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Proceedings of the 19th European Conference on Research Methodology for Business and Management Studies

A Virtual Conference hosted by University of Aveiro Portugal

18-19 June 2020

Edited by
Dr. Manuel Au-Yong-Oliveira
Professor Carlos Costa

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Proceedings of the

19th European Conference on Research Methods

ECRM 2019

18-19 June 2020

Hosted By

The University of Aveiro, Portugal

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Dr. Manuel Au-Yong-Oliveira and Professor Carlos Costa

Review Process
Papers submitted to this conference have been double-blind peer reviewed before final acceptance to the conference. Initially, abstracts were reviewed for relevance and accessibility and successful authors were invited to submit full papers. Many thanks to the reviewers who helped ensure the quality of all the submissions.

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ECRM Preface

These proceedings represent the work of contributors to the 19th European Conference on Research Methodology (ECRM 2020), hosted by University of Aveiro, Portugal on 18-19 June 2020. The Conference Co-chairs are Dr. Manuel Au-Yong-Oliveira and Professor Carlos Costa, both from University of Aveiro, Portugal.

ECRM is a well-established event on the academic research calendar and now in its 19th year the key aim remains the opportunity for participants to share ideas and meet. The conference was due to be held at University of Aveiro, Portugal, but due to the global Covid-19 pandemic it was moved online to be held as a virtual event. The scope of papers will ensure an interesting conference. The subjects covered illustrate the wide range of topics that fall into this important and ever-growing area of research.

The opening keynote presentation is given by Dr Paul Griffiths, from the Ecole de Management de Normandie, Oxford on the topic of *Re-thinking Research Methods in Social Sciences: Moving away from Determinism.* The second day of the conference will open with an address by João José Pinto Ferreira, University of Porto, on the subject *How to help students effectively use keywords (thesis, dissertation or research article)*.

With an initial submission of 140 abstracts, after the double blind, peer review process there are 37 Academic research papers and 5 PhD research papers published in these Conference Proceedings. These papers represent research from Australia, Bahrain, China, Croatia, Czech Republic, Estonia, Finland, Germany, Ireland, , Italy, Malaysia, the Netherlands, Peru, Poland, Portugal, Russia, South Africa, Spain, Turkey, UK and USA

We hope you enjoy the conference.

Dr. Manuel Au-Yong-Oliveira

The University of Aveiro
Portugal, June 2020

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Conference and Programme Chairs

Professor Carlos Costa is a full professor and entrepreneur based at the University of Aveiro, Portugal. Carlos started out doing an undergraduate degree in regional and urban planning (University of Aveiro). This was followed by a specialization in tourism, at the master's and doctoral level, at the University of Surrey, in the UK. Carlos is now Head of Department, at DEGEIT – the largest department of the University of Aveiro. With publications at the highest level, Carlos also enjoys writing down-to-earth articles for the media and for the general public. As the Director of the PhD in Marketing and Strategy, as well as of the PhD in Tourism, both at the University of Aveiro, Carlos is an inspiration to colleagues and students alike – to perform beyond their dreams and achieve new entrepreneurial heights, whatever the domain may be.

Dr. Manuel Au-Yong Oliveira is an Assistant Professor at the University of Aveiro (Department of Economics, Management, Industrial Engineering and Tourism – DEGEIT), in Portugal, where he lectures at the undergraduate, master's and doctoral levels on marketing, strategy, innovation, technology and on research methods. Manuel did an MBA at Cardiff Business School, in Wales (1992-1993) and has a Ph.D in Industrial Engineering and Management (FEUP), for which he was awarded a distinction for his thesis on innovation. Manuel has ten years of work experience with multinational corporations as well a varied experience working with smaller more entrepreneurial enterprises. At present, Manuel is the Director of the Master's Degree in Management at the University of Aveiro. Manuel is also a member of the Executive Committee of his department - DEGEIT - University of Aveiro. Manuel has a passion for teaching and education.

Keynote Speakers

Dr Paul Griffiths BSc, MEng, DBA, A.Dip.C is Professor of Banking, Finance and Fintech and Academic Director of the MSc in Banking and Fintech at the Ecole de Management de Normandie and is based at the UK Campus in Oxford. Prior to becoming a full-time academic Paul spent many years in leadership positions at global management consulting firms, serving Boards of blue-chip companies, particularly in the financial services sector. He specialises in the management of intangible assets such as intellectual capital and artificial intelligence. He helps organisations and industry sectors set up knowledge networks on technological platforms such as cognitive computing, augmented reality and blockchain. Having lived in nine and worked in 15 countries he defines himself as multicultural.

João José Pinto Ferreira got his Licenciatura in Electrical Engineering and Computers at Faculty of Engineering, University of Porto (FEUP) in 1987; MSc Electrical Engineering and Computers at FEUP in 1991; PhD in Electrical Engineering and Computers at FEUP in 1995; Habilitation in Industrial Engineering and Management in 2011. Has held several positions at the FEUP: 1987-1995: Assistant Lecturer; 1995-2003: Assistant Professor; 2003-today: Associate Professor. Since 2004, João José is the Director of the Master Degree of Innovation and Technological Entrepreneurship. With publications in the areas of Manufacturing, Information Systems and Innovation, he is co-founder and co-editor-in-chief of the Journal of Innovation Management (ISSN: 2183-0606 www.open-jim.org).

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Andrew Basden is Professor of Human Factors and Philosophy in Information Systems, University of Salford. On returning to academic life after 12 years in 'industry', Andrew took an interest in a wide range of research fields in computer science, HCI, information systems, language, sociology, business, sustainability, theology and language.

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Game Theory in Business: Application to Succession in Family Firms

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Abstract: Family firms are the oldest and most prevalent form of business in the world, representing 70 to 90 percent of the global Gross Domestic Product. Family firms worldwide range from micro and small firms to large conglomerates which dominate the global business panorama. Family firms is an area of research which has drawn rising interest given the impact and influence that such firms have on the economy worldwide. The challenge of management succession is the ultimate test that family firms face. The successor selection is a strategic decision making process characterized by the interdependence of both the founder and the potential successors. Therefore, it is essential to adopt a methodology which accentuates an integrated vision of successor selection, considers the role and interplay of the various factors influencing the successor selection, and also highlights the existent interdependencies. This paper aims to shed a new light on one of the most researched topics in family business literature by using the solid analytical approach provided by game theory. The internal consistency and mathematical foundations of game theory makes it a forefront strategic tool to study the complex decision-making process related to successor selection. The process of successor selection is eminently a strategic decision process characterized by the interdependence of the founder and his children. This paper employs the methodology of game theory as it provides a solid analytical way to study interdependent decision making to predict the successor outcomes. Although the use of game theory in this field is not novel it is still in its embryonic stages and this paper contributes to its advancement.

Keywords: family firms, succession, game theory, nash equilibrium, family optimal, successor selection

1. Introduction

Game theory is the study of decision making by various rational players where decisions made by a player have repercussions on the outcomes of the other players. Strategic interdependence is the essence of game theory. This paper aims to shed a new light on one of the most researched topics in family business literature by using the solid analytical approach provided by game theory. The internal consistency and mathematical foundations of game theory makes it a forefront strategic tool to study the complex decision-making process related to successor selection. The objective of the paper is to show how game theory is a relevant research method to study strategic decision making in the managerial arena. The paper aims to present this methodology and an application to one of the key issues facing family firms –executive succession. Therefore, the successor selection process is modeled as a game allowing to formally and systematically analyze the prevalent strategic interactions. Family firms (FF) are said to be the beginning of any form of business activity (Wakefield, 1995).

It is recognized that the family plays a vital role in enterprises, especially so in FF (Aldrich & Cliff, 2003; Rogoff & Heck, 2003). Executive succession is one of the most important and hardest tasks in organizational life (Zahra, 2005). The numbers speak for themselves. Only 3 out of 10 FF survive to the second generation and only 10% to 15% live on to the third (Kets de Vries, 1993).

This article analyzes executive power transfers from the founder to the next generation. More specifically, it focuses on the selection of the successor, in management successions of family firms from the first to the second generation. In this paper, the focus is on the use of game theory to study its impact on successor choice. In the game modeled to exemplify, both the family and the business dimension are incorporated, taking into consideration both economic and emotional factors.

This paper will start by presenting the main traits and uses of this methodology, with an introduction to the different types of games and how they can be used to model and predict solutions. This is followed by the literature review pertaining to the use of game theory to FF succession. Then the game modeled will be presented and the results analyzed. The paper finalizes with the conclusion and avenues for future research.

2. Game theory and games

Game theory is the study of strategic decision making. A game is formal description of a strategic situation. A game is defined by its players, their information set, the possible actions available to them, and their preferences and payoffs. The players are the agents (i.e. individuals, groups, firms) who make the decisions. A game is of complete information when players are aware of all the information pertaining to the game: the players; the timings of the decisions; their possible actions and resulting payoffs. In games of incomplete information part of that information is unavailable to the players. Their payoff, also referred to as utility, is a numerical value which shows the desirability of an outcome for that player. The payoff of each player is influenced by his actions but also by the actions of the other players. The strategic interdependence of the players is the corner stone of any game.

2.1 Types of games

Games can be cooperative or non-cooperative. Cooperative game theory focuses on the outcome individuals receive when acting as a group and analyzes the conditions which lead individuals to deviate from the agreed behavior. Whereas non-cooperative game theory analyzes strategic decision making by rational individuals acting on, and for, their own accord. These non-cooperative games can be sequential or simultaneous.

2.1.1 Simultaneous games

In simultaneous games, players act at the same time, making their decisions in ignorance of the other players' decisions. These games are represented in normal form, listing each player's actions and the payoffs resulting from all the possible combinations. The classic Prisoner's Dilemma game is a simultaneous game.

Dominance and equilibrium analysis are the two solution techniques used for non-cooperative games. Simple dominance identifies what the player will not do, and by applying this technique to all the players, and going back and forth in the players of the game, (i.e. using iterated dominance) all dominated strategies are eliminated which may lead to the solution of the game. The dominance technique works under the assumption that all players are rational and that their rationality is common knowledge (all players know that each one knows that all are rational). Additionally, there can be games where successive elimination of strictly dominated strategies is not enough to predict the outcome. Then the Nash equilibrium is used as a solution technique.

The Nash equilibrium refers to the set of strategies of best response for each player where there is no incentive for any player to deviate from that strategy (self-enforcing). The Nash equilibrium always survives iterated elimination of strictly dominance strategies but the inverse it not true, so the Nash equilibrium is a stronger solution. Nash proved that any non-cooperative finite game always has at least one mixed strategy[1] Nash equilibrium (Nash, 1950). However, in some games there can be multiple Nash equilibrium[2] and the solution of the game can be found by identifying the most compelling solution or by introducing refinements to the Nash equilibriums. In the Nash equilibrium both players play their best response, which can also be a dominant strategy and no player is better off by unilaterally altering his decision.

2.1.2 Sequential games

In sequential games, unlike simultaneous games, the players are called to play in a particular sequence. In a sequential game of perfect information, the players move in sequence and are fully aware of the strategies available to each one, and observe all the moves before making theirs. Each player knows exactly who has made what move before making a decision. These games are expressed in extensive form and are defined by: (i)The players of the game; (ii)When each player has to make a decision; (iii) What each player can decide at each point; (iv)The payoff for the players resulting from each of the possible combination of chosen moves. The extensive form is represented by a game tree which summaries all this information.

[1] A pure strategy gives a complete definition of each player's Nash strategy, whereas a mixed strategy assigns a probability to each pure strategy.

[2] The Battle of the Sexes is a classic example of a game which has multiple Nash equilibrium. In this game a couple is deciding what do in the evening choosing between going to the opera or going to a football. The wife would rather go to the opera whereas the husband would rather go to the football match, but both would rather go together. This game has two pure Nash equilibrium and one mixed strategy Nash equilibrium solutions.

The strategy of each player is the complete plan of action for that player for each contingency, specifying what the player will do at each node he is called to play. Whilst Nash equilibrium requires that each player act rationally, at the beginning of the game, given all other players' strategies, subgame perfect Nash equilibrium (SPNE) requires sequential rationality - that players' behavior optimally at every node of the game (and not just on the equilibrium path) when they are called to play, given the other players' strategies.

To reach the SPNE, for sequential games with perfect information, backward induction should be used, i.e. the game should be read from right to left. This technique warrants each player to look ahead and think backwards, before making his decision. The underlining logic is that each player should figure out how each of the others will react to his move, and how he will respond to that, and so on, as a result he should anticipate the different players' reactions to his move and consider this when making his decision (Grossman and Perry (1986)). Applying the technique means starting at the terminal node, and choosing the best option, and then proceeding to the next-to-last node, identifying the optimal action for the player, assuming he anticipates what will follow and continuing this procedure, moving backwards, until arriving at the root (Kreps, 1990).

2.2 Game theory and family firm succession

The selection of the successor of the FF is essentially a strategic decision, involving the founder and the potential successors. The mathematic foundations of game theory provide a rigorous and objective analysis on one of the most demanding challenges that the FF faces. Thus the use of game theory to study FF succession is a natural option. Although not novel, the application of game theory to FF succession is still in its early stages. Michael-Tsabari and Weiss (2013) applied the Battle of the Sexes game to study succession in FFs. They showed that deficient communication leads to disagreements and clashes between father and son. Earlier, Lee, Lim and Lim (2003) studied the importance of the potential successor's ability (offspring vs outsider) as well as the degree of idiosyncrasy of the business, on the choice of successor. They showed that in high idiosyncratic businesses, families tend to prefer a successor from inside the family. Burkart et al. (2003) model focused on the choice between leaving the public firm to the family or to a professional manager, and how that decision is shaped by the legal environment. Bjuggren and Sund (2001) also evidenced the role of the legal setting. They used game analysis to study alternative ownership succession options and the role legal and transactional costs played. Blumentritt, Mathews and Marchisio (2013) provided an introduction to the application of game theory to FF succession. They conceived a game where the children simultaneous chose whether to run or not for the CEO position, and then the father would choose his successor. Their results showed that in the particular situation when both the children decided to run, then the father would compare each child's attributes. Founders who prefer having a successor who really wants the job to one who is more capable of maximizing the firm's potential but is not as interested, will choose the child endowed with greater desire in detriment to the ablest. More recently, Mathews and Blumentritt (2015) presented a sequential game where the children chose the level of effort to pursue the FF CEO position, given the father's preference for one of them. In summary, the application of game theory to study FF succession has adopted payoff functions which have included various economic aspects, related to the legal context, and to the successor's ability. All the researchers have made some reference to the importance the founder attributes to continuity and to preserving family harmony. However, only recently with Jayantilal, Palacios & Jorge (2015); Jayantilal, Jorge & Palacios (2016a, 2016b and 2019); have the games formally integrated non-economic factors in the payoff functions of the players. The game modeled in this paper will follow this trend.

3. Model and methodology

A sequential game of complete and perfect information is modelled. In the game, the founder/father (F) starts by deciding whether or not he wants to initiate the succession process by inviting one of his children to head the FF. The chosen successor can accept or decline the position. Then the other child decides whether or not he/she runs for the position. Figure 1 represents the three players (F, Elder child (E) and Younger child (Y)) and the three staged game. The first node (also referred to as the root) represents the first move and refers to the father's decision. He decides between inviting one of his children to succeed him and not inviting anyone (i.e. not moving forward with the succession). If he chooses not to move forward with the succession the game finishes. If he invites his E, then the game moves to the upper part of the tree and at the next node E is called to make his move. He can choose to either accept or decline the invite. Finally, Y is called to play and decide whether he wants to run for the CEO position or not. If F invites his younger child, then the game moves to the lower part of the tree and at the following node Y accepts or declines the invitation. Finally, E decides whether or not to run for the top position in the family firm.

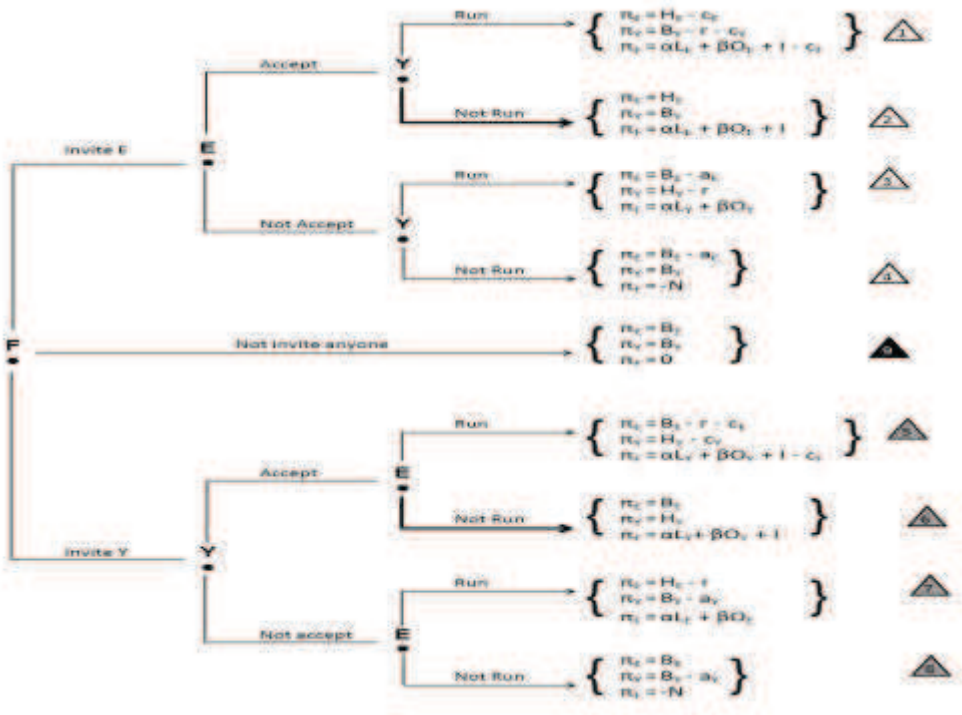

Figure 1: Game tree

The founder's payoff function is the weighed sum of the successor's ability to maximise the firm's potential (business dimension) and the successor's valuation of family involvement in the firm (family dimension). Each child is defined by his business related ability (L_i - leadership skills, which consider all the necessary managerial skills, competencies and know-how that will allow the child to maximize the firm's value) and by the way he views the firm's family serving purpose (O_i -family orientation) (Lumpkin, Martin & Vaughn, 2008). The extent to which a founder values the business sphere is given by α whereas β refers to the value he attributes to the family sphere. The founder's payoff resulting from the successor outcome is the weighed sum of both the family and the business related attributes of his successor. Additionally, in this game as the founder invites one of the children to succeed him, he registers an increase in his payoff when his chosen successor accepts his invitation (I). This can be seen as the emotional benefit that F derives from being obeyed. When none of his children are available then intergenerational continuity, a key aspect of socioemotional value, isn't secured, and the father registers this as a relevant emotional cost i.e. the negative payoff given by N (Zellweger et al., 2012).

The variables of the payoff function of the children are various. The children value heading the firm, given by H_i but sustain a cost of running for the position, given by r.[3]We assume that the value they place for heading the firm surpasses the cost they incur for running for the position ($H_i > r$). The children also take into consideration their career options outside the family firm. B_i refers to the payoff, net of any costs he might incur in securing it, for the child's best career option outside the family firm. Sibling competition refers to the situation when both the children run for the top position in the family firm. This can lead to affective conflict between the siblings. Given the negative impact that sibling conflict has, it is a relevant emotional cost which each child registers in their payoff functions. The sibling conflict has a negative spill over effect on the founder, who will also include this cost in his payoff function. The cost of conflict is represented by c_j (j= F, E, and Y).

The emotional factors relating to the value the children place in heading the family firm and the cost of conflict are influenced by the affective commitment to the firm and the family, respectively. In this game, when the child declines the founder's invite and prefers to opt for career outside the family firm, this will cause tension in the family. Going against (a_i) the father's wishes will generate tension between the child and his father and this is a relevant emotional cost. The following table summarizes the key variables used.

[3] Different costs of running for each child imply no significant differences on the conclusions but add complexity in terms of results.

Table 1: Summary of the variables of the games

Variables	Represents	i= {E,Y} j= {F,E,Y}	Conditions
L_i	Leadership Skills - Child's ability to head the family firm		$L_i>0$
O_i	Family Orientation - Extent child values family serving attribute of the firm		$O_i>0$
α	Degree Father values the business sphere of the family firm		$\alpha>0$
β	Degree Father values the family sphere of the family firm		$\beta>0$
H_i	Value the child places in becoming successor and heading the family firm		$H_i>0$
B_i	Value the child places in his best career option outside the family firm		$B_i>0$
c_j	Emotional cost resulting from sibling rivalry		$c_j \geq 0$
I	Emotional benefit father has when the child he invites accepts		I >0
a_i	Emotional cost child incurs for declining the father's invite		$a_i>0$
N	Emotional cost father incurs when he proactively wants to move forward with the succession but none of the children are avaliable		N >0
r	Cost of running for top position		$H_i>r \geq 0$

In Figure 1, a path refers to the set of decisions that leads from the root to the terminal node. The game has nine possible outcomes, resulting from nine possible paths, each with different payoffs for each player. For instance, path 1 refers to the following set of sequential decisions: F invites E, and E accepts and Y runs for the position. The payoffs for each player resulting from path 1 are: $\pi_E = H_E - c_E$ $\pi_Y = B_Y - r - c_Y$ and $\pi_F = \alpha L_E + \beta O_E + I - c_F$. This game is thus a sequential game and, having all playersstrategies and payoffs set, we must use the backward induction technique to find all the SPNE.

4. Equilibrium results and analysis

Applying backward induction technique to this game, and focusing on the upper part of the tree, starting at the terminal node where Y is called to play, he can choose between running or not running. When he knows that F has invited E and that E has accepted, he looks at his payoffs resulting from path 1 and compares his payoffs to those resulting from path 2. The payoff of Y for not running is the value of his best option outside the family firm and this is always higher than his payoff for running ($B_Y - r - c_Y$). In this case, Y best response, given that F has invited E, and E has accepted, would be to not run. This is to say, that path 1 will never be played as Y will always prefer path 2 to 1 (marked by a bolder line in the game tree). Now focusing on Y decision to run or not, given that F invites E and E declines, the invitation to become CEO (refers to path 3 and 4). In this case, the payoff Y gets for running is $H_Y - r$, and for not running is B_Y. He will decide to run (path 3) for the position if the value he attributes to becoming the successor, net of the cost of running, is greater than his best option outside the firm, else he will not run (path 4). [4]

Moving to the bottom part of the tree, when F invites Y (which result in paths 5 to 8, identified with a shaded triangle) we continue to use backward induction to analyse how E makes his decision between running or not for the position. If F invites Y and Y accepts, then E best response will be not to run for the CEO position in the family firm (notice that like path 1, path 5 will never be played). When F Invites Y and Y does not accept then E needs to decide whether or not to run. Comparing his payoffs resulting from path 7 and 8, he will choose to run for the position if he values the CEO position of the family firm, net of the cost of running, more than his best option outside the family firm ($B_E > H_E - r$), else he will opt not to run for the position. Continuing to use backward induction, now at the node where E must decide if he will accept or decline the founder's invitation. E already anticipates that if he accepts then Y will not run, and his payoff will be the outcome of path 2. He will not accept the invitation if $B_E > H_E + a_E$ and the outcome will result from either path 3 or 4 dependant on Y's decision.

Focusing on the lower part of the game tree, Y needs to decide whether or not to accept his father's invitation to become the successor. If he accepts, his payoff will be H_Y, as he knows that in that situation, E will decide not to run (path 6). Y will decline the invitation if the value he places on his best career option outside the firm suppresses both the value he attributes to becoming successor and the cost of going against his father ($B_Y > H_Y + a_Y$). If Y declines the invitation, then it will be E decision to run or not run which will determine if path 7 or 8 is chosen. Figure 2 graphically illustrates the backward induction until this point.

[4] If $H_i - r = B_i$ and/or $H_i + a_i = B_i$ then the assumption is that the child prefers pursuing the top position in the family firm.

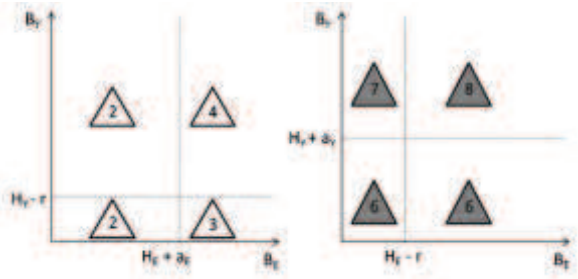

Figure 2: E and Y decisions

Continuing to use backward induction we finally arrive at the first node which refers to the founder's decision. He can choose between inviting one of his children and not inviting anyone. If he decides to maintain the status quo and not move forward with the succession, his payoff will be 0 (as we assume he only values passing the family firm to his children). When deciding who to invite F takes into consideration what the subsequent players of the game (E and Y) will do and under what conditions.

Figure 3 graphically resumes all that information and shows what choices F faces in each situation.

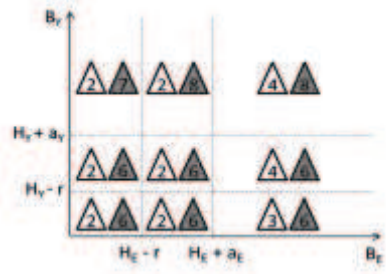

Figure 3: F options

For instance, looking at the upper left corner of the graph ($H_Y + a_Y < B_Y$ and $H_E - r > B_E$) if F chooses to invite E (represented by the clear triangles) then the equilibrium path will be path 2, whereas if he invites Y (represented by the shaded triangle) path 7 will be the equilibrium path. F prefers path 2 to 7 as his payoff is higher in that case. Thus the equilibrium path is path 2,[5]as is the case when he needs to choose between path 2 and path 8. Using the same reasoning, when F faces deciding between path 6 and 3 or path 6 and 4 he will opt for path 6.

Now focusing on the situation when both his children value their career options outside the family firm such that they are unavailable to head the firm (i.e. $H_i + a_i < B_i$), then if F invites either child he will get a negative payoff of N (N>0), resulting from path 4 or 8. Therefore, in this case he will prefer not to invite anyone and obtain a payoff of 0 and the equilibrium path will be given by path 9. In the opposite situation when both his children are available to succeed him F will choose according to his predisposition of valuing the business or the family dimension of the family firm. This is illustrated in Figure 4.

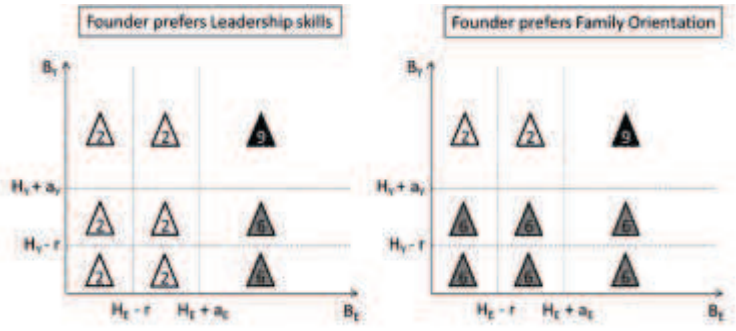

Figure 4: F decisions

[5] Note that each player's strategy is the complete plan of action for that player for each contingency, specifying what the player will do at each node he/she is called to play. In this case the equilibrium strategy is for Y: Y Not Run if F invites E and E Accepts; and Y Not Accept if F Invites Y. For E: E Accept if F invites E, and E Run if F Invites Y and Y Not Accept and for F: F Invite E. This results in equilibrium path 2.

The successor outcomes which result from the equilibrium paths are illustrated in Figure 5.

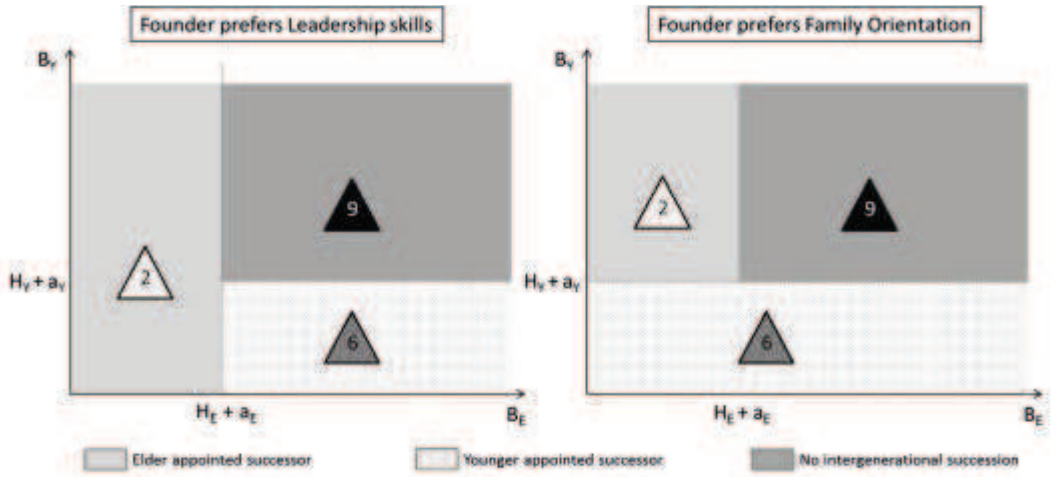

Figure 5: Equilibrium paths and successor outcomes

The results show that when both children value their career options outside the family firm such that they opt to pursue them even incurring in the cost of going against their father ($B_i > H_i + a_i$) then the family firm's executive control will not stay in the family. The propensity of the family firms' executive control not staying in the family will be decreased for children who are more subservient to their father and therefore do not want to go against his wishes (higher levels of a_i).

In the case that only one child is available to head the family firm (i.e. $B_E > H_E + a_E$ and $B_Y < H_Y + a_Y$ or $B_E < H_E + a_E$ and $B_Y > H_Y + a_Y$) then that child will be appointed successor. This is because intergenerational continuity is an emotional benefit the founder values which overrides appointing anyone from outside or selling the firm.

The founder's choice is dependent on the children's relative attributes and how the founder values those attributes. The exact condition is given by $\alpha(L_E - L_Y) > \beta(O_Y - O_E)$, for a more business oriented founder (prefers leadership skills), in which case he will opt for path 2, and invite E. Whereas for a family-first type of founder, the equilibrium path will be path 6 and Y will be his selected successor (the condition will be: $\alpha(L_E - L_Y) < \beta(O_Y - O_E)$.[6]

When both the children value their career options outside the family firm such that they are unavailable to succeed their father, the propensity of the firm not remaining in the family's control increases. This was the case for Norton Cooper's family firm which was responsible for bringing Chambord to the U.S. market. Both his sons established their own businesses outside the FF, and the FF was sold (to the Jack Daniels group).

This shows that the founder by being proactive places the onus on the child, making it more difficult for him to consider other career options. This is due to the emotional cost the children incur when they opt to go against their father's wishes (a_i). The more averse the children are to conflicting with their father (higher a_i) then the greater the propensity of securing intergenerational succession. The emotional cost is important in determining that increase but so is the effort they are required to expend to be considered as potential successors (given by r). In some firms the requirements to be considered as a potential candidate are as low as showing interest, whilst in others these can be very demanding.

Also, it is important to analyse the family optimal solution. This solution refers to the successor outcomes resulting from decisions made with the objective of maximizing the aggregate payoff of the family, rather than each individual's payoff. For example, the family's payoff resulting for path 1 is: $\pi_E + \pi_Y + \pi_F = H_E - c_E + B_Y - r - c_{Y+} \alpha L_E + \beta O_E + I - c_F$. From path´s payoffs comparison, we conclude that the paths which result in higher aggregate payoffs are paths 2, 6 and 9. Figure 6 shows where each of these path hold higher aggregate payoff of the family.

[6] If F is indifferent between choosing his elder or younger child, it's assumed he chooses the elder.

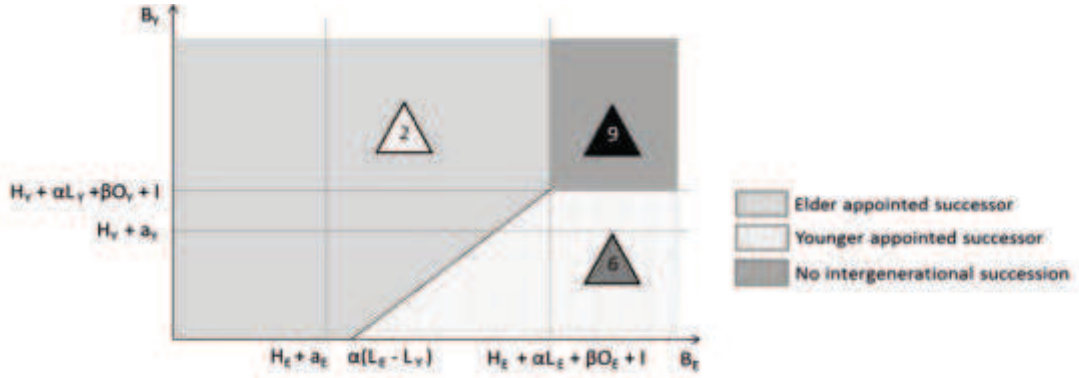

Figure 6: Family optimal outcomes

Figure 6 shows that the subgame perfect Nash equilibrium successor outcomes are not always family optimal. This is easier to see by overlapping the family optimal solutions (Figures 6) with the perfect Nash solution (Figure 5). For instance, consider that both children place the same value to becoming the new head of the family firm ($H_E=H_Y$), and both have the same family orientation level ($O_E=O_Y$) but in terms of leadership skills the elder child is more endowed than the younger ($L_E>L_Y$) and that $H_E+ a_E > \alpha(L_E - L_Y)$. Figure 7 shows that the subgame perfect Nash outcomes are not always family optimal.

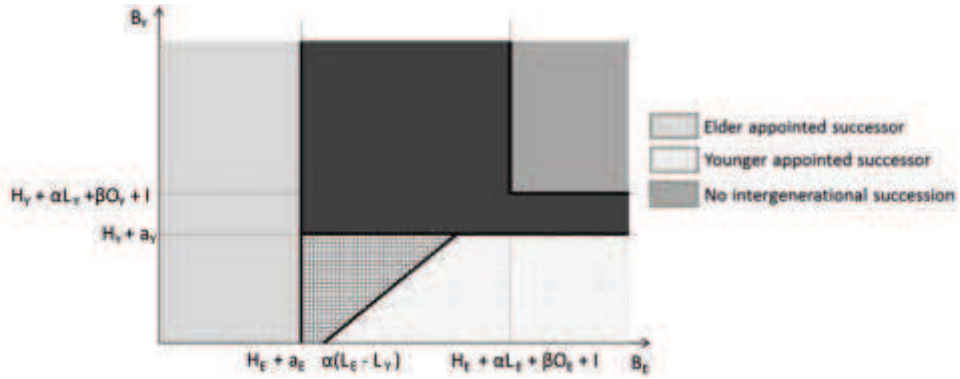

Figure 7: Family optimal vs. subgame perfect Nash outcomes

The results show that if decisions were made with the concern of maximizing the payoff of the family as a unit, intergenerational succession would be secured more often than when each person is motivated to maximize his individual payoff. This increase is illustrated in Figure 7 by the dark shaded L shaped areas. Additionally, the comparison shows that the family optimal outcome would result more times in the founder's preferred successor being appointed as is shown by the checkered triangular areas in Figure 7.

5. Conclusion

The process of successor selection is eminently a strategic decision process characterized by the interdependence of the founder and his children. This paper shows that the methodology of game theory is useful as it provides a solid analytical way to study interdependent decision making to predict the successor outcomes. Although the use of game theory in this field is not novel it is still in its early stages and this paper contributes to its advancement.

Additionally, the methodology enables to attain the equilibrium results but also highlights, via the family optimal analysis, the impact of making decisions as a family unit in the business arena.

Future research could extend the use of this methodology, by resorting to cooperative games to study the incentive for potential successors to collude to enable certain successor selection, for instance.

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