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"Who Comes Next?": Planning and Managing Sustainable Initiatives that Facilitate Family Business Succession

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Abstract

Family businesses are increasingly recognized for their significance in the global economy, constituting a growing portion of companies worldwide and elevating the importance of this topic on governmental agendas. Unique challenges confront family firms, intertwining business decisions with familial repercussions. Among these challenges, the succession process emerges as a critical threat to their continuity. Inadequate solutions to the question of succession often lead to organizational failure, underscoring the urgency of addressing this issue. This study endeavors to construct an analysis model to support decision-makers throughout the succession journey, integrating a constructivist approach that merges cognitive mapping and interpretive structural modeling (ISM). This dual methodology facilitates the swift identification and analysis of factors crucial for smoother family business succession. The model development leverages insights from an expert panel and entails delineating cause-and-effect relationships among identified determinants and prioritizing these factors based on their significance. Subsequently, the model undergoes validation through a consolidation session with experts from the *Associação de Empresas Familiares* (*i.e.*, Family Business Association in Portuguese), who assess its practical applicability. This includes perspectives from a Brazilian expert renowned for his understanding of family business dynamics within an emerging economy—Brazil. The insights gleaned from these sessions inform recommendations on implementing the tested procedures within real-life family enterprises, thereby contributing to the sustainability and longevity of these businesses.

Keywords Cognitive Mapping · Family Business · Interpretive Structural Modeling (ISM) · Family Business Succession · Succession Process · Sustainability

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Introduction

Family business succession has garnered considerable attention from both researchers and managers in recent decades (Marques et al., 2022; Miller et al., 2003; Mokhber et al., 2017). While numerous studies have underscored the competitive advantages of family firms, such as their unique company culture (Chua et al., 1999; Marques et al., 2022; Miller & Le Breton-Miller, 2005; Rovelli et al., 2022), others have highlighted the challenges they face, including conflicts between family members and limited resources (Cabrera-Suárez et al., 2001).

Despite the extensive literature on the topic, comprehensive overviews of family business succession challenges remain rare (Saura et al., 2023), especially in emerging economies such as Brazil, China, and India. This scarcity is particularly notable given the increasing prevalence of family firms in the global economy, where they serve as vital contributors to market management, innovation, and technology.

Most previous studies of family business succession have suffered from two major methodological limitations: (1) the unclear way in which succession determinants are identified; and (2) the scarcity of research focused on the cause-and-effect relationships between these determinants (*cf.* Marques et al., 2022). The present investigation sought to address these limitations by applying cognitive mapping and interpretive structural modeling (ISM).

The main objective is to construct a model that enables decision-makers to identify and analyze factors promoting sustainable family business succession processes. Additionally, three complementary objectives are defined. The first is to broaden the scope of family business succession research to encompass sustainability considerations. The second objective aims to develop a decision-support tool for family firm managers that integrates sustainability principles. Lastly, the objective is to establish a heterogeneous panel of expert decision-makers to ensure that the developed model embodies real-world challenges. This study overall focuses on mitigating existing gaps in the literature by addressing the following research questions:

- How can the determinants of family business succession be identified?
- What are the most influential relationships between these variables?
- Which determinants/initiatives should decision makers prioritize to facilitate family business succession?

The proposed model was designed to help family company managers more clearly identify relevant factors because its contents were defined during two sessions with an expert panel possessing significant knowledge and practical experience in family business succession. The decision problem was first structured by applying cognitive mapping. ISM was then conducted to identify the causal relationships between each pair of determinants, as understood by the panel, and to develop a hierarchy of these factors by importance. Due to its process-oriented nature (see Bell & Morse, 2013), the procedures applied can be tailored to any country or context, including emerging economies, as confirmed during the consolidation phase of the present study. This research thus confirmed that managers can use these multicriteria analysis techniques to guide family business succession processes.

This paper is organized into five sections. The next section provides a literature review focused on family business succession and the contributions and limitations of prior studies to this field of study. The subsequent section outlines the conceptual framework of the methodologies applied. Following that, the methodological application and results are covered. The last section presents the main conclusions and limitations of this investigation, as well as suggesting lines of future research.

Related Literature and Research Gaps

The family business concept has undergone extensive examination across various academic domains (Marques et al., 2022; Miller et al., 2007; Wu et al., 2022), yet consensus on its definition remains elusive. The European Commission's (2009) conceptualization has long held significance within the academic community, as it serves as the foundation for definitions adopted by the International Association of Family Businesses and European Family Businesses.

A company is typically classified as a family firm if it meets at least one of four criteria. First, the majority of the company's rights are held by the founder, their successors, or relatives thereof. Second, family members are formally involved in the company's management. Third, in the case of a publicly traded company, a founder, their successor, or their family members own 25% or more of the organization's share capital. Last, the majority of the firm's rights are owned by a family, either directly or indirectly.

If none of these criteria are met, a business may still be designated as a family company if a relative of the founder or a family representative is formally involved in its management. Additionally, the European Commission (2009) contends that this definition extends to companies listed on stock exchanges. Comparative analyses between family businesses and other firm types reveal distinctive characteristics, such as intergenerational continuity and intricate interplay between family, business, and property (Metsola et al., 2020; Tatoglu et al., 2008). This organizational type is prevalent

across most economies globally (*cf.* Motwani et al., 2006; Rovelli et al., 2022).

According to Hatak and Roessl (2015) and Nordqvist et al. (2013), family business succession involves a change in ownership or management of a family company, wherein the successor—whether from within or outside the family—brings fresh ideas and a unique management style. However, the new owner or manager may not necessarily inject fresh capital into the company. Succession poses one of the most complex challenges for family firms (Benavides-Velasco et al., 2013; Cisneros et al., 2018), serving as the primary continuity mechanism for the family as the business evolves.

Given the complexities surrounding succession in family businesses (Acs et al., 2018; Dekker et al., 2015), consultants often recommend adopting a family constitution, preferably during the founder's lifetime, to ensure a seamless, conflict-free transition to the next generation (Sathe et al., 2022). Successful succession entails a smooth transfer of leadership and ownership (Pyromalis & Vozikis, 2009; Thevenard-Puthod, 2022), accompanied by positive company performance and robust business viability (Le Breton-Miller et al., 2004; Marques et al., 2022), alongside stakeholder satisfaction with the successor (Cabrera-Suárez et al., 2001; Sathe et al., 2022; Steier, 2001).

While significant strides have been made in addressing the challenges faced by family firms, numerous contributions to the literature remain constrained by limitations, many of which are prevalent across different contexts, including emerging economies. Table 1 illustrates examples of prior literature concerning family business succession, detailing their findings and constraints.

No study is immune to limitations. While academic research on family business succession has surged, particularly in recent years, scholars still grapple with defining this process and identifying factors that foster sustainability within it (*cf.* Marques et al., 2022; Powell & Eddleston, 2017; Strike et al., 2018). Table 1 underscores the diverse limitations present in prior studies, some of which are shared across multiple investigations.

The first common shortcoming is the vague identification and definition of succession determinants and their integration with sustainable practices. To address this limitation, the present research employed cognitive mapping, a method that organizes complex decision problems through simple, easily understandable procedures. The second prevalent weakness in family business succession studies is the neglect of cause-effect relationships between process determinants. The current investigation tackled this issue by utilizing another constructivist method, namely ISM, which facilitated the identification of causal links between each pair of variables and their hierarchical importance, while considering sustainability concerns and allowing for the accommodation of nuances specific to emerging economies.

The selection of methods in this study was influenced by four key factors. First, cognitive mapping and ISM are well-regarded socio-technical approaches known for their ease of application and effectiveness in facilitating decision-making in various organizational settings (*cf.* Ackermann & Eden, 2001; Çipi et al., 2023; Santos et al., 2024). Second, as suggested by Ackermann and Eden (2001) and Bai et al. (2024), the choice of methods was tailored to suit both the decision context and the characteristics of the expert panel. Third, ISM's strengths include its ability to incorporate both qualitative and quantitative criteria and to handle their interdependencies when examining cause-and-effect relationships. Last but not least, while cognitive mapping and ISM are relatively popular, their combined application is quite novel, highlighting the uniqueness of the proposed framework in this study context.

Methodological Background

This study combines cognitive mapping and ISM, which are based on multiple-criteria decision analysis (MCDA). MCDA is usually characterized by: (1) a lack of focus on optimization; (2) a reduced need for data; (3) simple and transparent procedures; (4) bottom-up planning; (5) the active participation of decision makers; and (6) an incorporation of uncertainty and subjectivity (*cf.* Ferreira et al., 2011). MCDA is also integrates both objective and subjective aspects (Ferreira et al., 2012).

Cognitive Mapping

The cognitive mapping term was originally used by Tolman (1948) to refer to people's mental maps of their physical space. Cognitive mapping was subsequently introduced into the field of operations research and management science by Eden (1988). According to Eden (2004), a cognitive map is an aggregation of ideas that are structured hierarchically and interconnected by arrows that represent cause-and-effect relationships. In essence, *"a cognitive map is the representation of thinking about a problem that follows from the process of mapping"* (Eden, 2004, p. 673).

Ferreira et al. (2016) strengthen this definition by adding that cognitive maps function as epistemological structures that help decision makers organize their thoughts, experiences, and values. In practice, these maps are tools for structuring complex decision problems as cognitive mapping provides an integrated approach to the configuration and evaluation of challenging problems (Brito et al., 2019). This technique can be applied to complicated, confusing, and, in many cases, multidisciplinary tasks (Abramova, 2016). As a result, cognitive mapping is widely recognized as an

Table 1 Recent studies of family business succession

Authors	Purpose	Contributions	Main Limitations
Sharma et al. (2003)	Understand successors and owners' satisfaction with the family business succession process	■ The study found that timely planning of this process facilitates its success	■ The researchers fail to provide empirically robust evidence or support for the conclusions ■ The sample was limited and shallow
Zellweger et al. (2011)	Determine the career choice intentions of students whose relatives are associated with family businesses	■ Students raised in a family business environment tend not to pursue entrepreneurial careers as they have experienced the restrictions and personal sacrifices imposed on their parents, have been affected by their parents' absence due to business, and thus want to avoid similar responsibilities and pressures	■ The results only include the successors' personal motives and behavior as factors that determine their career choice
Jayantilal et al. (2016)	Use game theory to explore family business succession by more explicitly including non-economic factors related to the family dimension and focusing on the emotional cost of conflict arising from siblings' competition as possible successors	■ The results reveal that the emotional cost and founder's preference are fundamental to the election of the successor ■ Collaborative family behavior facilitates the succession process	■ This study only covered succession between the first and second generations, so the data were extremely specific ■ The analysis focused on a single real case
Schell et al. (2018)	Understand the role of social capital and contact network transfer in family business succession processes	■ Both family businesses' owners and their successors are aware of the importance of transferring share capital and contact networks to the next generation ■ Future successors also must be warned of their lack a structured social network and competence to build relationships with important contacts in predecessors' networks	■ The research was limited to companies in Germany, so the results cannot be generalized
Porfírio et al. (2020)	Compare and analyze a sample of 383 observations of family business successors, the pre-succession process, and the dispositions and attitudes of the next generation, as well as examining their emotions and intentions regarding the succession process	■ The results show a balance between the influence of personal (*e.g.*, successors' gender, age, and education) and organizational (*e.g.*, family business size) characteristics as determinants of the succession process ■ This study contributes to a better understanding of family business succession and clarifies ways to adopt specific management policies regarding succession	■ The main limitations stem from the questions the researchers asked of the successors about specific succession processes ■ The sample selected failed to consider the sector or type of family business
Cisneros et al. (2022)	Examine external social capital transfer from business owners to a team of brothers during a family business succession process	■ The transfer of family business owners' contact network (*i.e.*, external share capital) to successors is of great importance to the success of the succession plan, and new contacts need to be integrated into the successors' network ■ Complementarity between successors facilitates succession ■ The predecessor's continuity in the company can provide several strategic advantages, contrary to what many researchers have recommended	■ The study was limited to companies in Canada, so the findings should not be generalized ■ The sample was limited and shallow
Lévesque and Subramanian (2022)	Understand how essential direct and indirect activities are categorized and structured in family business succession plans, including the introduction of technology as a tool to improve the plans	■ An overall structure of the succession plan was created using technological intelligence, which can help professionals supervise the teams responsible for the succession plan and identify tools to integrate essential direct and indirect activities into the succession process ■ This succession plan is a practical tool that helps define succession objectives and the main steps to achieve them, as well as alert professionals to the right moment to execute the succession plan	■ The investigation focused exclusively on companies in the United States, which means the results cannot be generalized ■ The researchers failed to provide empirically robust evidence or support for the conclusions

Table 1 (continued)

Authors	Purpose	Contributions	Main Limitations
Sathe et al. (2022)	Analyze the importance of a family constitution based on 21 cases of family business succession	■ Creating a family constitution is not associated with positive socio-emotional wealth (SEW) ■ While the founder is alive, SEW is positive regardless of whether a family constitution is adopted ■ When the founder dies during the succession process, the property is distributed among various family members, and the process of developing a family constitution is superficial, making the aggregated SEW negative	■ No empirically robust evidence or support was provided

important method of structuring complex decision problems (Oliveira et al., 2017).

Cognitive mapping can: (1) incorporate qualitative variables; (2) allow for the configuration of multifaceted situations affecting evaluations; (3) support group work; and (4) help decision makers make and implement strategic choices (Eden & Ackermann, 2004). This methodology creates maps of nodes associated with related factors or concepts and of arrows representing direct causal influences or relationships. The arrows are associated with influence signals (*i.e.*, + or −) that show the type of connection between the relevant variables (Abramova, 2016). According to Eden (2004), cognitive maps, as a rule, contain a hierarchical structure.

This method has many advantages, but it also has limitations. For instance, Jetter and Kok (2014) report that this tool rarely produces proven theories. Thus, cognitive mapping should not be considered an objective to be reached but instead a way to achieve an objective (Eden, 2004).

Interpretive Structural Modeling

The ISM method was developed by Warfield in 1973 (*cf.* Janes, 1988; Warfield, 1974; Xu & Zou, 2020) to identify the relationships between multiple influential factors in complex systems (Kwak et al., 2018; Mathivathanan et al., 2021; Yu et al., 2018). Sakar et al. (2020) report that ISM, besides determining interconnections between variables, also determines the degree of influence factors have on each other. Mathiyazhagan et al. (2013, p. 272) further describe this method as *"an interactive learning process in which a set of dissimilar and directly related elements are structured into a comprehensive systematic model"*.

ISM additionally uses specialists' knowledge and skills to identify and analyze measures that address complex questions and, ultimately, to make a multilevel structural model of each decision problem (Singh & Kant, 2008). Jayant and Azhar (2014) explain that this method takes decision makers through the following steps:

- Step 1: The variables most relevant to the analysis system are identified.
- Step 2: The contextual relationships are defined between the variables listed in the first step to identify which need to be examined.
- Step 3: A structural self-interaction matrix (SSIM) is constructed to show binary correlations between variables.
- Step 4: The initial reachability matrix (IRM) is developed from the SSIM and is checked for transitive relationships.
- Step 5: The IRM from the fourth step is used to determine the different levels of the variables.

- Step 6: Based on the relationships revealed by the IRM, the decision makers can draw a directed graph or digraph after removing the transitive links.
- Step 7: The results are then converted into a final reachability matrix (FRM) by replacing the transitive connections with the designated symbol.
- Step 8: The ISM digraph developed in the previous steps is checked for conceptual inconsistencies, and all necessary modifications are made. A *Matrice d'Impacts Croisés Multiplication Appliquée à un Classement* (MICMAC) analysis is also conducted to support the findings.

In the first step, the decision makers must carry out a comprehensive literature review to gather the necessary information about the decision problem. The determinants found in the literature are then analyzed and discussed in a semi-structured meeting with specialists in relevant fields to determine which factors should be included in subsequent analyses. The third ISM step begins with the creation of an SSIM designed to define the contextual relationships the experts attribute to the variables. Four types of correlations can exist: (1) one variable affecting another variable (*V*); (2) a variable being affected by another variable (*A*); (3) both variables affecting each other (*X*); or (4) both variables having no effect on each other (*O*). Next, the decision makers can start developing the IRM based on the SSIM by replacing the four symbols (*i.e.*, *V*, *A*, *X*, and *O*) with the numbers "0" and "1", according to the contextual relationships of the variables. One of the model's main assumptions is the transitivity of these links. That is, if variable *A* is related to variable *B* and *B* is related to variable *C*, then *A* is necessarily related to *C*. The fifth step comprises determining the level of each factor within a hierarchy by importance. The IRM is used to identify each variable's antecedent set (*i.e.*, the variable itself and those factors that affect it) and reachability set (*i.e.*, the variable in question and the determinants that are affected by it). The hierarchical level of each factor is determined by the intersection of its reachability set with its antecedent set. If the reachability and intersection sets are the same, that factor is placed in Level 1, which is the highest level in the ISM hierarchy. The results are used to create the FRM, which comprises the preliminary ISM model. This step removes any transitivity to simplify the final digraph. The sixth, seventh, and eighth steps complete the process of building the ISM digraphs, after which the decision makers can construct the final model, perform a MICMAC analysis, and check for any inconsistencies in the model's structure.

Application and Results

The theoretical and methodological framework presented in the previous section were applied in the empirical component of the present research. The MCDA process was divided into a structuring phase, which relied on the "post-its technique" (Ackermann and Eden, 2001) to facilitate the construction of a group cognitive map, and an evaluation phase in which the ISM technique was applied. The combined use of these two methods was essential to the successful development of the final multicriteria analysis model.

Structuring Phase

In the structuring phase, two group work sessions were held for about three and a half hours each with a panel of expert decision makers made up of chief executive officers (CEOs) or board members of family businesses. The panel's composition can influence the quality of the evaluation model, so the following four criteria were applied to select the specialists. The first was deep know-how about family business succession, while the second was relevant positions and significant experience in succession processes. The third was decision makers from family companies that had already been through at least one succession so that these expert would have more knowledge about which factors have positive and negative effects on related processes. The last criterion was heterogeneity in terms of age, gender, professional experience, and business sector. The panel needed to consist of between 5 and 12 members (*cf.* Brito et al., 2019), and, in this case, 6 specialists participated in both the first and second sessions. Notably, representativeness was not—and did not have to be—a point of concern given that the objective of the selected methodologies is not to formulate generalizations but rather to maintain a strong focus on process (*cf.* Bell & Morse, 2013).

Cognitive mapping was applied to structure the assessment model of family business succession. This method was facilitated by the "post-its technique" (Ackermann & Eden, 2001), in which the decision makers wrote down on separate post-it notes all the variables believed to be important—whether positive or negative. To kick-off the group work, the following trigger question was presented to the panel members: *"Based on your professional experience/knowledge, what initiatives could facilitate the succession process in family businesses?"*. The application of the "post-its technique" was made possible by *Miro* (https://miro.com/), an online platform that allows multiple users to interact in real time.

The first session was overall divided into three phases: (1) gathering the decision makers' inputs using the "post-its technique"; (2) grouping the determinants identified into clusters; and (3) ranking the criteria by importance (*i.e.*, three levels) within each cluster. After the first group session, the data generated were used to create a group cognitive map using the *Decision Explorer* software (see http://www.banxia.com). This map was validated by the decision

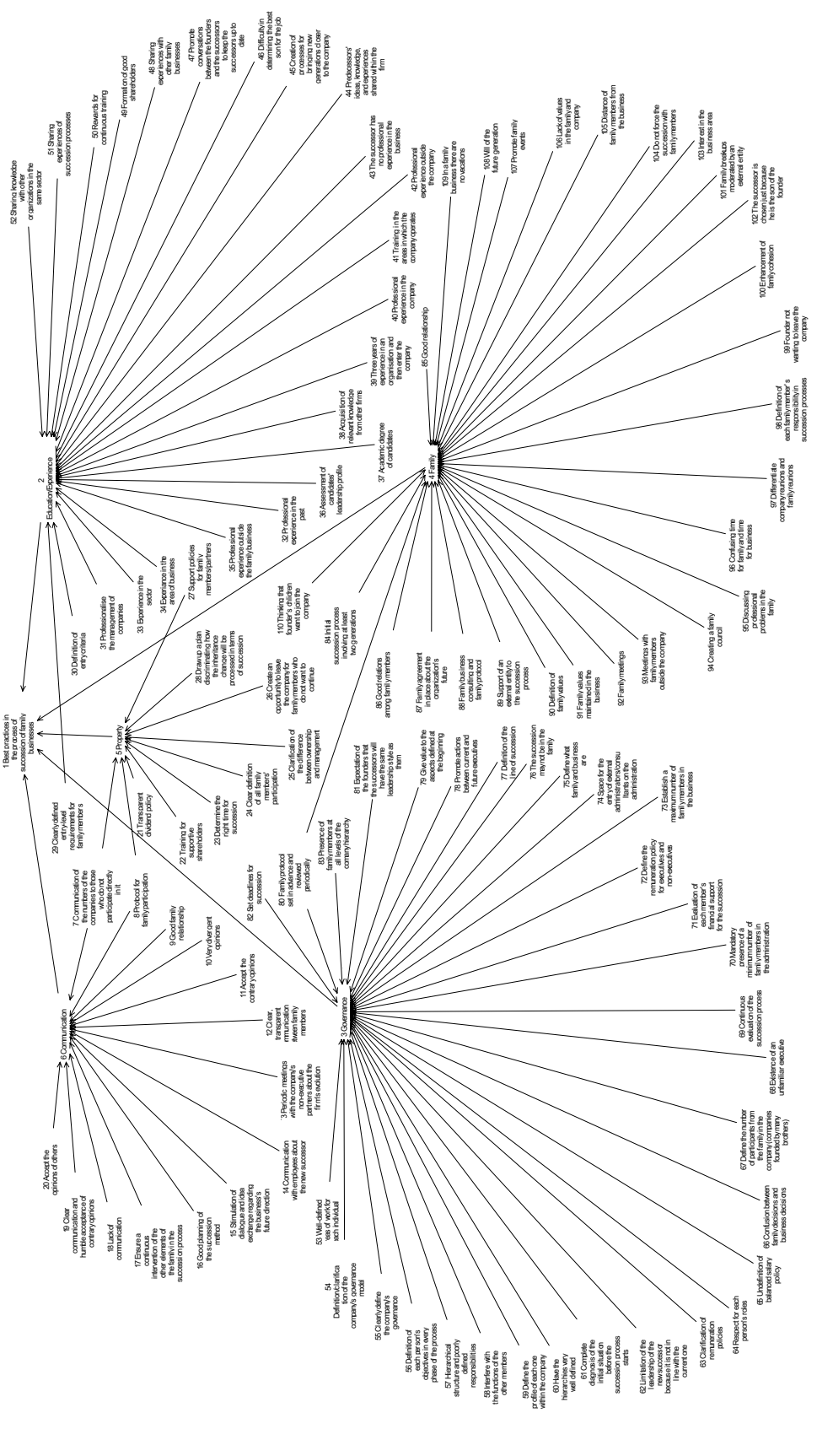


Fig. 1 Group Cognitive Map

makers in the second group session, after which no further changes were made (see Fig. 1).

All the procedures were completed based on discussions that ended only when the experts had reached a consensus. The above map shows the five clusters identified and labeled as follows: *Education/Experience* (C1); *Family* (C2); *Governance* (C3); *Property* (C4); and *Communication* (C5). The cognitive mapping technique thus proved to be extremely useful as it stimulated a rich exchange of information and experience. The map generated provided the expert panel with a more holistic view of the decision problem and a better understanding of the cause-and-effect relationships among determinants of family business succession. The remainder of the second session focused on applying ISM to the clusters and their contents, and carrying out a MICMAC analysis.

Evaluation Phase: ISM and MICMAC Analysis

In this session, the six decision makers session were again all present. The first step was to present the ISM method and the procedures to be followed in its application as succinctly as possible to the panel of specialists. The main objective was to understand how each factor affects or is affected by the remaining variables and then to place them in a hierarchy based on their greater or lesser effect.

The ISM application started with the decision makers using multi-voting to select the evaluation criteria that, in their opinion, were the most important within each cluster. The selected criteria (SCs) used in the remaining procedures are listed in Table 2.

The overall goal was to identify the structure of the causal relationships between the determinants of succession processes and construct an analysis model that decision makers can use to make choices and create solutions for the complex decision problem under study. To this end, the ISM steps had be followed (see Sect. 3.2) using the five clusters. The first of these steps was to fill in the SSIM with the causal links that the expert panel identified for each pair of criteria in the second session, according to the four types of relationships: *V*, *A*, *X*, and *O*. The analysis of factors within each cluster concentrated on the SCs and their respective causal connections, as shown in Table 3.

The SSIM for the five clusters were then used in the second step to fill in the IRM, which shows the binary correlations between the variables (Virmani and Sharma, 2019). The decision-maker panel changed the cells that had a *V* or *X* relationship to "1" in the upper part (*i.e.*, above the diagonal) of the matrix. In the lower part, the cells that contained *A* or *X* relationships were also filled in with "1". All the remaining cells were completed with a "0". This procedure was followed for all the clusters. An example of the results is provided in Table 4.

The next step was to find transitive relationships using Warshall's (1962) algorithm. This auxiliary calculation used the IRM to analyze the possibility of transitivity. All the cells with a "0" where a transitive link was identified were changed to "1*". The result was an FRM for each cluster. Table 5 provides the FRM for C1. The total of the matrix's columns and lines are the driving and dependence power of each SC, respectively, and become that factor's coordinates in the MICMAC analysis.

One of the biggest advantages of using ISM in this study was being able to construct a hierarchy by importance of the variables that can affect family business success, within each cluster. Table 6 shows the partition levels for C1. The first of the three columns is the reachability set, which refers to the SCs assigned a "1" in the FRM. The second column is the antecedent set, which concerns all the SCs that have a "1" in their column, and the third column is the intersection between the first two sets.

The level of each determinant was found by comparing its intersection set with its reachability set. Factors for which the two sets were identical went into Level 1. Next, the SCs identified as belonging to Level 1 were removed, and the remaining factors were analyzed based on their intersection and reachability sets. The variables for which the latter two sets were exactly the same were designated as Level 2, and the process was repeated until all the factors were ranked by level of importance. When all the SCs had been placed in the hierarchy, the ISM digraph could be created. This digraph is another form of representing the results but in a much simpler format. Figure 2 contains the digraph for C1.

Figure 3 shows the digraph for C2, which has four levels—the most important being Level 1 and Level 4 comprising the least important SCs. In Level 1, SC101 is the most significant factor with regard to family business succession. Level 2 contains SC98, SC84, and SC80. SC87 and SC100 appear in the third and fourth levels, respectively. Notably, the team responsible for the succession process should first pay attention to the SCs with the lowest level of importance and then go up level by level to implement the proposed model correctly.

C3, in turn, has five levels. Any practical implementation of the model in a family business should first consider SC61 before the succession process begins as this determinant is the least important in C3. Next, the company needs to focus on SC64, SC53, and SC56, in that order. Finally, the firm still must pay special attention to the three most significant variables in this cluster (see Fig. 4).

The digraphs for C4 and C5 are similar. Both these clusters' SCs all belong to Level 1, which means that, teams responsible for implementing the evaluation model in their family companies' succession processes can choose which factor they want to start work on first. The SCs have the

Table 2 Specific criteria (sc) for assessing family business succession

C1—Education/ Experience	C2—Family	C3—Governance	C4—Property	C5—Communication
Clearly defined entry-level requirements for family members (SC29)	Initial succession process involving at least two generations (SC84)	Complete diagnosis of the initial situation before the succession process starts (SC61)	Training for supportive shareholders (SC22)	Periodic meetings with the company's non-executive partners about the firm's evolution (SC13)
Professional experience outside the family business (SC35)	Family agreement in place about the organization's future (SC87)	Respect for each person's roles (SC56)	Transparent dividend policy (SC21)	Clear, transparent communication between family members (SC12)
Assessment of candidates' leadership profile (SC36)	Definition of each family member's responsibility in succession processes (SC98)	Well-defined areas of work for each individual (SC53)	Clear definition of all family members' participation (SC24)	Stimulation of dialogue and idea exchange regarding the business's future direction (SC15)
Predecessors' ideas, knowledge, and experiences shared within the firm (SC44)	Enhancement of family cohesion (SC100)	Definition of each person's objectives in every phase of the process (SC64)	Clarification of the difference between ownership and management (SC25)	Communication with employees about the new successor (SC14)
Rewards for continuous training (SC50)	Family protocol set in advance and reviewed periodically (SC80)	Clarification of remuneration policies (SC63)	Protocol for family participation (SC8)	Clear communication and humble acceptance of contrary opinions (SC19)
Training in the areas in which the company operates (SC41)	Family values maintained in the business (SC91)	Definition of the line of succession (SC77)	–	–
Acquisition of relevant knowledge from other firms (SC38)	Family breakups moderated by an external entity (SC101)	Hierarchical structure and poorly-defined responsibilities (–) (SC57)	–	–

C cluster; (–) negative effect on process

Table 3 Structural self-interaction matrixes (ssims) for five clusters

SSIM for Education/Experience (C1)							
	SC29	SC35	SC36	SC44	SC50	SC41	SC38
SC29		V	V	O	V	V	V
SC35			V	X	O	X	V
SC36				O	O	V	V
SC44					V	V	X
SC50						V	V
SC41							X
SC38							
SSIM for Family (C2)							
	SC84	SC87	SC98	SC100	SC80	SC91	SC101
SC84		V	V	V	V	V	V
SC87			V	V	V	V	V
SC98				X	X	V	V
SC100					X	X	V
SC80						V	V
SC91							O
SC101							
SSIM for Governance (C3)							
	SC61	SC64	SC53	SC56	SC63	SC77	SC57
SC61		V	V	O	O	V	V
SC64			V	V	V	V	O
SC53				V	V	V	V
SC56					V	V	V
SC63						O	O
SC77							O
SC57							
SSIM for Property (C4)							
	SC22	SC21	SC24	SC25	SC8		
SC22		V	O	V	X		
SC21			V	V	X		
SC24				X	X		
SC25					X		
SC8							
SSIM for Communication (C5)							
	SC13	SC12	SC15	SC14	SC19		
SC13		X	V	V	X		
SC12			V	V	X		
SC15				O	V		
SC14					V		
SC19							

C cluster; *SC* selected criterion; *V* direct relationship; *A* reverse relationship; *X* bidirectional relationship; *O* absence of relationship

Table 4 Initial reachability matrix for cluster one

	SC29	SC35	SC36	SC44	SC50	SC41	SC38
SC29	1	1	1	0	1	1	1
SC35	0	1	1	1	0	1	1
SC36	0	0	1	0	0	1	1
SC44	0	1	0	1	1	1	1
SC50	0	0	0	0	1	1	1
SC41	0	1	0	0	0	1	1
SC38	0	0	0	1	0	1	1

SC selected criterion

Table 5 Final reachability matrix for cluster one

	SC29	SC35	SC36	SC44	SC50	SC41	SC38	Dr Pw
SC29	1	1	1	1*	1	1	1	7
SC35	0	1	1	1	1*	1	1	6
SC36	0	1*	1	1*	1*	1	1	6
SC44	0	1	1*	1	1	1	1	6
SC50	0	1*	1*	1*	1	1	1	6
SC41	0	1	1*	1*	1*	1	1	6
SC38	0	1*	1*	1	1*	1	1	6
Dp Pw	1	7	7	7	7	7	7	

SC selected criterion; Dr *Pw* driving power; Dp *Pw* dependence power

Table 6 Reachability, antecedents, and intersection sets and partition levels for C1

	Reachability Set	Antecedent Set	Intersection Set	level
SC29	29–35–36–44–50–41–38	29	29	–
SC35	35–36–44–50–41–38	29–35–36–44–50–41–38	35–36–44–50–41–38	1
SC36	35–36–44–50–41–38	29–35–36–44–50–41–38	35–36–44–50–41–38	1
SC44	35–36–44–50–41–38	29–35–36–44–50–41–38	35–36–44–50–41–38	1
SC50	35–36–44–50–41–38	29–35–36–44–50–41–38	35–36–44–50–41–38	1
SC41	35–36–44–50–41–38	29–35–36–44–50–41–38	35–36–44–50–41–38	1
SC38	35–36–44–50–41–38	29–35–36–44–50–41–38	35–36–44–50–41–38	1
	Reachability Set	Antecedent Set	Intersection Set	level
SC29	29	29	29	2

SC selected criterion

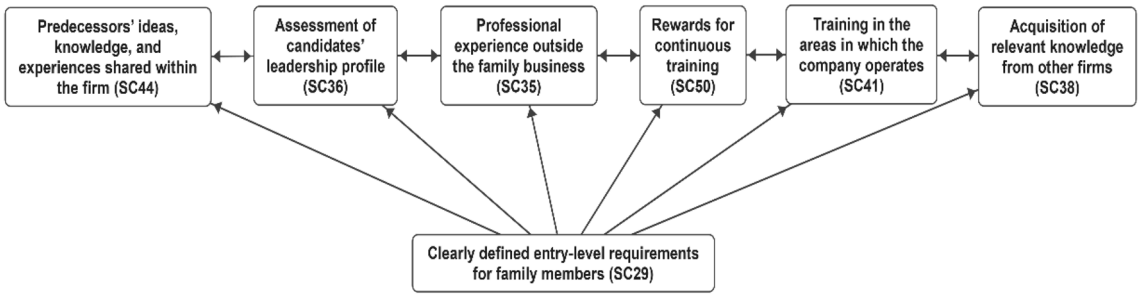
same importance in both clusters. Figure 5 shows the ISM digraph for C4, which contains SC22, SC21, SC24, SC25, and SC8.

Figure 6 comprises the digraph for C5. Similar to C4, this cluster only includes five SCs of equal significance: SC12, SC13, SC15, SC14, and SC19.

The final procedure followed was the MICMAC analysis. The coordinates had already been calculated for each SC in the FRM based on each determinant's driving and dependence power. These coordinates show which quadrant contains each SC and thus the type of factor they are.

Autonomous variables are located in the first quadrant (QI) as they have reduced driving and dependence power. In contrast, the SCs in the second quadrant (QII) have low driving power but high dependence power, which makes them dependent factors. Quadrants three (QIII) and four (QIV) have high driving power in common. However, QIII has high dependence power, while QIV has low dependence. The SCs allocated to QIII are linkage variables, and those in QIV are independent. Figure 7 provides an example of the inter-cluster analysis.

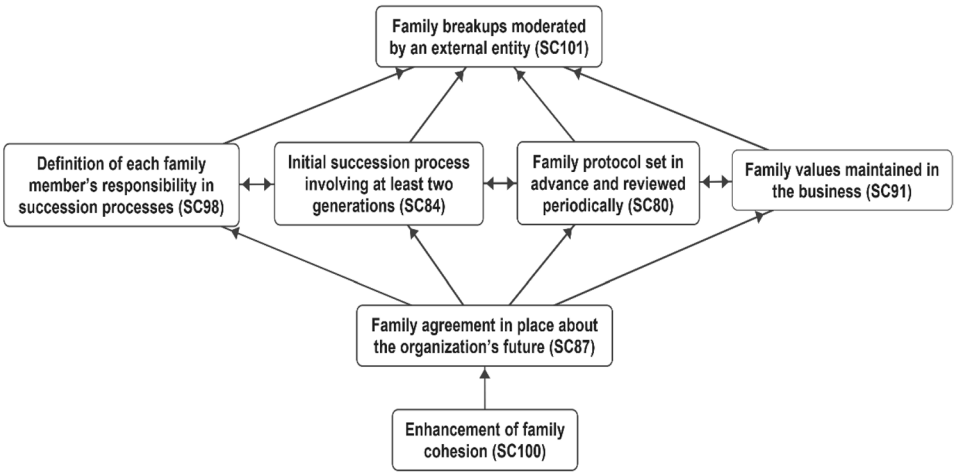
After all the calculations were completed for the five clusters, the final ISM digraph was constructed to summarize the



Note. SC = selection criterion.

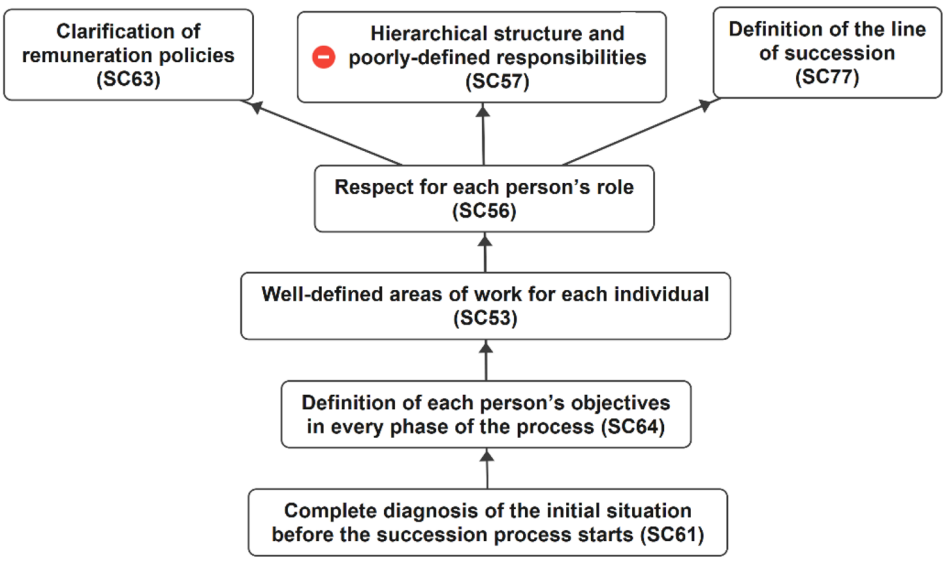
Fig. 2 Interpretive Structural Modeling Digraph for C1. *SC* selection criterion

Fig. 3 Interpretive Structural Modeling Digraph for C2. *SC* selection criterion

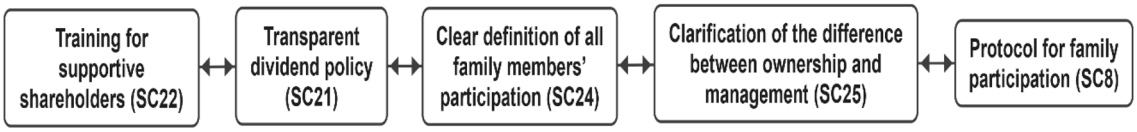


Note. SC = selection criterion.

Fig. 4 Interpretive Structural Modeling Digraph for C3. *SC* selected criterion; – = negative concept

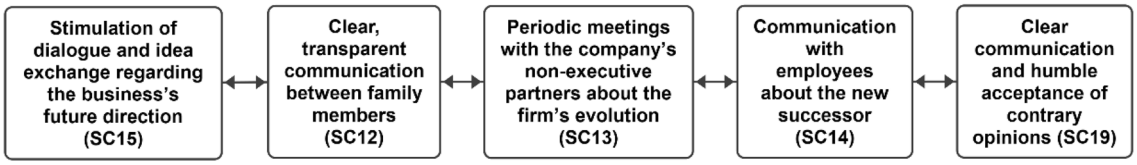


Note. SC = selected criterion; – = negative concept.



Note. SC = selected criterion.

Fig. 5 Interpretive Structural Modeling Digraph for C4. *SC* selected criterion



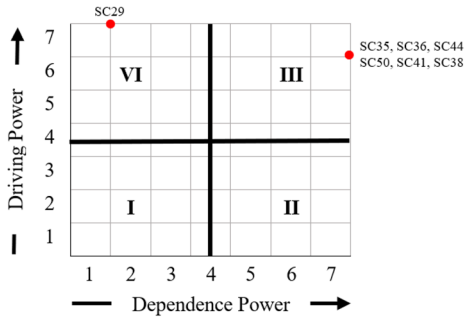
Note. SC = selected criterion.

Fig. 6 Interpretive Structural Modeling Digraph for C5. *SC* selected criterion

MICMAC Analysis

	Dp Pw (*x*)	Dr Pw (*y*)	Type	Quadrant
SC29	1	7	Independent	IV
SC35	7	6	Linkage	III
SC36	7	6	Linkage	III
SC44	7	6	Linkage	III
SC50	7	6	Linkage	III
SC41	7	6	Linkage	III
SC38	7	6	Linkage	III

MICMAC Diagram



Note. MICMAC = *matrice d'impacts croisés multiplication appliquée à un classement*; Dp Pw = dependence power; Dr Pw = driving power; C = cluster; SC = selected criterion.

Fig. 7 MICMAC Analysis for C1

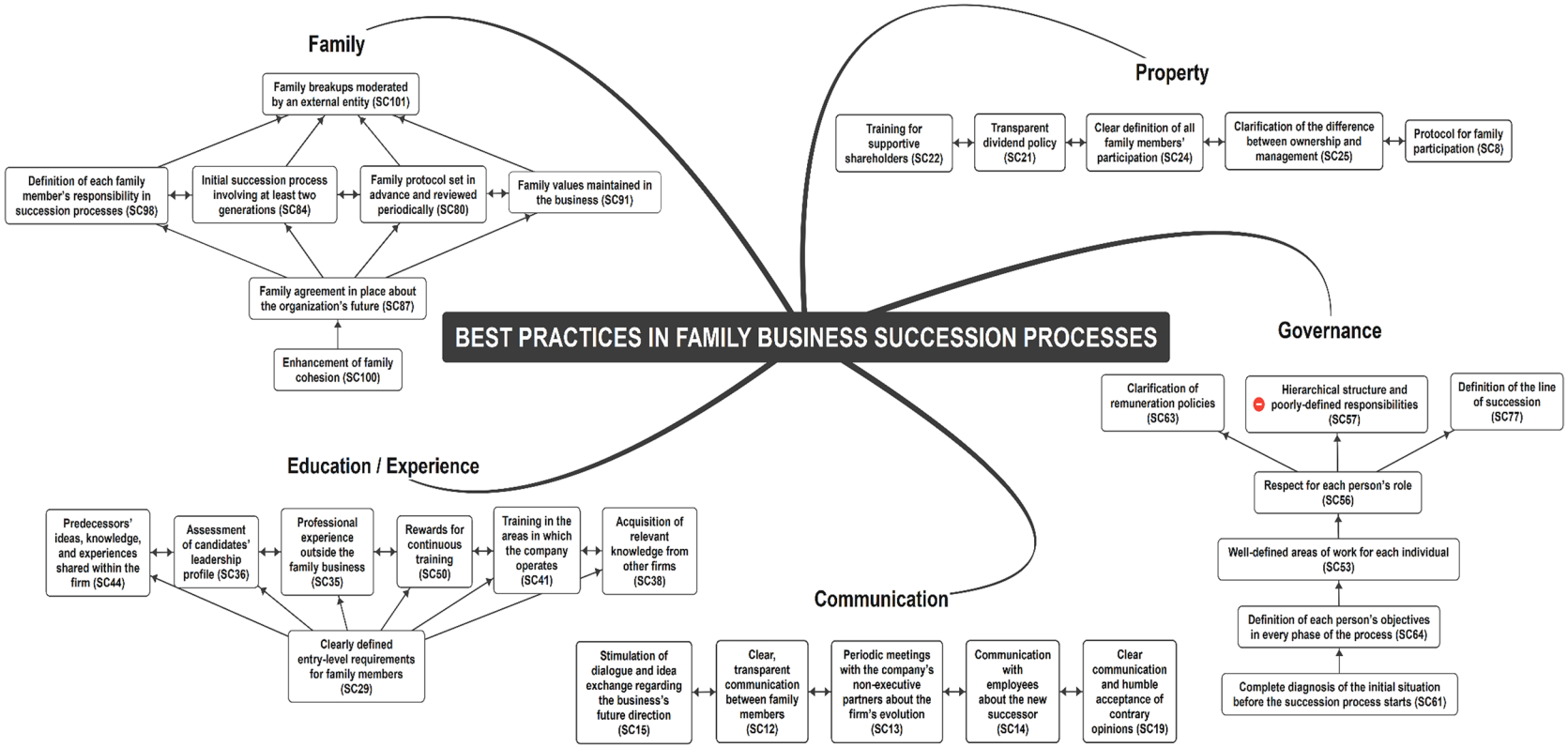
findings. This representation was generated with the help of the *SimpleMind Pro* software (https://simplemind.eu/download/full-edition/) (see Fig. 8). These results incorporate the digraphs of the five clusters with the ranking of their SCs.

The empirically robust model presented in Fig. 8 is clearly structured. This digraph is also easy to apply in practice as it prioritizes the succession determinants, making it ready for use by the business community.

Recommendation Phase: Discussion and Consolidation of Results

A final consolidation session was held to discuss the practical applicability of the proposed model. This meeting involved representatives of *Associação de Empresas Familiares* (*i.e.*, Family Business Association in Portuguese), a private non-profit organization that seeks to support the managers of these firms. The association has around 400 national and international member companies from varied business sectors and of different sizes and economic importance.

Two specialists with extensive knowledge about and experience in the topic under analysis participated in the session. The first interviewee was the general secretary of the association, and the second was the CEO of three companies headquartered in Brazil, who has had an impressive career in the field of family businesses, including publishing two books on this subject. Both experts were considered impartial about the decision-making process in



Note. SC = selected criterion; – = negative concept.

Fig. 8 Model of Factors Facilitating Family Business Succession Process. *SC* selected criterion; – = negative concept

the two group work meetings as neither interviewee had participated in them.

The consolidation session was held online via the Zoom platform (https://zoom.us/), and the meeting lasted for approximately one hour. The session was split into four phases: (1) a brief contextualization of the research topic and methodology; (2) a presentation and discussion of the results; (3) an analysis of the proposed model's practical applicability; and (4) a discussion of suggestions and recommendations.

The two specialists were unfamiliar with the techniques used to create the analysis system (*i.e.*, cognitive mapping and ISM), so the meeting began with a brief presentation of the methods used. The experts immediately acknowledged these techniques have great potential for solving the problem of family business succession. Next, the final ISM digraph was presented since this is the result of all the procedures followed in the study. The interviewees carefully analyzed each cluster's digraph and SC hierarchy, which the specialists agreed were accurate and valid. Both experts confirmed that the proposed model has great promise in terms of implementation in practice in real firms, and they invited the interviewer to present the study's findings to companies with which they were in contact.

The specialists thus agreed with the research and its results, but they recommended care be taken with implementations of the analysis system in actual firms. For example, the analysis model should first be presented to the next generation of successors to the family business rather than those still in charge because the successors will be more open to the proposed procedures. The interviewees felt that the younger generation is more likely to change than the managers currently in power.

Overall, the two experts gave positive feedback on the model developed, which meant that they reached a consensus about its validity. The specialists also asserted that this tool could greatly help family businesses deal with one of their biggest problems—succession—and that the methodologies *"inspire a lot of confidence in those trying to build more trust in the generation in power"* (in their words). The interviewees observed that managers' lack of conviction is a major obstacle to the success of family business succession processes.

Our findings present a significant contribution to the existing literature on family business succession, aligning with prior research highlighting the complexity and challenges associated with this critical process (Marques et al., 2022; Saura et al., 2023). While previous studies have often focused on theoretical frameworks or case studies to understand succession dynamics, the novelty of this approach lies in its integration of cognitive mapping and ISM techniques to develop a practical model for addressing succession issues. By combining qualitative insights with quantitative analysis, the study offers a comprehensive understanding of the underlying factors influencing succession within family businesses. This methodological innovation not only enhances the rigor of the research but also provides actionable insights for practitioners, bridging the gap between theory and practice in the field of family business management.

The implications of this approach extend beyond the realm of succession planning, resonating with broader themes of sustainability and effective family business management. By empowering family businesses to navigate succession challenges more effectively, the proposed model can foster continuity and resilience within these enterprises, thereby contributing to their long-term sustainability (*cf.* Marques et al., 2022). Furthermore, by emphasizing the importance of engaging the next generation of successors in the succession planning process, the study underscores the significance of intergenerational collaboration and knowledge transfer for the continued success of family businesses. This not only ensures a smooth transition of leadership but also cultivates a culture of innovation and adaptability essential for sustaining competitiveness in today's dynamic business environment.

The present findings are to some extent context-specific, but the proposed analysis system is process-oriented so it should be seen as a learning mechanism instead of an end in itself or a tool to prescribe optimal solutions. From a methodological perspective, this approach means that the procedures can be replicated in other contexts and countries and/or with different expert panels as long as the necessary adjustments are made (*cf.* Bell & Morse, 2013). As pointed out by the Brazilian expert, this aspect holds particular relevance for family business management in diverse contexts, including emerging economies such as Brazil. By prioritizing a systematic and iterative approach to addressing succession challenges, the proposed model offers a flexible framework that can be adapted to different cultural, institutional, and economic contexts. This adaptability is crucial for empowering family businesses in emerging economies to navigate unique challenges while leveraging their inherent strengths. By facilitating knowledge exchange and best practice sharing across borders, the proposed methodology underscores the potential for cross-cultural learning and collaboration in advancing family business management globally, ultimately contributing to the resilience and growth of these enterprises in diverse socio-economic contexts.

Conclusion

Family businesses are central to the global economy as they form a growing percentage of the world's businesses. The topic of family companies is thus increasingly relevant, which has led to an exponential surge in the number of investigations in this field.

Family firms face specific challenges that no other types of organizations do, namely internal family-related issues. These problems include decision-making processes that can affect both the business and family—the most important example being succession. The latter is the main reason for failure in family businesses, as cogent succession practices are crucial for the smooth transfer of the company's sustainable management to the next generation.

The main objective of this study was to assist family firm managers in their decision-making process by designing a multicriteria analysis model using a combination of cognitive mapping and ISM in order to identify and analyze determinants of family business succession. The research also addressed three predefined research questions (*i.e.*, How can the determinants of family business succession be identified? What are the most influential relationships between these variables? Which determinants/ initiatives should decision makers prioritize to facilitate business succession?).

The results are promising—as the specialists in the consolidation session confirmed—given the model's practical applicability in real-life family companies. This decision-support system can provide managers with an overview of the factors and initiatives that influence family business succession. These determinants are organized into specific areas (*i.e.*, education and/or experience, family, governance, property, and communication) and, within these, a hierarchy by importance. The expert panel was crucial to this study because of their knowledge and experience, which provided the necessary inputs to develop the proposed model in the two group work sessions. The panel members clearly influenced the quality of the analysis system, which made the decision-maker recruitment process extremely important.

The last session was also a crucial phase of the study as that meeting dealt with the model's validation, including an impartial analysis of the results and their practical applicability in real-life firms. As mentioned previously, the feedback of the independent, neutral specialists was quite positive, especially since they felt that analysis models created in the past are inadequate in terms of dealing with subjective variables. These tools have also failed to help current owners of family businesses deal with succession processes because previous models' procedures are extremely unclear and difficult to adapt to match the realities of current family businesses. The experts confirmed that the present study's model responds well to family companies' limitations and that, due to its process-oriented nature, it can be applied in many contexts, including emerging economies such as Brazil. In addition, the methodologies provide managers with the confidence needed to convince the family members in power to implement the necessary succession measures.

Regardless of the interviewees' positive assessment, methodological limitations need to be considered. First, subjectivity is an inherent part of the techniques applied since they require decision makers to share and discuss experiences and values. Second, the expert panel defined the causal relationships, which may have introduced bias because these links were quantified based on individuals' observations. Nonetheless, this research was based on a combination of methods that produced a simple, practical model, which can guide the formulation of new family business practices that ensure smoother succession processes.

The limitations identified provide opportunities for additional studies. Researchers can apply the same methodologies with a different group of specialists or conduct investigations concentrating on the same topic but using different multicriteria analysis techniques. The present results can also be complemented by applying other methods that may further encourage managers to use the proposed decision-support model. In conclusion, this analysis system meets multiple needs and thus enriches the literature on sustainable management of family companies. Its applicability in real business environments makes it a significant contribution to decision-making processes related to family business succession.

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Data Availability All the data used will be available upon request.

Declarations

Conflict of interests The authors confirm their unwavering commitment to the highest ethical standards. Any reproduced material is appropriately credited. All authors have directly participated in the planning and execution of the study and have read and approved the final version submitted. The contents of this manuscript have not been previously published.

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