waste management (Rodríguez Martín, Palomo Zurdo & González Sánchez, 2020; Conseza, De Andrade & De Assunção, 2020), and others that address conceptual issues such as the approaches by Silva, Shibao, Kruglianskas, Barbieri, and Sinisgalli (2019). These authors state that the formulation of the concept in the literature is fragile due to the lack of methodological cohesion in the outcome measurement criteria. Such perspective is confirmed by Sehnem, Campos, Julkovski, and Cazella (2019). Therefore, the gap for elaborating studies concerning the transition to business models in rural enterprises becomes evident.

Regarding family succession, the bibliographical survey allowed verifying studies such as Mishra, El-Osta, and Shaik (2010), which deals with the decision process about family succession in rural businesses in the United States. Ghee, Ibrahim, and Abdul-Halim (2015) discuss the main factors related to the succession plan and business performance. Michel and Kammerlander (2015) also found the same conclusion when they examined the role of consultants in supporting the family succession process. We also have Cardona and Balvín's (2014) studies on family succession protocol. Chalus-Sauvannet, Deschamps, and Cisneros (2016) elaborate on unexpected succession, and Bocatto, Gispert, and Rialp (2010)

discuss the influence of nomination performance and family and non-family successors. Taylor, Norris, and Howard (1998) designed a study related to succession patterns in Canadian rural businesses. Gudmunson and Danes (2013) investigated on social capital in family businesses. Fan, Wong, and Zhang (2012) analyzed succession and its accounting properties. Massis, Frattini, Majocchi, and Piscitello (2018) produced a study on family businesses' internationalization.

Based on the literature surveyed, it was evident that studies concerning the family succession dynamics characterization combined with the transition to circular business models are a scientific opportunity and a potential for generating new knowledge to academia.

1.1.1 Research question

The following research question was formulated considering the systematization and formulation of the problem to guide this study: What is the impact of the transition to circular business models on the family succession dynamics in rural enterprises?

1.2 OBJECTIVES

A general objective, which was later unfolded into three specific objectives presented below, was determined to answer the research question and guide the work sequence.

1.2.1 General

This research's general objective is to:

- To analyze the impacts caused by the transition to circular business models on the family succession dynamics of rural enterprises.

1.2.2 Specific Objectives

The three specific objectives are:

a) Characterizing circular business models and transition elements;

b) Characterizing the family succession dynamics in rural enterprises;

c) Identifying the impacts caused by the transition to the circular business model in the family succession dynamics in rural enterprises.

1.3 JUSTIFICATION AND CONTRIBUTION OF THE STUDY

The approaches inherent to CE and family succession have demonstrated relevance in scientific studies and social interactions observed in the current context. Analyzing the transition to the CE demands a deeper examination, especially regarding comparisons between models, sectors, and countries. It is an opportune condition for producing studies aimed at monitoring similar businesses and with the potential to help in the formulation of indicators (Muradin & Foltynowicz, 2019).

The transition to CE cannot be seen only to slow down the current production process. It is a challenge presented to entrepreneurs to channel their efforts and find business opportunities aligned with the strategic management of the planet's natural capital. Considering the possibility of aligning socio-environmental and economic sustainability, the European Union estimates that its manufacturing sector alone will add more than 600 million euros per year with the transition to CE (Muradin & Foltynowicz, 2019). By 2030, this situation should result in an increase of at least 30% in the bloc's GDP and provide the generation of 700,000 new jobs (Hazen, Russo, Confente & Pellathy, 2020).

The expectation regarding the impacts of the rural business transition reaches some similarities with what is expected in the industrial chemical sector. This condition stems from the innovation capacity and connection with several production chains (Ferreira, da Silva & Ferreira, 2017). Besides generating primary products for several activities, rural businesses demand large amounts of inputs and capital goods; therefore, they have a unique potential to generate new products.

Understanding the feasibility of CE concept and practices implementation is essential, as it focuses on environmental issues and implies new business practices. Lorenzo, Parizeau, & Von Massow (2019) draw attention to the fact that a truly circular economy must clearly express economic viability. The authors have presented a clear object of study: the impact of the possible waste outsourcing to developing countries. They also presented "ecological modernization" as a proposal to abandon the traditional view that the economy and environment always have opposing interests.

The interest in these issues and the production of studies related to CE have grown considerably; however, there is still a noticeable lack of in-depth studies, especially on circular business models in Brazil (Sehem, Campos, Julkovski & Cazella, 2019). For Paes, de Medeiros, Mancini, de Miranda Ribeiro, & Oliveira (2019), the CE is still incipient and presents few publications in scientific journals.

Barbabè and Nazir (2020) state that a gap exists in the area because there are no studies concerning measurement tools - a view corroborated by Scarpellini, Marín-Vinuesa, Aranda-Usón, and Portillo-Tarragona (2020). These authors also argue that the growth of discussions and analyses at the macro level is currently perceived. This situation is different from the knowledge on the introduction in the business environment that is in the beginning stages and remains poorly understood.

Mishra, El-Osta, and Shaik (2010) state that most studies on family succession address tax issues. They also point out that little empirical work has been devoted to the topic. For Ghee, Ibrahim, and Abdul-Halim (2015), research concerning family businesses focuses on survival rate, as it has been found that one-third of this type of enterprise does not survive the transition to the next generation. Mishra, El-Osta, and Shaik (2010) also highlighted that explanatory variables regarding succession dynamics lack observable utility and require data set analysis.

For Chalus-Sauvannet, Dechamps, and Cisneros (2016), the literature on family businesses presents little focus on succession planning, an element that from the authors' perspective should be addressed well in advance especially to confer adequate conditions for the successors' preparation. Bocatto, Gispert, and Rialp (2010) point out that few studies investigate the relationship between business performance and succession. Wennberg, Wiklund, Hellerstedt, and Nordqvist (2011) suggest that research related to ownership transition should look more closely at differences in short and long-term effects. Taylor, Norris, and Howard (1998) warned that succession impacts were neglected in research related to the agricultural environment.

Gudmunson and Danes' (2013) approach emphasizes that studies on family businesses should identify the challenges in identifying observable indicators and the shape of the underlying interest process.

Given the above, the importance of addressing the topics CE and family succession in agricultural establishments is evident. It is also verified that the possibility of investigating the connection between them is justified because the vast majority of establishments are under

family management, geared towards succession, which may be influenced by decisions at the strategic level, such as the transition to a circular business model.

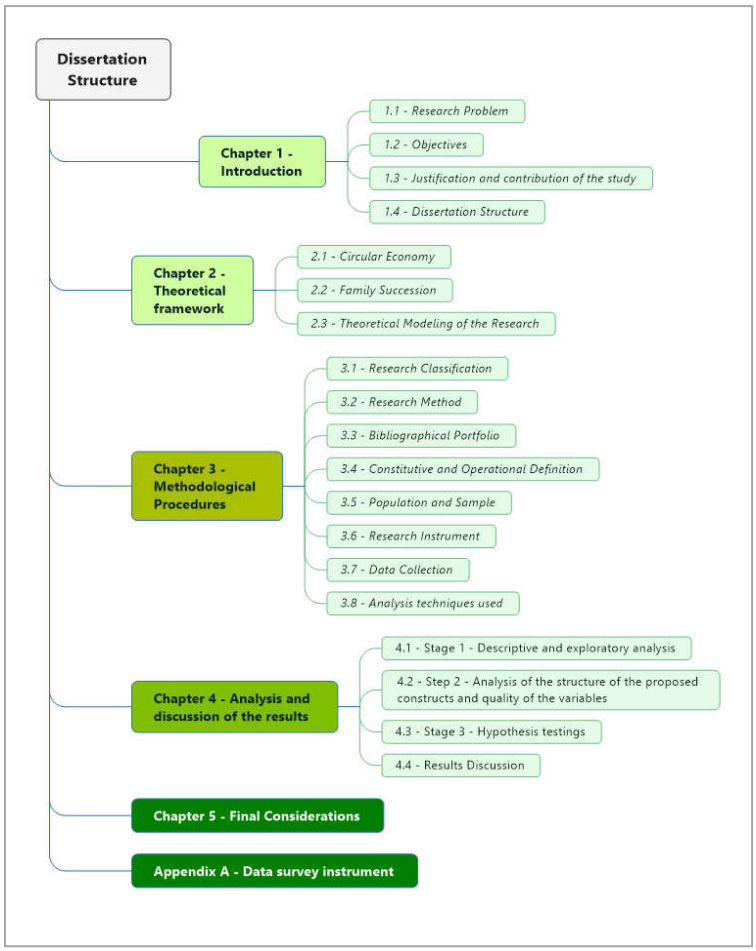
This study's main contributions correspond to the formulation and availability of the academic environment of constructs analyzed on the themes with potential references for assessing businesses and public policies. From the rural producers' perspective, it will help understand the status of the business model transition and the family succession dynamics in their farms.

1.4 DISSERTATION STRUCTURE

The dissertation systematization contemplates a five-chapter structure as shown in Figure 1.

Figure 1

Dissertation Structure



Source: Prepared by the author

The first chapter showed the introductory elements of the present work. It highlighted the connection between the work's problem and goals. It brought light to the importance of the topics Circular Economy and family succession in the scope of rural enterprises.

The second chapter presents the systematized theoretical foundation from the bibliographical survey. This part of the work will also present the constructs formulated to guide the applied research and, consequently, the data analysis. This theoretical modeling can be visualized in the representations of mental maps by construct and consolidated in section 2.3 of the chapter.

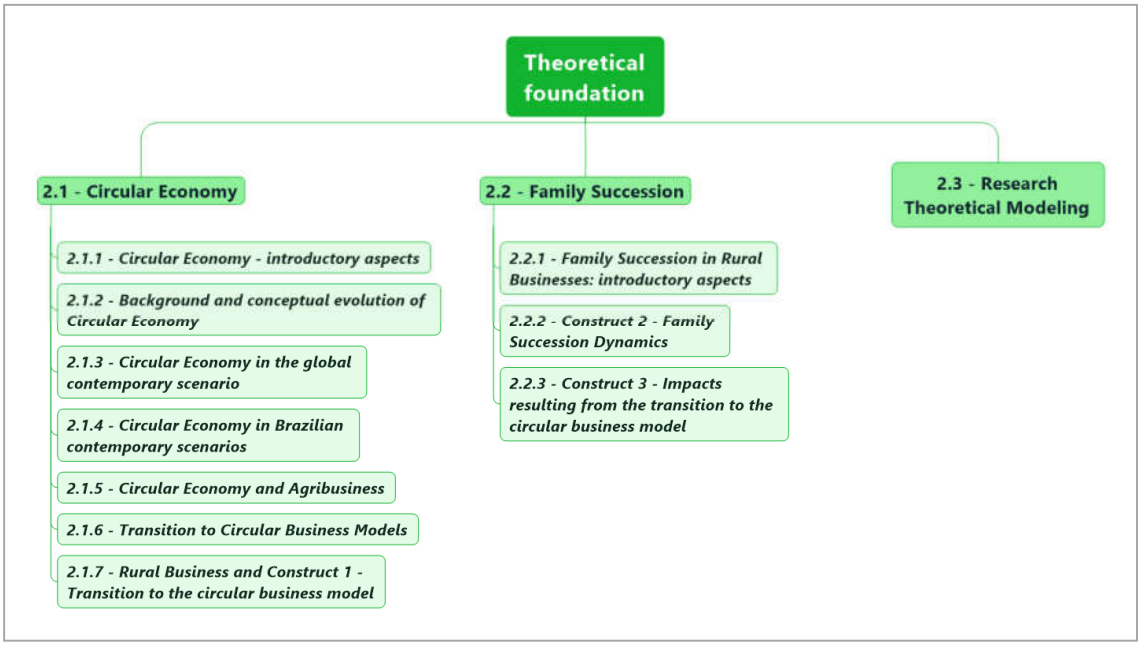
The third chapter presents the detailed methodological procedures adopted to carry out this work. The fourth chapter presents the analysis - divided into stages - and discusses the results. The author's final considerations are found in the fifth and last chapter. The data survey instrument is included as an appendix and can be seen entirely.

2 THEORETICAL BACKGROUND

This chapter will present the theoretical foundation used to develop this work. It is divided into three parts. The first presents the systematization developed from the bibliographical portfolio on Circular Economy. Next, the approach contemplates the family succession theme. The final part is dedicated to presenting the theoretical modeling built to conduct the research. Figure 2 presents a mind map with the chapter's structure.

Figure 2

Theoretical Background of the Dissertation



Source: Prepared by the author

In sections 2.1 and 2.2, we will first consider the introductory aspects, and then the unfolding of the constructs formulated according to the themes used in the research and submitted for analysis and subsequent validation.

2.1 CIRCULAR ECONOMY

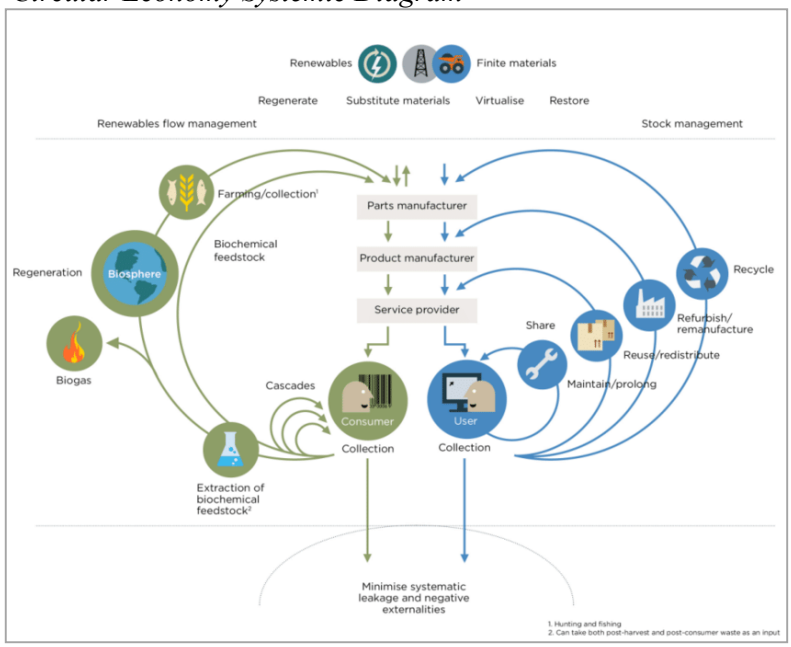
2.1.1 Circular Economy: introductory aspects

CE is an approach that has gained notoriety since 2010. It promotes reconciliation between business activities and environmental sustainability (Cechin & Veiga, 2010). It calls for the revision of the current linear logic - based on extract, produce, and waste - in the sense of closing the loop (closed looping). Therefore, it is a "cradle to cradle" vision in which technical and biological cycles are observed and result in the maximum valorization of resources (Carballada, 2020).

This vision is shared by the Ellen MacArthur Foundation (EMF) of the United Kingdom, which, according to Cosenza, De Andrade, and De Assunção (2020), is one of the most prominent organizations on the subject worldwide. This relevance was achieved due to the mobilization of leaderships promoted in the social environment and by producing important works on the subject. Figure 3 shows CE's most widespread graphic representation today - the Systemic Diagram, nicknamed the Butterfly Diagram - created by EMF.

Figure 3

Circular Economy Systemic Diagram



Source: Adapted from https://archive.ellenmacarthurfoundation.org/pt/economia-circular/diagrama-sistemico, retrieved November 1, 2021.

For Muradin and Foltynowicz (2019), one of the key results of EMF is the diffusion that CE is a restorative and regenerative system by intention and design. It recognizes the opportunity to combine entrepreneurial capacity with available technology and scientific production for conscious and creative business design. The effectiveness of this combination depends on systemic approaches and collaboration mechanisms (Ferreira, da Silva & Ferreira, 2017). For Silva, Shibao, Kruglianskas, Barbieri, & Sinisgalli (2019), this compatibility is described as a multidisciplinary study of industrial and economic systems that demands conciliatory efforts between academia, business, and third sector institutions.

Regarding the CE concepts (Barnabè and Nazir, 2020), more than 100 definitions can be found. Most people associate CE with a set of closed cyclical systems seeking material regeneration and maximum energy use with non-corrective situations. In this sense, they highlight the important role of business design and modeling (Cramer, 2020).

Circular Economy fits into the new generation of propositions regarding the economic paradigm. It emerges along with the approaches of social enterprises, solidarity economy, collaborative economy, and economy of the common good (Chaves Ávila & Monzón Campos, 2018).

CE achieves prominence over previous interactions and theoretical currents on sustainability because it highlights the possibility of reusing resources, including with lower costs inherent to the practice of disposal (Sehnem, Campos, Julkovski & Cazella, 2019). This aspect corresponds to the industrial sectors that make commitments under the CE. Such condition promotes the growing interest in the topic (Paes, de Medeiros, Mancini, de Miranda Ribeiro & de Oliveira, 2019).

The CE proposes that developed and developing nations have initiatives to reconfigure the main supply chain management processes from the macro perspective. This economic perspective has gained a promising status due to the active participation of governments and economic agents in the construction of agendas and regulatory frameworks (Hazen, Russo, Confente & Pellathy, 2020). Certainly, CE can be seen as a development strategy (Barnabè & Nazir, 2020; Scarpellini, Marín-Vinuesa, Aranda-Usón & Portillo-Tarragona, 2020).

Comparing CE and Linear Economy is the starting point to advance the understanding of the concept and implementation of the practices. For Ferreira, da Silva & Ferreira, (2017, p. 452):

> The linear economy is almost like a straight line; it flows in only one direction. It is driven by the "more-better-faster-safe syndrome, i.e., unbridled consumerism. In this production economy model, which originated in the industrial revolution,

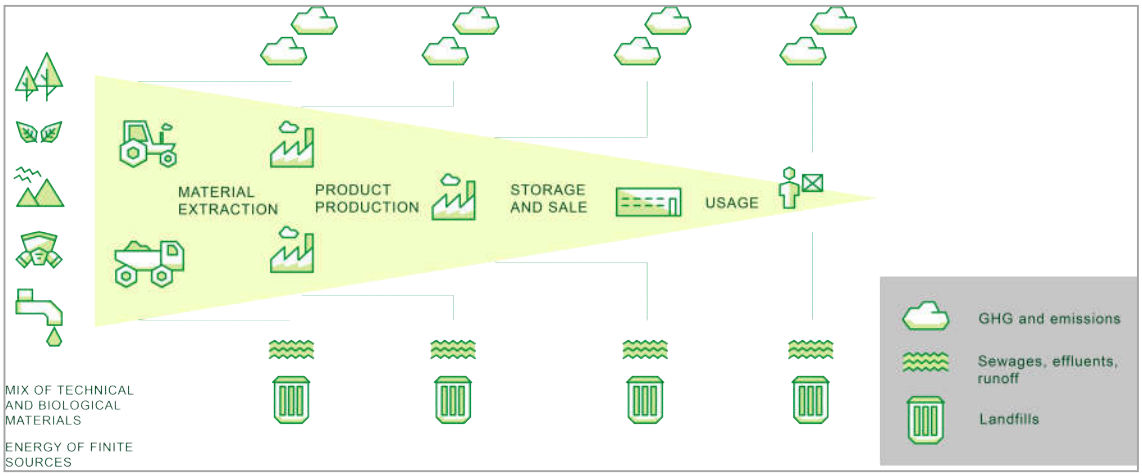
> natural resources are transformed into products and sold to the consumer after a series of steps that add value to the product.

Under these conditions, a large part of the extracted resource is devalued. Residues generated along the transformation chain and after consumption are perceived as externalities that generate costs or environmental liabilities.

Figure 4 graphically represents this dynamic.

Figure 4

Linear Economy Representation



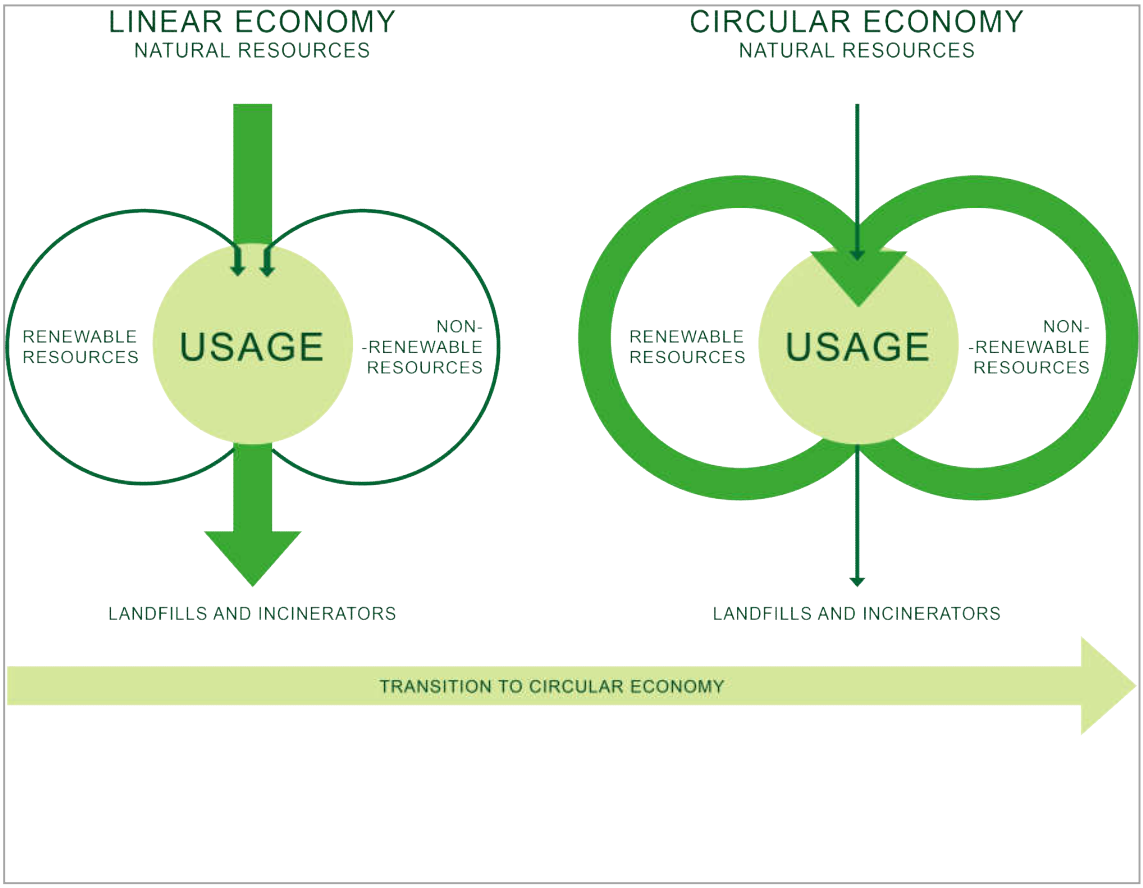
Source: Adapted from Weetman (2019)

For CE, this view must change. Businesses already in the conception phase, that is, the design should consider the need to maintain the maximum resource value in the cycle. Hence, the term closed looping (Cechin & Veiga, 2010).

Figure 5 graphically represents such a comparison.

Figure 5

Transition to the Circular Economy



Source: Adapted from Potting, Hekkert, Worrell & Hanemaaijer (2017)

Chaves Ávila & Monzón Campos (2018) believe that society already realizes that many corporations prosper without generating value for the community. The CE intends to change this logic through the awareness of shared value.

The perception of shared value is more easily visualized through the practices corresponding to the CE. For Cosenza, De Andrade, and De Asunción (2020), knowing ongoing practices is essential to building the concept. According to Rodríguez Martín, Palomo Zurdo, and González Sánchez (2020), closing the cycle depends on seven steps: reintroducing, redesigning, reusing, repairing, remanufacturing, recovering, and recycling.

In Cosenza, De Andrade, and De Assunção's (2020) view, practices adhering to the CE concept are sustainable purchasing of raw materials, green production processes, design, adopting distribution models, and developing secondary markets for raw materials.

Other CE practices also stand out, such as the replacement of product sales with rentals and subscriptions, as has already occurred in the real estate, automotive, and clothing markets (Ferreira, da Silva & Ferreira, 2017). Industrial symbiosis is a practice capable of promoting harmonious relations and benefits between economic agents. Therefore, it is the regular use of waste from one business as a high-value input for another (Silva, Shibao, Kruglianskas, Barbieri & Sinisgalli, 2019). At the non-operational level, adopting accounting reports that can record and communicate CE practices is suggested (Barnabè & Nazir (2020).

2.1.2 Background and Conceptual Evolution of Circular Economy

Several authors present elements on the background and origin of the term "Circular Economy." Initially, CE is perceived as an evolution of previous approaches such as Industrial Ecology and Service Economy (Cramer, 2020; De las Heras, 2016). In Rodríguez Martín, Palomo Zurdo, and González Sánchez's (2020) view, the "germ" beginning of CE is in 2010, when the Europe 2020 Strategy was launched. Such movement was reinforced in 2015 when the European Commission approved the package of initiatives called "European Cities for a Circular Economy." In the 1970s, the term Circular Economy appeared in public documents, according to Cosenza, De Andrade, and De Assunção (2020, p. 6):

> The term circular economy first appeared in 1976 in a report to the Energy Commission of the European Communities (now the European Commission) entitled "Potential for Substitution Manpower for Energy" by Walter R Stahel and Geneviève Reday-Mulvey; it was made public five years later in the book "Jobs for Tomorrow, the Potential for Substituting Manpower for Energy." [...]

In this sense, it is evident that different initiatives and visions about sustainability have been connected through the Circular Economy concept.

Table 1 presents a systematization of the main events that influenced the consolidation of the term.

Table 1

Important events related to the creation of the Circular Economy concept

YEAR	EVENT	REFERENCE
1968	First mentions of the importance of mitigating environmental degradation at the Club of Rome	Muradin & Foltynowicz, 2019
1970	Framework for Ecological Economics due to relevant events such as the oil crisis	Cechin & Veiga, 2010 Chaves Àvila & Mozón Campos, 2018
1987	World Commission on Environment and Development (Brundtland Commission)	Muradin & Foltynowicz, 2019
1989	Introduction of the embryonic concept of Circular Economy by Pearce and Turner	Muradin & Foltynowicz, 2019
1992	United Nations Conference on Environment and Development - Eco 92	Muradin & Foltynowicz, 2019
2009	Launch of the Circular Economy Law in China	Muradin & Foltynowicz, 2019
2014	Launch of the Zero Waste for Europe Program Launch of the document Closing the Loop - A European Union Action Plan for the Circular Economy	Muradin & Foltynowicz, 2019 Chaves Ávila & Monzón Campos, 2018 Cosenza, De Andrade & De Assunção, 2020 Scarpellini, Marín-Vinuesa, Aranda-Usón & Portillo-Tarragona, 2020.
2015	Paris Agreement	Rodríguez Martín, Palomo Zurdo & González Sánchez, 2020
2016	Opinion on Circular Economy	Chaves Àvila & Mozón Campos, 2018
2017	Report of the Circular Economy Action Plan Implementation Committee Launch of the 2030 Agenda for Sustainable Development World Circular Economy Forum in Helsinki Launch of ISO 20400:2017 standard dealing with sustainable procurement	Carballada, 2020 Rodríguez Martín, Palomo Zurdo & González Sánchez, 2020 Muradin & Foltynowicz, 2019
2018	AFNO's seminar that brought together representatives from 65 countries aiming to create an ISO standard for Circular Economy	Rodríguez Martín, Palomo Zurdo & González Sánchez, 2020

Note: Prepared by the author

2.1.3 Circular Economy in the Global Contemporary Scenario

CE is advancing on all continents and is present in the policies of important countries. China has been promoting interactions around the theme since 1990. In 2002, the central government assumed propositions favorable to CE in its development strategy and launched the Circular Economy Promotion Law in 2009 (Muradin & Foltynowicz, 2019).

Unlike the control perspective in China, Japan prioritized the participatory construction of strategies on CE (Silva, Shibao, Kruglianskas, Barbieri & Sinisgalli, 2019).

CE transition in the European Union has been considered a framework organized into eight building blocks. It contemplates the initiatives of industrial symbiosis, material resource efficiency, product life-cycle extension, bio-based products, energy efficiency, performance economy, sharing economy, and platform economy. Since 2016, European Union legislation has banned the disposal of organic materials and established that by 2025 textile waste must be recycled into final products (Määttänen, Asikainen, Kamppuri, Ilen, Niinimäki, Tanttu & Harlin, 2019). The economic bloc's political leadership goal is to transform the European Union into a low-carbon economy.

It is worth emphasizing that the Netherlands stands out for its CE-related results. Since 2015 the Amsterdam Economic Council (AMEC) has taken the lead in the design and execution of the regional CE program. In the same year, the Dutch government adopted the program across its entire structure. More than thirty municipalities act with urgency to implement CE (Cramer, 2020).

Great Britain and France have already introduced national standards for CE – BS 8001-2017 and XPX 30-901 – thus generating guidance for economic actors (Muradin & Foltynowicz, 2019). In Spain, there are already several documents and sectoral guidelines on CE. Some sectors have characteristics that link them more directly to the topic. It is the case of the forest industry - wood is a renewable, reusable, and recyclable material (Carballada, 2020). Portugal has also started negotiating the transition to the CE and created the Action Plan for the Circular Economy of Portugal (PAEC, 2017) (Cosenza, De Andrade & De Assunção, 2020). Countries such as Belgium, the United States, and Canada have also launched regulations and are moving forward on different fronts to establish this transition (Paes, de Medeiros, Mancini, de Miranda Ribeiro & de Oliveira, 2019; De Lorenzo, Parizeau & von Massow, 2019).

2.1.4 Circular Economy in the Brazilian Contemporary Scenario

Compared to European countries, especially the Netherlands, Denmark, England, and particularly China, Brazil's conceptual maturity in CE is less advanced (CNI, 2018). Indeed, the complete transition has not yet occurred in any country; however, such differences can be verified when observing the conceptual diffusion and the implementation of practices.

In the Brazilian scenario, CE consolidation is associated with implementing combined actions between the public and private sectors. For this to occur successfully, it is necessary to clarify tangible benefits – especially for the private sector. This condition depends on overcoming barriers such as infrastructure for reverse logistics, flaws in the tax system, lack of technologies, and others also relevant (CNI, 2018).

The connection with practices and results from other countries to promote the customization of initiatives to adapt to local conditions presents itself as a viable option (Cosenza, De Andrade & De Assunção, 2020). In this sense, it is worth highlighting the position achieved by the University of São Paulo (USP) on the world stage. In September 2016, the institution signed an agreement with the Ellen MacArthur Foundation (EMF), thus joining a selected group of six major universities worldwide to form the Pioneer University group – an international network dedicated to the theme (USP, 2021).

About a year earlier (October 2015), the Circular Economy 100 (CE100) program was conceived. A pre-competitive and innovative collaboration brings together stakeholders from business, government, academia, and other affiliated organizations to act as living laboratories for the CE transition in Brazil. This movement is also connected to the global initiative of the same name and is led by the Ellen MacArthur Foundation (EMF, 2017).

One of the great efforts observed in the Brazilian national scenario is inherent in the interactions for governments – state and municipal – and business sectors to meet the National Solid Waste Policy (Federal Law 12.305/2010; Cosenza, De Andrade & De Assunção, 2020; Silva, Shibao, Kruglianskas, Barbieri & Sinisgalli, 2019).

Another important movement is the one undertaken by the National Confederation of Industries (CNI) and state federations linked to the system. The organization has instituted CE as one of the pillars of its low-carbon strategy, along with forest conservation, energy transition, and carbon pricing (CNI, 2018).

In short, Brazilian experiences are still considered embryonic (Sehnem, Campos, Julkovski & Cazella, 2019). However, it becomes relevant to consider the importance of the ongoing movements and especially the commitments already made by the public and private sectors. It is also important to consider the Brazilian opportunities, such as systemic and climate advantages, proximity to installed production chains, natural assets, and the launch of new policies and exclusive resources to implement practices (CNI, 2017). In this context, the transition to circular business models challenges managers of rural enterprises.

2.1.5 Circular Economy and Agribusiness

The dedication of the agents promoting CE in proposing new ways to manage flows related to industrial sectors is notorious. However, the production system is a link that precedes the processing system in supply chains. Therefore, it presents an opportunity to analyze CE's adherence to principles, practices, and strategic initiatives.

Agribusiness agents can exploit several developing possibilities. Ferreira, da Silva, and Ferreira (2017, p.459) corroborate with and highlight the example about the soybean agri-food chain:

> Soy is renewable biomass and has a very interesting production chain that is well illustrative of the Circular Economy concept. The world production of soybeans is 312.362 million tons (source USDA), and the U.S. is the world's largest producer of this grain with a production of 106.934 million tons.

The same authors expose frying oil to be converted into biodiesel or soap. This initiative generates value by re-signifying waste and mitigating the polluting potential.

A highly relevant action that positions Brazil as a global reference refers to the reverse logistics of pesticide packaging. The movement undertaken by associated rural producers manages to return and recycle 94% of the packages sold. It is a work based on consistent reverse logistics planning (Cosenza, De Andrade, & De Assunção, 2020).

Regarding the initiatives on-farm operations, it is relevant to draw connections between CE and agroecological and organic practices. The CE presents partial adherence to these concepts since they are based on millennial knowledge and systemic vision prior to the logic of mass consumption and scale production. It is possible to affirm that organic and agroecological production are present in family agriculture and niche market products. Differently, CE practices can be implemented considering a wider scope. This possibility is generated by releasing the obligation of a complete transition linked to obtaining and maintaining certification. Some practical examples can be highlighted, such as soil preparation using organic composts, irrigation with rainwater, solar energy use, optimization, and sharing in the transportation of products. In other words, it is possible and feasible for a rural producer to opt for a partial transition of his production system rather than a full and radical conversion (Silva, Shibao, Kruglianskas, Barbieri & Sinisgalli, 2019).

In this scope, some Brazilian initiatives are notable and similar to the green chemistry promotion in the European Union, which has REACH (Registration, Evaluation,

Authorization, and Restriction of Chemicals) in its regulation, a benchmark (de las Heras, 2016).

The Circular Economy 100 (CE100) program can be highlighted as an example, as it points out that the transition to CE in agriculture must consider three strategic axes. They deal with the importance of biodiversity assets and highlight the role of the relationship between biointelligence and technology as conditioning factors for leverage.

Other recent initiatives that achieve relevance in the Brazilian context refer to the launching of the National Bio-Inputs Program – Decree No. 10.375/2020 – and the regulation of the Rural Product Bond (CPR) related to conservation activities recovery of native forests and their biomes. The GREEN CPR (CPR-V) is created from the amendment to Article 1 of Law No. 8.929/94. October 7, 2021.

The circularity of the rural environment also generates a connection between rural farms and the service sector. Tourism companies act in partnership with rural businesses (Vargas-Sánchez, 2019). The highlight is perceived in the energy generation from biomass characterized by organic materials used in food production. An example is the volume of manure in places of agricultural concentration that allows anaerobic digestion or pyrolysis processes (Yazan, Cafagna, Fraccascia, Mes, Pontrandolfo, & Zijm, 2018; Cosenza, De Andrade, & De Assunção, 2020).

Finally, it is important to highlight organized groups of rural producers that mobilize information and develop strategies to transit their business models. The same occurs with the Associated Group for Sustainable Agriculture (GAAS), a movement started in 2017 that brings together more than 600 rural producers from all regions of Brazil. Its mission is to "create an environment of integrated and sustainable solutions to develop an agriculture with local and regional resources," that is, agriculture closely linked to the concepts of Circular Economy (GAAS, 2021).

In the agribusiness sphere, it is noticeable that many actions already implemented are related to the CE concept and enable the use of standards for sector classification and accounting. More relevant is the observation that there are many development opportunities.

2.1.6 Transition to Circular Business Models

Understanding the circular business model becomes a less demanding exercise when business modeling concepts are more familiar in the broadest sense (Sehnem, Campos,

Julkovski, and Cazella, 2019). The basic conceptual alignment is to perceive the business model as an abstract representation about fulfilling objectives by meeting needs and generating value for people (Osterwalder, 2004). According to Barnabè and Nazir (2020), four groups of key elements characterize a business model: inputs, business activities, outputs, and results generated.

As presented in section 2.1, the butterfly diagram devised by the Ellen MacArthur Foundation in the UK has become popular in several countries. It has occurred because of its assertiveness in representing the circular business model. It clearly shows the decoupling of value addition from the misuse of scarce natural assets (Sehnem, Campos, Julkovski, e Cazella, 2019).

CE implementation is directly associated with understanding and reviewing business models. By visualizing such representations, the identification of improvement opportunities and innovations occurs more fluidly and supports the closed looping logic (Cramer, 2020; Barnabè & Nazir, 2020).

For Consenza, De Andrade, and De Assunção (2020), conventional business models based on Linear Economics lack balance, rely on the excessive use of materials and often disregard waste value. Proactive adjustments can be made when these models focus on multidisciplinary approaches. Table 2 shows initiatives and practices adhering to circular business models.

Table 2

Initiatives and Practices Adhering to Circular Business Models

INITIATIVE / PRACTICE	REFERENCE
Eco-Innovation	de las Heras, 2016
Transition from fossil fuels to renewables	Scarpellini, Marín-Vinuesa, Aranda-Usón, & Portillo-Tarragona, 2020)
Integration of technical and biological aspects Utilization of resources for as long as possible Waste reduction Biodiversity Renewable energy Symbiosis Circular sourcing Bio-based products Sharing platforms Reuse policies Repair Remanufacturing Versatility for technological change	Sehnem, Campos, Julkovski & Cazella, 2019
Dematerialized products Longer lasting products	Vargas-Sánchez, 2019

Note: Prepared by the author

For this development to occur, the importance of the systemic vision and the focus on maintaining continuous flows is evident (Consenza, De Andrade & De Assunção, 2020).

One successful example presented by Consenza, De Andrade, and De Assunção (2020) is described in the article "The Product-Life Factor" (Stahel, 1982) that describes the modeling of a closed-loop economy. That paper won the Mitchell International Sustainable Development Award. Another approach that relies on the circular business model design is the one put forward by Flores, Bressers, Gutierrez, and Boer (2018). These authors state that the imperative of zero waste is conditioned by the maintenance of the value of materials, by the frequent use of products with short life spans, and the use of natural resources as they regenerate. Studies on circular business models help to understand the maturity of implementing CE (Sehnem, Campos, Julkovski & Cazella, 2019).

It is worth reporting that, even with the growing interest in CE, there are still few studies on transition processes. However, it is possible to highlight successful experiences already registered, such as the creation of eco-industrial parks, industrial symbiotic relationships, and initiatives of municipal governments in Europe (Cramer, 2020).

Perhaps more than government regulations, identifying market or cost reduction opportunities certainly drive the transition (Cramer, 2020). For Silva, Shibao, Kruglianskas, Barbieri, and Sinisgalli (2019), the lack of methodological cohesion demonstrates the need for adopting effective indicators for successfully monitoring this dynamic. Paes, de Medeiros, Mancini, de Miranda Ribeiro, and Oliveira (2019) also add the importance of calculations related to carbon credit.

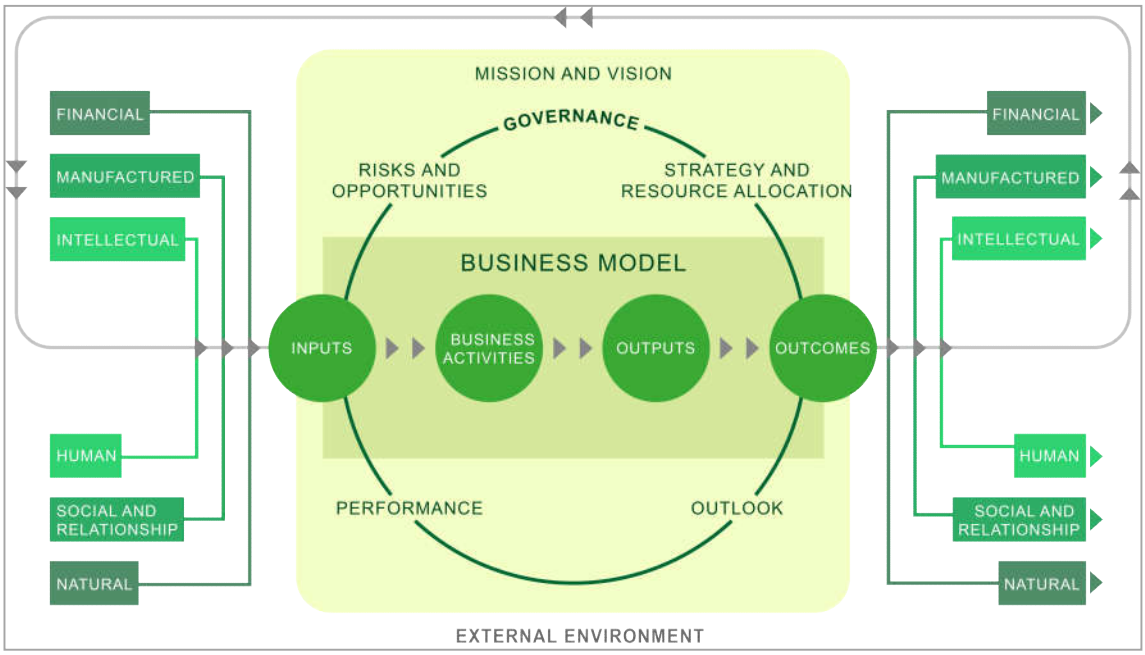
The standard developed by the European Community provides elements to assist in measuring transition status (Muradin & Foltynowicz, 2019). The groups of indicators suggested by the organizing committee contemplate: a) sustainable resource management; b) social behavior and business operations; and c) eco-innovation.

In Hazen, Russo, Confente, and Pellaty's (2020) perspective, the transition implies reengineering the production and consumption side. Consequently, it demands investments in design and processes that support maintenance, repair, reuse, remanufacturing, refurbishment, and recycling. For this, overcoming technological and financial barriers is key. Based on Baranabè and Nazir (2020), the transition to a circular business model should consider the following key elements: a) inputs, b) business activities, c) outputs, and d) outcomes.

Figure 6 provides a representation of the context and function of a circular business model.

Figure 6

Proposed Representation of the Transition to a Circular Business Model



Source: Adapted from Barnabè and Nazir (2020)

Still considering European experiences, the proposal of the framework of indicators for monitoring the transition called Eurostat stands out. The European statistics include ten indicators divided into four thematic areas: a) production and consumption; b) waste management; c) secondary raw materials; and d) competitiveness and innovation (Eurostat, 2019).

More than adaptations due to environmental pressures, the transition to circular business models challenges entrepreneurs concerning eco-design. That is, the creative anticipation – prototyping – of problem-solving and exploitation of opportunities for products to fulfill their marketing function and, at the same time, maintain the value of the resources employed in them for as long as possible. (De las Heras, 2016).

2.1.7 Rural Businesses and Construct 1 - Transition to a Circular Business Model

Once the systematization of the bibliographical portfolio related to the macro-level perspective of the Circular Economy has been presented, this part of the section has another

focus. It highlights the structure and theoretical framework related to the concept of Transition to the Circular Business Model. It allows visualizing how the perspective of the several authors relates to the research variables carried out with the rural producers of the sample. The chosen format includes the presentation of the mind map, followed by the respective selected theoretical basis.

However, it is appropriate to address a relevant perspective used in several parts of this work before entering into this dynamic. Rural enterprise, as the Land Statute refers to the rational exploitation of rural property by individuals or legal entities, is also called rural enterprise (Law No. 4.504, 1964). Therefore, a connection between the term and the activity can be noticed, rather than other forms of typification, such as property size, producer typologies, or social contexts.

The set of rural enterprises forms the production system of the production chains. Therefore, if the processing link – related to industries – has the Industrial Revolution as the milestone of the Linear Economy, for the production system link, this milestone occurs a little later, in the transition between the 1930s and 1940s, with strong diffusion starting in the 1960s. This is the Green Revolution, the result of several innovations implemented in the field to ensure food security on a large scale.

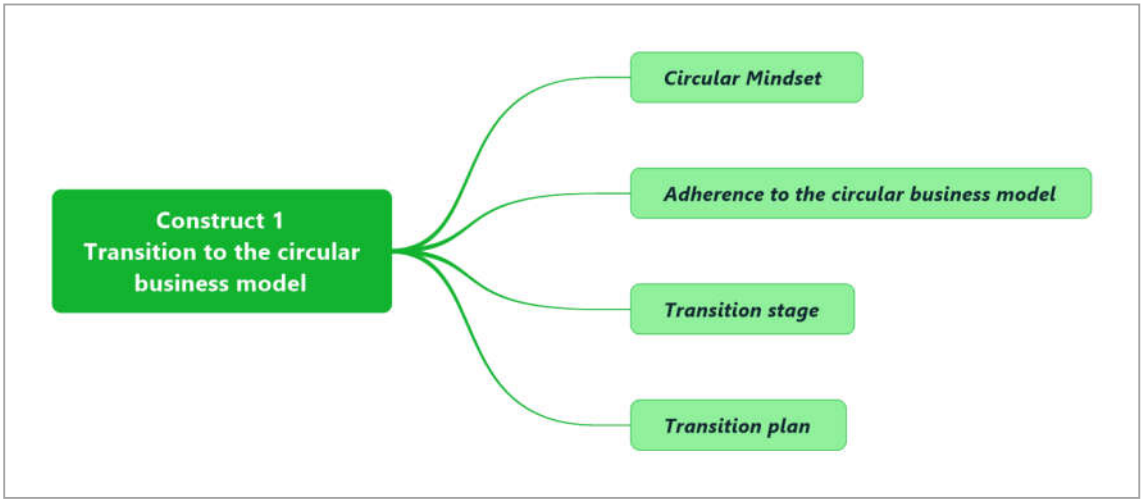
Since then, agribusiness results worldwide show successive records related to productivity and production. Conversely, it accounts for negative environmental externalities that, in turn, constitute opportunities for sustainability approaches, especially CE. In this sense, assuming the CE focus on regenerating and reusing natural capital makes the constitution of fertile ground for the transition of business models in agricultural establishments noticeable (Barabè & Nazir, 2020). For Silva, Shibao, Kruglianskas, Barbieri, and Sinisgalli (2019, p. 49):

> Pollution prevention actions (P8) were evidenced among rural producers, such as biodiesel as a fuel for generators. Other pollution control and treatment interventions, known as "end of pipe" measures (Glavič and Lukman, 2007) such as systems for domestic effluent treatment by septic tanks and biofilters were verified for Farmer 2. Through drip and micro-irrigation techniques, farmers used solar energy, rainwater, and irrigation.

Therefore, a construct regarding the transition to the circular business model was formulated in the field research integrating this work. Figure 7 presents the construct's representative mind map.

Figure 7

Mind Map for Construct 1 - Transition to the Circular Business Model

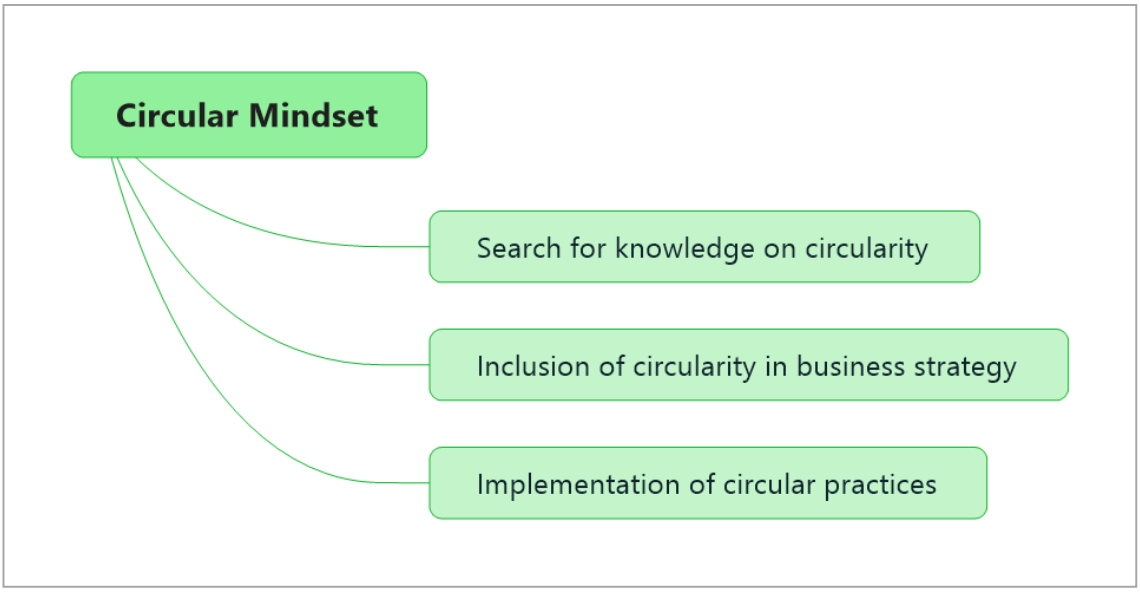


Source: Prepared by the author

The construct was proposed comprising four factors and 17 variables. The first factor is associated with the Circular Mindset. Its breakdown into variables is shown in Figure 8.

Figure 8

Unfolding of the Circular Mindset Factor



Source: Prepared by the author

The determination of the circular mindset as a congregating factor of variables derives from the understanding that it is an initial movement for the transition of the business model. From a new way of thinking about the business, rural managers start the search for information, plan the insertion of practices as elements of the business strategy, and promote the necessary implementations that show a circular business model. The view of Ferreira, da Silva, and Ferreira (2017 p.460) contemplates the importance of the change of mentality:

> It requires a systemic approach and goes beyond incremental improvements to the existing model and developing new collaboration mechanisms. It changes the economic logic because it replaces the mode of production with ideas.

Lett (2014) corroborates this view by stating that since the circular economy is based on the foundations of the environmental school, it demands a paradigm shift through transformations of deep and lasting understandings. It is about rethinking processes and seeking to evolve the existing model (Barnabè & Nazir, 2020).

At first sight, it is possible to perceive the mindset change as a quick and deliberate individual event. However, it should be considered that for an agent active in the market to conceive possibilities of changing his business, he depends on stimuli and visualization of opportunities or problems. That is why it is common to verify that initial reluctance to change, and market opportunities for differentiation or redirection are strong influencers (Cramer, 2020). For Cramer (2020), there are different roles in this dynamic beyond managers. They include niche proponents, who wish to see their innovations accepted, and influential intermediaries. Thus, the importance of considering mindset as an important factor in the transition to circular business models becomes evident.

Cosenza, De Andrade, and De Assunção (2020) believe that the elements of the circular economic process require a multidisciplinary approach that integrates areas related to the social and natural sciences. Thus, considering promoting transitions in the business model, a rural business manager automatically opens gaps to be filled by new knowledge. These gaps can occur individually or collectively, depending on the personnel structure typology involved with business strategic and tactical issues. Family members often jointly seek knowledge on circular practices in courses, mentorships, or events with other formats. These elements support the search for knowledge on circularity as a variable associated with the Circular Mindset factor.

The explicit strategy of a business can reflect its organizational culture. Therefore, CE perception in strategic elements, such as vision and strategic objectives, is an assumption of

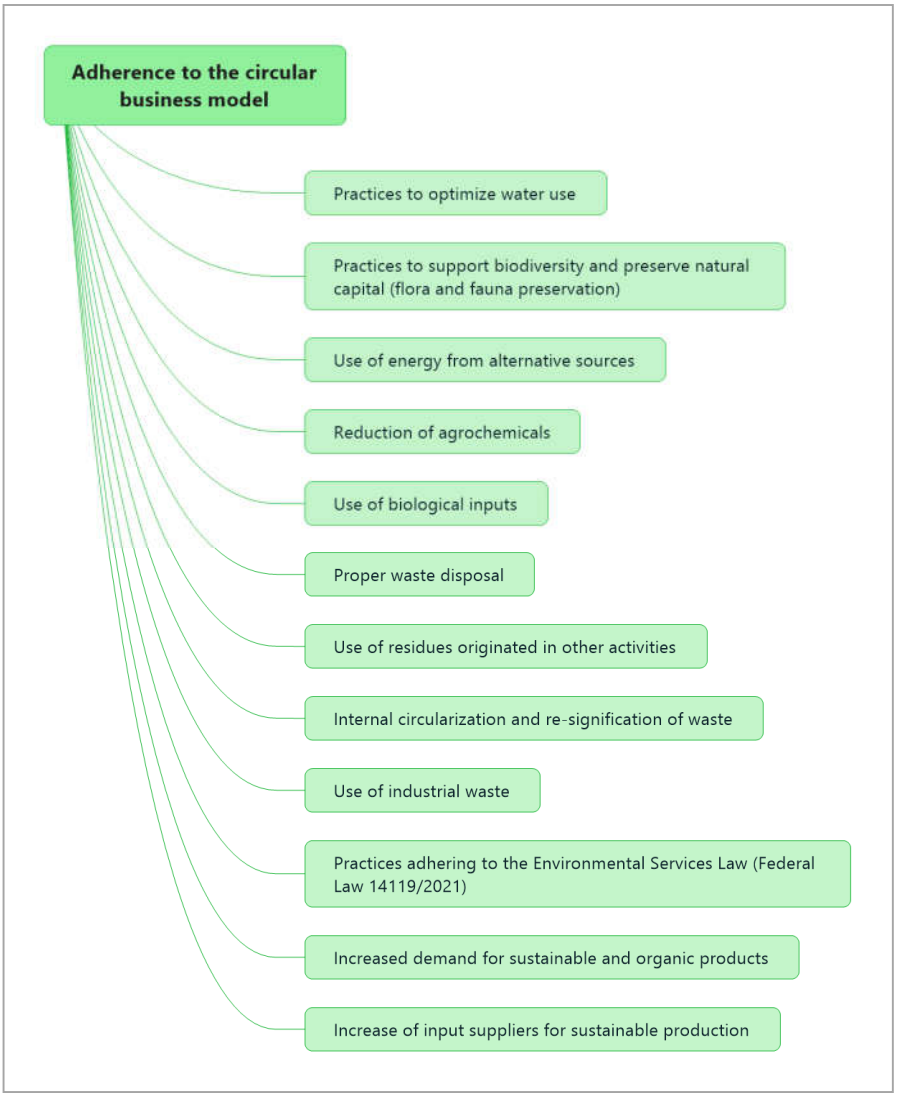
the model transition and the organizational culture itself (Vargas-Sánchez, 2019). This situation justifies adding circularity to the business strategy as a transition-related variable.

The implementation of circular practices configures as a variable of the factor. Sehnem, Vazquez-Brust, Pereira, and Campos (2019) state that empirical evidence of firms implementing CE practices achieves relevance due to the current scarcity of this typology of information.

Adherence to the circular business model is the second factor related to Construct 1. Its breakdown regarding the variables is represented in Figure 9.

Figure 9

Unfolding Factor of Adherence to Circular Business Model



Source: Prepared by the author

Twelve variables were aimed at the rural properties' adherence to the circular business model. The formation of this list included approaches applicable and often verifiable in the rural environment.

Considering water a crucial resource in agricultural production, reuse practices and others related to optimization are equally important. Farmers can capture and use rainwater, drip irrigation, and other solutions capable of combating waste (Silva, Shibao, Kruglianskas, Barbieri & Sinisgalli, 2019). Thus, verifying practices to optimize water use is essential.

Preserving rural properties' natural capital is important for producing goods and maintaining life (Cechin & Veiga, 2010). Integrating a production system with natural capital preservation practices proves the practical application of the systemic approach and the valorization of resources recognized as irreplaceable (Carballada, 2020). These perspectives are connected to these variables: Practices Supporting Biodiversity and Preservation of Natural Capital and Practices Adhering to the Environmental Services Law – Law 14.119/2021. It should be noted that such law allows financing preservation techniques in rural properties through the issue and transaction of bonds – Green Bonds.

Farms present opportunities to use and generate energy from alternative sources, especially on intensive livestock farms. Technologically speaking, different forms can be employed, such as manure-based bioenergy, pyrolysis, and photovoltaics (Silva, Shibao, Kruglianskas, Barbieri & Sinisgalli, 2019; Yazan, Cafagna, Fraccascia, Mes, Pontrandolfo & Zijm, 2018).

Business models contemplate the understanding that input resources are mobilized and transformed to generate outputs and results (Baranabè & Nazir, 2020). Regarding rural businesses, the approach inherent to synthetic inputs reduction – agrochemicals – and the adoption of biological inputs reach interest in the CE scope (Sehnem, Campos, Julkovski & Cazella, 2019). Thus, the variables Reduction of Agrochemicals and Use of Biological Inputs are listed as elements to be verified as evidence of adherence to CE.

Rural businesses present several opportunities to re-signify waste. This practice shows great adherence to the CE assumption due to operating in a closed-loop and managing technical and biological cycles. This condition is amplified by businesses operating in the livestock and agriculture integration since animal production waste with great contamination potential can be treated, thus increasing the productivity of agricultural systems.

Waste can assist in energy production – it is the integration of technical and biological aspects and the use of resources for as long as possible (Sehnem, Campos, Julkovski & Cazella, 2019). Rural properties even allow using waste from other activities generated on

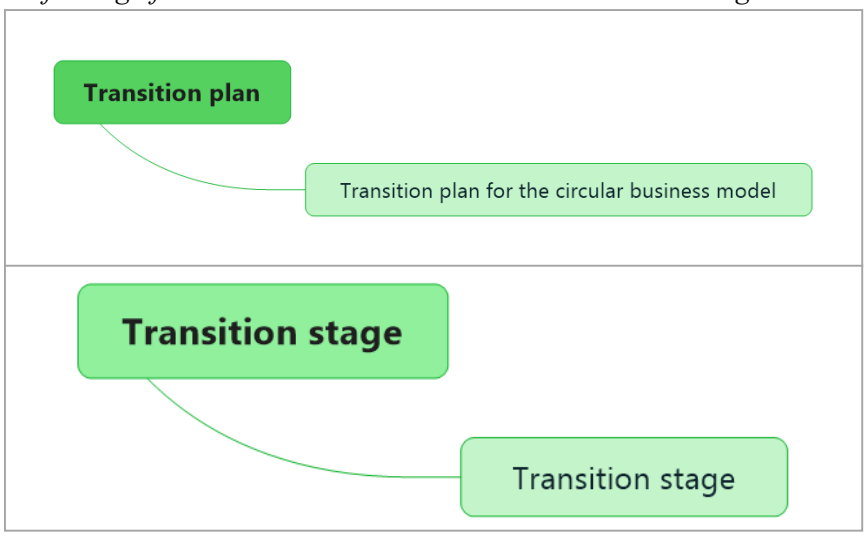
third-party properties or even in the industry – symbiosis (Silva, Shibao, Kruglianskas, Barbieri & Sinisgalli, 2019; Lifset & Graedel, 2002). These perspectives guide the integration of the variables Proper Waste Disposal, Use of Waste Originated in Other Activities, Internal Circularity and Resignation of Waste, and Use of Industrial Waste to the factor.

The Adherence to Circular Business factor integrates the last two variables: Increase in Demand for Sustainable and Organic Products and Increase in Suppliers of Sustainable Production Inputs. According to Cosenza, De Andrade, and De Assunção's (2020) perspective, sustainable purchasing of raw materials, adopting distribution models, and developing secondary markets of base elements allow visualizing the advance of the business models' transition. Thus, verifying the expansion of suppliers and demanders of these types of products demonstrates that rural business managers are, at the very least, being considered as targets by other specialized players in the market of sustainable and organic products.

The third and fourth factors associated with Construct 1 deal with Transition Plan and Transition Stage. Both present unfolding with only one variable each, consisting of Transition Plan for the Circular Business Model and Transition Stage, as shown in Figure 10.

Figure 10

Unfolding of the Factors Transition Plan and Transition Stage



Source: Prepared by the author

These two factors and their respective variables allow checking the formal planning process and the status of the business model transition. For Sehnem, Campos, Julkovski, and Cazella (2019), the transition to circular business models needs plans that demonstrate how to get to better points than the current ones. The same authors also address the importance of

measuring transition maturity levels to support continuous improvement. According to Cramer (2020), factors such as market opportunities can drive the transition; for this, formal planning and stage monitoring are critical for effectiveness in pursuing desired results.

Given the above, sections 2.1 to 2.7 sought to present a systematization arising from the bibliographic survey related to CE and transition to the circular business model. Besides conceptual elements, it also presented the structure of Construct 1 as a proposal of factors and variables to be used in applied research for further analysis and validation.

2.2 FAMILY SUCCESSION

2.2.1 Family Succession in Rural Businesses: Introductory Aspects

Family businesses are characterized as those in which one or more families hold control of at least 50% of shares – or quotas – if held privately and 25% if held publicly (Calàbro, Minichilli, Amore & Brogi, 2018). Typically, these ventures have a strong connection to local roots (De Massis, Frattini, Majocchi & Piscitello, 2018). Currently, a large proportion of active businesses are under family control - a condition that is even more pronounced in rural businesses.

In this context, one of the central themes of rural family businesses is succession. Fan, Wong, and Zhang (2012) see succession as occurring in the year when the main manager leaves his or her position, enabling replacement by a new person. It can be seen as a process that transfers ownership and leadership to a next-generation successor and, according to Michel and Kammerlander (2015 p. 46), it is "one of the most important processes in the life cycle of a family business because of its substantive effect on strategy, culture, and the survival of the firm."

Given its importance, the succession dynamics have elements that demand and allow analysis and deepening. The succession route draws attention due to its impact on future business performance (Wennberg, Wiklud, Hellerstedt & Nordqvist, 2011). The transmission of commitments and correction of irregularities of the previous management are relevant for achieving legitimacy before stakeholders (Chung & Luo, 2013).

The issue of "transgenerational business survival" arouses great interest among researchers due to the challenges that managers must overcome to avoid becoming part of the stratum characterized by early mortality - only one third survives the first transition (Ghee,

Ibrahim & Abdul-Halim, 2015). A conditioning factor for the mortality of transgenerational businesses stems from managers' decisions based on family needs that are not compatible with the real demands of the business. According to Bocatto, Gispert, and Rialp (2010), the most studied topics in the family succession scope are a) succession as a process, b) the founder's role, c) the next generation's perspective, d) succession analyses in different perspectives, and e) characterization of effective successions.

Along the time horizon in which it is established, it is common to verify that influences of agricultural and personal characteristics occur and generate impacts in different perspectives in the succession dynamics (Mishra, El-Osta & Shaik, 2010). Therefore, it is important to conceive that family succession in rural businesses does not occur in a single act. It may be initiated by the top manager even before the successor's first work interactions with labor activities and usually ends when the younger generation reaches middle age (Taylor, Norris & Howard, 1998). These perspectives reinforce the importance of assessing the influence of strategic business-related events on family succession dynamics.

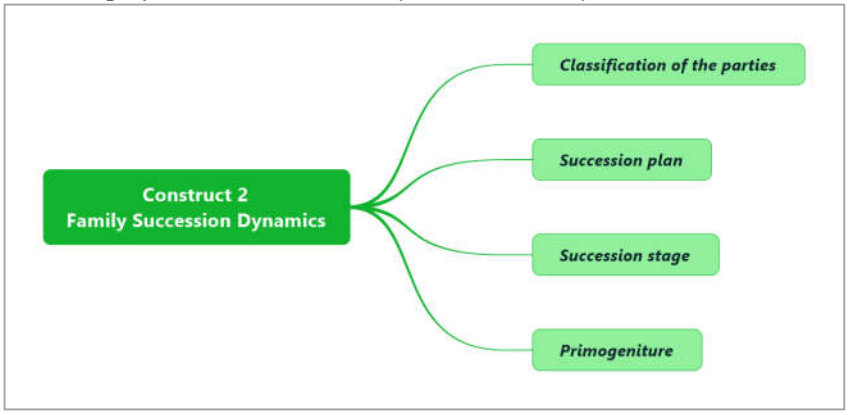
2.2.2 Construct 2 - Family Succession Dynamics

Observing the same format related to the second part of the section on Circular Economy, below we will present the elements and structure of two constructs related to family succession dynamics that guided the research with the rural producers of the sample.

Construct 2 is presented in Figure 11 and is proposed with four factors and six variables associated with Family Succession Dynamics.

Figure 11

Mind Map of Construct 2 - Family Succession Dynamics

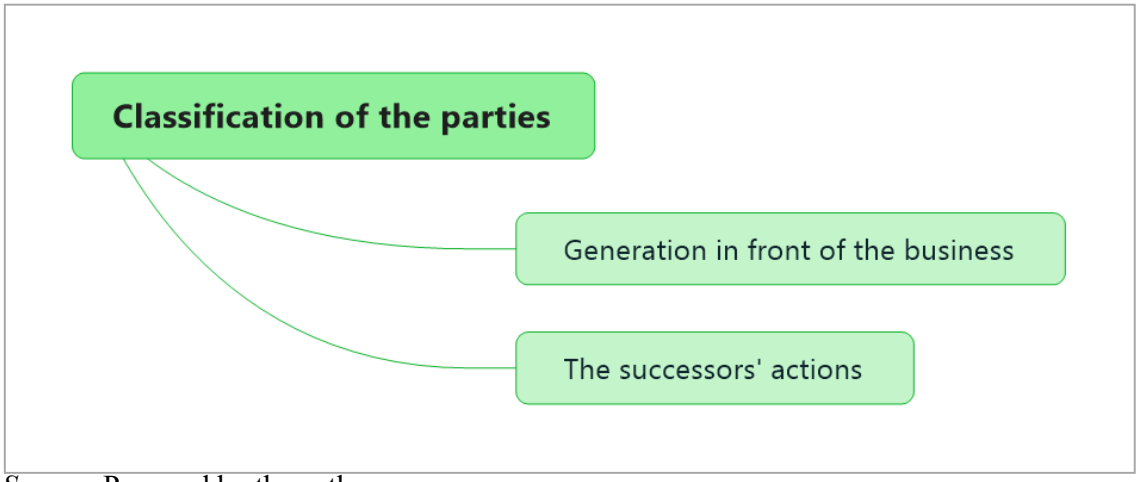


Source: Prepared by the author

The classification of the parties is essential to understanding the family structure that influences business performance. For Massis, Frattini, Majocchi, and Piscitello (2018), family structure refers to individuals who share ties and can be characterized differently. Thus, the factor Classification of Parties brings together two variables: Generation before the Business and Successor(s) Actions. Figure 12 exhibits this unfolding.

Figure 12

Unfolding of the Factor Classification of the Parties



Source: Prepared by the author

The succession plan is crucial in the transfer of intergenerational businesses. It can obtain different conditions, from a simple manager's decision to a detailed formal plan prepared with the support of specialized consultants. According to Michel and Kammerlander (2015), the succession planning effectiveness requires preparatory actions. The agreement of strategic, financial, and time horizon aspects is a basic item for this decision-making.

Oliveira and Vieira Filho (2019) consider that the succession agreement essentially comprises three important transfers: the farm's management, assets, and income. These authors emphasize the importance that these transfers occur gradually, in progressive and structured steps. Therefore, it can be considered that succession planning minimally refers to the set of decisions of rural producers on the stages, questions, and time horizon of transgenerational transfers.

When considering the importance of structuring the succession stages, the importance of properly formalizing the definitions becomes clear, especially through a suitable document capable of guiding all parties involved. For Cardona and Balvín (2014), succession planning should include documents that organize the property and company transfer, always

considering the best fiscal cost-benefit. In Mishra, El-Osta, and Shaik's (2010) view, succession planning is part of a complete business plan for agricultural operations. The authors also point out that this document must consider the family's needs, the manager's wishes, and the business demands.

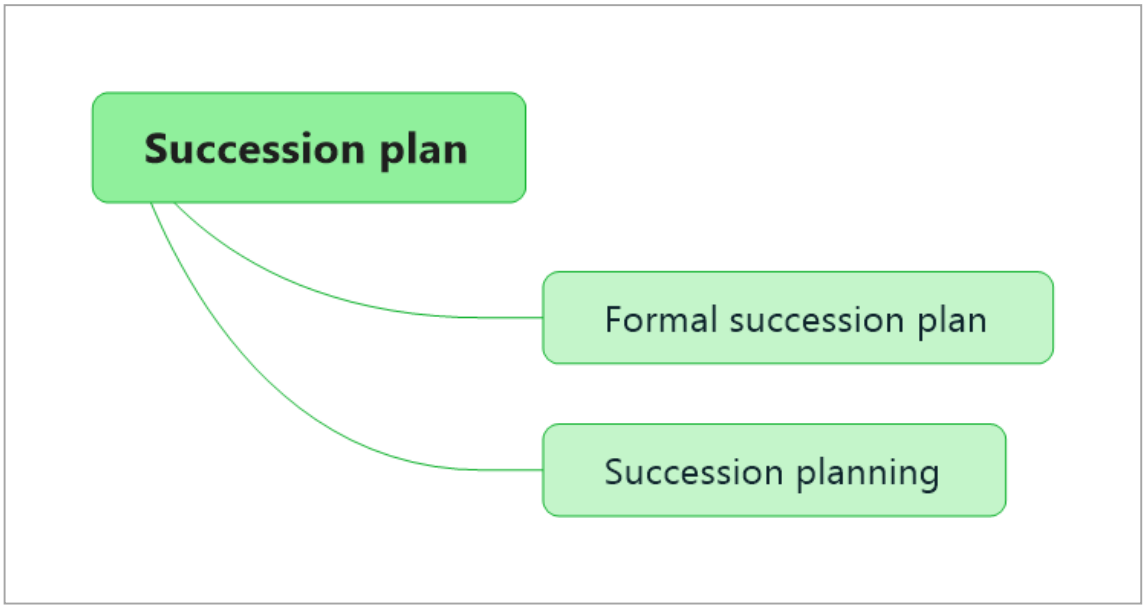
García, Ayala-Calvo, and Schumacher (2021) point out that few family businesses formalize a succession plan and emphasize that it is a key element to ensure the continuity and prosperity of the rural family business. The authors define a succession plan as a document containing the set of principles, actions, and steps involved in assuming the new leadership. Guidelines aimed at anticipating business trends and preparing the farm to meet future demands must be established, in addition to addressing issues regarding new technologies and certification of production processes and products, traceability requirements, and interaction with workers.

Given the above, it is clear that there is no standard structure for the formal succession plan. However, its importance for the rural business' long-term strategy and the expression of the family alignment is evident, at least in the areas of equity, leadership, and income of the rural enterprise after the departure of the main manager.

Figure 13 presents the mind map with the unfolding of the Succession Plan factor used in this study.

Figure 13

Unfolding of the Factor Succession Plan



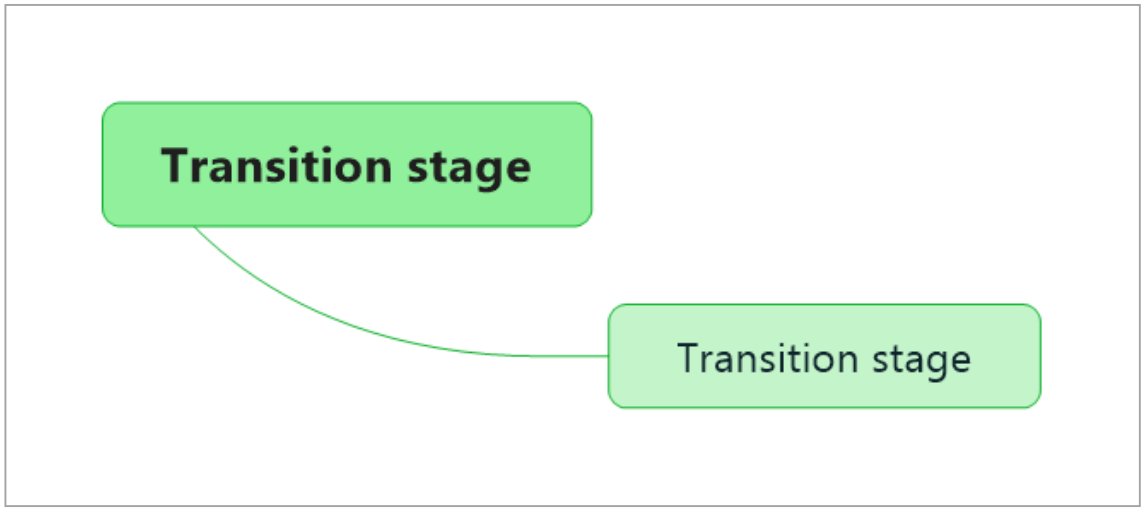
Source: Prepared by the author

The Succession Plan factor includes the variables Formal Succession Plan and Succession Planning. When the succession planning is formalized – Formal Plan – it demonstrates a higher level of maturity.

The third factor associated with Construct 2 is related to the succession stage. This factor contemplates only one variable. The unfolding is shown in Figure 14.

Figure 14

Unfolding of the Factor Succession Stages



Source: Prepared by the author

According to Mishra, El-Osta, and Shaik (2010), the wealth-generating capacity of the business and how each family household will be impacted in this regard are among the elements used to estimate the succession decision.

A relevant perspective was presented by Michel and Kammerlander (2015). When classifying the phases of succession dynamics, they highlighted the importance of the "trigger" – a situation in which the main manager generates and assumes the initial vision on how the business should operate in the future. This vision is shared with the succession candidate if he or she has the maturity for interaction – not necessarily for managing the business. It is a dynamic that may take many years and will only be completed when the successor takes over the management position (Taylor, Norris & Howard, 1998). Thus, the variable Expectation of the manager ahead of the rural business (in years) helps to understand the time horizon (if already established) for concluding the succession dynamics.

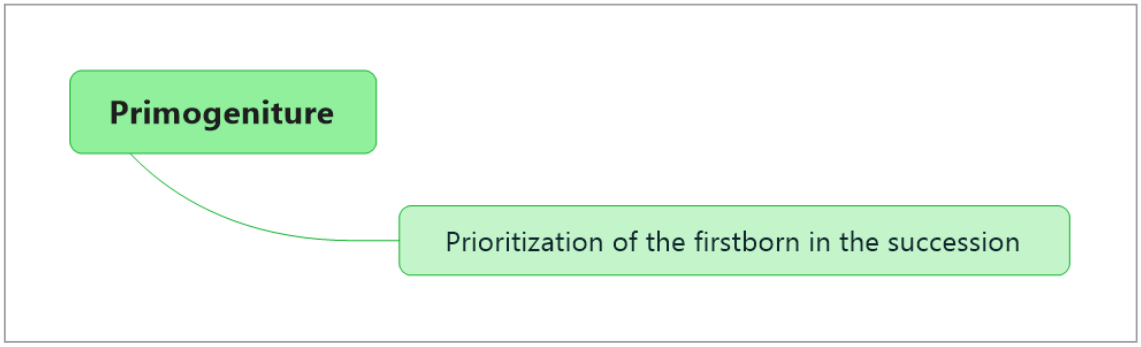
The temporal definition is automatically associated with the deadline projected by the manager for the execution of the set of activities related to the achievement of the dynamics,

such as the definition of the candidate pool, selection criteria, rules, and guidelines for future training the successor (Michel & Kammerlander, 2015). The definition of a communication plan to align stakeholders is also an activity that requires prioritization, timing, and relational strategy.

The last factor associated with Construct 2 is related to Primogeniture. It includes only one variable entitled Prioritization of the firstborn in succession. It refers to the rural producer's inclination to choose his oldest son as the successor, regardless of other variables such as competence. Figure 15 presents the factor breakdown.

Figure 15

Unfolding of the Factor Primogeniture



Source: Prepared by the author

The studies by Mishra, El-Osta, and Shaik (2010) report that the oldest child's age is one of the significant aspects in the intra-family successor choice. This question can achieve direct association with business success (Calabrò, Minichilli, Amore & Brogi, 2018).

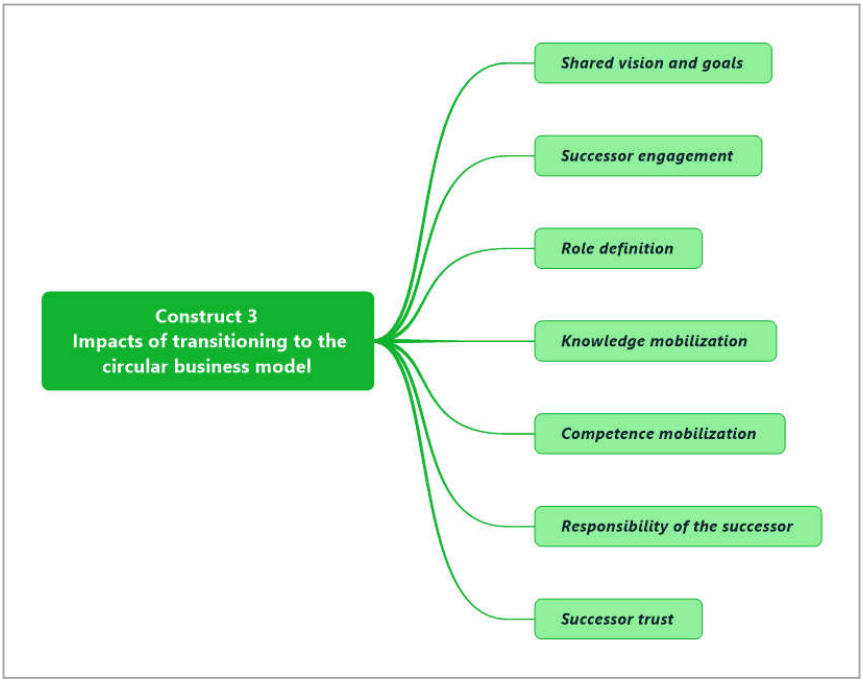
Therefore, investigating the positioning of this factor in the succession dynamics is relevant and can reveal cultural aspects of the families controlling rural businesses. The Italian experience is a practical example. The country's legislation allows the distribution of property among heirs; however, the absence of the main manager in the business control is typically filled by the first-born (Calabrò, Minichilli, Amore & Brogi, 2018).

2.2.3 Construct 3 - Impacts Arising from the Transition to the Circular Business Model

Construct 3 was proposed, structured according to Figure 16 to identify the impacts caused by the transition to the circular business model in the family succession dynamics.

Figure 16

Mind Map for Construct 3 - Impacts of the Transition to the Circular Business Model



Source: Prepared by the author

Construct 3 was designed considering a single factor and seven variables. All of them refer to conditions of family dynamics after the beginning of the business model transition.

The first variable refers to the active participation of the successor(s) in building the new vision of the rural business after the beginning of the transition to a circular business model. The beliefs of family members affect the performance of the business and even its continuity (Ghee, Ibrahim & Abdul-Halim, 2015). The main manager has a dominant position at this moment, and verifying the successors' participation in defining the vision and strategic business goals helps in the perception of relational development. The collective construction of the strategic elements embodies the pride and the very identity of the family (Gudmunson & Danes, 2013).

For Williams Jr, Pieper, Kellermanns & Astracham (2018), organizational identity theory can assist business stability and succession dynamics. The same authors report that it can be found in the literature that family businesses aligned around organizational identity are less prone to the need for boards of directors.

The variable Successor(s) Engagement is associated with work activities after the business model transition begins. A family business is considered to embody pride and identity (Gudmunson & Danes, 2013). The successor's identification with the proposed work can be visualized through the engagement degree.

According to Massis, Frattini, Majocchi, and Piscitello (2018), roles in family businesses require a strong understanding since they can influence behavioral propensities. Considering this logic, selecting the variable Redistribution of Roles to Manager and Successor after the Beginning of the Transition to a Circular Business Model seeks to identify aspects related to the new view on activities in families that control ventures in the business model transition. It can be associated with the re-signification of the successor(s) regarding the company, the impossibility of taking on new challenges demanded of the main manager, and an increase in the experiential experience of the candidate(s) in conducting business-related issues.

Every strategic business change implies the acquisition of new knowledge and skills. In the transition to circular business models, this premise is even more reinforced. This condition occurs due to the demand for multidisciplinary approaches, especially in areas related to the natural sciences (Consenza, De Andrade, and De Assunção, 2020). Thus, the variables New Knowledge Mobilization by the Successor(s) and New Skills Mobilization by the Successor(s) after the beginning of the transition to a circular business model were listed.

For Ghee, Ibrahim, and Abdul-Halim (2015), market dynamics require knowledge mobilization beyond that acquired in formal education. The transition to a business model challenges managers and successors – regardless of degree and area of training – to undertake movement toward this new direction. Another relevant aspect is that knowledge mobilized for business activities before the model transition will have diminished importance when facing new strategies and market demands (Chung & Luo, 2013). The intensity of knowledge and skills mobilization can show the willingness to adapt to the market connected to the CE.

One of the fears of rural business managers is related to losses resulting from the successors' actions. Besides the expectation related to the business performance, parents transfer wealth to their children so that there is a counterpart of the workforce – whether at an operational, tactical, or strategic level – and even to ensure retirement conditions (Mishra, El-

Osta, & Shaik, 2010). Thus, the perception regarding the successor's responsibility and increased trust in his/her performance complies with the relevant elements in the succession dynamics. Therefore, the variables Perception of Increased Responsibility of the Successor(s) and Manager's Trust in the Successor(s) after the beginning of the transition to a circular business model are justified as components of Construct 3.

2.3 THEORETICAL MODELING OF THE RESEARCH

The bibliographical reference and constructs systematization allowed the consolidation of the research's theoretical modeling. Table 3 shows how these elements are related and the hypotheses to be verified.

Table 3

Theoretical Modeling of the Research

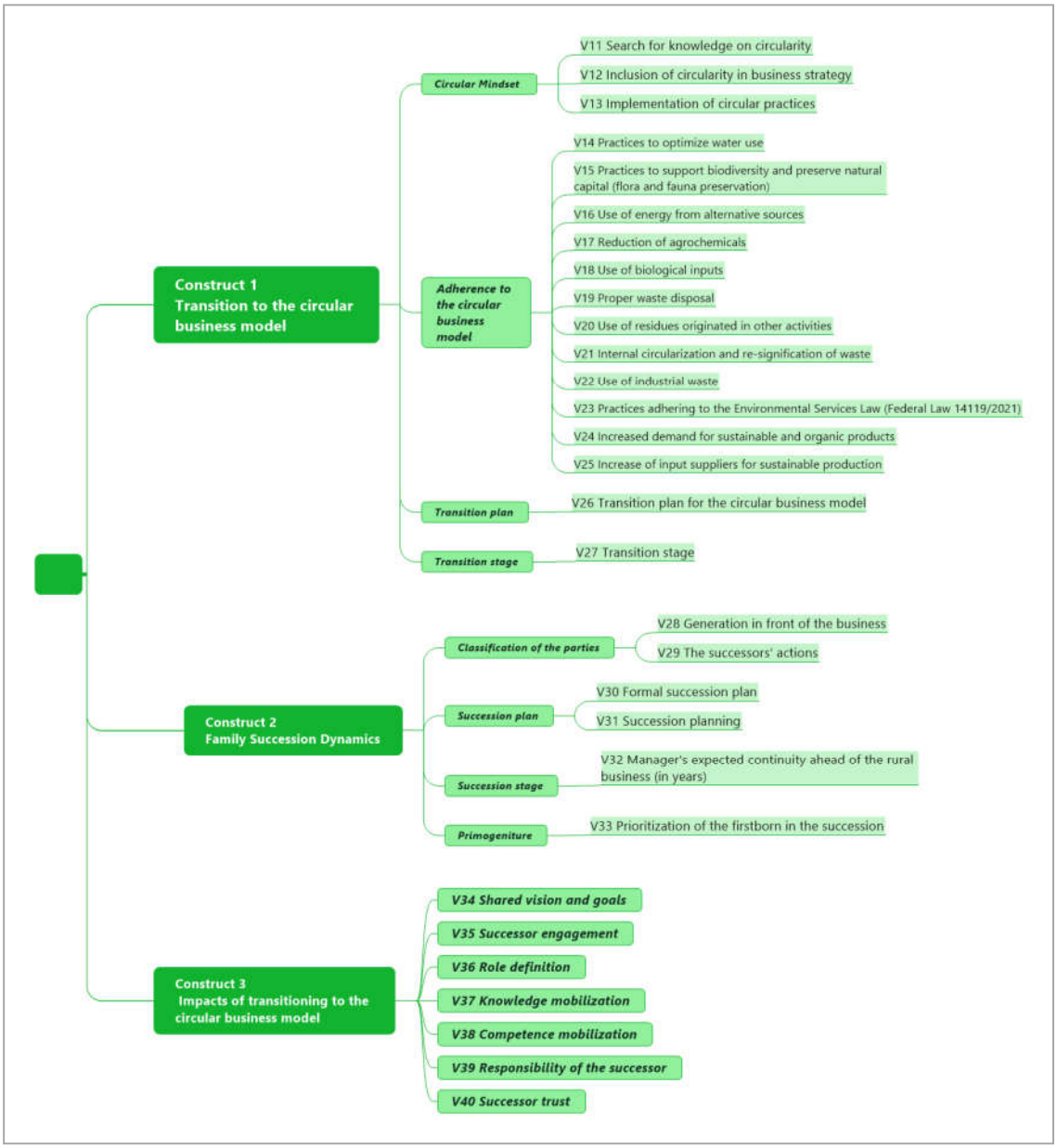
Construct	Hypothesis	Bibliographic Referential
1 – Transition to the circular business model	H1 - The inclusion of circularity in the strategy of rural enterprises is positively related to the transition to a Circular Economy	Ferreira, da Silva, and Ferreira, (2017); Lett, (2014); Barnabè and Nazir, (2020); Cramer, (2020); Cosenza, De Andrade, and De Assunção, (2020); Vargas-Sánchez, (2019); Sehnem, Vazquez-Brust, Pereira, and Campos, (2019); Silva, Shibao, Kruglianskas, Barbieri, and Sinisgalli, (2019); Cechin and Veiga, (2010); Carballada (2020); Silva, Shibao, Kruglianskas, Barbieri, and Sinisgalli, (2019); Yazan, Cafagna, Fraccascia, Mes, Pontrandolfo, and Zijm, (2018); Sehnem, Campos, Julkovski, and Cazella, (2019); Lifset and Graedel, (2002).
2 – Dynamics of Family Succession	H2 - There is a negative relationship between the manager's expectation of continuity in business and succession planning in rural enterprises	De Massis, Frattini, Majocchi, and Piscitello, (2018); Michel and Kammerlander, (2015); Cardona and Balvín, (2014); Mishra, El-Osta, and Shaik, (2010); Taylor, Norris and Howard, (1998); Calabrò, Minichilli, Amore, and Brogi, (2018).
3 – Impacts arising from the transition to the circular business model	H3 - The impacts that enhance the dynamics of family succession in rural enterprises are positively related to the transition to a circular business model	Ghee, Ibrahim, and Abdul-Halim, (2015); Gudmunson and Danes, (2013); Pieper, Kellermanns, and Astracham, (2018); Consenza, De Andrade, and De Assunção, (2020); Chung and Luo, (2013); De Massis, Frattini, Majocchi, and Piscitello, (2018); Mishra, El-Osta, and Shaik, (2010).

Note: Prepared by the author

Figure 17 presents the mind map with all the proposed constructs and their respective breakdowns into factors and variables.

Figure 17

Proposed Constructs with Respective Factors and Variables



Source: Prepared by the author

The proposition of the constructs and variables was carried out considering the theoretical framework systematized from the bibliographic portfolio on Circular Economy and Family Succession in Rural Businesses.

Applying empirical research will allow obtaining analysis data to validate the constructs and factors.

Chapter three will present the selected methodological procedures.

3 METHODOLOGICAL PROCEDURES

This chapter presents the methodological procedures adopted for building this dissertation, highlights the classification of the research, and describes the contributions of each step to the achievement of the goals previously set.

3.1 RESEARCH CLASSIFICATION

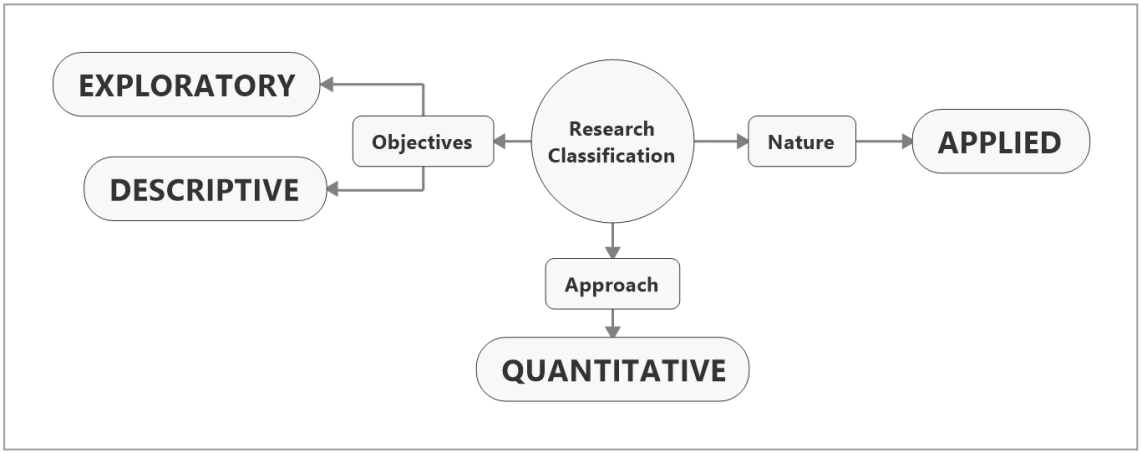
This work is classified as an applied study mainly due to the search for scientific knowledge directed to practical application corroborated by the involvement of local truths (Gil, 1991; Wieringa, 2014).

As for the problem's approach, the classification refers to a quantitative study (Venkatesh, Brown & Bala, 2013). The approach used to understand the theme includes a sample of rural producers who are agricultural establishments' managers and sought knowledge on the transition to a circular business model.

From the perspective of objectives, as the research includes a bibliographic survey and primary data collection, it is classified as exploratory and descriptive (Gil, 1991; Papapetrou et al., 2017). According to Gil (1991) and Wieringa (2014), technical procedures contemplate bibliographic research and survey. Figure 18 presents a mind map that synthesizes the classification.

Figure 18

Research Classification



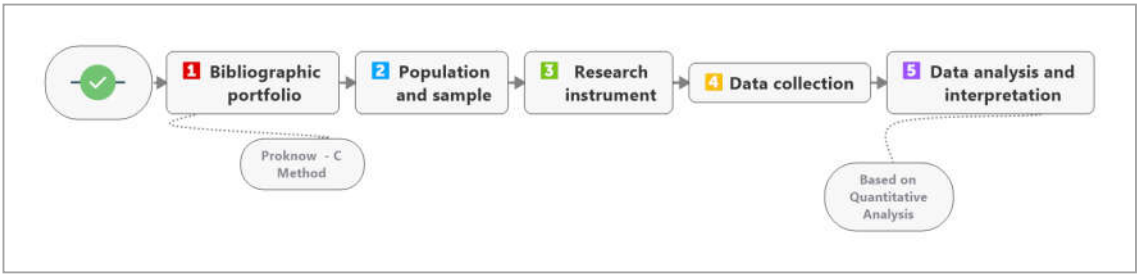
Source: Prepared by the author

3.2 RESEARCH METHOD

The flow of the methodological procedures was outlined, considering the hypothetical-deductive method in cross-sectional and longitudinal retrospective, contemplating five steps presented in Figure 19.

Figure 19

Procedure Flow



Source: Prepared by the author

3.3 BIBLIOGRAPHIC PORTFOLIO

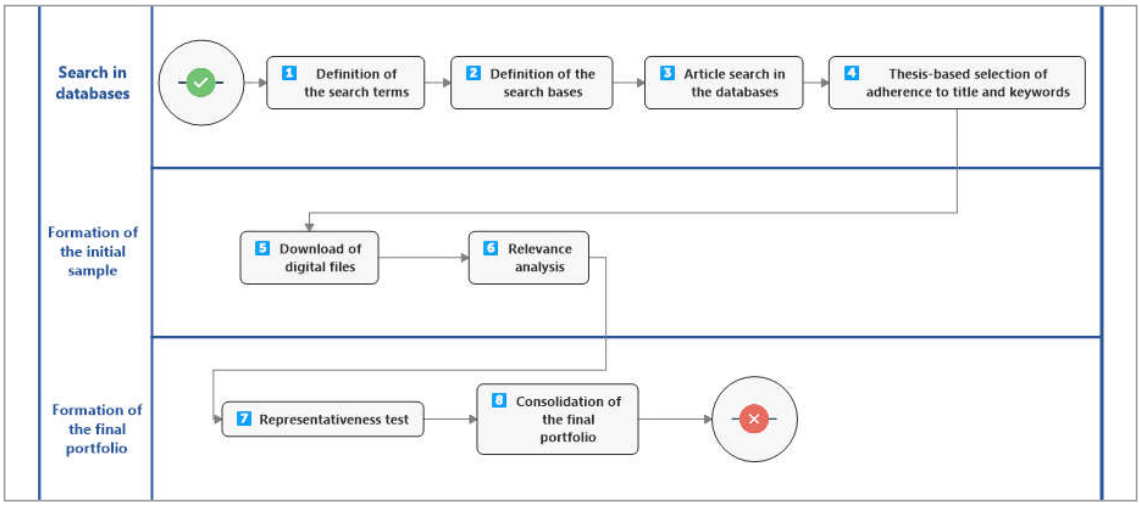
For constructing the theoretical framework, a bibliographic search was conducted to consolidate a portfolio capable of conferring scientific rigor to the research and guiding the construction of the analysis categories. According to Easterby, Smith, Thorpe, and Jackson (2015), systematic reviews are key mechanisms to promote knowledge diversity in a given domain.

To consolidate the bibliographic portfolio, bibliographic reviews inherent to two research axes – Circular Economy and Family Succession in Rural Businesses – were carried out. The construction of the operational flow for consolidating the portfolio was based on the steps proposed by the Knowledge Development Process – Constructivist (Proknow - C) methodology due to the adherence to the determined scope (Eduardo Tasca et al., 2010; Afonso, Souza, Ensslin & Ensslin, 2011; Vilela, 2012).

Figure 20 shows a graphical representation of the formulated operational flow.

Figure 20

Construction Processes of the Bibliographical Portfolio



Source: Prepared by the author

The search terms for the CE axis were: "Economia Circular" and "Circular Economy." The terms selected for the Family Succession in Rural Business axis were: "sucessão familiar" and "family succession." It was decided to select terms that would allow many returns.

The article banks or research bases selected for the searches were: a) Web of Science; b) Scopus; c) Emerald Insight; and d) Wiley Online Library.

The searches in the databases took place between 03/21/2021 and 05/16/2021. The results obtained contemplated 349 articles related to the Circular Economy axis and 198 related to Family Succession. These returns were based on articles with search terms in the following fields: title, keywords, and abstract.

Given the returns obtained, it was possible to start the adherence test of titles and keywords to the research theme. Thus, the gross sample of the portfolio was generated, resulting in the download of 55 articles on Circular Economy and 54 on Family Succession, totaling 109 publications.

Based on Afonso, Souza, Ensslin, & Ensslin (2011), the following variables were considered for the relevance analysis: a) number of citations; b) year of publication; c) abstract reading.

The number of citations shows the article's scientific relevance. The year of publication allows confirming the theme's timeliness. Finally, the abstract analysis highlights

the connection points between the selected articles and the intended research (Afonso et al., 2011). After conducting this process, the sample was consolidated with 65 articles, 47 of which were inherent to the thematic axis Circular Economy and 18 to Family Succession.

3.4 CONSTITUTIVE AND OPERATIONAL DEFINITION

In order to reach the objectives and obtain qualified answers to the research question, analytical categories were built based on the theme, thus allowing the proposition of constructs capable of guiding the empirical research.

According to Kerlinger (1980), the scientific conceptual definition of the variable or model based on the theoretical foundation comprises the Constitutive Definition (CD), and the empirical analysis procedure is understood as the Operational Definition (OD). Observing this orientation, in the sequence, the constitutive and operational definitions of the following analysis categories are presented:

a) Transition to the circular business model

b) Family Succession Dynamics

c) Impacts arising from the transition to the circular business model

These definitions were based on the consolidation of the methodological alignment of the research. Table 4 enables this visualization.

Table 4

Methodological Alignment of the Research

GENERAL OBJECTIVE	SPECIFIC OBJECTIVES	CATEGORIES OF ANALYSIS	AUTHORS	RESEARCH HYPOTHESES	QUESTIONS APPENDIX A
To investigate the impacts caused by the transition to circular business models on the family succession dynamics of rural enterprises.	Characterize circular business models and elements of the transition.	Transition to the Circular Business Model	Ferreira, da Silva, and Ferreira, (2017); Lett, (2014); Barnabè and Nazir, (2020); Cramer, (2020); Cosenza, De Andrade, and De Assunção, (2020); Vargas-Sánchez, (2019); Sehnem, Vazquez-Brust, Pereira, and Campos, (2019); Silva, Shibao, Kruglianskas, Barbieri, and Sinisgalli, (2019); Cechin and Veiga, (2010); Carballada (2020); Silva, Shibao, Kruglianskas, Barbieri, and Sinisgalli, (2019); Yazan, Cafagna, Fraccascia, Mes, Pontrandolfo, and Zijm, (2018); Sehnem, Campos, Julkovski, and Cazella, (2019); Lifset and Graedel, (2002).	H1 - The inclusion of circularity in rural enterprises' strategies is positively related to the transition to a Circular Economy	11 to 27
	Characterize the dynamics of family succession in rural enterprises.	Dynamics of Family Succession	De Massis, Frattini, Majocchi, and Piscitello, (2018); Michel and Kammerlander, (2015); Cardona and Balvín, (2014); Mishra, El-Osta, and Shaik, (2010); Taylor, Norris, and Howard, (1998); Calabrò, Minichilli, Amore, and Brogi, (2018).	H2 - There is a negative relationship between the manager's expectation of continuity in business and succession planning in rural enterprises	28 to 33
	Identify the impacts caused by the transition to the circular business model on the family succession dynamics in rural enterprises.	Impacts arising from the transition to the circular business model	Ghee, Ibrahim, & Abdul-Halim, (2015); Gudmunson and Danes, (2013); Pieper, Kellermanns, and Astracham, (2018); Consenza, De Andrade, and De Assunção, (2020); Chung and Luo, (2013); De Massis, Frattini, Majocchi, and Piscitello, (2018); Mishra, El-Osta, and Shaik, (2010).	H3 - Impacts that enhance the dynamics of family succession in rural enterprises are positively related to the transition to a circular business model	34 to 40

Note: Prepared by the author

Based on the bibliographical reference, the categories of analysis were defined, which also represented the three conceptual constructs used to congregate factors and variables. Before the empirical research was applied and submitted to validation through quantitative analysis, this was an initial proposition.

3.5 POPULATION AND SAMPLE

The set of target elements of the study that can be observed and are related to the features to be surveyed was considered to determine the population (Barbetta, 2008). In this sense, agricultural establishments represented in five editions of the course "Biological Dynamics and Plant Nutrition," held between 09/19/2019 and 01/21/2021, were selected. These editions had 201 participants representing 136 different agricultural establishments.

This course was developed to raise awareness and provide basic guidelines for transitioning from conventional to circular rural business models. This training had the following guiding proposals: soil recovery, remineralization based on local geology, use of microorganisms, implementation of biofactories, internal manufacturing of biofertilizers and composts, integration of agriculture and livestock, use of residues, and reduction or elimination of agrochemicals.

These are useful guidelines for certified organic production and, simultaneously, contemplate rural properties that commercialize their products in conventional markets. This situation implies an impact related to sustainability. However, due to the non-mandatory nature of the certification protocol, it enables partial adherence and allows positioning in different points of the environmental gradient – from the total elimination of agrochemicals, in compliance with the organic production legislation, to the substitution of some products, aiming at reducing production costs.

Table 5 shows the number of enrolled students per class for this course.

Table 5

Participants by Edition of the Biological Dynamics and Plant Nutrition Course

Edition	1	2	3	4	5
	19/09/2019	18/02/2020	12/08/2020	20/10/2020	21/01/2021
Participants per edition	31	41	41	35	53
Total Participants	201				

Note: Prepared by the author

The course participants are domiciled in eight Brazilian states and in Paraguay.

Table 6 presents the distribution of participants by domicile.

Table 6

Participants' Distribution of the Biological Dynamics and Plant Nutrition Course by Household

State	Participants
Paraná	132
Mato Grosso do Sul	17
São Paulo	12
Minas Gerais	5
Rio Grande do Sul	4
Bahia	3
Santa Catarina	2
Goiás	2
Brazil	**177**
Paraguay	**24**
Total	**201**

Note: Prepared by the author using the company's database that manages the events

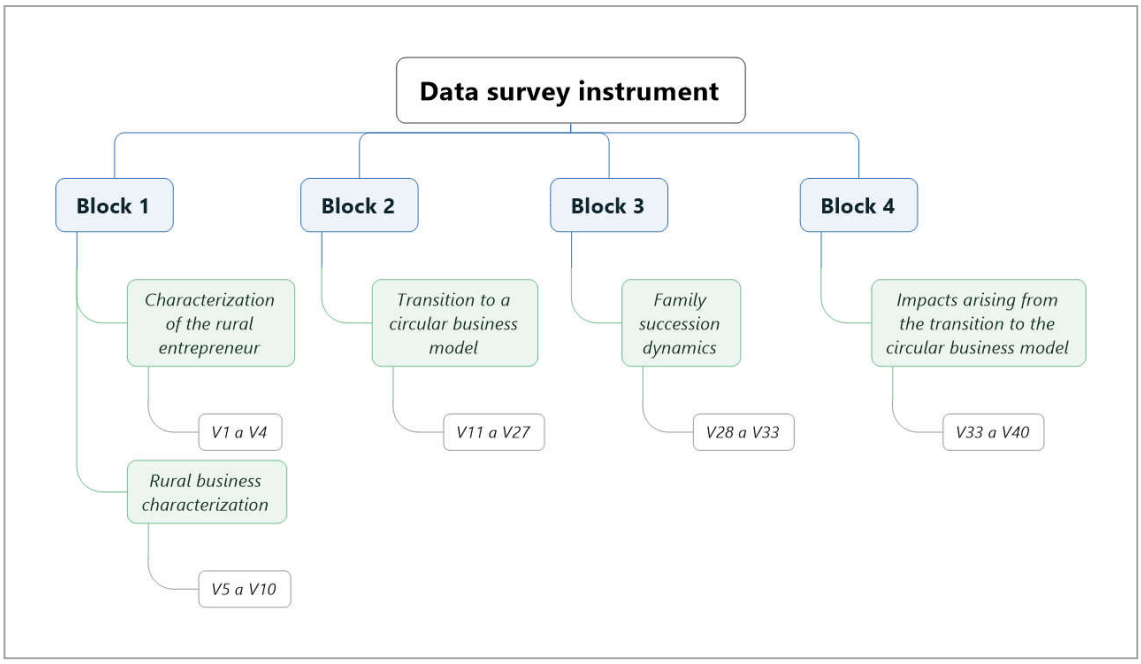
From the 201 participants, 136 rural producers were selected to send the data survey instruments. The exclusion criterion considered technicians who did not own rural areas, family members of the same business, and participants of more than one edition of the course. The survey instrument was sent to 136 managers, and 30 responded to the survey.

3.6 DATA COLLECTION TOOL

For the quantitative research, the questionnaire was used – a key tool for the technical procedure called "survey", which was composed of four blocks, as shown in Figure 21.

Figure 21

Mind Map Representing the Structure of the Data Collection Instrument



Source: Prepared by the author

The first block was prepared with questions about the basic characterization of the rural entrepreneur and rural business. The questions were designed to keep respondents' identities confidential. Blocks two, three, and four correspond to questions organized according to the three proposed constructs. Table 4 presents the bibliographical basis used to formulate the questions. Appendix A presents the instrument used in the research in its entirety.

The Likert Scale of Attitudes was used for the questions in blocks 2 to 4. According to Feijó, Vicente, and Petri (2020), this is a widely used scale - especially in questions of preferences, tastes, and perceptions. It was developed in 1932 and is one of the best-known models worldwide for measuring preferences and perspectives. Dalmoro and Vieira (2013) point out five points that are required for classifying the scale as Likert. Otherwise, it will represent a "Likert-type" rating scale. Thus, the formulation of the data survey instrument considered this premise when structuring the questions and the data entry format.

3.7 DATA COLLECTION

Initially, the pilot stage was performed by applying the instrument to three respondents. Next, aspects related to the relevance of the questions, response time, and necessary adjustments were analyzed. The pilot test showed the need to adjust the data entry dynamics to reduce the respondent's navigation time. There was no need to adjust the elaborated questions. The three surveys conducted in the pilot stage integrated the database for this study. The survey application included the use of the Google Forms tool.

In the initial part of the instrument, a cover letter was introduced with information about the research, highlighting the guarantee of non-disclosure of individual data collected. The reception of the answered instruments occurred from 07/27/2021 to 10/20/2021.

3.8 ANALYSIS TECHNIQUES EMPLOYED

Univariate techniques were initially employed for data analysis (da Silva, Lopes, & Braga Junior, 2014). The use of descriptive statistics aimed to evaluate trends and data quality, especially using the median and mean mode (da Silva, Lopes, & Braga Junior, 2014).

Frequency counting and percentages were also used aiming at aggregation and summarization (da Silva, Lopes & Braga Junior, 2014). MS Excel spreadsheets were used for better graphic representation, where charts, graphs, and tables were produced. Furthermore, in the first stage, the data obtained were submitted to statistical standardization and combined to form three scores (Mendonça, 2017).

The second stage of the analysis aimed to verify the validity of the theoretical constructs proposed based on the bibliographic portfolio that guided the structuring of the data survey instrument. In this phase, Cronbach's Alpha coefficient and Factor Analysis were used.

Da Hora et al. (2010) defined Cronbach's Alpha coefficient as a way to estimate the reliability of a questionnaire applied in some medium. Thus, this coefficient measures the correlation between respondents' responses through profile analysis of these answers, i.e., an average correlation between questions. α is calculated through the variance of individual items, considering the same scale for the questionnaire items, as well as the variance obtained from the sum of the items, as follows:

$$\alpha = \left(\frac{k}{k-1}\right)\left(1 - \frac{\sum_{i=1}^{k} S_i^2}{S_t^2}\right).$$

In this formula, k represents the number of questionnaire items, refers to the variance of each item, and will be the total variance of the questionnaire, i.e., the sum of all variances. In the context of the Exploratory Factor Analysis and according to Hair J. F. (2009), this coefficient aims to verify the internal consistency of the data, i.e., to check whether the data and the variable scales produce consistent results on the relationship between them. Cronbach's Alpha coefficient varies basically in the range between 0 and 1, so that the closer to 1, the better the internal consistency of the data. When it is closer to zero, this consistency is worse. In the literature, acceptable values above 0.6 are recommended for the alpha coefficient.

According to Fávero and Belfiore (2017), Factor Analysis is a statistical method used to describe the variability between observed and possibly correlated variables. In addition, it aims to establish new variables that capture the collective behavior of the original ones. They are called "factor" to understand each factor as a grouping of the original variables. Among the methods that can be used to determine factors, the main components method, which is the most widely used in practice, stands out. It is worth noting that the Exploratory Factor Analysis (EFA) will be addressed, aiming to reduce the size of the data by creating factors from the original variables and analyzing the condition of the constructs and factors initially proposed for the research.

The variables must be quantitative and measured on an interval or ratio scale in this type of analysis. This assumption is critical because the analysis must be performed with quantitative variables, and some studies are often conducted using ordinal variables. To perform EFA, one must follow a few steps and predict the existence of a correlation between the variables. Initially, the correlation matrix (ρ) was calculated between the k original variables in the database. For the analysis to be adequate, the variables must be correlated,

and it is also expected that the variables highly correlated with each other also correlate with the same factors.

Moreover, if the sample is relatively large ($n \geq 50$) the correlation matrix can be obtained via Pearson's correlation coefficient. If $n < 50$, Spearman's correlation coefficient can be used. Visual inspection of the correlation matrix does not reveal whether the factors will be properly extracted; however, according to Hair et al. (2009), a substantial amount of values lower than 0.30 indicates that Factor Analysis may be inappropriate.

Bartlett Test of Sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sample adequacy can be applied to test the appropriateness of the factor model. The KMO statistic compares the magnitudes of the observed correlation coefficients with the magnitudes of the partial correlation coefficients, with the following hypotheses to be tested:

$$\begin{cases} H_0: \rho = I \\ H_1: \rho \neq I \end{cases}$$

Where ρ is the population correlation matrix while I is the identity matrix. It can be calculated as follows:

$$KMO = \frac{\sum_{l=1}^{k} \sum_{c=1}^{k} \rho_{lc}^2}{\sum_{l=1}^{k} \sum_{c=1}^{k} \rho_{lc}^2 + \sum_{l=1}^{k} \sum_{c=1}^{k} \varphi_{lc}^2}$$

Where:

- L and c represent the rows and columns of the correlation matrix ρ, respectively.
- Φ represents the partial correlation coefficients.

This statistic ranges from 0 to 1; thus, the closer the statistic is to 1, the better suited the data are for a Factor Analysis. Meanwhile, small KMO values indicate that the correlations between pairs of variables cannot be explained by other variables - indicating that the analysis is inappropriate.

As highlighted previously, significant correlations between variables are required for applying the Factor Analysis. In this context, it is necessary to verify whether there is a statistically significant correlation between the variables; Bartlett's Test of Sphericity is applied for this. This test is used to examine the hypothesis that the variables are uncorrelated in the population; that is, the population correlation matrix is an identity matrix, where each

variable correlates perfectly with itself (ρ = 1), but shows no correlation with the other variables (ρ = 0). The statistic of this test is given by:

$$\chi^2_{Bartlett} = -\left[(n-1) - \left(\frac{2k+5}{6}\right)\right].\ln(|\rho|).$$

Where:

N is the sample size;

K is the number of original variables;

|ρ| is the determinant of the correlation matrix.

Furthermore, the statistic $\chi^2_{Bartlett}$ follows a χ^2 distribution with k (k - 1) /2 degrees of freedom.

After performing all these steps, the number of factors can be set. Several processes are suggested in the literature: a priori determination, observation of eigenvalues, and graphical representation (scree plot), among others. For the a priori determination, the researcher decides how many factors to use. By the eigenvalue, as it represents the amount of variance associated with the factor, only those with variance greater than 1 are included. The Scree plot is a graphic representation of the eigenvalues associated with the number of factors in the extraction order. The point where the slope smoothens indicates the number of factors to be used, which is generally higher than revealed by the eigenvalues.

After determining the number of factors to consider in the analysis, it is necessary to estimate the factorial loads inherent to each factor and each variable studied. For this estimation, some methods are used, including Maximum Likelihood, which requires the assumption of normality of the data, and the more usual Principal Components (PC). The latter is based on the Principal Component Analysis (PCA) and has no assumption of normality of the data under study.

In the CP method to estimate the loadings, orthogonal rotation is used to improve the interpretation of the factors obtained for easily identifying the variables that will compose each factor. In the EFA, one of the most used rotations is the Varimax, where, according to Fávero and Belfiore (2017), the intention is to maximize the correlations of each variable with the determined factors and, thus, favor the identification of the composition of the factors, since each variable will be highly correlated with only one factor. These factors remain uncorrelated, and the commonalities and specificities of the variables are preserved; that is, the variability percentage of the variables explained by the model and the random will be

maintained, respectively. It is worth noting that the higher the communality, the better the model to explain the variability of the variable and fit the data.

The correlation analysis was performed between variables in the third and last analysis step. Given that they are on a Likert scale – ordinal variables – Spearman's non-parametric coefficient was used by Restrepo and Gonzáles (2007). For Silva, Lopes, and Braga Junior (2014), bivariate tests or inferential statistics are a set of tests for assessing differences between data groups.

The software R (version 4.1.1) was used in the last two stages. After data processing, the main results were systematized, followed by final discussions and final work considerations.

4 ANALYSIS AND DISCUSSION OF RESULTS

This chapter presents the analysis of the results obtained through the survey conducted with 30 rural producers who sought new knowledge about the circular business model transition. The analysis considered three stages, starting with the exploratory, descriptive stage and then evaluating the quality of the constructs and variables through Cronbach's Alpha and Exploratory Factor Analysis. The third and last stage comprises the application of Hypothesis Tests between the variables. The discussion of the results is presented in the last section of the chapter.

4.1 STAGE 1 - DESCRIPTIVE AND EXPLORATORY ANALYSIS

4.1.1 Characterization of Managers and Rural Businesses Surveyed

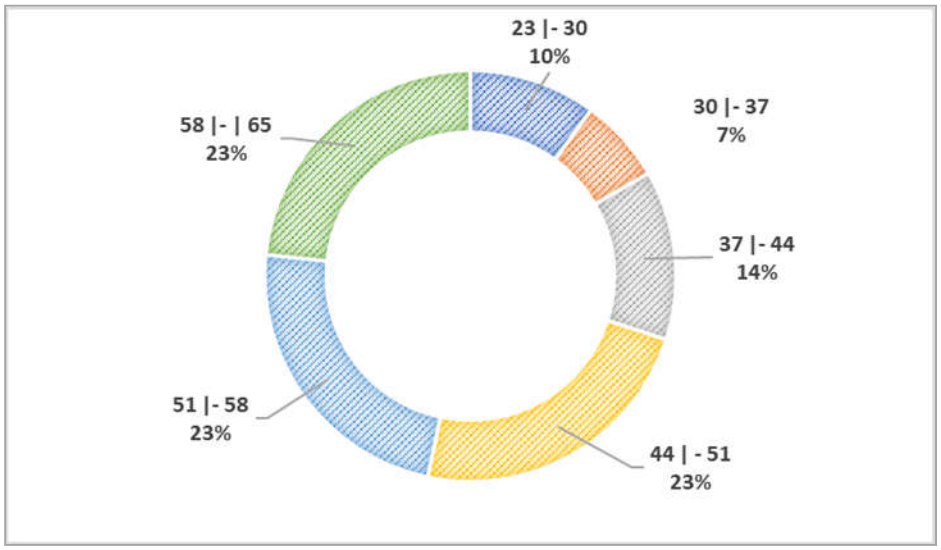
The survey was applied with managers of rural businesses participating in the five editions of the Biological Dynamics and Plant Nutrition course, held between 09/19/2019 and 01/21/2021. The events had 201 participants, and 136 rural businesses were represented. The data survey instrument was sent to the managers of these businesses, and only 30 returned responses.

This sample comprises 24 men and six women, and the majority (69%) are between 44 and 65 years old, and 47% live on the farm.

Figure 22 presents the distribution of the interviewed managers according to age.

Figure 22

Distribution of the Rural Managers Surveyed by Age



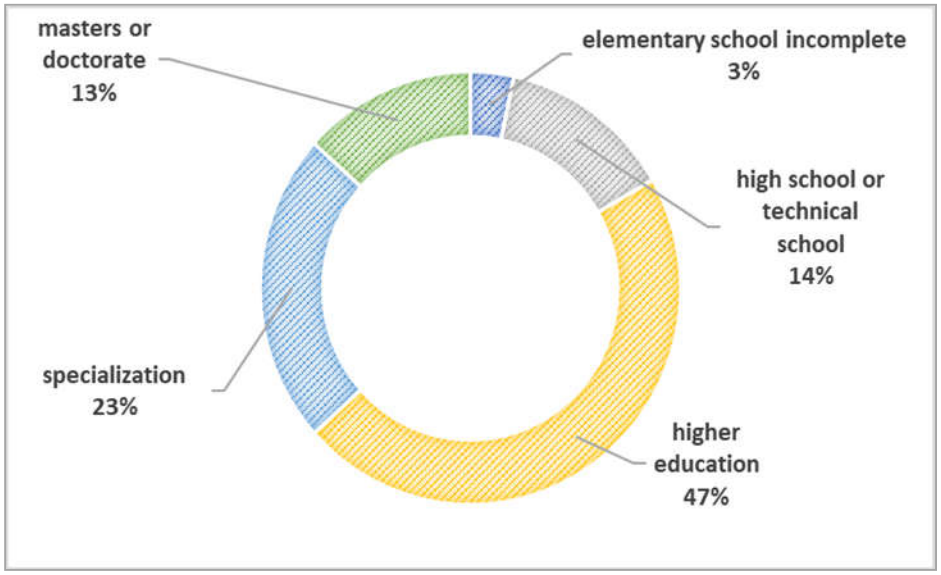
Source: Prepared by the author with research data (2021)

Most have higher education, and four interviewees have master's or doctorate degrees regarding academic education.

Figure 23 shows the distribution according to education.

Figure 23

Distribution of Rural Managers According to Academic Degree



Source: Prepared by the author with research data (2021)

The sample brings together seven different classifications regarding family composition, with the highest frequency seen in the one that includes the manager, spouse, and one child. Table 7 shows the complete distribution.

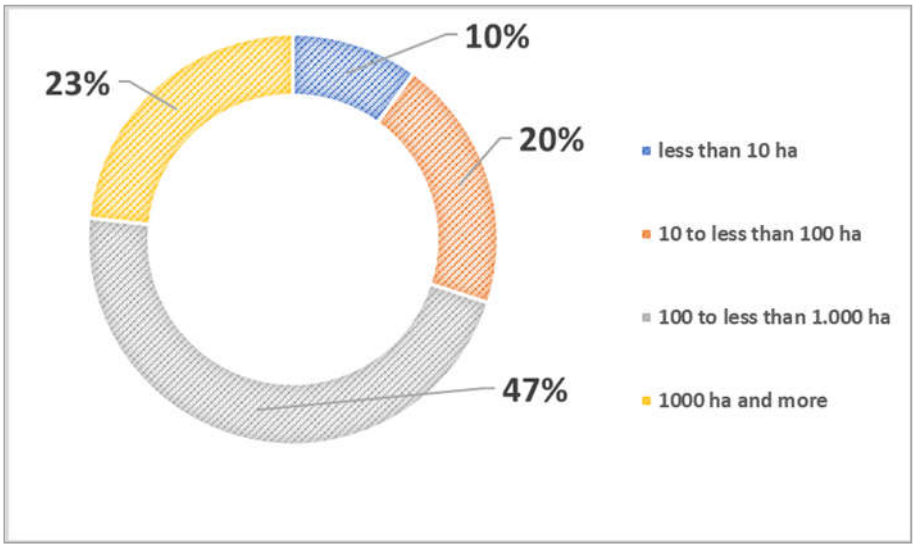
Table 7
Distribution of Rural Managers by Family Composition

	CLASS	FREQUENCY
1	Manager only	3
2	Manager and spouse	5
3	Manager, spouse, and one child	9
4	Manager, spouse, and two children	8
5	Manager, spouse, and three children	2
6	Manager and one child	2
7	Manager and two children	1
	Total	30

Note: Prepared by the author with research data (2021)

To verify the variable area used by the rural enterprises, the same classification used in the Agricultural Census carried out in 2017 was used (IBGE, 2019). It was found that three enterprises have an area of fewer than ten hectares. Most enterprises include agricultural establishments between 100 and 1000 hectares, representing 47% of the sample. Figure 24 shows the distribution of enterprises by total area in hectares, regardless of the number of properties explored.

Figure 24
Enterprises' distribution by Area



Source: Prepared by the author with research data (2021)

According to the Brazilian legislation, especially Law no. 4.504/1964 - Statute of the Land - the classification of the agricultural establishments related to the area of the rural property is conditioned to the number of fiscal modules it represents. Minifundium refers to a rural property of less than one fiscal module, small property between one and four fiscal modules, medium property between four and fifteen modules, and a large property above fifteen modules.

Law 8.629/93 states that the size of the fiscal module varies according to the municipality where the property is located. For example, for considering an agricultural establishment as a minifundium in Toledo, Paraná, it must have an area of less than 18 hectares, and in Salvador, Bahia, it must have 5 hectares (https://www.embrapa.br/codigo-florestal/area-de-reserva-legal-arl/modulo-fiscal, retrieved on November 20, 2021).

Another classification that considers the property size is the one established in Law 11.326/2006, which deals with the National Family Farming Policy. This law establishes that the rural family entrepreneur is conditioned to act in properties with areas smaller than four fiscal modules.

Most rural businesses (54%) represented in the sample comprise management of non-continuous areas. According to IBGE (2019), they conform agricultural establishments with more than one property under single management and mobilized a group of exploitation resources. The sample showed that 17% of the investigated producers exploit more than five properties to maintain their rural enterprises.

Concerning productive activity, soybean cultivation presents the highest incidence in the sample, present in 24 properties. It is followed by cereals, especially corn, with 23 frequencies, and cattle-raising in 14 properties. Soybean cultivation is also the main source of income for 17 managers surveyed, followed by cattle-raising.

These businesses are responsible for generating 296 direct jobs - an average of 9.8 - and the highest incidence in the sample (67%) is of enterprises with up to nine jobs filled by people outside the owning family.

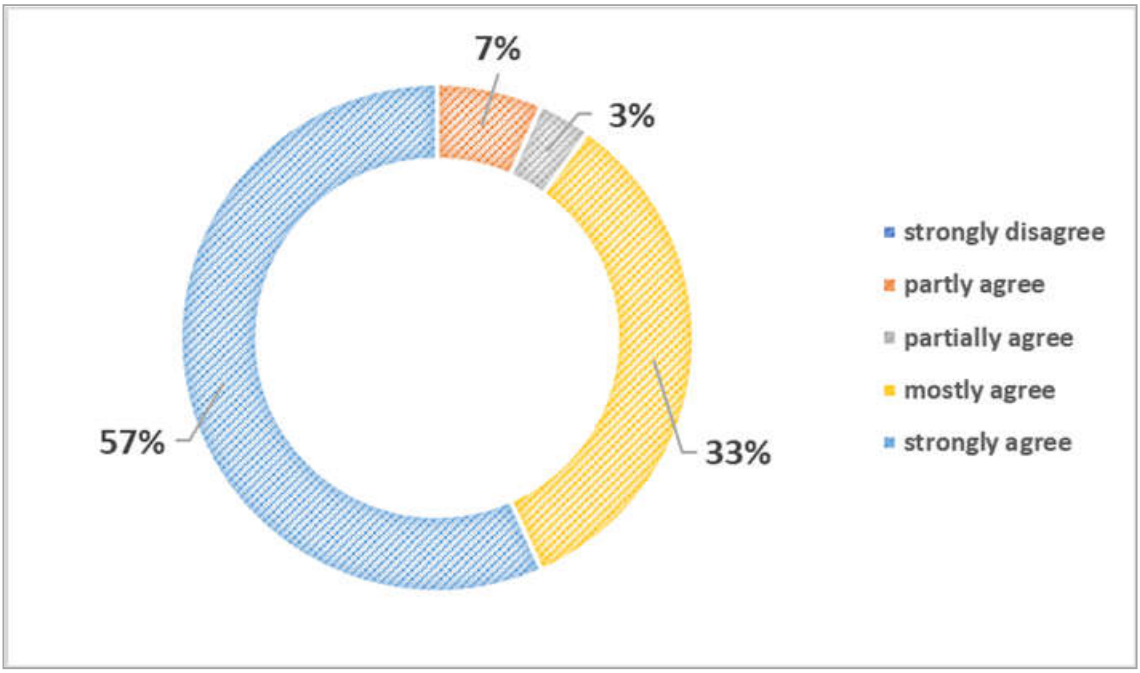
4.1.2 Transition to the Circular Business Model

This section presents the descriptive and exploratory analysis of the questions block referring to the Transition to the Circular Business Model. The layout follows the construct order and factors proposed according to the theoretical foundation.

The Circular Mindset factor gathers three variables. Considering the timeframe between 2019 and 2021, the first one concerns the search for knowledge on sustainability and circularity in the rural business because, in this period, it was evident that all managers sought information on the subject in different intensities. It was possible to verify that 57% of the respondents are strongly associated with this search. Figure 25 shows the distribution of the answers to this question.

Figure 25

Search for Knowledge on Sustainability and Circularity in Rural Businesses



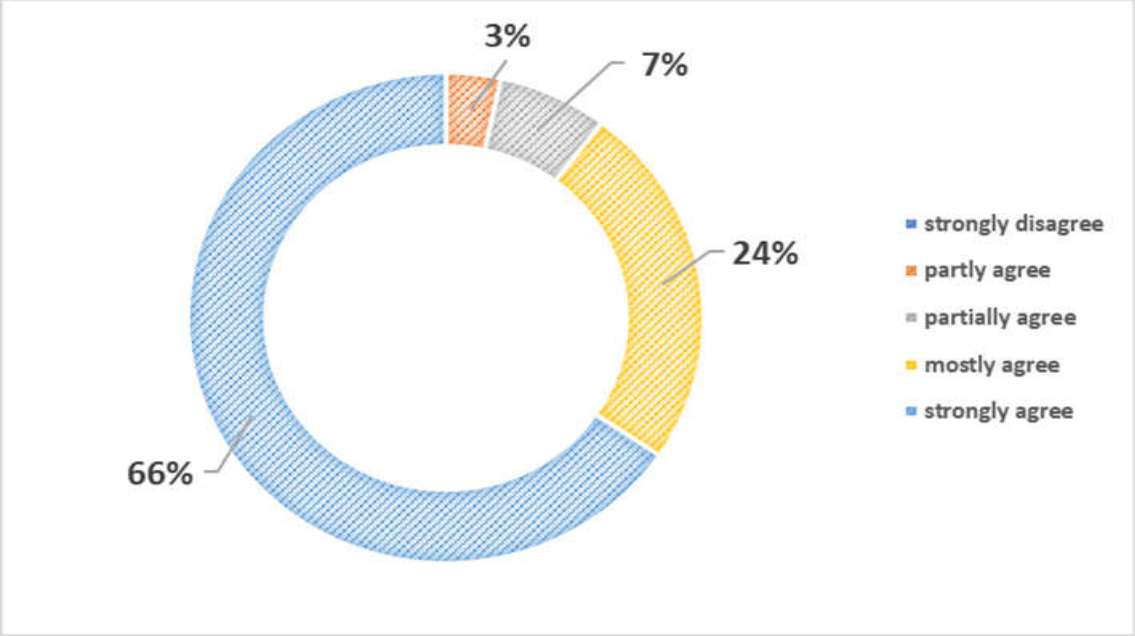
Source: Prepared by the author with research data (2021)

The survey allowed verifying that circularity appears as a strategic element in all the businesses represented. It is worth mentioning that 66% of the managers are strongly associated with circularity and sustainability in the vision and strategic goals of the enterprises they manage.

Figure 26 shows the distribution of answers regarding this question.

Figure 26

Presence of Sustainability and Circularity in the Strategic Objectives and Future Vision of the Rural Business



Source: Prepared by the author with research data (2021)

The results related to Circular Mindset found that 62% of managers strongly agreed with the statement that circular practices had been implemented in the businesses they run in the last two years. Only one respondent strongly disagreed with the statement.

The managers' perspective on implementing practices can be better investigated considering the proposed Adherence to the Circular Business Model. The research sought to raise the association of the rural businesses in the sample with ten practices, namely:

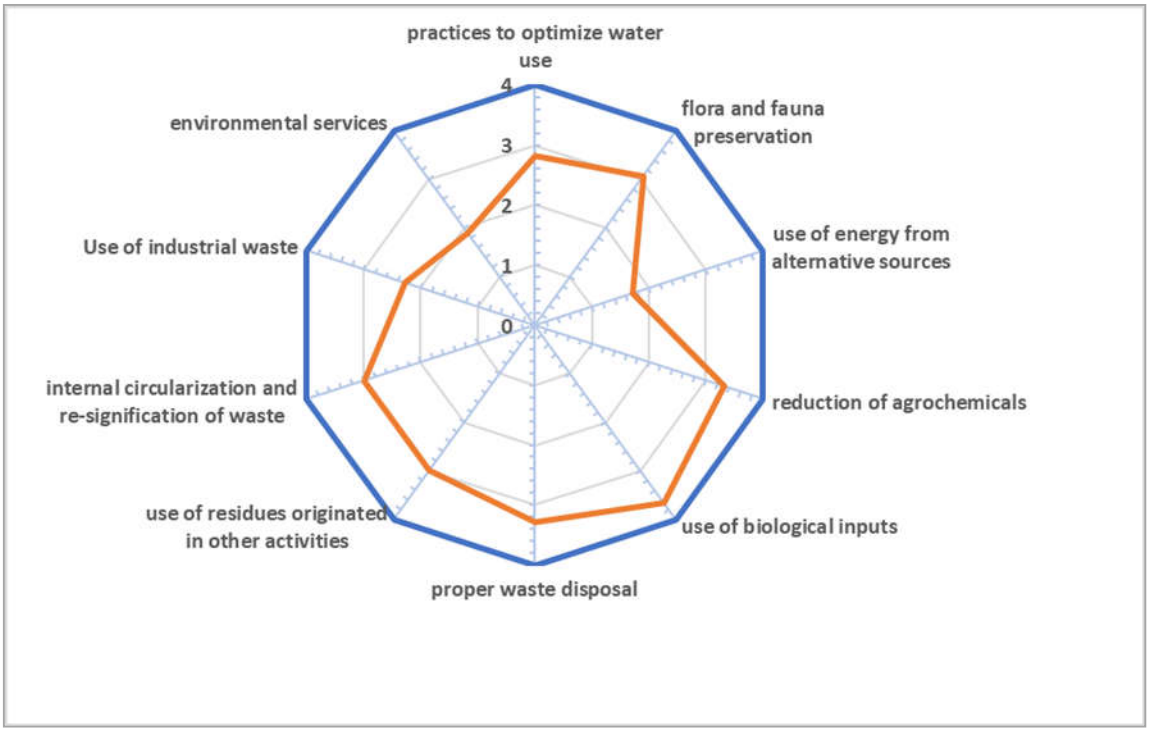
a) Water use optimization
b) Practices that help preserve the flora and fauna
c) Use of energy generated from alternative sources
d) Reduction in agrochemical use
e) Increase in the use of biological inputs
f) Proper waste destination
g) Residues acquisition from other productive activities in the production system
h) Internal circularity where residues from one activity become input for another
i) Use of residues from industries
j) Practices adherent to the federal legislation of environmental services (Federal Law 14.119/2021)

The sample average was calculated considering the ten variables to synthesize and better understand the adherence to Circular Economy practices (V14 to V23). The calculation considered a scale of zero (strongly disagree) and four (strongly agree).

Figure 27 represents the systematization of this result.

Figure 27

Adherence to Practices Inherent to the Circular Business Model



Source: Prepared by the author with research data (2021)

We can see that biological inputs present the highest incidence, followed by a reduction of agrochemicals and proper waste disposal. A lower frequency is seen in energy generated from alternative sources. It was found that, based on the answers, the surveyed farmers declared that they implemented at least three of the ten practices listed on their farms.

A result worth mentioning is associated with industrial waste consumption by 25 of the 30 respondents. It is inferred that this demonstrates the potential of rural businesses to mitigate environmental externalities – including those of other economy sectors.

Besides the observation related to the operational practices of rural businesses – promoted in the internal environment – the survey made it possible to verify the evolution of the relationship with economic agents specialized in the supply and acquisition of sustainable products. It was found that 55% of the respondents presented a greater association with the increase in the demand for products from sustainable systems or with organic certification,

and 73% presented a greater association with the increase in companies that offer commercial products for this type of production.

The Transition to Circular Business Model Construct proposition comprised two last factors inherent to the Plan and Transition Stage. Both consist of only one variable each.

The research verified that 79% of the interviewed managers are not strongly associated with the existence of structured plans for the business model transition. However, 70% responded that they are at an intermediate implementation stage or even at a more advanced stage.

Only two producers surveyed informed that they had not started the transition. However, the observation on implementing practices in these two cases presents a different situation. One of them states that he has implemented three of the ten practices listed, and the other agreed that all the practices investigated have been or are being implemented on the farm.

In contrast, four producers consider the transition to a circular business model finalized. In these cases, a discrepancy between the perception of the declared transition stage and the verification of the implemented practices was also verified since two respondents have not yet implemented practices related to environmental services and energy generation from alternative sources. This condition may demonstrate that these practices were not included in the scope of the transition plan of these rural enterprises.

4.1.3 Family Succession Dynamics

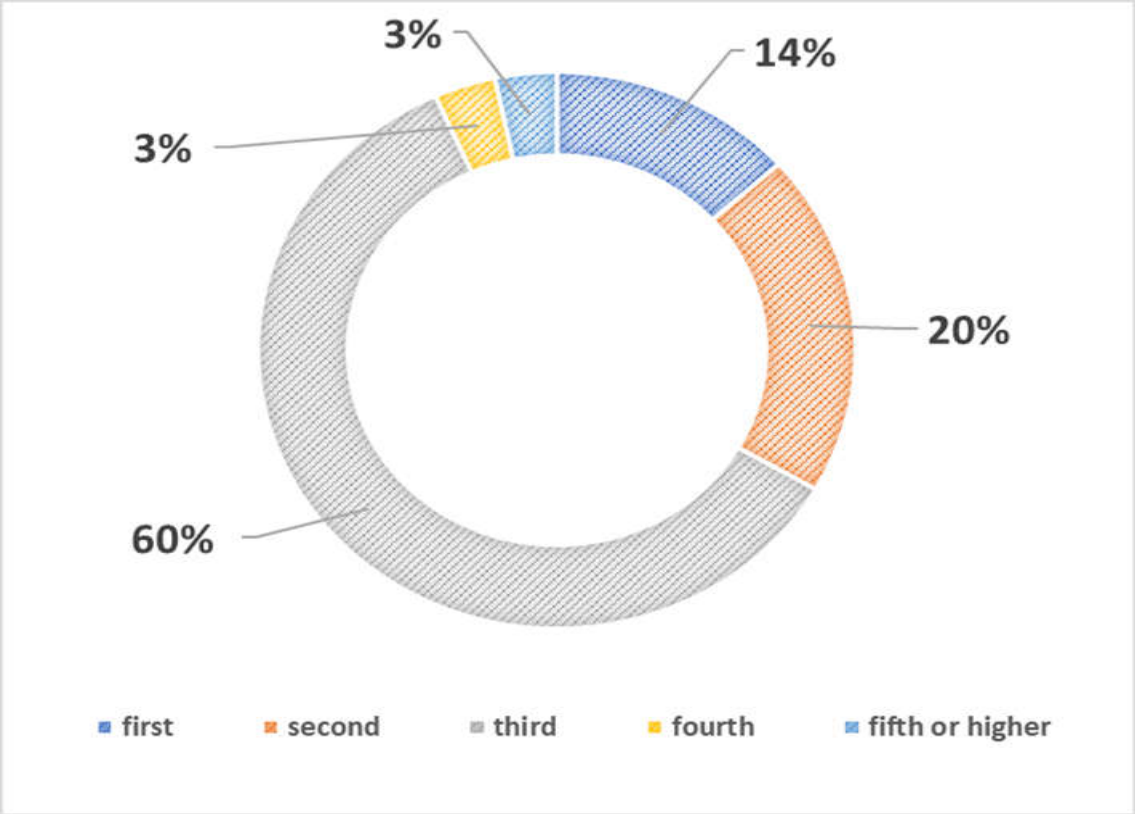
In this section, we present the descriptive and exploratory analysis of the questions of the block about family succession dynamics, following the proposal generated from the theoretical foundation. This represents a construct composed of four factors and six variables.

The first factor concerns the classification of the parties facing the succession dynamics and congregates the variables Generation before the Successor(s)' Business and Performance. It was verified that most of the 30 managers surveyed (60%) represent the third generation ahead of the rural business. Besides being successors, they witnessed their parents' assumption of the highest management positions.

Figure 28 shows the distribution of the respondents according to the generation they represent at the head of the rural business.

Figure 28

Distribution of the Managers Surveyed by Generation at the Head of the Rural Business

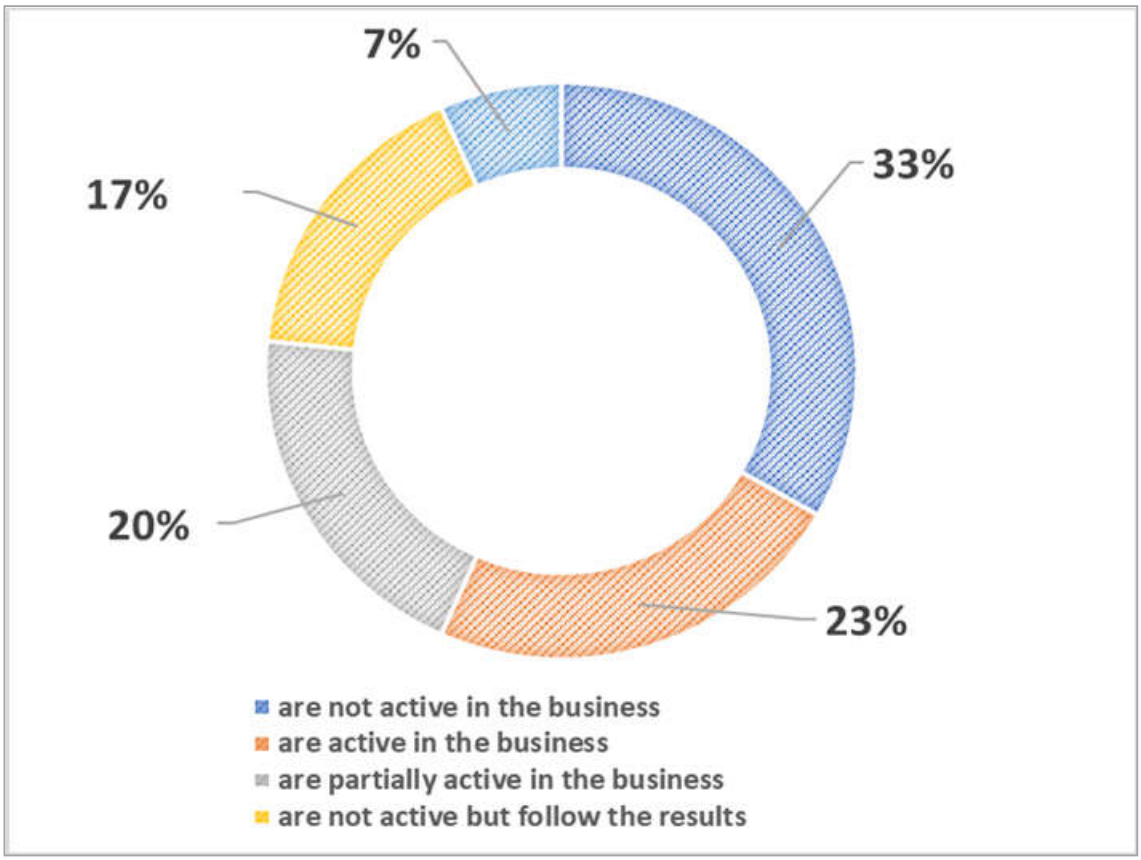


Source: Prepared by the author with research data (2021)

Regarding the successors' activities, 33% of the managers stated that they do not yet work in the business. In contrast, 23% said that their children are fully active in the business.

Figure 29 shows the complete distribution of this variable.

Figure 29
Successors' Performance in the Rural Business



Source: Prepared by the author with research data (2021)

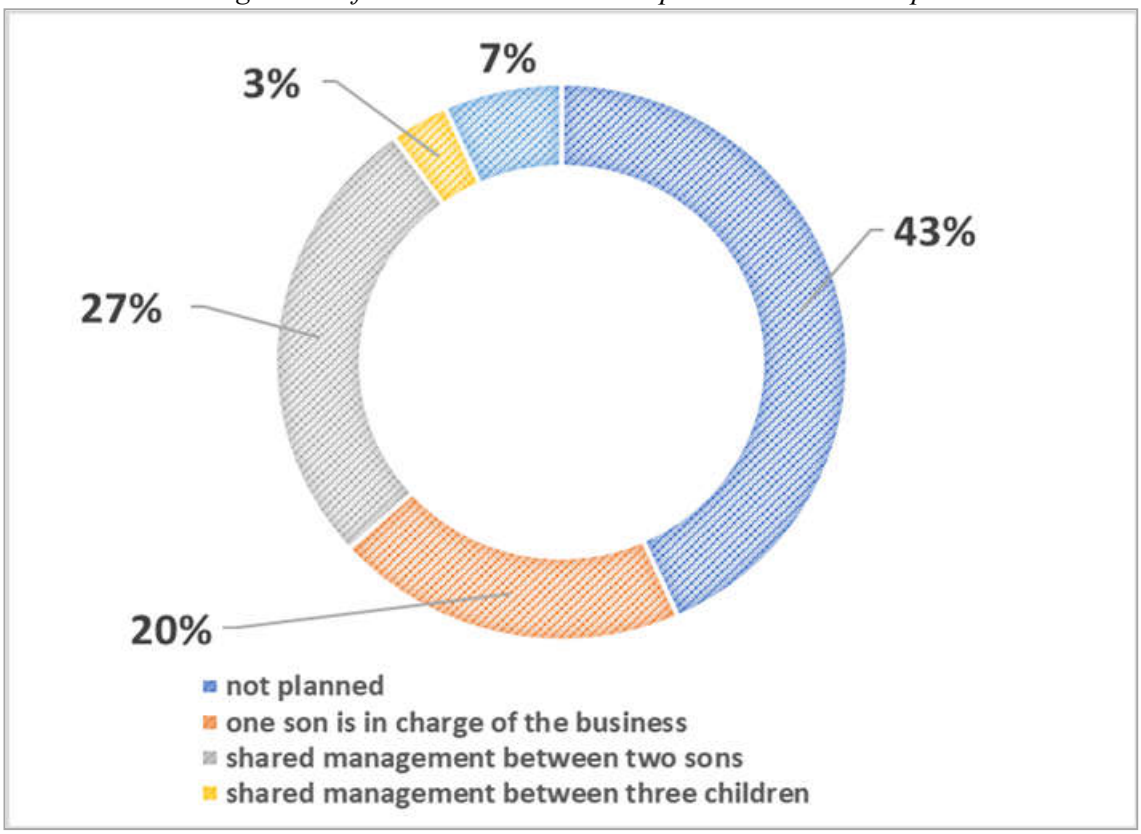
In 17% of the businesses represented in the sample, the role of the successors is limited to monitoring the results.

Regarding succession planning, it was verified that 13 of the managers (43%) still do not know how the process will occur and, especially, who will take over the next management generation.

The other 17 managers find themselves in different situations, as shown in the graphical representation of figure 30.

Figure 30

Succession Planning Status of the Rural Businesses Represented in the Sample



Source: Prepared by the author with research data (2021)

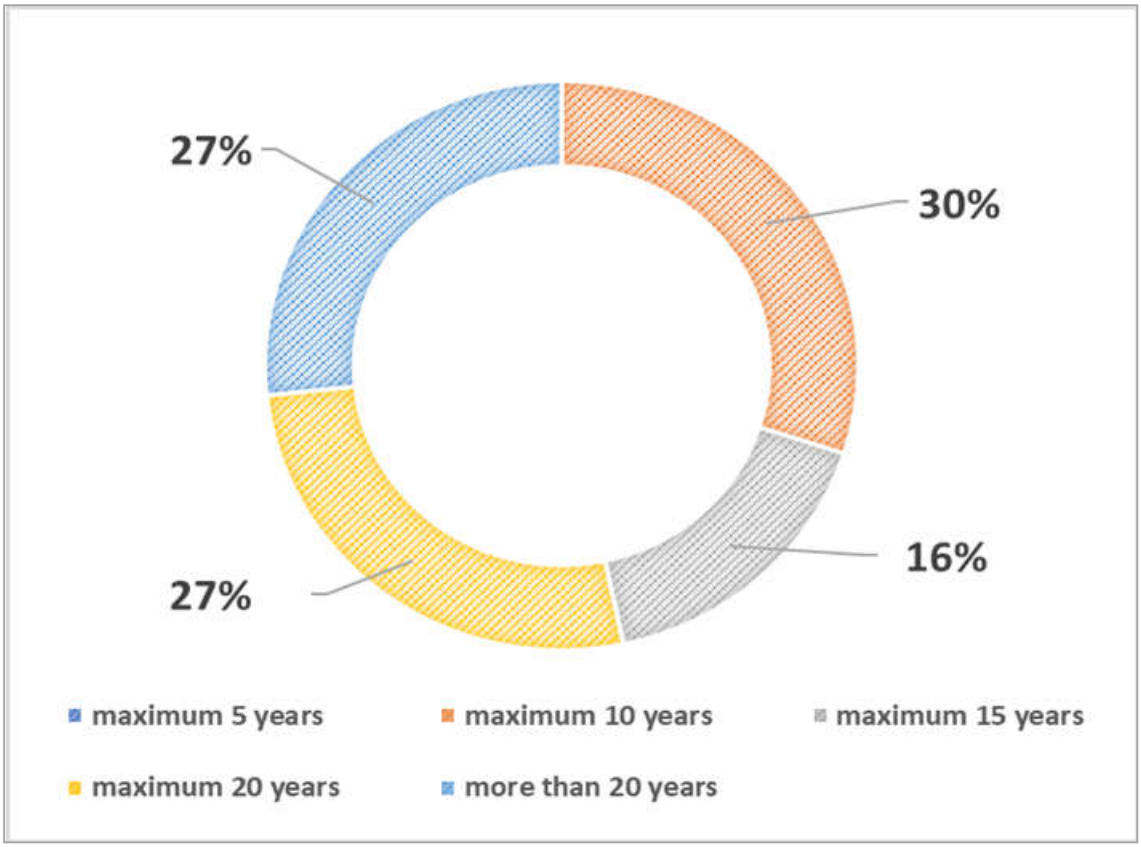
The survey also identified that 50% of the respondents have not yet developed a formal succession plan, and 33% of the managers are in the early preparation stages. Only two respondents said that their formal plans had been finalized.

The succession dynamic finally ends when the command of the business is transferred to the successor. Therefore, the expectation of continuity of the main manager ahead of the business is a key element.

Figure 31 shows the distribution of the managers' answers considering the time (in years) that they still intend to continue leading the rural business.

Figure 31

Managers' Expectations Concerning the Continuity of the Rural Business Management



Source: Prepared by the author with research data (2021)

The survey allowed observing that 30% – the highest frequency – of the interviewed managers intend to pass on the command of the rural business in the next ten years. An equal frequency (27%) was verified for managers who expect to continue leading the business for 15 and 20 years.

Finishing the analysis inherent to the Family Succession Dynamics construct, a survey was carried out on the expectations of the first-born successor in the next management cycle. Of the 28 respondents, nine said they still do not know how this factor will impact the succession dynamics, and 12 (higher incidence) answered that the enterprise management would be shared between two or more children. Only four of the managers stated that the first-born would be the successor. Two producers did not answer this question.

4.1.4 Impacts Arising from the Transition to the Circular Business Model

For the descriptive and exploratory analysis of the last research block, ten observations were suppressed from the sample. This setting was necessary due to the impossibility of evaluating impacts in cases where the successors do not act or accompany the rural business. Thus, observing the variables that form the construct Impacts Resulting from the Transition to the Circular Business Model contemplated 20 cases.

The survey showed that all responding farmers – at different perception levels – identified increased participation of successors in building the elements "vision" and "strategic objectives" – after beginning the transition to a circular business model. Of those, 65% responded that they strongly or mostly agree with this statement.

Table 8 presents the two-dimensional analysis and considers strata related to the typology by successors' performance.

Table 8
More Active Participation in Building the New Future Vision and Goals of the Rural Business

SUCCESSOR(S) PERFORMANCE	PARTIALLY AGREE		MOSTLY AGREE		STRONGLY AGREE		TOTAL
Are active in the business	2	29%	3	43%	2	29%	7
Are partially active in the business	2	33%	3	50%	1	17%	6
Are not active, but follow the results	2	40%	2	40%	1	20%	5
Manage other businesses and work on the farm	1	50%	1	50%			2
TOTAL	7	35%	9	45%	4	20%	20

Note: Prepared by the author with research data (2021)

Of the 20 cases analyzed, 55% are associated with either full or mostly agree that successor engagement increased after the transition to a circular business model began.

Table 9 presents the crossover between variables.

Table 9
Increased Engagement of Successor(s)

SUCCESSOR(S) PERFORMANCE	PARTIALLY AGREE		MOSTLY AGREE		STRONGLY AGREE		TOTAL
Are active in the business	3	43%	2	29%	2	29%	7
Are partially active in the business	2	33%	3	50%	1	17%	6
Are not active, but follow the results	3	60%	1	20%	1	20%	5
Manage other businesses and work on the farm	1	50%	1	50%			2
TOTAL	9	45%	7	35%	4	20%	20

Note: Prepared by the author with research data (2021)

Regarding the redistribution of functions to the manager and successors after the beginning of the business model transition, one of the respondents stated that it did not occur. However, 25% of the managers are associated with full agreement with the statement.

Table 10 presents the distribution concerning this variable.

Table 10
Redistribution of Functions to Manager and Successor(s)

SUCCESSOR(S) PERFORMANCE	STRONGLY DISAGREE		PARTIALLY AGREE		MOSTLY AGREE		STRONGLY AGREE		TOTAL
Are active in the business	1	14%			3	43%	3	43%	7
Are partially active in the business			5	83%	1	17%			6
Are not active, but follow the results			3	60%	1	20%	1	20%	5
Manage other businesses and work on the farm					1	50%	1		2
TOTAL	1		8	40%	6	30%	5	25%	20

Note: Prepared by the author with research data (2021)

All respondents considered that there was a mobilization of new knowledge by the successors in the last two years related to the circular business model.

According to Table 11, 30% of the respondents agreed with this statement.

Table 11
Mobilization of New Knowledge Related to the Activity by the Successors

SUCCESSOR(S) PERFORMANCE	PARTIALLY AGREE		MOSTLY AGREE		STRONGLY AGREE		TOTAL
Are active in the business			5	71%	2	29%	7
Are partially active in the business	2	33%	2	33%	2	33%	6
Are not active, but follow the results	1	20%	3	60%	1	20%	5
Manage other businesses and work on the farm			1	50%	1	50%	2
TOTAL	3	15%	11	55%	6	30%	20

Note: Prepared by the author with research data (2021)

It is possible to verify in Table 12 that, regarding new skills acquired by the successors, 35% of the respondents partially agree with the statement, and 20% strongly agree.

Table 12
Mobilization of New Skills Related to the Activity by the Successors

SUCCESSOR(S) PERFORMANCE	PARTIALLY AGREE		MOSTLY AGREE		CONCORDO FORTEMENTE		TOTAL
Are active in the business	2	29%	3	43%	2	29%	7
Are partially active in the business	3	50%	3	50%			6
Are not active, but follow the results	1	20%	3	60%	1	20%	5
Manage other businesses and work on the farm	1	50%			1	50%	2
TOTAL	7	35%	9	45%	4	20%	20

Note: Prepared by the author with research data (2021)

65% of the respondents are associated with totally or mostly agreeing with this statement about the successor's increased responsibility after the start of the business model transition.

Table 13 presents the distribution inherent to this variable.

Table 13
Manager's Perception of Successor's Increased Responsibility

SUCCESSOR(S) PERFORMANCE	STRONGLY DISAGREE		PARTIALLY AGREE		MOSTLY AGREE		STRONGLY AGREE		TOTAL
Are active in the business	1	14%	3	43%	1	14%	2	29%	7
Are partially active in the business			2	33%	4	67%			6
Are not active, but follow the results			1	20%	3	60%	1	20%	5
Manage other businesses and work on the farm					1	50%	1	50%	2
TOTAL	1	11%	6	30%	9	45%	4	20%	20

Note: Prepared by the author with research data (2021)

The last variable analyzed through the survey concerns the rural manager's increased trust in the successor after the beginning of the business model transition.

Observing Table 14, we can see that 25% of the respondents strongly agree with the statement that the trust in the successor increased after the beginning of the business model transition.

Table 14
Manager's increased Confidence in the Successors

SUCCESSOR(S) PERFORMANCE	STRONGLY DISAGREE		PARTIALLY AGREE		MOSTLY AGREE		STRONGLY AGREE		TOTAL
Are active in the business			4	57%	1	14%	2	29%	7
Are partially active in the business			1	17%	3	50%	2	33%	6
Are not active, but follow the results			1	20%	3	60%	1	20%	5
Manage other businesses and work on the farm	1	50%			1	50%			2
TOTAL	1	13%	6	30%	8	40%	5	25%	20

Note: Prepared by the author with research data (2021)

Only one respondent disagreed with the statement, showing that in 13% of the cases, there was no increase in the manager's trust in the successor after the beginning of the business model transition. This respondent pointed out that, while the successor supports the company management, he is connected to businesses outside the farm.

4.1.5 Scores Formulation

Considering the assumptions of Exploratory Analysis according to the theoretical foundations of Mendonça (2017), three scores (V100, V101, and V102) were formulated from the combination of variables. The data were subjected to statistical standardization. Next, quartiles were calculated for the scores, and the categorization was organized according to Table 15.

Table 15
Classification of Scores

Categories	Intervals
Low	−∞ ⊢ Q1
Moderately Low	Q1 ⊢ Q2
Moderately High	Q2 ⊢ Q3
High	Q3 ⊣ ∞

Note: Prepared by the author based on Mendonça (2017)

The V100 Score is related to the Circular Mindset and brings together the three variables that comprise this factor:

a) V11 - Search for knowledge on circularity

b) V12 - Inclusion of circularity in the business strategy

c) V13 - Implementation of circular practices

Score V101 refers to the Adherence to the Circular Business Model. It was formed considering the following variables:

a) V14 - Practices to optimize the use of water

b) V15 - Practices to support biodiversity and preservation of natural capital

c) V16 - Use of energy from alternative sources

d) V17 - Agrochemical reduction

e) V18 - Use of biological inputs

f) V19 - Proper waste disposal

g) V20 - Use of residues originated in other activities

h) V21 - Internal circularity and re-signification of residues

i) V22 - Use of industrial waste

j) V23 - Practices adhering to the Environmental Services Law (Federal Law 14.119/2021)

k) V24 - Increased demand for sustainable and organic products

l) V25 - Increase in input suppliers for sustainable production

The assumption of Score V101 is that the transition to a circular business model should be measured based on the practices implemented. Therefore, the proposal is to allow for the visualization of the transition status, considering the perspective of the survey respondents.

Score V102 was formulated based on the Succession Plan factor and comprised the following variables:

a) V30 - Formal succession plan

b) V31 - Succession Planning

The purpose of Score V102 is to identify the status of the rural business in the context of succession dynamics. Subsequently, the sample observations were classified according to the categories. Finally, the scores' Box Plots were generated (to visualize the quartiles) and the possibility of correlation analysis between selected variables and standardized scores. The first classification presented is related to the V100 Score. Table 16 allows verifying the distribution of the 30 observations.

Table 16

Classification of the Observations According to Score V100

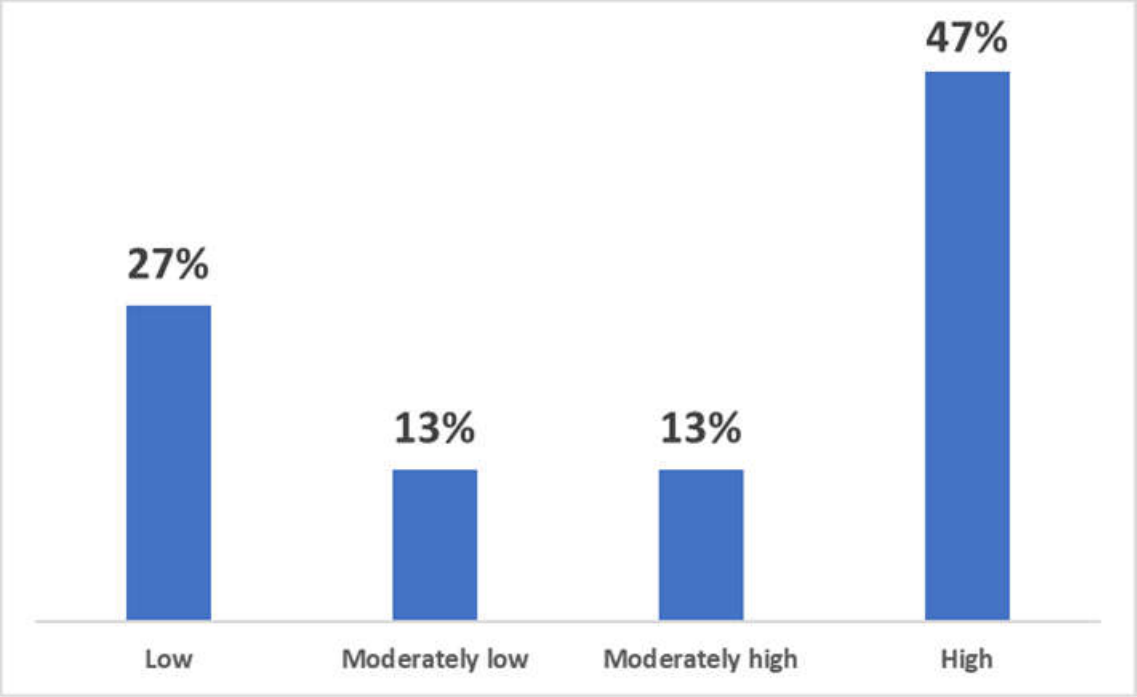
Categories	N	%
Low	8	26.67
Moderately Low	4	13.33
Moderately High	4	13.33
High	14	46.67
Total	30	100

Note: Prepared by the author with research data (2021)

Table 16 shows that 46.67% of the observations have a high V100 score, and 26.67% have a low score.

Figure 32 allows the graphical representation of the distribution of the observations considering the quartiles.

Figure 32
Classification Graph of the Observations According to the V100



Source: Prepared by the author with research data (2021)

The results indicate that 47% of the managers surveyed present a high Circular Mindset Score considering the variables investigated. The second Score verified is the one that evidences the transition status to a circular business model of the sample analyzed. Since it is based on effectively implemented practices, the Score V101 enables the classification of the ventures according to four different stages towards the transition of the business model.

Table 17 shows the distribution.

Table 17
Classification of the Observations According to Score V101

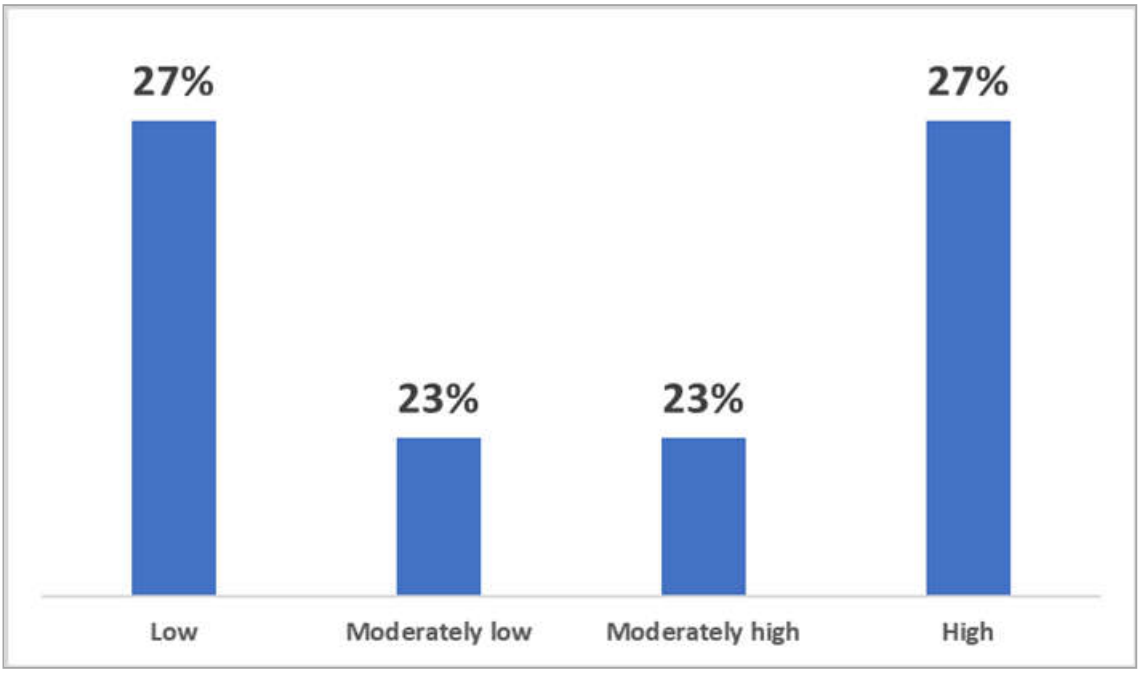
Categories	N	%
Low	8	26.67
Moderately Low	7	23.33
Moderately High	7	23.33
High	8	26.67
Total	30	100

Note: Prepared by the author with research data (2021)

Regarding how the observations were classified according to Score V101, around 27% of them have low and high scores, and 24% have equivalent percentages for the moderate categories.

Figure 33 shows a graphical representation of the distribution.

Figure 33
Classification Graph of the Observations According to the V101



Source: Prepared by the author with research data (2021)

The results obtained from Score V101 indicate that the rural enterprises in the sample are well distributed in four transition statuses towards the circular business model. When

considering the Moderately Low and Moderately High quartiles as intermediate, they concentrate 46% of the observations.

Score V102 was designed to analyze the status of agricultural establishments given the family succession dynamics. It gathers the variables that show the planning condition and the formal plan from the perspective of the main manager.

Table 18 presents the distribution of the Score.

Table 18

Classification of the Observations According to Score V102

Categories	N	%
Low	0	0,00
Moderately Low	12	40,00
Moderately High	8	26,67
High	10	33,33
Total	30	100

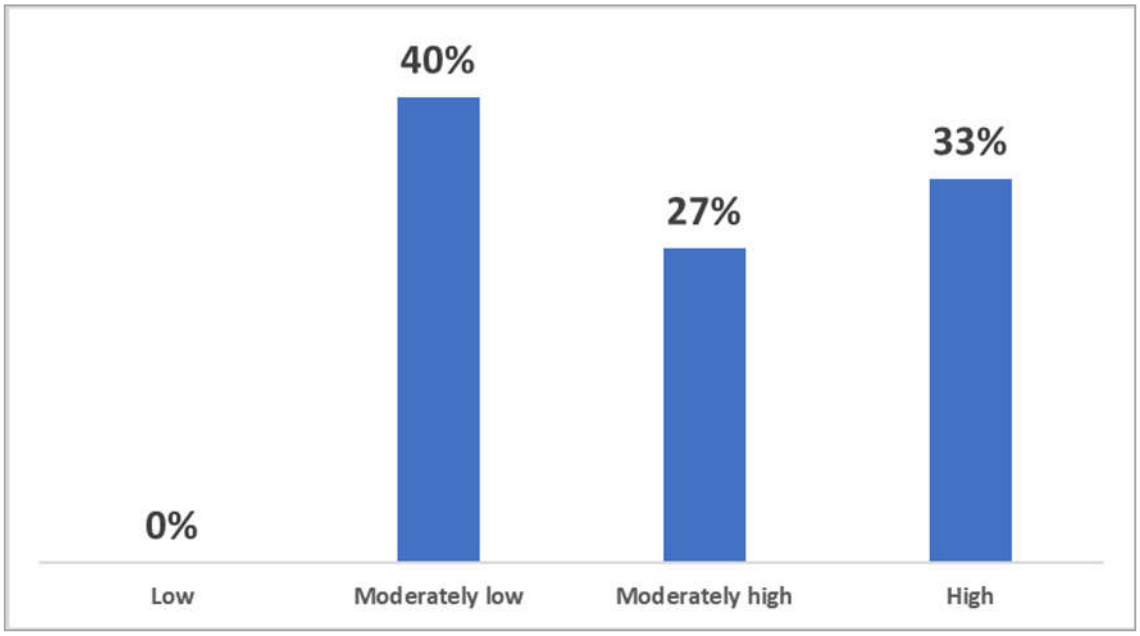
Note: Prepared by the author with research data (2021)

According to the classification relative to Score V102, it can be seen that 40% of the establishments are in the moderate-low condition. Moreover, around 34% of the sample was classified with a high score.

This result is graphically represented in Figure 34.

Figure 34

Classification Graph of the Observations According to the V102



Source: Prepared by the author with research data (2021)

The results generated from Score V102 show that the family succession dynamics are at a low, moderate level, or more advanced in all farming establishments.

Table 19 presents the characteristic descriptive measures related to the three scores.

Table 19
Descriptive Measures for the Scores

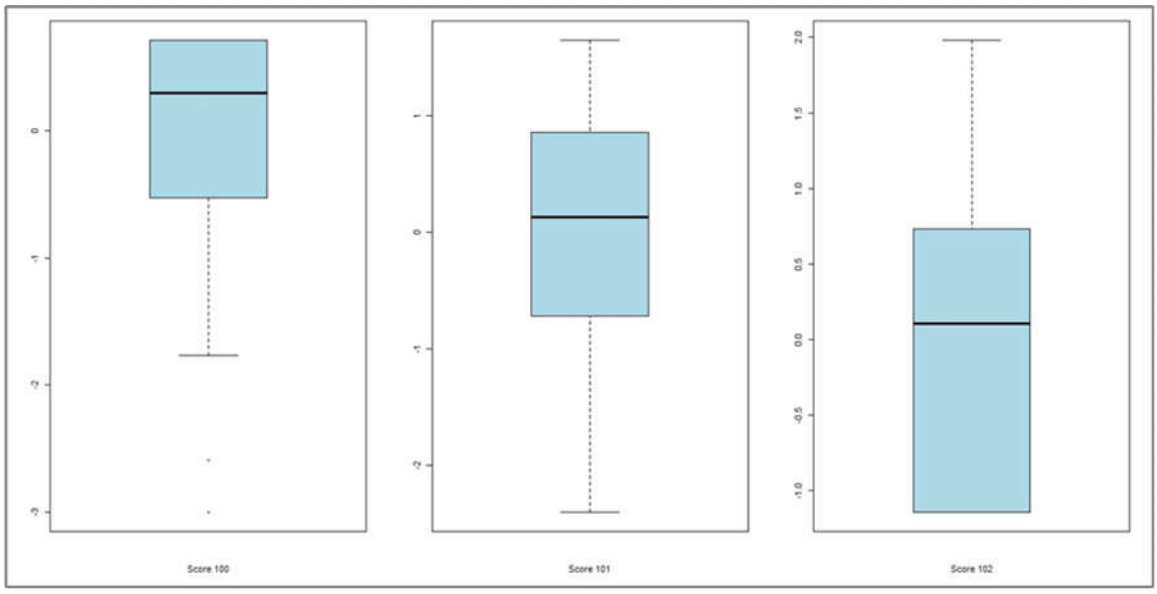
Scores	N	Minimum	Q1	Maximum	Mean	Median (Q2)	Q3	DP
Score 100	30	-3.00	-0.42	0.72	0,00	0.30	0.72	1.00
Score 101	30	-2.41	-0.66	1.65	0,00	0.13	0.80	1.00
Score 102	30	-1.15	-0.15	1.98	0,00	0.10	0.73	1.00

Note: Prepared by the author with research data (2021)

Table 19 shows that the lowest value among the scores was -3, and the highest was 1.98.

Figure 35 shows the boxplots generated considering this data group.

Figure 35
Boxplot Referring to the Scores



Source: Software R report (version 4.1.1) using survey data (2021)

Figure 35 shows the different distributions that the surveyed enterprises form in each score.

4.2 STAGE 2 - ANALYSIS OF CONSTRUCT STRUCTURE AND VARIABLE QUALITY

This section systemizes the results related to the second stage of analysis. These data correspond to the a posteriori evaluation about the quality of the variables and respective answers. It also contemplates verifying the construct and factor structures proposed for grouping variables as being adequate. These verifications were performed using Multivariate Analysis techniques, including Cronbach's Alpha and Factor Analysis.

4.2.1 Cronbach's Alpha Coefficient Calculation

Initially, Cronbach's Alpha coefficient was calculated overall and per block to evaluate data reliability. Three blocks were considered: Block 2 comprises the variables V11 through V27, Block 3 contains the variables V28 through V33, and finally, Block 4 considers the variables V34 through V40.

The results generated are shown in Table 20.

Table 20
Alpha and Cronbach Coefficient

	Alpha
General	0.921
Block 2	0.898
Block 3	0.382
Block 4	0.964

Note: Prepared by the author with research data (2021)

It is observed through the classification offered by Table 20 that Block 3 was the only one that did not meet the minimum value of data reliability - a situation that did not affect the overall consistency of the research, which reached a coefficient classified as excellent.

Table 21 supports the interpretation of Cronbach's Alpha.

Table 21
Criteria for Interpreting Cronbach's Alpha

Cronbach's Alpha	Internal Consistency
$\alpha \geq 0,9$	Excellent
$0,8 \leq \alpha < 0,9$	Good
$0,7 \leq \alpha < 0,8$	Acceptable
$0,6 \leq \alpha < 0,7$	Questionable
$0,5 \leq \alpha < 0,6$	Poor
$\alpha < 0,5$	Unacceptable

Note: Prepared by the author based on Da Hora et al. (2010)

The results indicate that the responses were consistently made by the respondents and show no evidence of bias or randomness.

4.2.2 Factorial Analysis

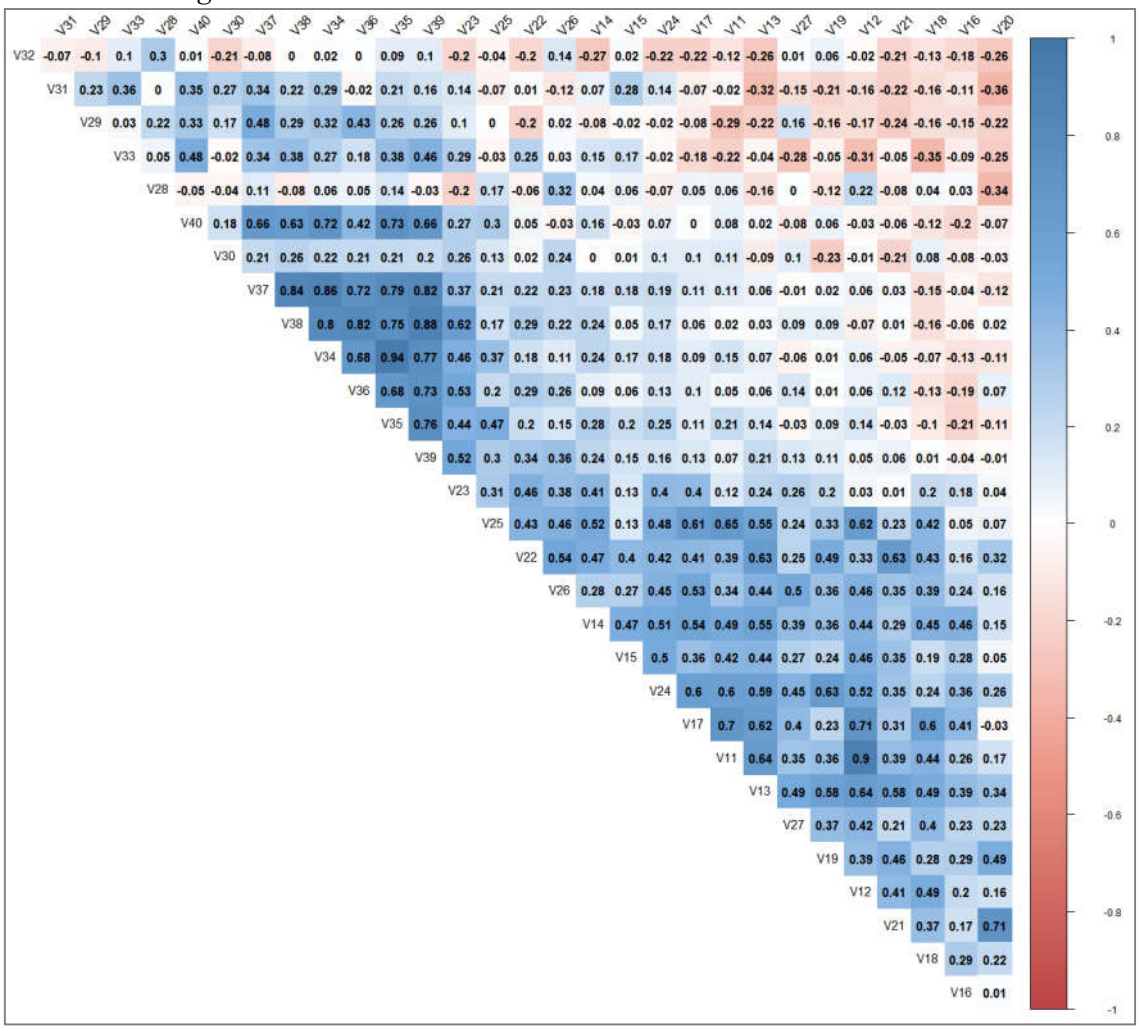
Based on the results obtained using Crombach's Alpha - which indicated internal consistency of the research - an Exploratory Factor Analysis was performed. This statistical method describes the variability and correlation among the observed variables. It also allows establishing new variables that capture the collective behavior of the original ones. These are called factors (Fávero & Belfiore, 2017).

Thus, the use of Factor Analysis with the generated database allowed verifying if the constructs and factors proposed for the research orientation can assume an improved structure of variable grouping.

The correlation matrix of the data was then calculated. A non-parametric method was used to obtain it. For Restrepo and Gonzáles (2007), Spearman's correlation coefficient is suitable because the determinant of the correlation matrix obtained by the most usual Pearson's coefficient was negative.

Figure 36 presents the correlation diagram to visualize these correlations well.

Figure 36
Correlation Diagram



Source: R Software Report (version 4.1.1) generated with survey data (2021)

One can verify that the strong colors represent a high correlation between the variables, leading them to be contained in the same factor. Subsequently, Bartlett's test of sphericity was performed, as shown in Table 22.

Table 22
Bartlett's Test of Sphericity

Test	p-value
Bartlett	< 0.001 ***

Note: * significant at 10%, ** significant at 5%, *** significant at 1%

According to the table above, the test was calculated to assess whether there is an absence of associativity between the variables. A highly significant p-value was obtained, rejecting the null hypothesis that the matrix ρ is equal to the identity matrix. This identity-matrix refers to a matrix with zeros and ones, implying it contains variables with no two-way correlations and, in this case, only with themselves. After analyzing this test, it is necessary to verify the adequacy of the factor analysis applied to the data.

Table 23 shows the correlation statistics.

Table 23
KMO Statistics

Statistics	Value
KMO	0.5

Note: Prepared in R Software (version 4.1.1) with survey data (2021)

The return on KMO statistics presented a rating between bad and reasonable. Although KMO higher than 0.8 would be more interesting, factor analysis is not unacceptable and can be performed. Factors conditioning the KMO obtained may be related to the sample size and the condition of construct 2, block 3 of the research.

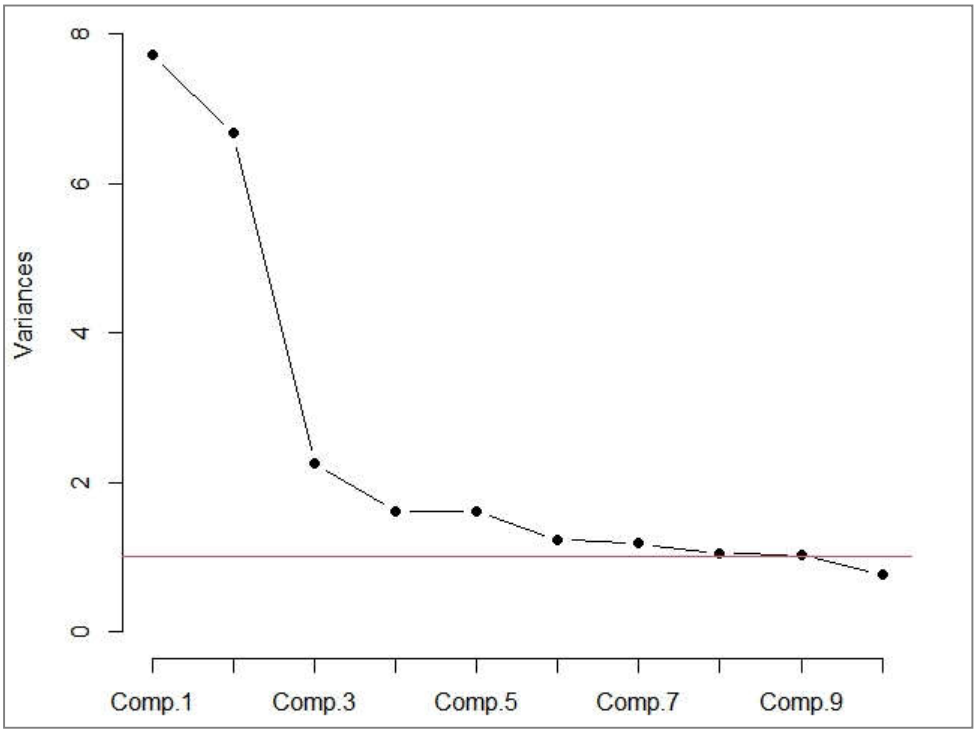
Table 24
Criteria for Interpreting the KMO Statistics

KMO Statistics	Overall Adequacy of Factor Analysis
0,9 ≤ KMO ≤ 1,00	Very Good
0,8 ≤ KMO < 0,9	Good
0,7 ≤ KMO < 0,8	Median
0,6 ≤ KMO < 0,7	Fair
0,5 ≤ KMO < 0,6	Poor
KMO < 0,5	Unacceptable

Note: Prepared in R Software (version 4.1.1) with survey data (2021)

Thus, the Factor Analysis via Principal Components for the data will be presented below in Figure 37.

Figure 37
Optimal Number of Factors



Source: R Software Report (version 4.1.1) generated with survey data (2021)

According to Figure 37, it is observed that nine factors are necessary to group the thirty variables under study in the best way. Table 25 shows these factors.

Tabela 25
Factorial Analysis of the Data

Factors	Eigenvalues	% of Variation	% of the Cumulative Variation
1	2.78	26.1	26.1
2	2.58	22.6	48.7
3	1.50	7.6	56.3
4	1.27	5.5	61.8
5	1.27	5.4	67.2
6	1.11	4.2	71.4
7	1.09	4	75.4
8	1.03	3.6	79
9	1.02	3.5	82.5

Note: Prepared in R Software (version 4.1.1) with survey data (2021)

Regarding the factors, they present eigenvalues greater than or equal to one. Besides that, they have a percentage of accumulated variance that explains the model above 70%.

Table 26 shows the factorial loadings of each of the variables under study and their respective commonalities and specificities.

Table 26
Factorial Loadings

Variables	Factors									Commonalities	Specificities
	F1	F2	F3	F4	F5	F6	F7	F8	F9		
V11	**0.93**	-0.04	-0.05	0.00	0.05	-0.04	-0.01	0.08	-0.03	0.89	0.111
V12	**0.88**	-0.07	0.11	-0.12	0.04	0.10	-0.07	0.18	-0.06	0.86	0.144
V13	**0.83**	-0.01	-0.11	0.04	0.24	-0.14	-0.01	0.20	0.20	0.87	0.134
V14	**0.72**	0.18	-0.13	0.11	0.07	0.05	-0.23	0.05	0.28	0.72	0.285
V15	0.50	-0.05	0.09	**0.56**	0.19	-0.02	0.07	0.15	0.12	0.66	0.342
V16	0.29	-0.17	-0.01	-0.01	0.11	0.00	-0.17	0.03	**0.81**	0.82	0.177
V17	**0.79**	-0.01	0.07	0.03	0.02	0.04	0.18	0.17	0.36	0.83	0.170
V18	**0.78**	-0.10	-0.02	-0.04	0.12	-0.14	0.27	0.02	0.14	0.75	0.249
V19	0.27	0.01	-0.13	-0.05	**0.77**	-0.11	-0.34	0.14	0.11	0.85	0.151
V20	0.04	-0.12	-0.55	-0.19	0.21	0.07	-0.02	**0.60**	-0.25	0.83	0.171
V21	0.24	-0.06	-0.09	-0.08	0.04	-0.01	-0.17	**0.88**	0.05	0.88	0.118
V22	0.37	0.22	0.00	0.20	0.15	-0.26	0.03	**0.69**	0.19	0.82	0.180
V23	0.23	**0.55**	-0.21	0.07	0.29	-0.11	0.26	0.09	0.42	0.76	0.240
V24	**0.53**	0.08	-0.18	0.36	0.44	0.15	-0.11	0.16	0.20	0.74	0.262
V25	**0.82**	0.21	0.10	-0.02	0.09	-0.03	-0.05	-0.04	-0.15	0.77	0.232
V26	**0.49**	0.15	0.42	-0.02	0.40	-0.02	0.28	0.37	0.15	0.84	0.155
V27	0.45	-0.03	0.07	-0.03	**0.60**	0.33	0.16	0.11	0.02	0.72	0.277
V28	0.08	0.06	**0.87**	-0.02	-0.13	0.23	-0.06	-0.04	-0.01	0.84	0.158
V29	-0.16	0.36	0.15	0.10	0.05	**0.79**	0.04	-0.13	0.00	0.84	0.165
V30	0.05	0.20	-0.07	0.05	-0.13	0.06	**0.84**	-0.13	-0.12	0.80	0.201
V31	-0.11	0.18	-0.05	**0.86**	-0.10	0.09	0.04	-0.13	-0.08	0.83	0.172
V32	-0.14	-0.01	**0.64**	-0.06	0.38	-0.36	-0.07	-0.27	-0.32	0.88	0.120
V33	-0.20	**0.54**	0.22	0.43	-0.09	-0.37	-0.16	0.09	0.18	0.78	0.218
V34	0.09	**0.93**	0.01	0.06	-0.06	0.06	0.03	-0.08	-0.10	0.91	0.090
V35	0.15	**0.93**	0.06	0.06	-0.03	0.00	-0.02	-0.07	-0.17	0.93	0.072
V36	-0.09	**0.84**	0.05	-0.14	0.06	0.19	0.18	0.22	-0.01	0.86	0.141
V37	-0.03	**0.92**	0.08	0.11	-0.04	0.20	0.02	0.01	0.03	0.92	0.080
V38	-0.08	**0.95**	-0.02	0.02	0.12	0.02	0.12	0.04	0.09	0.95	0.051
V39	0.05	**0.92**	0.10	0.03	0.09	-0.07	0.12	0.08	0.08	0.90	0.096
V40	0.04	**0.77**	-0.13	0.12	-0.12	0.04	-0.16	-0.20	-0.15	0.73	0.267

Note: R Software report (version 4.1.1) generated with survey data (2021)

The observation of the factorial loadings report enabled the systematization of Table 27, which presents the best grouping of the variables after submitting the Factor Analysis database.

Table 27

Factor Rankings

Factors	Variables								
factor 1	V11	V12	V13	V14	V17	V18	V24	V25	V26
factor 2	V23	V33	V34	V35	V36	V37	V38	V39	V40
factor 3	V28	V32							
factor 4	V15	V31							
factor 5	V19	V27							
factor 6	V29								
factor 7	V30								
factor 8	V20	V21	V22						
factor 9	V16								

Note: R Software report (version 4.1.1) generated with survey data (2021)

It is observed that factors 1 and 2 contain most of the variables, and the remaining variables were distributed in the others. It is worth noting that the variables have correlations directly proportional to their respective factor and commonalities above 70%. In short, most variables imply high variability and are explained by the Factor Analysis model. This information can be confirmed in Table 27.

Aiming to greater adequacy to the study's theoretical conceptualization, we used a block/construct Factor Analysis. This application allowed analyzing the best grouping option for the variables, thus maintaining the initially proposed design. It is possible to visualize the structure with more decisive factors and variables based on the relationship of the collected data - considering the three constructs proposed for the research. Thus, initially, Bartlett's test of sphericity was performed per block.

Table 28 shows the results.

Table 28

Bartlett's Test of \Sphericity by Block

Test	p-value Block 1	p-value Block 2	p-value Block 3
Bartlett	< 0.001 ***	0.024 **	< 0.001 ***

Note: *significant at 10%, ** significant at 5%, *** significant at 1%

After verifying that the p-value in the three blocks were significant, tests were performed to verify the adequacy of the factor analysis.

Table 29 presents the results obtained.

Table 29
KMO Statistics by Block

Statistic	Value Block 2	Value Block 3	Value Block 4
KMO	0.7	0.5	0.86
Overall Adequacy of the Factor Analysis	Acceptable	Poor	Good

Note: Overall adequacy according to the criteria presented in Table 24

It became evident that the Factor Analysis can be applied to the data even considering variables in three different blocks.

The results obtained pointed out that Construct 1 - transition to the circular business model - presents a better composition in five factors and variables distributed according to Table 30.

Table 30
Classification of Block 1 Factors

Factors	Variables						
factor 1	V11	V12	V13	V14	V17	V18	V25
factor 2	V20	V21					
factor 3	V22	V23	V26				
factor 4	V15	V16					
factor 5	V19	V24	V27				

Note: R Software report (version 4.1.1) generated with survey data (2021)

Regarding Construct 2 - Family Succession - the composition should consider four factors and contemplate the distribution as presented in Table 31.

Table 31
Classification of Block 2 Factors

Factors	Variables	
1	V31	V33
2	V28	V32
3	V29	
4	V30	

Note: R Software report (version 4.1.1) generated with survey data (2021)

The last processing of the Factor Analysis showed that Block 3 - Impacts arising from the transition to the circular business model - should keep the structure with a single factor and seven variables.

Table 32 shows these results.

Table 32
Classification of Block 3 Factors

Variables	Factors	Commonality	Specificity
	F1		
V34	0.95	0.91	0.090
V35	0.94	0.88	0.119
V36	0.86	0.73	0.267
V37	0.95	0.91	0.093
V38	0.95	0.91	0.092
V39	0.93	0.87	0.134
V40	0.76	0.58	0.422

Note: R Software report (version 4.1.1) generated with survey data (2021)

Concerning the block, the variables have correlations directly proportional to their respective factor and commonalities above 0.5, implying a high variability explained by the Factor Analysis model.

4.3 STAGE 3 - SPEARMAN'S CORRELATION COEFFICIENT

Bivariate statistical tests were performed to verify the correlation between variables and standardized scores. Because the variables under analysis are on a Likert scale - ordinal variables - it was necessary to apply the non-parametric Spearman coefficient by Restrepo and Gonzáles (2007). In executing the analyses, the R software was used in the R Studio interface (version 4.1.1).

The first testing stage comprised the correlation analysis between Score V101 and the variables V12 - Inclusion of Circularity in the Business Strategy and V13 - Implementation of Circular Practices. Table 33 shows the results.

Table 33
Correlation between Score V101 and Variables V12 and V13

	Correlation	P-value	Diagnosis	Note
V12 x V101	0.56	0.001 ***	Significant correlation	Directly proportional
V13 x V101	0.78	< 0.001 ***	Significant correlation	Directly proportional

Note: *significant at 10%, ** significant at 5%, *** significant at 1%.

Table 33 shows a directly proportional correlation between the inclusion of circularity in the business strategy and the transition status to a circular business model.

It was also evidenced that there is a significant correlation between the rural managers' affirmation regarding the implementation of circular practices and transition status assessed from Score V101.

The second testing stage considered the correlation between Score V100 and variable V25.

Table 34 shows the results.

Table 34

Correlation between Score V100 and Variable V25

	Correlation	P-value	Diagnosis	Note
V25 x V100	0.69	0.029 *	Significant correlation	Directly proportional

Note: *significant at 10%, ** significant at 5%, *** significant at 1%.

The results in Table 34 show that the perception of the increase in input suppliers for sustainable production has a directly proportional correlation with the Circular Mindset score.

The third step concerning the correlation tests concerns the analysis of Score V102 in variables V28, V29, V32, and V33.

Table 35 shows the respective results.

Table 35

Correlation between Score V102 and Variables V28, V29, V32, and V33

	Correlation	P-value	Diagnosis	Note
V32 x V102	-0.10	0.581	Non-significant correlation	No association
V28 x V102	-0.01	0.951	Non-significant correlation	No association
V29 x V102	0.24	0.198	Non-significant correlation	No association
V33 x V102	0.23	0.218	Non-significant correlation	No association

Note: *significant at 10%, ** significant at 5%, *** significant at 1%.

The results in Table 35 show no significant correlation between Score V102 and the variables, thus implying no association.

The fourth and last step of the tests consisted in analyzing the association between Score V101 and variables V34, V35, V36, V37, V38, V39, and V40.

Table 36 shows the results obtained.

Table 36

Correlation between Score V101 and Variables of Factor Impacts Arising from Transition

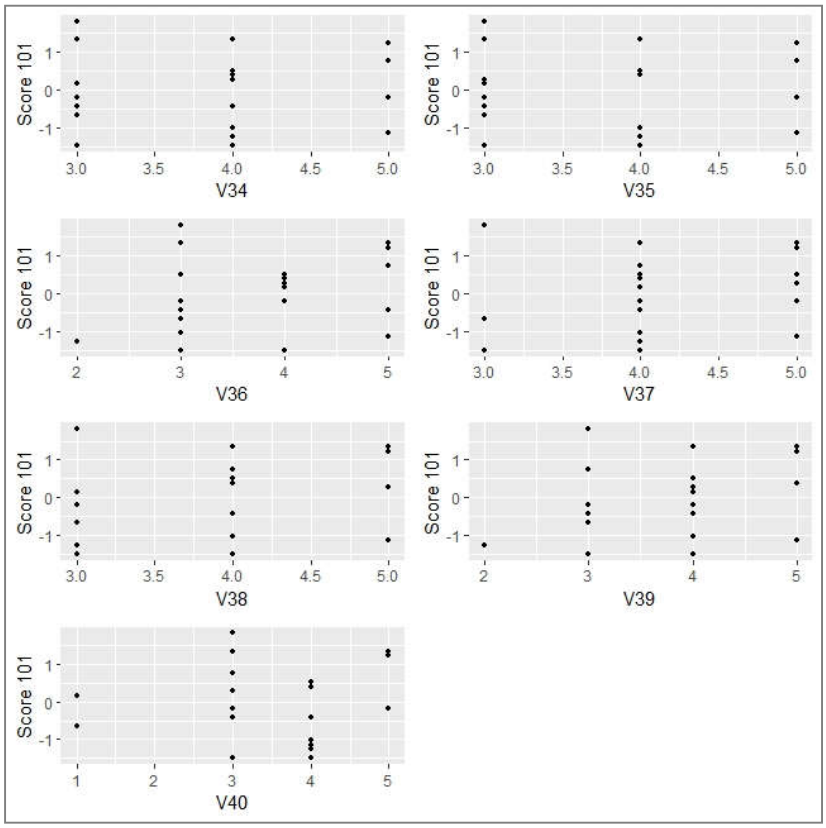
	Correlation	P-value	Diagnosis	Note
V34 x V101	0.04	0.864	Non-significant correlation	No association
V35 x V101	0.05	0.824	Non-significant correlation	No association
V36 x V101	0.25	0.296	Non-significant correlation	No association
V37 x V101	0.23	0.339	Non-significant correlation	No association
V38 x V101	0.27	0.251	Non-significant correlation	No association
V39 x V101	0.27	0.245	Non-significant correlation	No association
V40 x V101	0.06	0.810	Non-significant correlation	No association

Note: *significant at 10%, ** significant at 5%, *** significant at 1%.

Table 36 shows that in none of the tests a significant correlation was identified, implying that there is no association between the score that demonstrates the status of the rural enterprise inherent to the transition to a circular business model and variables related to the factor Impacts Resulting from the Transition to the Circular Business Model. Figure 38 congregates the scatter plots generated with the tests related to the Standardized Score V101.

Figure 38

Scatter Plot of Variables with Standardized V101 Score



Source: R Software report (version 4.1.1) generated with survey data (2021)

4.4 DISCUSSION OF RESULTS

This section is dedicated to discussing the main results obtained from the applied research. The findings were compared to those of previous works. Contents related to confirming the previously established hypotheses will also be presented. The order of exposition will obey that of the proposed constructs.

4.4.1 Discussions Regarding the Transition to a Circular Business Model Construct

Regarding this construct, the first aspect of being approached concerns identifying the transition of the researched entrepreneurship towards the circular business model. The results point out that all the firms have started the transition in the last two years in different statuses, and some managers consider it to be completed. Figure 33 allows visualizing the distribution of the enterprises in different statuses and points out that 27% (majority) of the enterprises are associated with the most advanced stage of transition, considering the ten practices listed in the survey.

This result meets the suggestion of the work of Sehnem, Vazquez-Brust, Pereira, and Campos (2019), who pointed out the importance of studies enabling the verification that the analyzed businesses are in fact in transition to CE. It also reinforces Vargas-Sánchez's (2019) conclusion, which pointed out how the CE is gaining strength and even being in an early stage allows the visualization of the elements of transition.

Such results also confirm the findings of Barnabè and Nazir (2020) because besides modern companies, traditional activities, such as those connected to agribusiness, can be suitable for operating in a closed circuit. This perspective is in line with the conclusions of Yazan, Cafagna, Fraccascia, Mes, Pontrandolfo, and Zijm (2018), which point out that the use of agricultural waste as biomass, fertilizer, and bioenergy is in line with EU development strategies and is considered important for sustainable development at the local level.

The observation that the rural managers surveyed implemented at least three of the ten practices listed places the sample in a different condition from the findings of Silva, Shibao, Kruglianskas, Barbieri, and Sinisgalli (2019). When analyzing 26 companies, which are not rural enterprises, they identified that the most widespread CE practices were related to product design and were the result of punctual implementations, not contemplating continuous actions.

The same authors also noticed that the environment variable was not included in the strategic planning of the businesses they researched. This situation also differs from the present study results since 66% (majority) of the rural producers surveyed stated that circularity and sustainability figure in their businesses' vision and strategic objectives. On this point, it is worth mentioning that, since the data are based on statements made by the managers, the research did not have access to the formal strategic planning of the enterprises. Therefore, variables such as formal strategic planning and its dissemination - internal or external - were not addressed.

Comparing surveys conducted among different groups does not represent statistical relevance. However, it reinforces the perception that Circular Economy is a strategic element that can be implemented in urban or rural enterprises.

Regarding the structured plans for the transition of the business model, it was verified that even with 70% of the rural producers recognizing that they are in an intermediate or more advanced stage of transition, only 3% of the associated producers demonstrate that they have this instrument. Compared to the findings of Barnabè and Nazir (2020) after analyzing 74 organizations, this condition reinforces the need for the elaboration and use of standardized reports.

This is because they have the potential to support transitions to CE at the micro-level. After all, they allow viewing the current and future situation of processes and their inputs and outputs.

The adoption of standardized reporting can mitigate risks such as those pointed out by Cramer (2020), who, when analyzing the implementation of the CE in Amsterdam, concluded that the transition should not be taken as a simplistic dichotomy and merely incremental versions. This author pointed out that the most assertive configuration is one of continuous transformative change. Thus, the absence of quantitative or qualitative indicators hampers the orientation of a transition.

Without preempting discussion on other constructs, it is worth taking advantage of the approach in this question and comparing it with Pieper, Kellermanns, and Astracham's (2018) finding that well-established goals also serve as moderators of succession effectiveness. That is, formal planning relies on reducing information asymmetry among stakeholders.

Considering Cosenza, De Andrade, and De Assunção's (2020) perspective, for the transition to CE in Brazil to be accelerated, it is important to have a cultural change, especially based on environmental education. In this sense, successors equipped with well-structured plans can strengthen this condition.

One aspect highlighted by Chung and Luo (2013), after evaluating 573 family businesses in Taiwan, is that the social context of emerging markets influences them. Therefore, perceiving the biological input market as emerging, it is plausible to conceive that the interaction of agents of the segment deeply impacts the perspective and decision of rural managers.

When assessing the association between variables, this study evidenced that V25 – Increase of Input Suppliers for Sustainable Production – presents a substantial positive correlation with V11 – Search for Knowledge on Circularity, V12 – Inclusion of Circularity in the Business Strategy, V13 – Implementation of Circular Practices, V14 – Practices to Optimize the Use of Water, and V17 – Reduction of Agrochemicals. In other words, there is strong evidence about the importance of specialized suppliers in influencing the transition to circular business models in rural enterprises.

The situation is different concerning the demand for sustainable and organic products. The associated variable (V24) strongly correlates with only two other variables. They are V14 – Practices for Optimizing Water Use and V15 – Practices for biodiversity and preservation of natural capital.

Closing the discussions in this section, the first research hypothesis (H1) reaches confirmation. The results obtained through the research, mainly from the application of Spearman's Correlation Coefficient, indicate that the inclusion of circularity in the rural business strategy has a positive relationship with the transition to the Circular Economy. The results regarding the analysis between variables V12, V13, and Score V101 indicate significant and directly proportional correlation.

4.4.2 Discussions Regarding the Family Succession Dynamics Construct

The discussions concerning the construct prioritize verifying the existence and characterization of the family succession dynamics at the rural businesses represented in the sample. The research revealed that all managers surveyed recognize the dynamics and are in different statuses in this regard. Figure 34 allows visualizing the graphic representation elaborated from the score Succession Plan (V102), a computation that congregates the variables V30 and V31, respectively, with Formal Succession Plan and Succession Planning.

According to the classification related to Score V102, it can be verified that 40% of the enterprises are in the moderate-low condition. In addition, around 34% of the sample was classified with a high score.

Regarding characterization, the research sample comprises 30 rural managers aged 49 years on average (between 23 and 65 years), 47% with a college education, and 60% representing the third generation in charge of the business. These variables were also observed in Taylor, Norris, and Howard's (1998) research when analyzing 36 farms in Canada. This sample was composed of managers aged between 40 and 77 years, with education between elementary school and the second year of college, most of them in the second generation at the head of the business. The same researchers concluded that there was a statistically significant difference between the education of senior managers and successors, with the latter presenting advanced education.

The generation aspect facing the business can influence other situations. For Ghee, Ibrahim, and Abdul-Halim (2015), in more mature family businesses – second and third generation – the management styles are more formal and objective. The research pointed out that although 60% of the rural managers in the sample represent the third generation in charge of the business, this variable has no significant correlation - no association - with Score V102, which represents the family succession status.

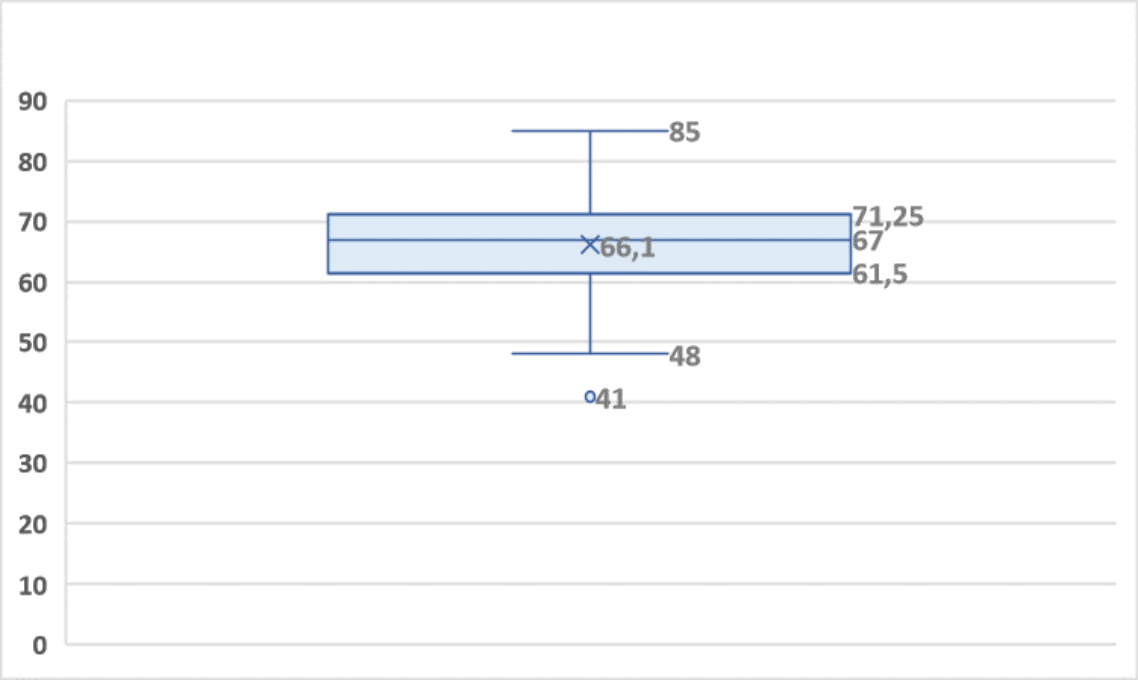
The research showed that ten successors do not work in the rural business yet, and 20 perform activities at different levels of relationships. In two enterprises, two successors work on the farm and manage other businesses. One of the conclusive aspects of Mishra, El-Osta, and Shaik (2010), after 3,000 observations in North American farms, is that even when the agricultural activity does not offer an adequate standard of living, the controlling family refrains from selling assets and seeks income complementation outside the farm.

Concerning the succession stage, the dimension "time" is the first to be highlighted. It was evidenced that none of the rural managers surveyed intends to finalize the succession before five years as of the survey application. Of the 30 respondents, most (30%) intend to pass on control of the business in ten years. By crossing the variable V32 with the respondents' age – V2 – we can verify that the projected age for passing on the business management to the successor is between ages 61 and 71.

Figure 39 shows the graphical representation of this distribution.

Figure 39

Projected Age of Managers for Transmitting the Rural Business Direction



Source: Prepared by the author with research data (2021)

Michel and Kammerlander (2015) argue that the dimension "time" combined with relevant events allows classifying the succession dynamics into phases. The authors named them Trigger, Preparation, Choice, and Formation. By applying this classification to the survey results, 13 managers have not yet entered the Trigger phase, and 17 have because they stated that they have already started succession planning.

Regarding the preparation phase, successors of 20 enterprises are already professionally connected to the business – at different relational depths – and build competencies by combining work activity, regular training, and other learning formats.

The choice phase can be verified from variable V31, which shows shared management between two sons as the highest incidence in the sample. When the choice phase is over, the training phase begins to prepare the chosen successor to take over the business management. The research sample indicates that 17 managers have already determined their successors. In this sense, the sample shows that the remaining time for the preparation of successors is between 11 and 23 years.

The findings of Calabrò, Minichilli, Amore, and Brogi (2018) indicate that increasing opportunities for business education for next-generation leaders creates spaces for increased competition among family and even non-family candidates. In this regard, initiating the education phase before the successor is chosen may imply other factors that, if well managed, can promote positive impacts on succession dynamics.

Still, in the formation phase, Michel and Kammerlander's (2015) findings indicate that succession tends to be more effective when impartial advisors and mentors accompany alternates. Impartiality in this context is a conditioning factor on whether or not agency costs exist. Based on Cramer (2020), when considering the family structure of the business, intermediaries can rely on the promotion of learning.

This accompaniment can also be part of a family protocol for succession that, according to Cardona and Balvín (2014), after analysis of family businesses in Colombia, are relegated especially due to fear or lack of knowledge of the families.

When asked about a formal family succession plan – protocol – the rural managers showed that 50% do not have one yet, and 33% are in the early drafting stage. Only two producers stated they had finalized plans. The results of Mishra, El-Osta, and Shaik (2010), after 3,000 observations, indicate that plans are considered by many to be a healthy progression in the life of a viable family farm business. Plans connect current managers to the future. This view is supported by Ghee, Ibrahim, and Abdul-Halim's (2015) findings, highlighting that well-developed succession plans increase the likelihood of cooperation among stakeholders and facilitate succession. For Pieper, Kellermanns, and Astracham (2018), well-established goals – a basic necessity for building plans – set themselves up as moderators of succession effectiveness and decrease asymmetric altruism. A condition where the goals of the parties involved in the succession dynamics overrides the interests of the business.

On primogeniture, Calabrò, Minichilli, Amore, and Brogi (2018) concluded that after analyzing 843 successions in Italian firms, the natural appointment of the firstborn as a successor could bring undesirable effects to the post-succession business performance. They also found that the appointment of a son other than the firstborn has a positive and significant effect on the firm's profitability in its second or later generation. By crossing variables V33 and V28, it is possible to conclude that 15 rural enterprises in the sample achieve this condition since they are businesses that have been under family control for two or more generations and have a definition that there will be no natural succession of the firstborn.

Regarding the hypothesis related to this construct (H2), it was verified that there is no significant correlation – association – between the manager's expectation of continuity ahead of the business and the succession plan in rural enterprises. This finding occurred from the results obtained with the Spearman test, which showed a p-value of 0.581 between variable V32 and Score V102. Thus, the hypothesis is rejected, indicating that it is not the age or the projection that the rural manager generates about how long he/she will continue to be in charge of the business that will determine the succession plan status.

4.4.3 Discussions Regarding the Impacts of Transition to Circular Business Models Construct

Construct 3 was conceived to connect the themes Circular Economy and Family Succession in Rural Businesses. Based on the theoretical survey, the formation proposed for this construct included seven variables and a single factor.

Initially, it should be considered that of the 30 surveyed entrepreneurs, only 20 had successors working in the business. Therefore, the impact analysis was limited to this portion of the sample.

When analyzing the intersection of international business and family business, the results obtained by De Massis, Frattini, Majocchi, and Piscitello (2018) showed that family involvement affects business performance and should therefore be measured. Thus, the first impact investigated by this research concerns the active participation of successors in building the future vision and strategic objectives of the rural business. It was identified that 65% of managers perceived an increase in successor involvement after the business model transition. This involvement can translate into firm behavior that promotes behavioral propensities such as willingness and ability (De Massis, Frattini, Majocchi, & Piscitello, 2018). Ghee, Ibrahim, & Abdul-Halim's (2015) findings point out that 80% of the family businesses in succession surveyed had a participatory management style and 20% a paternalistic one.

Regarding engagement, the results of this research pointed out that 55% of the managers investigated are associated with the statement that successors have increased engagement after the transition to a circular business model. This aspect is positive since the studies by Calabrò, Minichilli, Amore, and Brogi (2018) indicated that later generations experience a decline in family engagement and identification with the business. The authors

also point out that the mitigation of related risks should consider economic references in addition to socio-emotional ones.

On the role redistribution for manager and successor after the circular business model transition, it was found that 55% totally or mostly agree with this event. All respondents considered that there was, on the part of the successors, mobilization of new knowledge in the last two years related to the circular business model. It is worth emphasizing that 30% of the respondents fully agree with this statement.

It was possible to verify that 55% of the respondents strongly or partially agree with the statement concerning the new skills acquired by the successors. In Michel and Kammerlander's (2015) view, the family succession dynamics (called training) phase is appropriate for the successor to acquire the necessary governance, leadership, and business skills to gain acceptance and trust from all parties involved. To this end, an important task is to get in touch with all relevant stakeholders – internal and external – of the business.

65% of the respondents fully or mostly agree with the statement about the successor's increasing responsibility after beginning the business model transition. The same percentage (65%) is verified in farmers' association with the full or mostly agreement that they started to trust their successors more after the beginning of the business model transition. Only one respondent disagreed. This one, in particular, registered that his successor supports him in the administration of the establishment at the same time that he manages other businesses, a situation that may show the maturity of the successor regarding business management.

After 573 observations, Chung and Luo (2013) point to the importance between successor origin and social context. In this context, they concluded that organizational learning alters the impact of leadership succession.

Closing this chapter, the third hypothesis (H3) - impacts that enhance the dynamics of family succession in rural entrepreneurship - is rejected. Even though the descriptive statistics indicate that managers are associated with positive impacts in all variables of Construct 3, Spearman's test indicated another direction. When analyzing the relationship between Score V101 and variables V34 to V40, the test showed no significant correlation.

5 FINAL CONSIDERATIONS

The final considerations initially discuss the fulfillment of the objectives and hypotheses previously established. Subsequently, aspects related to the contributions and limitations of the research are addressed. In the end, it lists suggestions for future work identified during the research journey.

For a better contextualization, it is appropriate to recall the flow observed for the execution of this work that began with the formation of a bibliographic portfolio and theoretical foundation, followed by the proposition of three theoretical constructs that guided the research. After being applied, these constructs were submitted to consistency verification. The flow ended with the analysis of the results and the respective discussions.

The first construct was proposed to characterize the circular business models and the transition elements of the investigated rural enterprises. This specific goal was achieved based on the analysis of the listed variables, especially by the possibility of verifying the companies' distribution in the different transition stages using the V101 score that considered the verification of the implementation of 10 EC practices in the sampled farms. It was also possible to notice a very close distribution between the score quartiles, which had 27% of the enterprises in the high transition stage.

The hypothesis associated with construct H1 was also confirmed, and the importance of including circularity in the business strategy was highlighted due to the verification of a statistically significant association with CE practices' implementation status.

Regarding the second construct, the specific objective was to characterize rural business family succession dynamics. The analysis of this construct's variables allowed achieving it. The perception of the succession dynamics in the sample companies became evident, especially through the joint analysis of the questions related to the main manager's aspirations regarding the *continuum* ahead of the rural business, the successor's positioning, especially the status of the succession plan based on the interpretation of the Score V102. It was found that all enterprises are in the moderate-low stage or more advanced in the context of the succession dynamics, and 33% are distributed in the high stage.

No confirmation was found for the hypothesis associated with the construct. The research did not confirm that the succession plan reaches a more advanced status as the time projected by the rural producer to continue leading the business decreases. Therefore, it is evident that other variables affect this condition.

Concluding the first part of this session, the third construct shows the elements that connect the themes Circular Economy and Family Succession and the issues evaluated as impacts generated from the transition of the business model. The associated specific objective was achieved since the research managed to verify the occurrence of an impact considering such issues.

The results indicated that only one respondent fully disagreed with the occurrence of impacts after the start of the business model transition. Moreover, in all the variables evaluated, more than 50% of the respondents had full or mostly agreement.

A relevant aspect to highlight is that this result observed in the descriptive statistics was insufficient to confirm the hypothesis associated with Construct 3 (H3). This implies that, although most rural managers perceived improvement in the seven items listed for impact analysis, the association test showed no significant relationship between this perception and the CE transition stage.

Thus, the answer to the research question was reached. It states that rural producers have perceived positive impacts on the family succession dynamics caused by the transition to a circular business model that did not present a statistically significant association.

Theoretical and practical contributions are worth noting. The approach demonstrated that quantitative methods could be applied to analyze the transition of rural businesses to the Circular Economy. It was found that there was a practical advance of the CE in the sample formed by the researched agricultural establishments. Furthermore, even without a standard transition protocol, rural producers are implementing practices that place their enterprises in different stages of transition - a need identified in the literature survey phase.

Most of the studies reviewed focus on purely conceptual treatments with some practical applications.

Still, on practices, this study allows assessing individual advancement, as in the case of biological inputs and waste management, which present good diffusion in the sample. In contrast to this are the opportunities to implement practices related to energy generation from alternative sources.

The quantitative approach also stands out in the scope of family succession. Reinforcing its visualization as a dynamic composed of phases may help researchers and rural managers construct new implementations focused on reducing the enterprises' susceptibility to succession.

Another relevant contribution refers to the junction of the two themes. As no publications were found in this direction, this study is a unique proposal so far. Even with the

rejection of the hypothesis related to the third objective, the analysis presented an association between variables from different constructs. This argument implies the assertion that studies inherent to CE transition in rural businesses must consider aspects related to family succession and vice-versa.

One last contribution deserves to be highlighted: it refers to the possibility that this work generates by employing a flow of activities related to the formulation of constructs and analysis of their consistency after applying the research. The factor analysis indicated that the congregation of variables in nine factors could achieve better results; therefore, future research may consider this dynamic.

Limitations were identified and are relevant. The first refers to the sample size. The number of observations was the same as the number of variables listed, requiring the mirroring technique to make the factor analysis feasible. Construct 2 - Block 3 - showed low Cronbach's Alpha and KMO coefficients, indicating possibilities of improvement in the quality of the research from specific reviews in the structuring of variables related to this construct.

The sample comprises rural producers who, admittedly, have started to pursue circularity in their businesses. Therefore, applying the research to a different public demands a review of variables.

Throughout the systematization journey, and especially after analyzing the results, opportunities for future studies were identified. It was realized that, within this research, qualitative studies could support the deepening of aspects not captured by the quantitative approach. Moreover, maintaining the quantitative approach can achieve better performance when contemplating a sample with more observations and revised constructs, thus taking advantage of the results generated by factor analysis.

Opportunities for further studies were also perceived in exploring the unfolding of CE-related themes and family succession in rural businesses. They are:: Comparison between effective practices of transition to circular business models in rural enterprises; comparison and proposition of models – with indicators and scores – able to support the transition planning and monitoring of rural enterprises transition to CE; proposition of online platforms aimed at supporting rural entrepreneurs who wish to transition their business models to CE; alternatives for implementing a circular design in rural businesses; comparative analysis and proposal of formal plans for family succession in rural enterprises; identification and systematization of elements that condition the preparation of rural business successors; and contents and programs related to CE for rural business successors.

Certainly, the Circular Economy and Family Succession in Rural Businesses themes enable other studies with potential theoretical and practical contributions.

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APPENDIX A - DATA SURVEY INSTRUMENT

Esta pesquisa objetiva identificar a percepção dos empreendedores rurais sobre o impacto ocasionado pela transição para um modelo de negócio mais sustentável e circular na dinâmica de sucessão familiar. Solicitamos sua colaboração para participar do estudo respondendo o questionário a seguir. As informações serão utilizadas somente para fins acadêmicos e serão tratadas com o mais absoluto sigilo e confidencialidade, uma vez que não há identificação do respondente em qualquer parte do questionário.Caso haja dúvidas ou necessidade de mais esclarecimentos, é possível o contato direto com o pesquisador responsável pelo seguinte endereço eletrônico: economista.pauloamaral@gmail.com
Cordialmente,

Paulo Cesar do Amaral Junior - pesquisador responsável e mestrando em Administração do PPGA/UNIOESTE
Geysler Rogis Flor Bertolini - Orientador da pesquisa - PPGA/UNIOESTE

*Obrigatório

1. Diante do exposto, declaro que tenho conhecimento acerca dos objetivos da pesquisa e dou o meu consentimento para participar dela e para publicação de seus resultados. *

   Marcar apenas uma oval.

   - ◯ Concordo em participar da pesquisa
   - ◯ Não concordo em participar da pesquisa

Pular para a pergunta 2

CARACTERIZAÇÃO DO EMPREENDEDOR RURAL

2. Idade (anos) *

   _____

3. Sexo *

   Marque todas que se aplicam.

   - ☐ Masculino
   - ☐ Feminino
   - Outro: ☐ _____

4. Formação *

Marcar apenas uma oval.

- ◯ Ensino fundamental incompleto
- ◯ Ensino fundamental
- ◯ Ensino médio ou técnico
- ◯ Ensino superior
- ◯ Especialização
- ◯ Mestrado ou doutorado

Pular para a pergunta 5

CARACTERIZAÇÃO DO NEGÓCIO RURAL

5. Como sua família é formada?

Marcar apenas uma oval por linha.

	Não possuo	Homem	Mulher	Outro
Cônjuge	◯	◯	◯	◯
Filho 1	◯	◯	◯	◯
Filho 2	◯	◯	◯	◯
Filho 3	◯	◯	◯	◯
Filho 4	◯	◯	◯	◯
Filho 5	◯	◯	◯	◯
Filho 6	◯	◯	◯	◯
Filho 7	◯	◯	◯	◯

6. Você reside na propriedade rural? *

Marque todas que se aplicam.

- [ ] Sim
- [ ] Não

7. Quantas propriedades rurais compõem o negócio? *

8. Qual é área total das propriedades rurais que você administra? (responder em hectares) *

9. Quais atividades formam a renda agropecuária? Responder com nome da atividade e ao lado % participação na renda agropecuária. (Ex.: soja 50% - milho 50%) *

10. Quantos empregos diretos o negócio gera? *

BLOCO 1 - TRANSIÇÃO PARA O MODELO DE NEGÓCIO CIRCULAR

C 1.1 - MINDSET CIRCULAR

11. Nos últimos dois anos tenho buscado conhecimentos sobre sustentabilidade e circularidade no negócio rural? *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

12. Nos últimos dois anos passei a considerar a sustentabilidade e a circularidade nos objetivos estratégicos e visão de futuro de meu negócio rural. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

13. Nos últimos dois anos implementei práticas sustentáveis e circulares no sistema de produção. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

C 1.2- ADERÊNCIA AO MODELO DE NEGÓCIO CIRCULAR

14. ÁGUA - Nos últimos dois anos implementei práticas capazes de otimizar a utilização de água em meu negócio (ex.: redução de consumo, reuso, captação de água da chuva, recuperação de nascentes.) *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

15. FLORA E FAUNA - Nos últimos dois anos implementei práticas capazes de apoiar a preservação de animais silvestres e vegetação nativa em minha propriedade rural. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

16. ENERGIA - Nos últimos dois anos utilizei energia gerada a partir de fontes alternativas, como biomassa/biogás, solar e eólica . *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

17. AGROQUÍMICOS - Nos últimos dois anos reduzi o uso de agroquímicos no sistema de produção. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

18. INSUMOS BIOLÓGICOS - Nos últimos dois anos implementei ou aumentei o uso de insumos biológicos. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

19. RESÍDUOS - Destino adequadamente os resíduos gerados na propriedade a partir do tratamento específico e reintrodução no sistema de produção. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

20. RESÍDUOS - Realizo aquisição de resíduos de outras atividades produtivas para utilização em meu sistema de produção. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

21. CIRCULARIDADE - Em meu sistema de produção, os resíduos de uma atividade se tornam insumos indispensáveis para outra atividade, promovendo assim a circularidade interna. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

22. CIRCULARIDADE - Utilizo resíduos de indústrias locais como insumos indispensáveis para minhas atividades produtivas. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

23. SERVIÇOS AMBIENTAIS - Realizo serviços ambientais previstos Política Nacional de Pagamento por Serviços Ambientais (Lei Federal nº 14.119) *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

24. COMERCIALIZAÇÃO - Nos últimos dois anos aumentou o número de clientes que me apresentam demanda por produtos orgânicos ou sustentáveis. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

25. COMERCIALIZAÇÃO - Nos últimos dois anos aumentou o número de fornecedores que me ofertam insumos direcionados para produção sustentável ou orgânica. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

C 1.3 - PLANO DE TRANSIÇÃO PARA O MODELO DE NEGÓCIO CIRCULAR

26. PLANO DE TRANSIÇÃO - Possuo um plano de transição detalhado para que meu modelo de negócio se torne mais sustentável e circular. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

C 1.4 - ESTÁGIO DE TRANSIÇÃO

27. ESTÁGIO DE TRANSIÇÃO - A transição de meu modelo de negócio para circular se encontra no seguinte estágio: *

Marcar apenas uma oval.

- ◯ 1 - Não Iniciada
- ◯ 2 - Inicial de implementação
- ◯ 3 - Em fase intermediária de implementação
- ◯ 4 - Avançada de implementação
- ◯ 5 - Transição completamente implementada

BLOCO 2 - DINÂMICA DA SUCESSÃO FAMILIAR

C 2.1 - CLASSIFICAÇÃO DAS PARTES

28. Você representa qual geração a frente do negócio rural? *

Marcar apenas uma oval.

- ◯ Primeira
- ◯ Segunda
- ◯ Terceira
- ◯ Quarta
- ◯ Quinta ou superior

29. Atualmente como ocorre a atuação do(s) sucessor(es) no negócio? *

Marcar apenas uma oval.

- ◯ O(s) sucessor(es) não atua(m) no negócio.
- ◯ O(s) sucessor(es) atua(m) no negócio.
- ◯ O(s) sucessor(es) atua(m) parcialmente no negócio
- ◯ O(s) sucessor(es) não atua(m) no negócio e acompanham os resultados
- ◯ O(s) sucessor(es) administra(m) outros negócios e atua(m) na fazenda

C 2.2 - PLANO DE SUCESSÃO

30. Você possui um plano formal de sucessão do negócio rural? *

Marcar apenas uma oval.

- ◯ Não possuo
- ◯ Está em fase inicial de elaboração
- ◯ Esta em fase final de elaboração
- ◯ Sim, está finalizado
- ◯ Sim, está em implementação

31. Como está planejada a sucessão do negócio rural? *

Marcar apenas uma oval.

- ◯ Ainda não está planejada
- ◯ Contempla um filho a frente dos negócios
- ◯ Contempla gestão compartilhada entre dois filhos
- ◯ Contempla gestão compartilhada entre três filhos
- ◯ Contempla gestão compartilhada entre mais de três filhos

C 2.3 - ESTÁGIO DE SUCESSÃO

32. Com base em sua perspectiva atual, por quanto tempo você pretende continuar a frente da gestão do negócio rural? *

Marcar apenas uma oval.

- ◯ No máximo 5 anos
- ◯ No máximo 10 anos
- ◯ No máximo 15 anos
- ◯ No máximo 20 anos
- ◯ Mais que 20 anos

C 2.4 - PRIMOGENITURA

33. Como a primogenitura impacta no plano de sucessão familiar de seu negócio? *

Marcar apenas uma oval.

- ◯ Certamente o primogênito (primeiro filho) será o sucessor
- ◯ Ainda não tenho certeza sobre qual filho será o sucessor
- ◯ O sucessor será outro filho e não o primogênito
- ◯ A gestão será compartilhada entre dois ou mais filhos
- ◯ Não haverá sucessão familiar no negócio rural

BLOCO 3 - IMPACTOS DECORRENTES DA TRANSIÇÃO PARA O MODELO DE NEGÓCIO CIRCULAR

34. Após iniciar a transição para um modelo de negócio mais sustentável e circular, o(s) sucessor(es) PARTICIPARAM MAIS ATIVAMENTE DA CONSTRUÇÃO DA NOVA VISÃO DE FUTURO E OBJETIVOS DO NEGÓCIO RURAL. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

35. Após iniciar a transição para um modelo de negócio mais sustentável e circular, o(s) sucessor(es) APRESENTARAM MAIOR ENGAJAMENTO NO NEGÓCIO. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

36. A transição para um modelo de negócio sustentável e circular demandou NOVA REDISTRIBUIÇÃO DE FUNÇÕES PARA MIM E SUCESSORES. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

37. A transição para um modelo de negócio sustentável e circular demandou QUE OS SUCESSORES MOBILIZASSEM NOVOS CONHECIMENTOS RELACIONADOS A ATIVIDADE. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

38. A transição para um modelo de negócio sustentável e circular demandou QUE OS SUCESSORES MOBILIZASSEM NOVAS HABILIDADES NECESSÁRIAS PARA A ATIVIDADE. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

39. A RESPONSABILIDADE do(s) sucessor(es) FRENTE AOS NEGÓCIOS aumentou(aram) após início da transição para um modelo de negócio mais sustentável e circular. *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente

40. Após inicio da transição do modelo de negócio, passei a CONFIAR MAIS NO(S) SUCESSOR(ES). *

Marcar apenas uma oval.

	1	2	3	4	5	
Discordo fortemente	◯	◯	◯	◯	◯	Concordo fortemente