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ECONOMIC TRADE-OFFS AMONGST PRODUCTION DIVERSIFICATION STRATEGIES IN BRAZILIAN SOUTH-EASTERN COFFEE COOPERATIVES

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ABSTRACT

Brazilian agricultural cooperatives have seen an unprecedented growth in production in the last decade which has led to several different product diversification strategies. Almost all studies in Brazil focus on the financial outcome of these strategies but few empirical studies have addressed them properly. Even fewer papers have dealt with the causes and possible strategies for the diversification of such cooperatives and their impact on their strategic planning. Hence, this paper aims at comprehending the different strategies in operations management for production diversification in coffee-producing cooperatives in south-eastern Brazil. This was done through a multi-case analysis comprising six coffee-producing cooperatives. The research analysed both verbal (through interviews) and non-verbal (multi-criteria decision analysis) responses to the causes of their diversification behaviours. It was possible to find out that most of the cooperatives' rationale for diversifying is their pre-emptive response to financial crisis followed by increasing the number of associates as a strategy to overcome this economic struggle.

Keywords: agriculture, cooperative, production, diversification.

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1. INTRODUCTION

It is of primary interest for researchers to understand which factors lead cooperatives to succeed financially (FERREIRA; GONÇALVES, 2007; BIALOSKORKI NETO, 2007a; BIALOSKORKI NETO, 2007b). This understanding is not only supported by studies that indicate that cooperatives are more efficient ways of income distribution (BONTEMS, FULTON, 2009; BARTON 2011) but also as a way of providing economical sustainability in the long term (HERTIG, 2012). Although relevant for most countries, it is even more important for the BRIC (Brazil, Russia, India and China) economic reality in which cooperative results have considerable impact (ILO, 2001) on the agricultural sectors and national trade balance (HOSKISSON ET AL., 2000; HOLLENSEN, 2010).

Research on performance of Brazilian agricultural cooperatives focuses on economic and financial aspects (FERREIRA; BRAGA, 2007; BIALOSKORKI NETO; COSTA, 2009; DINIZ PEREIRA *et al*., 2009), with a few indications of factors that could have impact on them. Nevertheless, this paper is upstream-oriented, studying factors already identified in the literature, limiting them to the ones directly related to diversification of production and operations management strategies in coffee-producing cooperatives which might ultimately impact financial performance.

This paper aims at answering which are the most relevant criteria for the cooperatives to establish their diversification strategies. In order to do so, a few steps have been outlined: identify/build constructs, identify possible trade-offs between them, ranking the emerging strategies and finally, determine which ones have more impact on the cooperative behaviour. Finally this paper may find its application among cooperatives' decision-making crew and cooperative researchers.

2. LITERATURE REVIEW

In order to contextualise readers on the state of coffee cooperatives in Brazil, a concise review of the current literature is needed. Likewise, it is vital to understand the role of diversification in cooperatives and its causes.

2.1. Cooperatives in Brazil

In Brazil, regulated by law since 1971, cooperatives have developed and are active in various branches. Data from the Organization of Brazilian Cooperatives (OCB, 2012), demonstrate that more than 6,500 cooperatives are currently in

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operation in Brazil, with over 10 million associates and approximately 300 thousand employees. Within the Brazilian cooperative scenario there is a highlight for the productive sector, growing from 1.9% of Brazilian exports in 2005 to 2.4% in 2011 and being indirectly responsible for maintaining a positive trade balance of the country, impacting only 0.2% of imports in 2011. In short, the OCB estimates that Brazilian cooperatives represent 6% of Brazilian GDP.

Among the Brazilian cooperatives, the agricultural-husbandry ones account for 23% of all cooperatives. Moreover, the agricultural cooperatives have only 10% of registered associates in Brazil and 49% of direct jobs generated. The Southeast region of Brazil leads the overall number of cooperatives in the country with 34%.

The agricultural-husbandry cooperatives are also responsible for 97.3% of exports of all Brazilian cooperatives (OCB, 2012), with 39.3% of these exports originated from the sugarcane/alcohol production complex, 25.6% of the soybean complex, 16.9% of meat production complex, 9.2% of coffee, tea and spices and the remain divided among cereals, milk and dairy products, vegetable products, cotton and fruits.

2.2. Coffee cooperatives

Coffee is usually grown in mainly in third world countries, which concentrate most producers (MILAN, 2008, WINTGENS, 2009) and Brazil has a strong tradition in its production and exportation. Ferrari (2006) retraces a historic panel of Brazilian grain production in her thesis, as she affirms that coffee is the main responsible for the modernisation of Brazilian transportation during the 19th century.

However, Brazil has been losing its place in this market, as during the 60s the high prices attracted international concurrency, which led to the loss of importance of Brazilian market share. Ferrari (2006) cites the heavy frosts in 1918 and the Great Depression, in 1929, as factors that aggravated the economic situation for coffee producers, and claims the intervention policies adopted by the Brazilian government in the 60s and 70s to boost internal production and consumption by the internal market based on freezing prices and controlling food imports (including coffee) as one of the quality lowering factors which collaborated to the Brazilian's losing of market share. Farina and Zylberstajn (1998) also appoint lack of quality, high production costs, coffee producers' high debts, climatic problems and price

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oscillations as a few of the main reasons for Brazil to lose space in the international coffee market.

Although historically linked to coffee, Sao Paulo was not the only state engaged in its production. In the Parana state the agricultural production shifted from mate to wood and later coffee and has become one of the main coffee producers, whose production is nowadays only beaten by the soy complex in volume and return (FAJARDO, 2006). Other states have also significant coffee production, with four of them concentrating most of the Brazilian production.

Despite purchasing other crops and products, coffee has been the main product of these cooperatives. Nevertheless, aversion to risk, market stagnation for the last 20 years and climatic disasters obliged cooperatives to start considering diversification strategies in order to survive. Ferreira and Braga (2004) demonstrate that cooperatives which did not focus on coffee also started purchasing it to diversify their production, even though it was a minor production in some states. Saes, Santos and Pinto (1995) blame the aversion to risk – especially under conditions of fixed costs and great market value fluctuation – as one of the main reasons for coffee cooperatives in Minas Gerais to be gradually switching production towards other cultures, as has already happened more intensively in Sao Paulo and Parana. In Minas Gerais, heavy frosts in 1979 and 1982 reduced significantly coffee production and forced cooperatives to diversify their production in order to maintxain their industries and processing plants as is the case of Cooxupé - the biggest coffee cooperative in Brazil.

Milan (2008) demonstrates that commodity coffee market might be stagnated but there are efficient alternatives to commodities' price oscillation as specialty coffee.

2.3. Diversification of production

The foundation of this paper is that diversification strategies affect the financial performance of agricultural-husbandry cooperatives as it is a form of benefitting from their current production structure, organisational structure and economies of scale to add value to their production. Oijen and Hendrikse (2002) attest the unavailability of literature that associate cooperatives and product diversification yet they argue other sources of literature exist for diversification in other fields.

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Several authors (PLESHKO, HEIENS, 2012, HUSSAIN et al., 2013) concur in that diversification is one of four core alternatives companies must choose – besides increased market penetration, market development and product development – and that its acceptation implies in continually weighing and comparing the advantages of all them. He also provides a simple but useful framework to describe diversification by classifying its possibilities in three main groups: vertical diversification (verticalisation), horizontal diversification (within the main or primary scope) and lateral diversification (outside the main or primary scope).

Prymon (2011) reviews the same original concepts by demonstrating that only diversification strategies are truly consolidated and have real implementation possibility as the other strategies depend on external conditions to the company's reality to be fully applied. Sexton (1986) studied vertical integration of cooperatives and stated that the main gains of the cooperatives may be found between the scale economies and bargaining power. Donoso et al. (2003) stretch this concept by affirming that cooperatives strive to control all the production process until the end consumer in order to obtain these.

As for agricultural production, Mehta (2009) endeavours to explain the basic concepts of diversification as an equal-shared use of the land for a multitude of crops and concentration – or minimum diversification as he called it – the whole use of the land to produce one sole kind of crop. Likewise, he explains that even though it is easy to isolate concentration from diversification, one must proceed to ascertain the degree of diversification in an already diversified environment, i.e., the ratio of the products and their weights. Mehta (2009) also follows the current approach of using the Herfindahls' diversification index (OUSTAPADISSIS; NTAFIS; MOUTRAN, 1993; ARIYARATNE et al., 2000; RAHMAN, 2008) or one of its various adaptations (SECER, 2008; SINGH; PARK; LITTEN-BROWN, 2011) as one of the measures for diversification of production in farms and agricultural and husbandry cooperatives.

Culas and Mahendrarajah (2005) have studied reasons why agricultural production is more prone to diversify its production considering that while all fields of activities are exposed to financial risk and uncertainty, climate and natural factors have a substantial effect on the production outcome. They also add other factors related to marketing, price uncertainties, opportunistic behaviour and local policies. In this sense they follow Pope and Prescott (1980), who acknowledged that larger

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farms tend to be more diversified whereas smaller farms have an inclination not only to be less diversified but also managed by less experienced owners. They also argue the impact of the choice of diversification is of paramount importance to the farmer's welfare and income return. In addition, comparing to common farms, they noticed a correlation between product concentration and the cooperatives. Finally, O'Connor and Thompson (2006) discuss the relation between maintaining a position based on commodity production or product differentiation and state that the former group usually reap more financial advantages.

Thus, it can be inferred the lack of general research linking cooperatives and diversification. Also, it appears that studies that deal with further developments as diversification causes and strategies as well as trade-offs between them are non-existent.

3. METHODOLOGY

In this paper we aim at comparing trade-offs amongst different strategies in production diversification for coffee-producing cooperatives in south-eastern Brazil, which concentrate most of Brazilian coffee production.

As the objective of this paper is to investigate which criteria are employed by the cooperatives whilst developing diversification strategies, it has been empirically tried to classify the possible causes/strategies and built propositions that might explain the reasons for their adoption. A number of authors have employed classification as a means to develop constructs and theories (BAILEY, 1994, FETTKE; LOOS, 2003) and it is consistently used in organisational and operations' management studies.

Since this research was started with the development of theories before testing and validating them, it cannot be classified it as a case study, yet being acknowledged as grounded theory (MANUJ, POHLEN, 2012). Following their approach, the development of the research was split in four parts: 1) definition of the conceptual classifications (constructs); 2) discussion – obtaining data from interviews and PAPRIKA methodology; 3) analysis and contrast with the conceptual classifications (constructs); 4) comparison with the literature and final limitations.

To do so, six cooperatives whose production were concentrated on coffee but also purchase and process other crops and products were selected and their

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descriptions are depicted within the results and discussion session. Although the number of cooperatives chosen might not be enough to generalise, other researchers have successfully given evidence of strong theoretical and practical implication with a similar pool sample (WU; CHOI, 2005).

As for the first part, it was aimed at discussing which diversification causes/strategies were chosen by the cooperatives and the rationale underneath them through a semi-structured interview, which is usually the most appropriate alternative for qualitative research (BRYMAN, 1995; COLLINS; HUSSEY, 2003). Throughout the interviews, so as to ensure homogeneity in the answers, a body of basic questions was developed. Along with the basic information about the cooperatives, the questions were focused on their processes, diversification causes and future plans. The interviewees were chosen as being part of the managing staff of the cooperative. As for the interview sessions, they usually took 30 minutes each with additional 30 minutes for the Paprika questionnaire. All the interviews were conducted during the same schedule (October 2012).

To support and counterbalance the interviews, it was decided to re-test their answers based on the Potentially All Pairwise Rankings of all Possible Alternatives method (HANSEN; OMBLER, 2009) – also known as Paprika, which provides a safer way of measuring options and choices in strategies as although the inputs and outcomes are commonly perceived as verbal descriptors, internally they are treated as mathematical values for ranking and sorting. The reason for this re-testing is that by only asking questions during the interviews, we managed to perceive most of their intentions for the present course actions and future ones – i.e., what plans they have in mind to tackle the consequences of the pre-built scenarios (constructs) – yet using a Multi-criteria decision analysis (MCDA) method as Paprika enables the researcher to understand concepts of trade-offs between these causes/strategies and overcome the sheer verbal analysis barrier.

The goal of an MCDA method is to consider multiple criteria in the same decision-making situation, and thus, being able to sort preferences and trade-offs. As for Paprika itself, this method equates verbal decisions to values – for instance, higher financial performance and medium associates' production absorption versus medium financial performance and higher associates' production absorption - and translates the choices into mathematical groups and choices ($a1 > b2$ vs. $a2 < b1$)

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and finally sorts out all the criteria into groups and ranking of choices. The outcomes can be analysed through their mathematical relationships, but can also be interpreted as non-mathematical values to make decision-making easier to untrained practitioners. Although more commonly known methods (AHP, ANP, etc) are used in situations alike, it was preferred selecting Paprika for its ease of use and mathematical sorting, ranking and trade-off analysis possibilities. Hence, comparison between the interviews' analyses and ranking outputs/trade-offs from Paprika is useful to confirm the causes/strategies chosen in diversification and their results perceived by cooperative boards.

3.1. Constructs

Prior to interviewing cooperative members, it is necessary to develop constructs as basic assumptions. These assumptions are also the basis for the interviews and the decision-making matrix. It must be said that although a strategy is usually understood as a form implemented by an organisation to handle a cause, for the sake of this paper causes have been closely identified with strategies and clustered together.

The constructs' original references are Ferreira (2002), Ferreira and Braga (2004) – diversification, operation time and expansion of associates; Nilsson (2010) - Risk Aversion; Gimenes, Sousa and Gimenes (2007) - Climatic Conditions; Increase of Area – Gonçalves and Vegro (1994); and finally Lafleur and Merrien (2012) - Economic Crisis.

3.2. Operating time

The first construct considered by this paper deals with the Brazilian cooperatives' length of operating time as a factor of success and failure in their development and survival. It is paramount to the comprehension of Brazilian cooperatives as the length of their existence is structurally tied to the Brazilian economical history from the 30s to this time.

One of the reports of The Brazilian South Region Development Bank (BRDE, 2003) achieves a comprehensive depiction of Brazilian cooperative history and states that from the 30s and especially after the 40s this movement was heavily influenced by the presence of the first development agencies, under the new economical intervention policies enacted by the federal government (as a response to the Great

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Depression) and the promulgation of the first set of laws regulating the sector in Brazil.

During the 50s and 60s governmental actions shifted from stimulating the growth of cooperatives in Brazil to the prioritisation of industrialisation within the existing cooperatives, which had two main goals – increasing agricultural production and discharging workers so that they could be absorbed in urban activities. Lima (1974) notes that until 1957 there was a low rate of cooperatives engaged in coffee production.

In 1965 the National Rural Credit System was created and the "golden age" of cooperatives in Brazil started with the easy access to credit and abundance of government loans. This period would endure until the 80s and culminated in the crisis of cooperativism nationally as Brazil plunged in economical bankruptcy, which, according to Nicácio (1997), led to self-management of the sector as it saw itself abandoned by the Brazilian government and suffered from the steep shrinkage from R$ 21.6 billion in 1986 to R$ 5.6 billion in 1995 in government loans. In addition, abrupt changes in the monetary, exchange-rate and budgetary policies aggravated the cooperatives' financial performance.

In the 90s, cooperatives have regained balance, and despite many having shut down operations, the ones that remained nowadays benefit from and capitalise with the more stable economic environment. Consequently, the time a cooperative has had to develop and mature may be closely tied to the way it performs.

3.3. Risk Aversion

Many different opinions exist about the risk aversion especially concerning cooperatives. Kimball (1988) established the reason for cooperation as a non-formalised understanding in a group sharing a few members' risk, thus dividing the negative outcome. Nielsen (2000) also remarks that the farmer also faces a risk when balancing the pros and cons of being a member and not having full control of the sales and their margins and being a non-member and having to face all the risks of non-insertion in the market on their own.

As for agricultural and husbandry cooperatives this is even more important as there are more incontrollable factors involved in the production activities. Also, as not all cooperatives assume a verticalisation process, their dependency on commodities

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and the uncertainty about the possibly wavering prices might add a good amount of risk. Thus, the need of gathering in groups is part of the basis for the creation of a cooperative.

Nevertheless, some cooperatives have an even more conservative profile, as Bialoskorski Neto (2000) recalls, and end up sharing operations with non-members as a form of diminishing risk, particularly when these third-party associates are professional ones. This author also adverts that there is also a tendency of cooperatives that largely show aversion to risk usually being the ones to mask their situations and conceal their reality. Nielsen (2000) also notes that cooperative members generally tend to be conservative towards risk when it comes to "diversification and global investment" (p. 56). Thus, risk is present at all phases of agricultural and husbandry cooperative operations, be it production, insertion in the market, pricing, processing, selling and so on.

3.4. Natural disasters and climatic conditions

Natural disasters are part of the outcomes of all agricultural and husbandry cooperatives but coffee plantations are especially prone to die due to frost damage and during the 70s a series of heavy frosts ruined most of the coffee production – particularly the one in 1975 which almost decimated the coffee plants (SOUZA; BIALOSKORSKI NETO, 2004).

The harvest in 1975 (before the frost) in Paraná State amounted to 10.2 million bags – approximately 48% of the Brazilian production, which made Paraná the biggest exporter inside Brazil then – and the next year the harvested coffee summed up 3.8 thousand bags of coffee, equivalent to 0.1% of all Brazilian production. That had two main consequences: the shift from the production of coffee to other crops – mainly soya and wheat – and the migration of the farmers to others states northward.

Other states also suffered and are still vulnerable to the consequences of the frost and other natural disasters. Nowadays it is one of the main concerns of both the Brazilian cooperatives and government funding agencies to protect and develop ways of enhancing the agricultural production to these climatic disorders but it is an always present risk and fear. Hence some cooperatives may choose to trade less income from coffee for obtaining long term financial sustainability.

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3.5. Expansion of associates

In Brazil, the number of agricultural cooperatives has largely seen no changes varying approximately 15% between 1994 and 2010 whereas the number of associates was increased by 308% in the same period. Many reasons could explain this phenomenon, but the restructuration of Brazilian agribusiness both in cooperatives as in fully market-driven companies, the local currency exchange rates (similarly to other third-world countries) and the professionalisation of agribusiness are probably the main explanations.

Moreover, as in other countries, Brazilian cooperatives have also woken to external market investment and started playing with mergers, acquisitions and other vertical and horizontal absorption strategies (MERLO, 1998), which also led to the expansion in the number of associates to each cooperative. Thus, having an increase in the number of associates is an important advantage to any cooperatives but especially in Brazil, where local laws do not compel associates to sell or even maintain a pre-determined level of financial interaction with the cooperative, hence putting associates in a comfortable position to analyse the pros and cons of selling their produce to the cooperative or directly to the market (free-rider problems), leading to opportunistic behaviours which might undermine the cooperatives' strategic planning, including their diversification strategies.

3.6. Increase of area

No studies could be found in the Brazilian agricultural and husbandry cooperative sector about the direct impact of the increase of operation area of the cooperatives in their production and financial outcomes.

Differently from only increasing associates numbers – who may be concentrated in the area around the cooperative – opting for increase in the operation area encompasses new costs and new strategies as it may be useful to have not only a network of warehouses to absorb local production but also pre- or full local-based processing facilities. It may also involve the choice in keep focusing on the previous product(s) or opening their cooperative to newer products.

3.7. Economic crisis

As mentioned before, Brazilian cooperatives have benefitted from large sums of money lent by the government and also suffered from their withdrawal in times of

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need. Brazilian economy agonised during the 80s and in the end of that decade a new model of agricultural production has arisen, concentrating the purchasing power in the hands of few broker companies, leading to different economic scenarios and even oligopsonistic ones (GONÇALVES; VEGRO, 1994), where full-fledged speculation and total lack of liability between the brokers and sellers predominates.

On the strength of it, big farmers may keep playing in the market, but for small and medium farmers that possibility sounds sombre. Thus, they feel compelled to join or form cooperatives to avoid a completely helpless situation, and if this is the main reason for the existence of the cooperative, it may induce the cooperatives to base their strategies in the most conservative scenarios.

4. RESULTS AND DISCUSSION

The selected cooperatives were first contacted by telephone and agreed to be interviewed on the condition that their names, places or any other information that might lead to their identification would be undisclosed, as is the common practice in Brazil. The interviews were long enough to grasp the importance that the role of diversification plays on these cooperatives' daily lives, yet an in loco visit could add a broader perspective as it could or not match the information provided.

For the six cooperatives, the same order was followed: semi-structured interview and Paprika questions. As for the Paprika methodology, it is usually sent a questionnaire with option pairs so that the interviewee can choose the one he prefers or that explains better the situation in case. We chose to do this differently as the number of options was short, and could be done as an extension to the telephone interview.

The first cooperative (A) is a traditional cooperative and their main interest is in expanding the number of associates so that they may have a better financial basis to trade coffee and other products. The interview revolved around their plans to expand operations which explained their need of more associates who would provide not only more income to expand but also more production.

When clearly asked about their choice of diversification strategy it was stated that it took place whenever and wherever it was needed and that even if there were some guidelines discussed during internal meetings and associates' gatherings they were not strictly enforced.

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The next cooperative (B) displayed a different behaviour by stating that one of their priorities is to expanding operations but not by putting all their eggs in one basket. This seemingly conservative profile is supported by their history of approximately 40 years in operation, even if coffee was not always their main product.

During the interview, their line of thought suggested that their good financial situation of late is due to the fact that previous boards of directors have had the courage to break up with their past production focused on coffee to a more modern way of seeing their cooperative by opening space to other products and activities. When asked whether this option would weaken their coffee production, it was replied that it would not do any good to have higher income with coffee if it could all change in a second, be it as a result of a bad harvest or financial market turmoil.

This last question raised the issue of the lack of apparent knowledge of their strategy. The answer lies in the results of the Paprika questionnaire, in which it was clearly showed through question after question that their main concern was the financial situation. Whenever they had to choose between climatic changes or aversion to risk and economic crisis, the later was always appointed as the rationale for their decision.

The third cooperative (C) exhibited a fairly diversified portfolio of products absorbed by the cooperative but coffee still is their main product. They show an example of apparent lack of direction in their diversification strategies since different strategies were adopted in the last two decades without passing a full evaluation by their associates or not being followed for time enough to see their efforts paid off. In addition, their board of directors has been kept unaltered for the last 15 years.

Cooperative C maintains a position close to the cooperative A, in which they expect an expansion of their operations (especially processing and distributing coffee), but this expansion is done according to the local needs and it does not follow any guidelines, rather than being decided when needed.

They also opt for the search of new associates as a diversification strategy as they need a larger production to vindicate their processing plants, in view of a previous wave of diversification that led to more products absorbed by the cooperative but with less concentration.

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The fourth cooperative (D) was the only one to choose a different factor for their diversification strategy: climatic conditions. According to the interviewee the cooperative has suffered a lot from several pests in the 90s that afflicted the whole production including coffee. However after answering the Paprika questionnaire, it has showed a certain amount of doubt between this factor and the economic crisis that these pests initiated. Due to the similar or consequential aspect of the factors they may be interpreted as climatic conditions being followed by a subsequent economic crisis as a reason for their diversification.

The fifth cooperative (E) was the smallest and youngest of the cooperatives interviewed. According to the interviewee, the reason for their foundation was the economic crisis, and the fragile position the farmers found themselves into. As such, they formed a cooperative, but it is centred in the production of coffee. They display a low level of diversification but it was stated that the plans of the cooperative include diversify to other crops and husbandry-milk activities in order to complement their production.

The sixth and last cooperative's positioning (F) is to increase their associates' basis. According to the interviewee, they are planning to open several local warehouses to increase absorption of local production and invest in processing facilities. Their diversification strategy is to migrate from coffee to other crops (corn and soya) in the commodity market and keep investing in the processing of coffee towards final consumers.

During the interviews it was stated that one of the reasons for their diversification was also the economic crisis in the 80s and 90s and that this crisis would not have affected them as much as it did if they had increased the number of associates during these decades.

4.1. Analysis and contrast

This work aimed at better comprehending agricultural cooperative's point of view concerning production diversification. To delve into this matter a group of six coffee-producing cooperatives was chosen, which provided a homogeneous environment but – due to the low number of cases – was not enough to be a source of generalisation to the whole cooperative universe in Brazil.

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Nonetheless, it provides useful insights on the way Brazilian cooperatives choose their strategies as it demonstrates that their choices are not based on a thoughtful strategic plan, but rather on a daily basis. This might find its origin in the fact that none of the interviewed cooperatives would fit in the top category of financial performance, according to the classification of the Brazilian National Economic and Social Development Bank (BNDES, 2011).

However this comprehension might be ambiguous or unclear and the insights provided by the analysis given by Paprika are of great support to understand their relative importance. Since Paprika is one of the Multi-criteria Decision Analysis methodologies, their core might be analysed by the Choice Experimentation field, which, according to Azevedo, Corrigan and Crooker (2008), have become one the most used valuation methods because of their ability to understand multifaceted issues, based in the utility theory. One of the features of such theory is the possibility of ranking the attributes and their utility values:

Thus it becomes clear each attribute's influence in the general understanding of the strategies. However, to delve into the core of the cooperatives' system of values, one must continue to employ one of the main applications of the utility theory which is the concept of Marginal Rate of Substitution.

According to Pindyck and Rubinfeld (2012), the Marginal Rate of substitution is the rate of exchange between two items that would satisfy the trade, usually taking the form of a curve which could be interpreted by its two axis (x, y), in which any momentum would mean that the rate of x for y in that point would satisfy the exchange. This curve is thus defined as the indifference curve, which means that by extracting any given points from this curve, the situation will bear the same results to the decision maker, as the changing amounts of x and y would compensate for the lack of each other. However, for this study, the software only returns a specific point (instead of a curve), as the pool of entities tested is small and they were treated one body for the sake of the research.

Nevertheless, the Marginal Rate of Substitution is a powerful tool to understand in which terms the cooperatives are willing to let go or to adhere to one or more strategies and how far they would be willing to do so, as can be interpreted by the quantitative analysis of the different Marginal Rates of substitution. The advantage of not having a curve is that it is possible to calculate the average

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Marginal Rate of Substitution for each construct in comparison with the others, which provides some extra information on their relationship.

Table 1 – Attributes (integers) and utility values (normalised %)

Operation time	**Integer**	**Normalised %**
Short operation time	0	0.0%
Medium operation time	3	1.6%
Long operation time	6	3.2%
Risk aversion		
Little aversion	0	0.0%
Medium aversion	10	5.3%
High degree of aversion	31	16.6%
Natural disasters Unfavourable climatic conditions		
Low effect	0	0.0%
Medium effect	7	3.7%
High degree of effect	9	4.8%
Expansion of associates		
Little impact	0	0.0%
Medium impact	20	10.7%
High impact	40	21.4%
Increase of area		
Little impact	0	0.0%
Medium impact	11	5.9%
High impact	19	10.2%
Economic crisis		
Little influence	0	0.0%
Medium influence	41	21.9%
High influence	82	43.9%

The following table shows the Marginal Rates of Substitution of the constructs versus the others, according to the body of cooperatives:

What can be first deduced from this table is that obviously Economic Crisis is by far the most important reason for cooperatives to diversify and also that Climatic conditions and Operating time have a very low influence in the cooperatives' choice of strategies. Applying the concept of Marginal Rate of substitution, we can then understand that the body of cooperatives value Economic Crisis as 13.7 times more influential on their production diversification strategies as Operating Time - the widest relative importance found on the table. However it is more useful to analyse the data

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obtained through the average Marginal Rate of substitution. In this scenario, the distances between the constructs are less pronounced, yet Economic Crisis still more than doubles the MRS of Increase of Associates. This is consistent with the interviews, as Economic crisis is cited by 5 out of 6 cooperatives.

Table 2 - Relative importance of the items - Marginal Rate of Substitution of the constructs on the column by the ones in the row.

	Economic crisis	Increase of associates	Risk aversion	Increase of area	Climatic conditions	Operating time	**Average MRS**
Economic crisis		2.1	2.6	4.3	9.1	13.7	**6.36**
Increase of associates	0.5		1.3	2.1	4.4	6.7	**3.00**
Risk aversion	0.4	0.8		1.6	3.4	5.2	**2.28**
Increase of area	0.2	0.5	0.6		2.1	3.2	**1.32**
Climatic conditions	0.1	0.2	0.3	0.5		1.5	**0.52**
Operation time	0.1	0.2	0.2	0.3	0.7		**0.30**

On the other hand, the role played by Increase of Area seems to be the one of a medium-sized influence factor and Increase of Associates and Risk aversion have a substantial influence on the strategies but not as much as Economic Crisis. Increase of associates is quoted as the most influential by 3 out of 6. What must be taken into account is that both constructs are intertwined and could be interpreted in conjoint.

As for these two constructs, while Economic Crisis is the most significant (as it is present in almost all answers, and is also top-ranked in MRS), the strategic planning of cooperatives still values - at least verbally - Increase of associates as a greater influence in their choice of production diversification strategies.

After analysing all the cooperatives' interviews and Paprika questionnaires, it can be understood that the main reason for cooperatives to diversify their activities is the drive for expansion of associates. That may be linked to the literature concept of

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value migration strategy (SLYWOTZKY, 1996; WALTERS, 2012) in which the coordination of the chain is primordial. It also appoints to the double nature of such cooperatives which split their activities in the buying-selling commodities and their processing and selling to the final consumer. In order to achieve those, in a context where cooperatives depend on the purchases from their associates to keep their processing facilities working – and especially in a fluctuating market which means risk to them – it is necessary to reinforce their associate basis as a first step in preparation for bigger plans.

Second, almost all cooperatives also listed economic crisis as the main or minor reason for their diversification. This may be one of the reasons for none of them to fit in the BNDES's top financial performance category. It is also indicative of their lack of strategic planning and their waiving specialised external consultancies.

Only one cooperative (A) has not cited economic crisis in the reasons for their diversification. Their motives for diversification are centred in the increase of associates which is closely tied to the increase of area. It seems that even in their lack of strategic planning, they have at least a direction to pursue which is the expansion of their production through the increase of associates.

Thus we can break down their main and secondary factors for diversification as such:

Table 1 – Main factors for diversification.

Cooperatives' Diversification Factors						
	A	B	C	D	E	F
1st	Increase of Associates	Economic Crisis	Increase of Associates	Climatic Conditions	Economic Crisis	Increase of Associates
2nd	Increase of Area	Aversion to risk	Economic Crisis	Economic Crisis	Aversion to risk	Economic Crisis

This leads to the comprehension of the connection between the two main reasons for cooperatives to diversify their productions: economic crisis as a source and increase of associates as the solution most cooperatives have chosen to end their economic turmoil history. It also demonstrates that – at least for the

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cooperatives interviewed – climatic conditions, increase of area and aversion to risk are secondary and subjected to the main factors.

4.2. Conclusions and limitations

Studies on cooperatives tend to focus only on the economic outcome. Few researchers have addressed the problems related to diversification within those cooperatives, and even fewer deal with causes and strategies for such diversification options.

This paper's goal was to provide basic comprehension on these causes/strategies in Brazilian coffee cooperatives. As it could be understood from the data gathered in the research, most of these cooperatives in Brazil face economic struggles. As for the strategies chosen by them to overcome such hardships, the most important was found to be the increase in their operations, especially when increase of associates is taken into account. It is also demonstrated that although literature in Brazil indicates other problems as having significant impact on their financial outcomes, Climatic conditions and Operation time have in fact little impact on their strategic planning.

As for practitioners, it is also enlightening to perceive that most cooperatives concentrate their efforts in the increase of means of production, which are the consequences of increasing their associates, as a goal to improve their financial situations.

Although providing important evidence for the pursuing of studies in the area, this paper should not be held able to generalise its conclusions to the whole universe of coffee producing cooperatives in Brazil. This is due to the fact that coffee production in Brazil is concentrated in three states (Sao Paulo, Minas Gerais and Espirito Santo) but new growing areas emerge everyday (Bahia, Brazilian Midwest), presenting a broader geographical area, which prevented in loco interviews.

A second important limitation is that the number of cooperatives is low compared to the hundreds of cooperatives available. Also, the constructs are all linked in their conception and should not be understood separately. Other studies aimed at better comprehending these constructs and expanding them may arise.

This study also concentrated in medium-sized cooperatives, which still struggle with the economic difficulties inherited from the 80s and 90s and this

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scenario may be different for top tier cooperatives, which have most probably overcome this situation.

Another limitation is that the Paprika methodology works only on personal choices which may or may not reflect reality for the whole cooperative background. The methodology itself is planned to avoid such research problems, but in loco interviews could have been used to complement its results. Also, the statistics used do not count for inter-correlation, and for future studies, more complex methodologies could be used – as structural equation modelling – so that the internal relationships between the constructs may be better comprehended.

As for the constructs themselves, in case of further studies, it is also advised to empirically attempt to separate constructs from strategies, which is something not found in the literature. Other studies may also be developed to confirm these constructs and results and expand their comprehension by using a quantitative-statistical approach.

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