STRATEGIC CONTROL OF AGRO-INDUSTRIAL COOPERATIVES: A STRATEGIC MAP PROPOSAL

Abstract

This article discusses about the design of a qualitative model of strategic implementation and control in agro-industrial cooperatives. Based on the concepts of Balanced Scorecard – BSC and System Dynamics, and considering the corporate features of agro-industrial cooperatives as societies made of people and not of capital, the article proposes a strategic map, which presents up variables that represent the critic processes in strategic management for these organizations, as well as identifying causal relations hypothesis between the variables. From the concepts of BSC, the map is built with the four traditional perspectives: financial; customers; internal process; growth and learning; and adding two other important perspectives in agro-industrial cooperatives: the social perspective and the member relationship perspective. From the concepts of System Dynamics, the map is qualitatively built, predicting the complexity of strategic control in agro-industrial cooperatives, in accordance to the need of conciliation and balance of economic goals between the cooperative and its members. From the proposed strategic map, the goal is to proceed with the research, defining new indicators of each variable in the map, as well as its adaptation and application towards agro-industrial cooperatives, through the action-research method. The qualitative model can also serves as a conceptual basis for future parameterization and simulation of a quantitative model, through the stocks and flows language of System Dynamics.

Key words: Strategic control, agro-industrial cooperatives, Dynamic Scorecard

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1.   Introduction

Cooperative societies present several differences in relation to the mercantile societies or investor owned firms – IOF, and so they demand the adaptation of specific management tools. Being constituted as societies of people instead of societies of capital, the strategic administration of cooperatives depends significantly on the relationship they maintain with their members. The members view a cooperative as an intermediary organization between their individual ventures and the market and are stimulated to maintain and strengthen their commercial relationships with the cooperatives through economical advantages for their own individual enterprises. In this context, strategic management of agro-industrial cooperatives depends on the development of new models that consider the conciliation and the balance among the cooperatives and members distinct goals.

In this paper, core concepts of strategic management and particular characteristics of agro-industrial cooperatives are discussed. A strategic map is proposed, based on the Balanced Scorecard concept and associated to the vision and resources of the System Dynamics. These tools have been applied aiming to improve the strategic analysis model proposed, considering the complexity inherent to cooperative management.

2.   Research Problem and Objective

Cooperative societies show peculiarities in their legal constitution and adopt principles and doctrines that exert significant influence in their structuring and organizational governance, delegation and use of power and, consequently, in the way how decision process happens. Cooperatives are societies of people who unite themselves seeking for the satisfaction of common needs. In opposition of IOF, where the power is proportional to the invested capital, in cooperatives the power is egalitarian, because of each member exerts the right of a single vote independently of the owned capital. In a cooperative the financial result is not the only objective. The decisions about re-investment or distribution of the financial surpluses to members are taken in assembly formed by the peers. The financial surpluses share returns to the members proportionally to their work with the cooperative, instead of the amount of capital owned. (BIALOSKORSKI, 2001).

In cooperative societies, an ambiguous relationship among the members happens. They are at the same time customers, suppliers and owners of the society. Due to that, the emergence of conflicting goals is verified, especially in the case of highly competitive markets. Among the causes of these conflicting goals, one of the most important are the difficulties to balance the pressure for decreasing the prices of final products, coming from market, with the pressure for increasing the price paid for supplies, coming from members – who are the suppliers of the cooperative. (BIALOSKORSKI, 2001).

Cooperatives face different pressures influencing their decision process at a strategic level. On one hand, the internal environment is composed by members who seek their satisfaction and corporative goals that are barely convergent, due to the

homogeneity of the social boards and the kind of relationship between members and cooperatives. On the other hand, cooperatives work in high competitive markets, including the more industrialized ones, demanding the need for development of effective management practices that can provide the necessary competitiveness for the business success. From the internal environment, corporative pressures, that may cause the political behavior of the decision makers emerge and, from the external environment emerges competitive pressures demanding a rational behavior of these decision makers (BARREIROS, 2005).

Within this framework it is possible to highlight the following research problem: The members of an agro-industrial cooperative, as independent economic agents, not always have a convergent behavior with the collective goals of the cooperative. In this sense, the development of a strategic management model for this type of organization depends on adaptations that adequately consider the effect and influences of the member's behavior in relation to the decision process of cooperatives – as commitment, degree of capitalization acceptance and degree of technological innovations acceptance.

Based on the concepts of the Balanced Scorecard and System Dynamics, the purpose of this paper is to present a strategic map, adapted to the peculiar characteristics of agro-industrial cooperatives, and that provides conditions for future development of management strategy modeling in this type of organization

3.   Strategic Control, Balanced Scorecard and Dynamic Scorecard

When studying performance assessment and control systems for implementation of business strategies, Simons (2000) conceived a model of strategic control levers that involve four dimensions. These dimensions are partially related with the 5 Ps of strategy (MINTZBERG et al., 2000): strategy as perspective, strategy as positioning, strategy as plan and strategy as pattern. Only the fifth P of Mintzberg – strategy as ploy – is not considered in this model. The model of control levers developed by Simons (2000) took advantage of some concepts and formulations of strategy developed previously. The first one was the analysis of the Design's School (ANDREWS, 1996), which establishes that the strategy formulation should be done according to the analytical study of threats and opportunities of the external environment and of strengths and weaknesses of the internal environment – SWOT analysis. In order to position the businesses in the external environment, the dynamic of market competition is also used – 5 strengths model of Porter (PORTER, 1998). In order to recognize and to develop resources and competences of the enterprise, the vision based on resources of Barney (1991) and on essential competences of Prahalad and Hamel (1998) have been considered as well.

Strategy as perspective involves the consideration of values, beliefs and ideals as the organization's master guide. Essential values are beliefs that define basic principles, purposes, as well as the organization's course. These values create the principles that must guide the relationship and responsibilities with customers, employees, local communities and suppliers. Strategy as perspective depends on the establishment of belief systems that communicate, give support and establish commitment from the individuals who are part of the organization, with the goal of establishing the culture that reproduces the values of the company's mission.

Strategy as positioning involves the consideration of boundaries that must guide behaviors and management decisions, according to the risks that must be avoided. The establishment, communication and monitoring of these limits must be done through

boundaries systems, such as codes of conduct, limits on decision-making autonomy and internal and external compliance norms, which are stated by firms, laws or external regulatory departments. This strategy also considers the limits originated by the strategic positioning in the market intended by the organization, according to the pressures and competitiveness of the industrial segment.

After defining the mission and the strategic positioning, through the analysis of the competitive dynamics of the market, resources, competences and internal capabilities, the dimension of the strategy as plan emerges. In this phase, formally the goals are expressed, communicated and distributed for the whole organization, and also the necessary resources are estimated and coordinated in order to actually reach the goals. In this phase are also defined the measures of performance and the necessary procedures to reach the goals.

The hierarchy "mission >> strategy >> goals >> measures of performance >> actions" defines a concept in a cascade way that begins at a general inspiring mission towards a specific quantitative measure of performance. This hierarchy is supported by strategic plans based on analytical techniques, such as SWOT. However, according to Simons (2000) this is an incomplete frame of the strategic formulation process. Complementing this process, Mintzberg and Quinn (2001) studied the emergent strategies that define the strategy as pattern and are the origin of the organizational learning process. This strategy considers that ideas emerge from people, who are part of the organization, and those may become good strategies for the organization.

Simons (2000) considers that in the implementation of strategies, in order to reach the financial goals, managers must deal with the following tensions that are inherent to organizations seeking high performance:

a) Tensions among profit, growing and control;
b) Tensions among deliberate and emerging strategies;
c) Tensions among unlimited opportunities to limited attention;
d) Tensions among self-interest and the desire for contributing.

It is a managers' duty to know how to use the several techniques of measure of performance along with the four control levers, shown in figure 1, in order to cope with these tensions. CEOs also may use the control levers to inspire commitment with the organization's purposes, to recognize the competition environment of the market, to coordinate and monitor the execution of strategies at an operational level and to stimulate and guide creation and control of emergent patterns, which may be used as future strategies.

The control levers allow managers to have an effective coordination and business administration when used along with techniques of performance measurements, such as budget plans, measures of corporative performance, balanced scorecards and systems of resource allocation – which are considered in Simons' model as systems of diagnosis control and systems of interactive control. In other words, they provide conditions for the appropriate strategic management of a firm. In a global approach, these tools of performance measurement provide the necessary motivation, mensuration, learning and control for efficiently achieving goals, for creative adaptation and for profitable growth during the life cycle of a firm.

Figure 1 – STRATEGIC CONTROL LEVERS (Source: Simons, 2000)
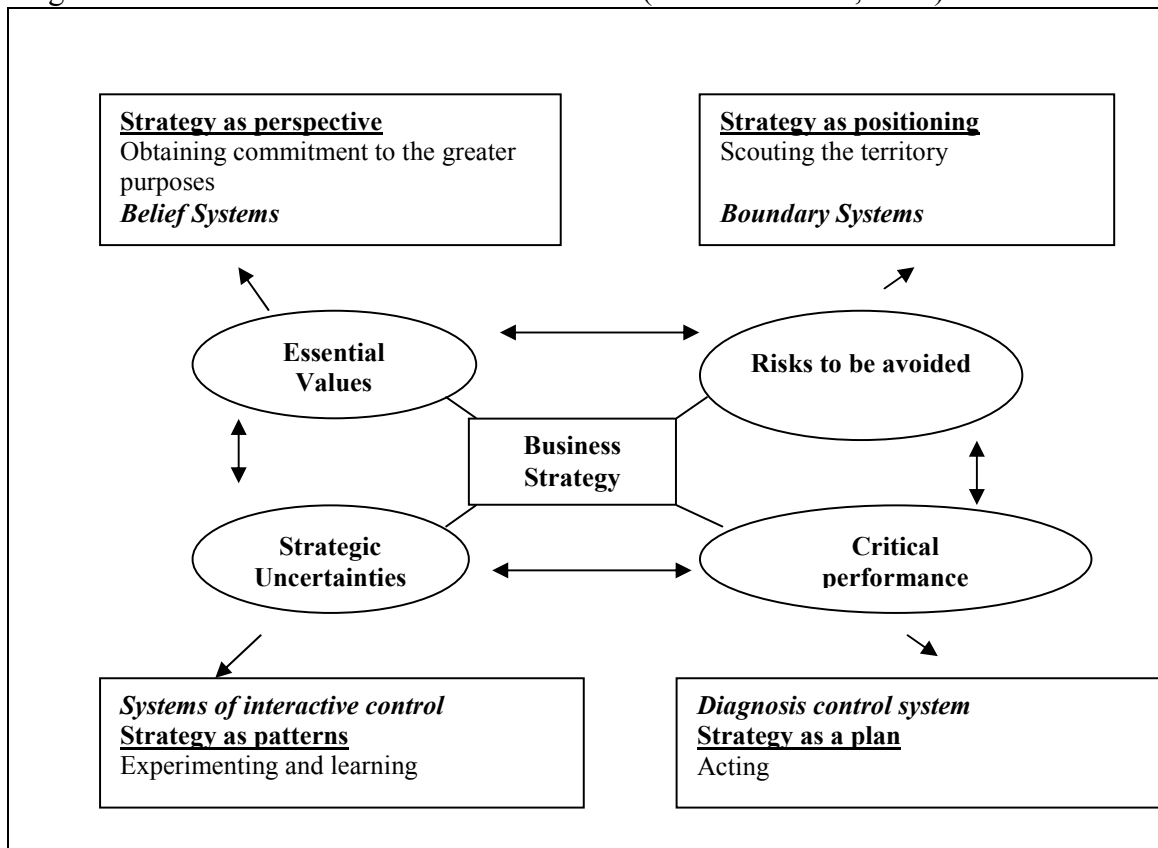
The way of converting strategy into practical actions throughout the firm, detailing guidelines and goals, creating tools for monitoring and for measurement of strategies' results and creating a favorable environment for strategic alignment and learning has been one of the greatest challenges for the strategic management field. Seeking this goal, several methods have been developed, such as Tableaux of Board, Administration by Goals (developed by Peter Drucker), the Method of Management by Guidelines and, the Balanced Scorecard method, created by Kaplan and Norton (FERNANDES, 2003).

According to Kaplan and Norton (1997), the BSC is structured as a set of indicators and is a system of strategic management aiming at:

a) Clarifying and obtaining consensus about the strategy;

b) Communicating the strategy throughout the firm;

c) Aligning departmental and personal goals with the strategy;

d) Connecting strategic objectives with long-term goals and budgets;

e) Identifying and aligning initiatives, investment programs and strategic action;

f) Accomplishing periodic and systematic revisions;

g) Getting feedback in order to increase the knowledge about strategy, to improve it and to develop strategic learning.

The BSC seeks to translate the vision and the strategy of a firm into a broad set of goals and performance measures, having as structure a modeling based on four basic perspectives of a firm: financial, customers, internal processes and also growth and

learning. This modeling is expressed through a map, known as strategic map, that must tell the history of the firm's strategy.

Goals have to be stated on each of the four perspectives along with indicators that allow monitoring these goals. Besides, relations of cause and effect must be identified between the goals and indicators of the four perspectives of the map. In that way, the firm's strategy is concentrated within a set of assumptions about the relations of cause and effect, which have to be tested throughout the result assessment process .

The BSC's main presupposition is the idea that strategic management surpasses the financial dimension and reaches other perspectives, such as customers, internal processes as well as growth and learning. Thus, a BSC map must make explicit the relations among goals within these perspectives, making strategy management possible. Every indicator chosen for a scorecard must be an element of a chain of relations of cause and effect, which communicate the meaning of a firm's strategy (KAPLAN and NORTON, 2004). To Kaplan and Norton (2001), the most innovative aspect of BSC is its capacity for creating strategic learning, specially because the monitoring of performance indicators can assume the form of hypothesis tests of the relations of cause and effect modeled on the strategic map.

Despite the improvement caused by BSC on the strategic management field, there are some criticisms regarding BSC's limitations:

a) The relations of cause and effect are one way, or, in other words, feedback among goals is not made explicit;

b) The map is not operational, because it does not consider delays among relations of cause and effect;

c) The map cannot be experimented with, in other words, it is impossible to use the map in a reliable simulation.

In order to solve these limitations, it is possible to use the System Dynamics method in association with BSC. To Richmond (1999, cited by FERNANDES, 2003) the deficiencies regarding the BSC's strategic map might be solved by using the language of flows and stocks provided by the System Dynamics method. Due to this, the concept of Dynamic Scorecard was developed, where a simulation of the relations of cause and effect is possible, creating strategic learning.

By studying the viability of conjugation of BSC with System Dynamics, Schoeneborn (2003) showed that the relations of cause and effect of the various elements described in literature about the BSC are not suitable enough for the identification of indicators that bring successful results in the long run. Being based on simple views that ignore the delays and possible feedbacks, the strategic maps only show a part of the effects. Overcoming such limitations is possible through the conjugation of the BSC with System Dynamics, in a way that the delays and feedbacks between variables start being considered and set into parameters, so that model simulation and subsequent strategic learning are made possible.

About the possibility of conjugation of the BSC and System Dynamics techniques, David Norton admitted that the next generation of BSC would use the resources of simulation from System Dynamics.

Systemic thinking has been consolidating itself as a new paradigm in the way of facing organizations, no more only through analytical thinking, which treats things as a group of independent/dependent variables, but more importantly by acknowledging the complexity of the social systems, in which variables present a behavior of

interdependency. It was originated from the studies of Bertalanffy (1977) in biology, who, disagreeing from the Cartesian and reductionist view of the universe, proposed the general theory of systems. In this theory, systems should be studied globally, taking into consideration all the interdependencies of the component variables altogether, because an organism is a more complex whole than the sum of its parts.

System Dynamics, derived from this new way of thinking, which takes into account the complexity and interdependence of the variables that make up the systems, was developed initially through the studies of Jay Forrester. Currently the use of System Dynamics is very wide, comprising many different fields and problems, such as: business management, competition and business cycles, ecology, economy and social phenomena. It's possible to say that System Dynamics is useful for the study of the vast majority of problems that have a dynamic nature (PROTIL et al., 2007).

In System Dynamics, there are two basic forms of modeling: soft modeling (qualitative) and hard modeling (quantitative). Soft modeling uses causal maps to identify the structural components of the system and the relations of cause and effect and feedback between the variables. Hard modeling, on the other hand, based on causal maps incorporates the language of flows and stocks, parameterizing the relations between variables and the respective feedbacks and delays, thus adding the possibility of simulations in the system, through the analysis of different scenarios and their consequences on the behavior of the system component variables (STERMAN, 2000).

The conjugation of System Dynamics with the BSC is interesting in that it gives possibilities for overcoming the limitations of this method, as previously reported. By enabling the consideration of delays and feedbacks between different variables of the BSC strategic map, the model overcomes the initial limitations of unidirectionality and operational difficulties. The model then enables more reliable simulations and consequent strategic learning (SCHOENEBORN, 2003). Fernandes (2003) gave the combination of the BSC with System Dynamics the name of Dynamic Scorecard.

4. Management of Cooperatives

Georg Drahein in 1951 introduced the concept of dual nature of cooperative organization (Hanel,1994). On the one hand, the cooperative is primarily an association or a group in the sociological aspect, whose members are the owners and maintainers of the organization. On the other hand, the cooperative is also a joint company of the members' economic ventures and these members are the cooperatives' owners.

To Staatz (1989), until the 1960s, the debate on cooperative organizations, was focused on the discussion if cooperatives would represent a form of vertical organization of farmers, being simply as an extension of individual members' ventures, or if cooperatives could legitimately be analyzed as organizations with self-specific scope and with independent decision-making process, regardless the goals of farmers in their individual ventures. In this sense, the debate was focused on the discussion if the cooperative administration might simply implement the wishes of members, guided by their individual goals, or if they might look for the achievement of the cooperatives' objectives itself, as an independent organization, assuming the vision of collective goals, not always convergent with the goals of individuals.

Staatz (1989) states that Stephen Enke started a different discussion, but perfectly adherent to real conditions, when he said that on the day by day of a cooperative, its

administration is faced with situations in which decisions must be made, based on alternative choices and often antagonistic of what should be maximized between the goals of members and the needs of the cooperative itself. From this discussion emerged the approach to study cooperatives as independent organizations, with their own objectives and as alternative economic firms in face to the conventional IOF.

Enke's model emphasized that to maximize the outcome of members, the cooperative's management had to balance the benefits received from two different sources. Initially, the benefits received by members, derived from their operations with the cooperative, to the extent that it can offer lower prices for purchased inputs and higher prices for products sold by the members. In addition to these primary benefits, as wished by the members when forming the cooperative, another type of benefit might be considered, derived from the cooperative's industrial adding value to the raw materials supplied by the members. That is, industrializing the products delivered by the members and operating under market conditions, the cooperative would offer financial returns derived from profitable business in different markets, that in medium and long terms, could be shared among the members in proportion of their respective financial movements with the cooperative (STAATZ, 1989).

Prioritizing benefits focusing only one of these sources on financial return would tend to reduce the overall returns of members. That is, focusing only on the returns derived from the operations of members with the cooperative, could limit the capitalization of the cooperative in the long run, with consequences on the competitiveness and future returns of their own members. On the other hand, focusing only on the strengthening of the cooperative, at the expense of short-term economic benefits, could significantly compromise the return of the individual members' ventures. Enke, therefore, emphasized an important implication of specific cooperative organizations: the need to balance the benefits of members as users and as owners of the cooperative (STAATZ, 1989).

Reynolds (1997) reports that farmers establish and maintain a cooperative when they can reach their goals in a broader and more comprehensive way when compared to their alternative individual actions as separate economic agents. Cooperatives are voluntary organizations and operate under democratic principles of corporate governance. The cooperatives thus establish themselves as organizations based and dependent on consensus among their members. This author considers that members of cooperatives usually have divergent economic goals, given the differences in size, technological level and type of individual businesses and that the maintenance of cohesion and the creation of incentives for cooperation is much more complex the more different the productive and technological processes are. Thus, in order to meet the goals of the members it is necessary to establish clear policies which consistently sustain and support the relationship between cooperative and members, so that any transaction done with a member can be assessed by all others.

After studying the nature of the decision-making process in agricultural and livestock cooperatives from Paraná, Barreiros (2005) validated a decision-making process model comprised of three basic dimensions: political, economic and administrative. In this model, various internal and external relations existent in cooperatives, which influence their decision-making at strategic levels presented. The external environment influences in different ways the cooperative organization and the body of members. The members, organized into various committees according to the

level of diversification of their businesses, exert different pressures on the cooperative in an attempt to have their individual or corporate goals served. The cooperative, with its technical and administrative structure, tends to imprint as much rationality as possible in their decision making, based on information received from the market. However, given the democratic nature of its corporate governance, the cooperative is highly sensitive to internal pressures, in the search for consensus and coalition between members. In cooperatives, there are two apparently dual structures. On one hand, a technical structure, that seeks rationalization. On the other hand, the structure of power and political order, which influences the decision-making process, based on different individual or corporate goals.

Machado Filho et al. (2003), in turn, argue that in the strategic field, the cooperative model is difficult to manage, due to the need to tend to very diverse demands, leading to a natural increase of the political weight in decision making. Governance becomes very complex, and much of the management effort is concentrated on it. Besides, they reinforce that in Brazilian cooperatives, there usually is no separation between ownership and control, in that, in many organizations, managers come from the body of members, which can lead to management difficulties in that it increases the complexity and the competitive level of businesses. Lacking management professionals, cooperatives move away from the market, focusing on the operational aspect of production. Given the heterogeneity of the member's interest, the agricultural and livestock cooperatives still decentralize their efforts into diversified businesses, with not always sufficient scales of production, to the detriment of effectiveness and good management.

The analysis of cooperative societies from New Institutional Economics perspective takes into consideration five typical problems of these organizations, which are: the horizon problem, the portfolio problem, the incentive problem, the control problem and the influence problem, as described below (COOK, 1995; ZYLBERSZTAJN, 2003).

The horizon problem considers that members tend to reject strategies involving long-term immobilization of capital, when their residual claims on the net income generated by the invested asset are shorter than the productive life of that asset. This problem occurs regarding the inalienability of capital shares. In other words, capital used by the cooperative cannot be sold to third parties, as done in IOF, and is adjusted in a limited way by the cooperative according to its bylaw, regardless of the value increase of the Cooperative. This implicates a preference for short-term projects, rather than long-term investments. The horizon problem implicates the need for the creation of mechanisms to inhibit the exit of the cooperative member, through a penalty in the capital share.

The portfolio problem can be viewed from the cooperative firm's point of view as another equity acquisition problem. The lack of transferability, liquidity and appreciation mechanisms for exchange of residual claims prevents members from adjusting their cooperative asset portfolios to match their personal risk preferences. Therefore, pressures may emerge from members to maintain the cooperative's investment portfolio, in proportion of their preferred risk level, regardless the cooperative's needs. These limitation may cause problems to the extent that the cooperative will have more difficulty competing in markets with higher added value products , which require heavy investments in technology, marketing and distribution.

The incentive problem considers that the difficulty of monitoring the activities of members may generate opportunistic behavior, in case there is a concentration of the relationships with the cooperative only in situations of commercial benefits. This problem is observed, for example, when a member purchases producer goods from a cooperative, but diverts the product to other market channels, if a higher price is encountered there.

The control problem is related to the agency costs associated with trying to prevent the divergence of goals between the membership, represented by the board of directors (principal) and manager (agent). There is a fundamental difference between cooperatives and investor owned firms, in the extent that in cooperatives the pressure exerted by publicly traded equity is not present, masking possible management inefficiencies. Moreover, it is common in Brazilian cooperatives, that executive management is exerted by board of directors' members, which may be effective in cases of simple decision-making processes and less complex businesses, but it tends to be a limiting factor for the efficient management of these organizations, and this limitation is stronger the more the cooperative grows and the more complex its businesses become. In such cases, the improvement of corporate governance depends on the specialization and separation between ownership and control of the company.

The influence problems emerge from the goals' diversity among cooperatives' members. Influence activities arise in cooperatives when organizational decisions affect the distribution of wealth among members and when in pursuit of their self-goals. This leads to the emergence of political coalitions among members of the cooperative, in an attempt to take hold of executive positions, which are provided with a high amount of power. In this situation, the definition of the composition of the executive board is not always a function of the efficiency factor, but of influence procedures and political coalitions. The magnitude of influence issues depends on the degree of members' homogeneity.

Emerging from these considerations is the problem of this research, embodied by the apparent need for adaptation of the BSC methodology and consequently of the Dynamic Scorecard for use in cooperative societies, thus possibly incorporating, beyond the four traditional perspectives (financial, customer, internal processes as well as learning and growth), other perspectives, which are shown to be fundamental in this type of organization: the relationship of the cooperative with its body of members, which depends on transparent policies of incentives for the practice of cooperation, leading to fidelity of the members and strengthening of cooperative; and also the social perspective.

5.   Methodology and Results

From the arguments aforementioned the following research question is presented: How to insert the Social perspective and the Relationship with members perspective in the Dynamic Scorecard Model of agro-industrial cooperatives, given the need to conciliate and balance the goals of members - who seek for economic outcomes in their own individual ventures - with the goals of the cooperative itself, as an independent organization – that need capitalization, professionalization and investments to sustain sufficient competitiveness in agribusiness markets?

In a first stage, which is this article's object of analysis, a model represented by a generic strategic map applicable to agro-industrial cooperatives has been developed. For

the development of this model, which shows the hypothesis of relations of cause and effect of the critical success factors in a qualitative and dynamic way, the Vensim Software has been used.

In order to evaluate the consistency of hypothesis of causal relationships among the variables contained in the generic strategic map, five interviews have been conducted with experts of OCEPAR - Organization of Cooperatives of the State of Parana, followed by content analysis of the interviews - thematic analysis, co-ocurrence analysis and structural analysis - (BARDIN, 2010), and either by questionnaires to assess the perception of these experts on the intensity of causal relations reinforced by them.

In order to validate the hypothesis of causal relationships among the variables contained in the generic strategic map, a field work has been realized in the empirical reality of a great agro-industrial cooperative in the State of Parana – Brazil. This research has been conducted through documents analysis and interviews with twelve coop's managers, followed by content analysis - thematic analysis, co-ocurrence analysis and structural analysis - (BARDIN, 2010), and either by questionnaires to assess the perception of these managers on the intensity of causal relations validated by them.

In later stages, this research will continue with the definition of control indicators, in the different perspectives of the Dynamic Scorecard, that adequately express the critical strategic factors in the agro-industrial cooperatives; followed by the practical application of the proposed strategic map in agro-industrial cooperatives, through the action-research method.

The research will also continue, using the conceptual strategic map proposed as a basis to parameterize a quantitative and simulating model, using the flows and stocks language of System Dynamics.

From the theoretical basement, the research problem, and the researcher experience complemented with discussion with experts in cooperativism, the following variables were considered as key factors for the strategic control of agro-industrial cooperatives, considering the need of balance between economic interests of the cooperative and of its members:

a) technical assistance and members' qualification;
b) members' efficiency;
c) members' profits;
d) members' satisfaction;
e) members' fidelity;
f) cooperative's financial surpluses;
g) cooperative's financial surpluses distribution;
h) research, experimentation and innovation investments;
i) cooperative's capitalization;
j) new cooperative's investments;
k) cooperative's agro-industrial efficiency;
l) cooperative's efficiency of internal processes;
m) customers' satisfaction;
n) cooperative education;
a) cooperative's organizational culture;
p) employees' training and development;
q) social benefits.

The following topics were progressively analyzed in the two stages of the research, and each topic was modeled through one or more reinforcing or balancing loops:

a) Technological progress and members' economic performance;
b) Commitment between and cooperative;
c) Cooperative's economic performance and capitalization;
d) Cooperative education and cooperative's organizational culture;
e) Cooperative's professionalization and efficiency;
f) Social Progress;
g) Balance between cooperative and members.

As a result of the analysis, the following is a description, step by step, about the development of the strategic map, in the soft modeling language of System Dynamics. These language considers the variables, the relation between variables - represented by arrows - and delays in these possible relations between variables, represented by double lines across the arrows. The partial versions of the model are represented in figure 2, with the sequential and progressive causal loop diagrams, that represent reinforcement among variables (R) or equilibrium among variables (B).

The first reinforcing feedback loop designed (R1), illustrated in Figure 2, refers to the positive effect of technological advance on the economical results of members' farms. In designing this loop, one assumes the following set of hypothesis: technical assistance, disseminating the best agronomic practices, increases members' qualification. More qualified members, adopting appropriate technologies, achieve better levels of operational efficiency, with positive effect in production, and consequently in gross margin and profit in their ventures. Finally, the members, realizing the positive effects of the more appropriate technologies adoption on their businesses, predispose to strengthen technical assistance, closing the reinforcing loop R1. This feedback is a result of members' awareness in relation to the benefits brought by technical assistance.

Figure 2 – Loop R1
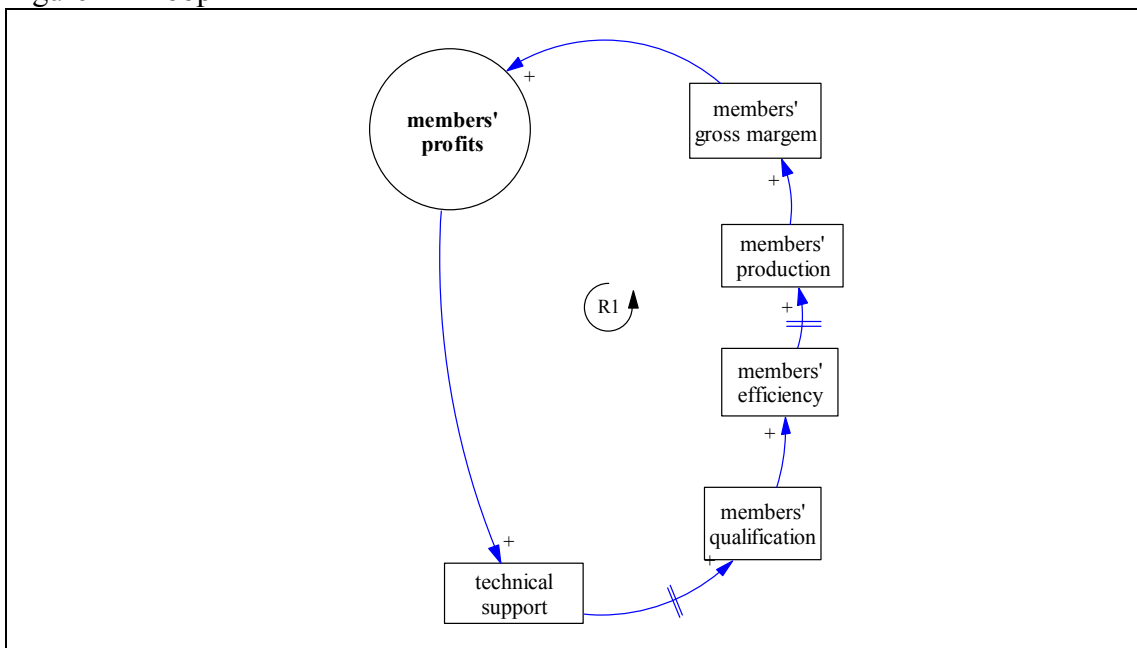
The second reinforcing feedback loop designed (R2) in addition to the model, represented in Figure 3, refers to the positive effect that the commitment of the members with the cooperative – expressed by the indicator fidelity -, influenced by their profits, exert over the financial surpluses of the cooperative, which in turn, increase the profits of the members through the possibility of surpluses distribution. In designing this loop, one assumes the following set of hypothesis: the members' satisfaction improves with greater profits; members' satisfaction, in turn, constitutes one of the factors that promote the members' fidelity, which increases the production delivered to the cooperative, which consequently increases its ability to generate financial surpluses. The cooperative's financial surpluses, being distributed back to members, increase their profits, closing the reinforcing loop R2.

Figure 3 – Loop R2
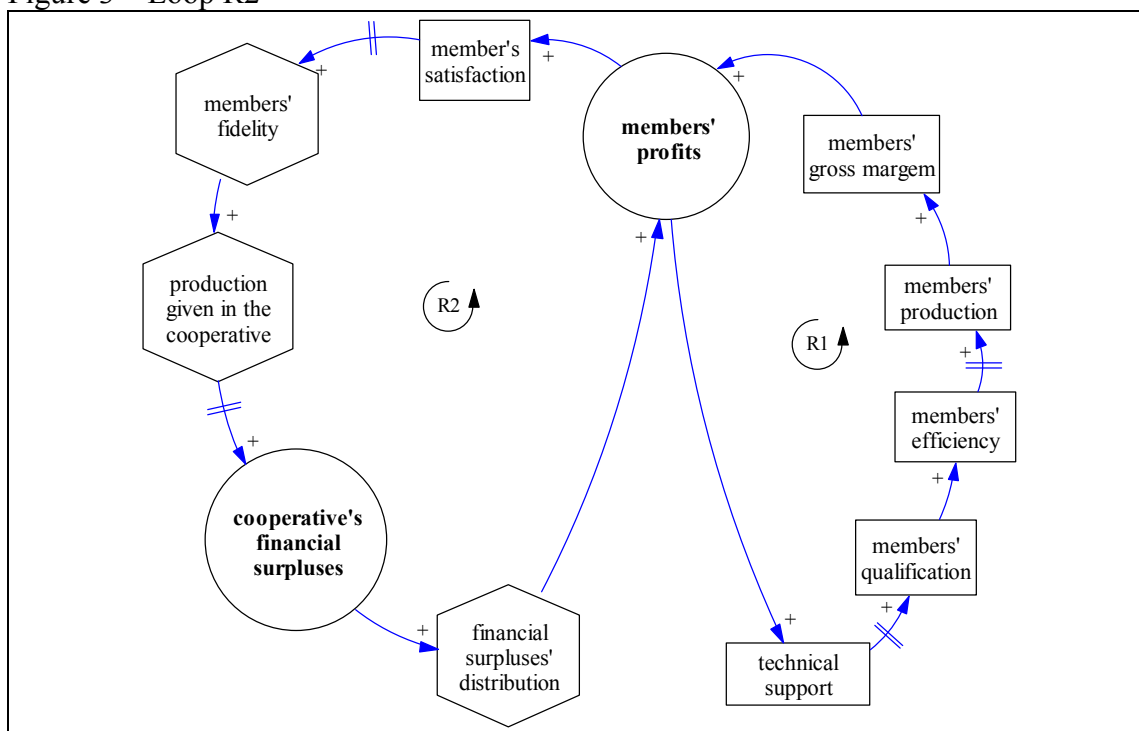
The third loop (B1), represented in Figure 4, is the first balancing feedback loop of the model. It refers to the positive effect that investment in innovation and experimentation exerts over the member's qualification and consequently over their efficiency, production, gross margin and profits, but at the cost of reducing the financial surpluses of the cooperative itself. Instead of reversing all the potential surpluses to the members, the cooperative can alternatively invest a part in agricultural innovation and experimentation, improving the technology employed by the members in their farms, with positive effects in the medium and long term, over the capacity and consequently over the member's profits. In designing this loop, one assumes the following set of hypothesis: investing in experimentation and innovation, the cooperative uses internal resources, with consequent reduction of financial surpluses and reduced distribution of surpluses to members. The investment in experimentation and innovation reduces the economic results of the cooperative and of the members in the short term, however, provides benefits in the medium and long term, as it improves the technology employed by the members, increasing their capacity, efficiency and then their economic results.

Figure 4 – Loop B1
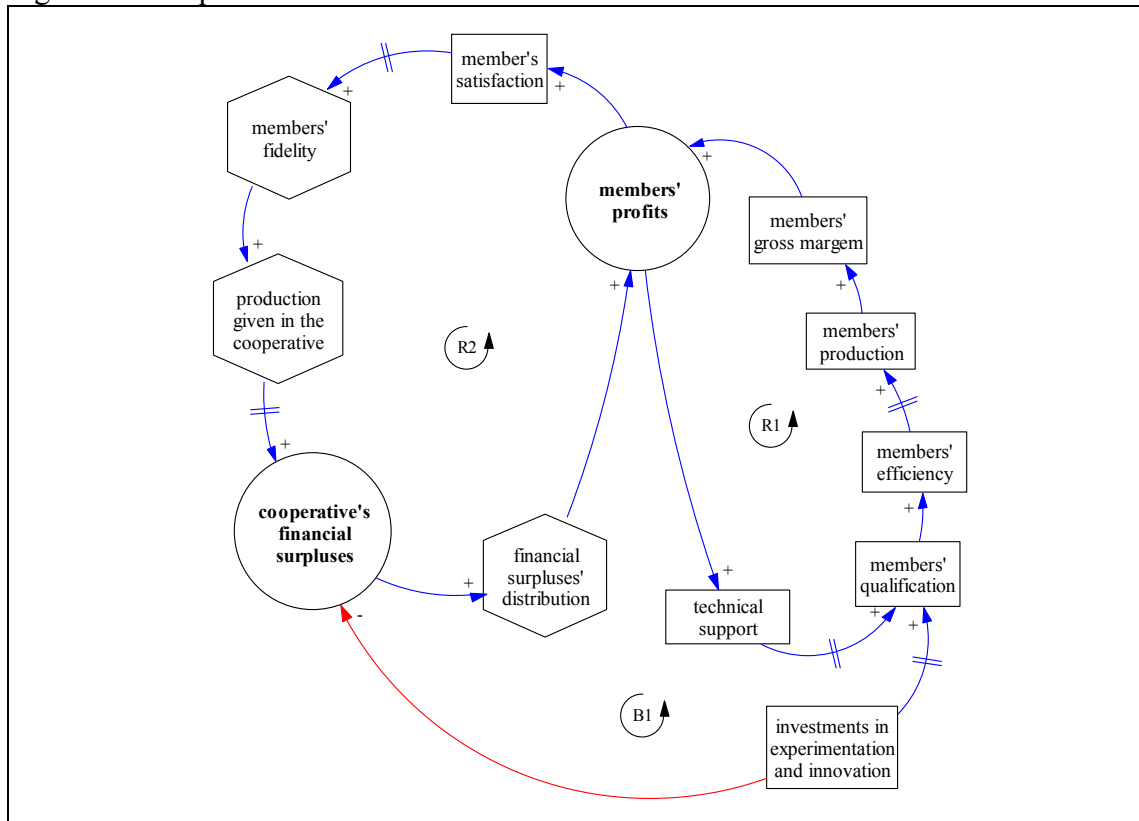
The fourth feedback loop (B2), represented in Figure 5, is also designed as a balancing one. It considers the positive effect that the capitalization of the cooperative exerts over its ability to make new investments, required to preserve its competitiveness in the agribusiness markets, with consequent increase of the cooperative's financial surpluses in the medium and long term. In designing this loop, one assumes the following set of hypothesis: The cooperative operates in competitive markets and needs equity for new investments that preserve or expand its competitiveness, with positive effects over agro-industrial efficiency, consequently over the satisfaction of external customers, sales and revenues, providing the increase in the financial surpluses of the cooperative. These investments, however, compete in the short term with the same surpluses that could alternatively be reversed to the members, closing the balancing loop B2.

Figure 5 – Loop B2
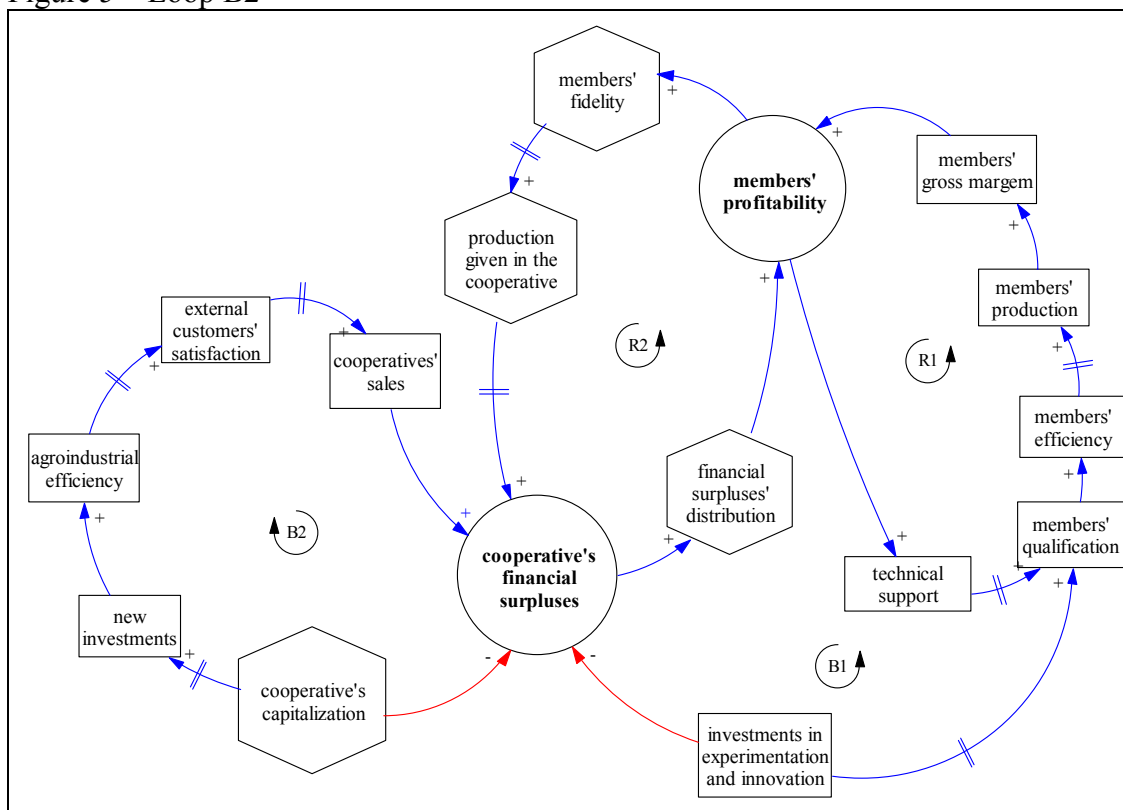
The fifth feedback loop (B3), represented in Figure 6, is also designed as a balancing one. It considers the positive effect that new investments may also exerts over the efficiency of internal processes of the cooperative and consequently over the member's satisfaction, and then with positive effect over their fidelity, yet with sacrifice, in the short term, of the cooperative's surpluses distribution.

Figure 6 – Loop B3
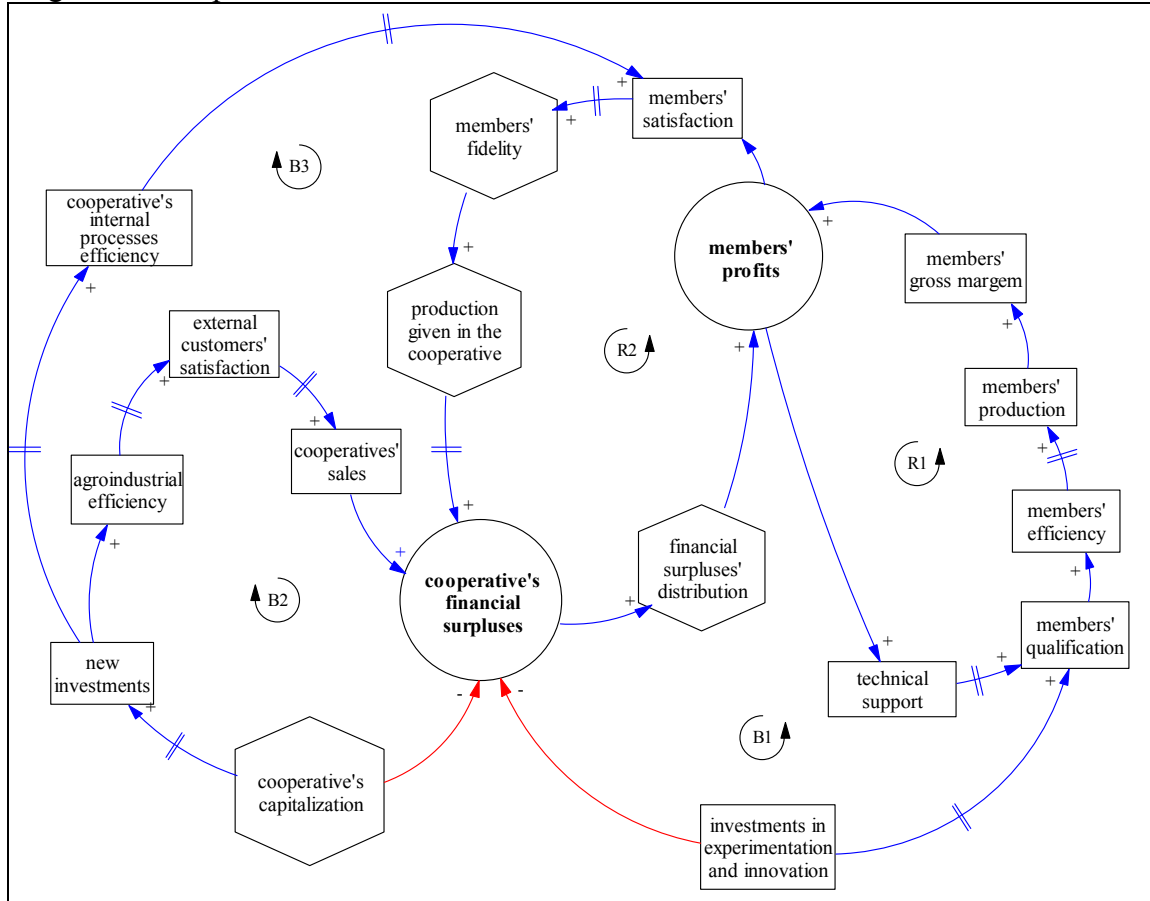
The sixth feedback loop designed as a balancing one (B4), represented in Figure 7, considers the positive effect that cooperative education exerts over the commitment and fidelity of members, and consequently, in the medium and long terms, over the financial surpluses of the cooperative. In designing this loop, one assumes the following set of hypothesis: the cooperative education increases member's awareness about the benefits of cooperativism, with positive effects on the cooperative's organizational culture. The member's awareness about the collective objectives of the cooperative associated with the belonging perception to the organization, leads to increased commitment and consequently the increase of the cooperative surpluses in the medium and long term. In the short term, however, there is a cost decreasing the financial surpluses of the cooperative.

Figure 7 – Loop B4
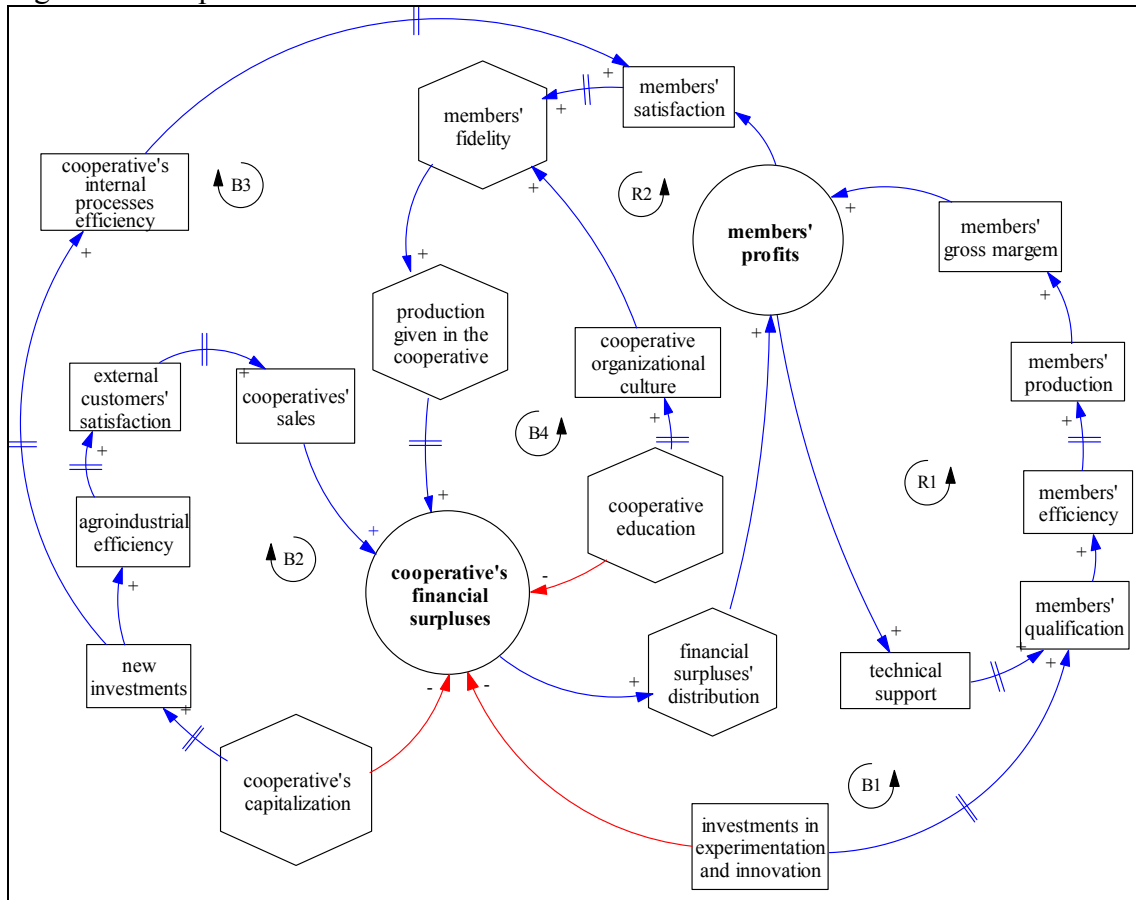
The seventh feedback loop designed as a balancing one (B5), represented in Figure 8 considers the positive effect that employee's training exerts over the efficiency of internal processes of the cooperative, both the agro-industrial efficiency, with positive effects in the external environment (customers), and the efficiency of internal processes, with positive effects in the internal environment (members). In designing this loop, one assumes the following set of hypothesis: the staff better trained, aware and able to perform their tasks better, with positive consequences both internally and externally, lead to economic benefits in the medium and long terms, but decreasing the financial surpluses in the short term, in proportion to the cost of training.

Figure 8 – Loop B5
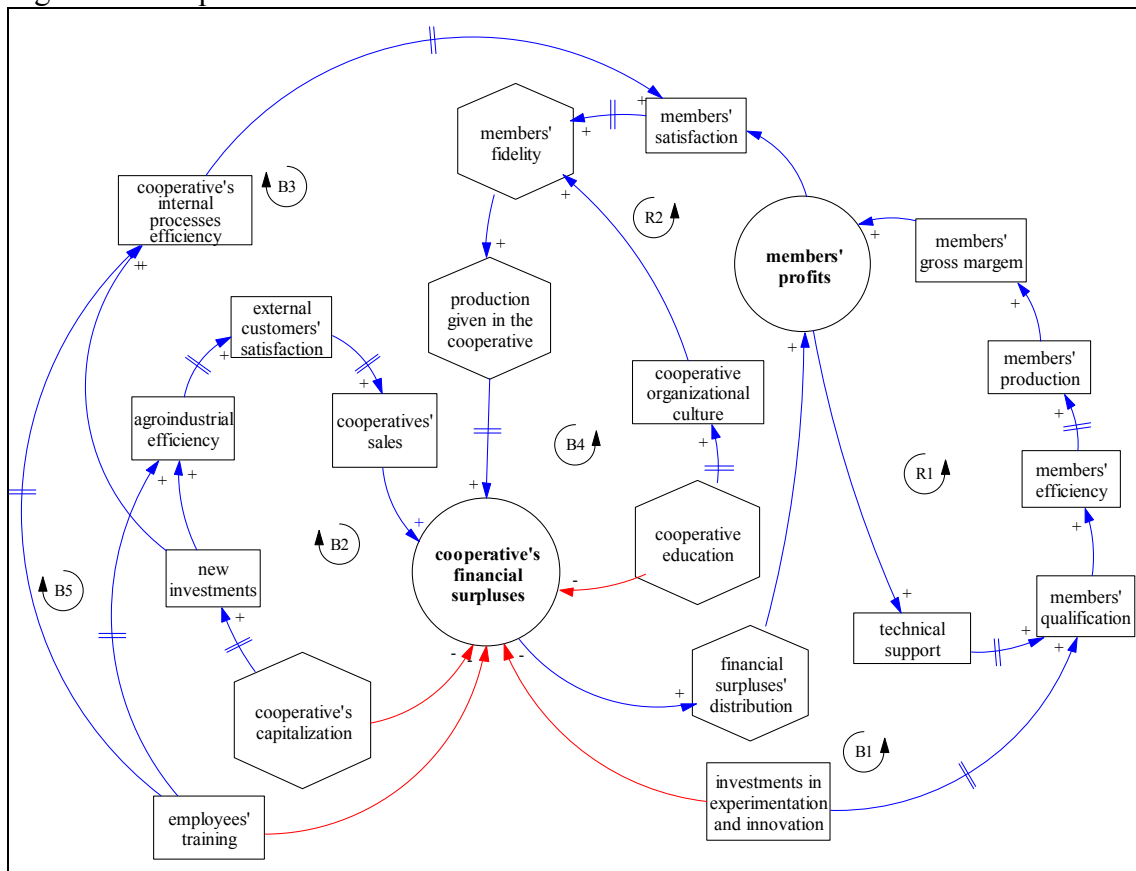
The eighth and last feedback loop (R3) is designed as a reinforcing one (R3), and considers the positive effect that profits of member's ventures exerts over social benefits, which in turn feeds the system positively, improving, in the medium and long terms, the organizational culture, the member's commitment and fidelity and also the cooperative's financial surpluses, closing the reinforcement loop R3. In designing this loop, one assumes the following set of hypothesis: as the members thrive, there is the generation of social benefits, due to increased and better income distribution, employment generation and improvement in the educational level of people. The perception of these benefits, over time, strengthen the organizational culture of the cooperative, with positive effects on the members' commitment and fidelity and the cooperative's ability to generate financial surpluses.

This last loop integrated to the other ones result in the proposed strategic map, adapted to agro-industrial cooperatives illustrated in Figure 9.

Figure 9 – Proposed Strategic Map in Causal Loop Diagram Format
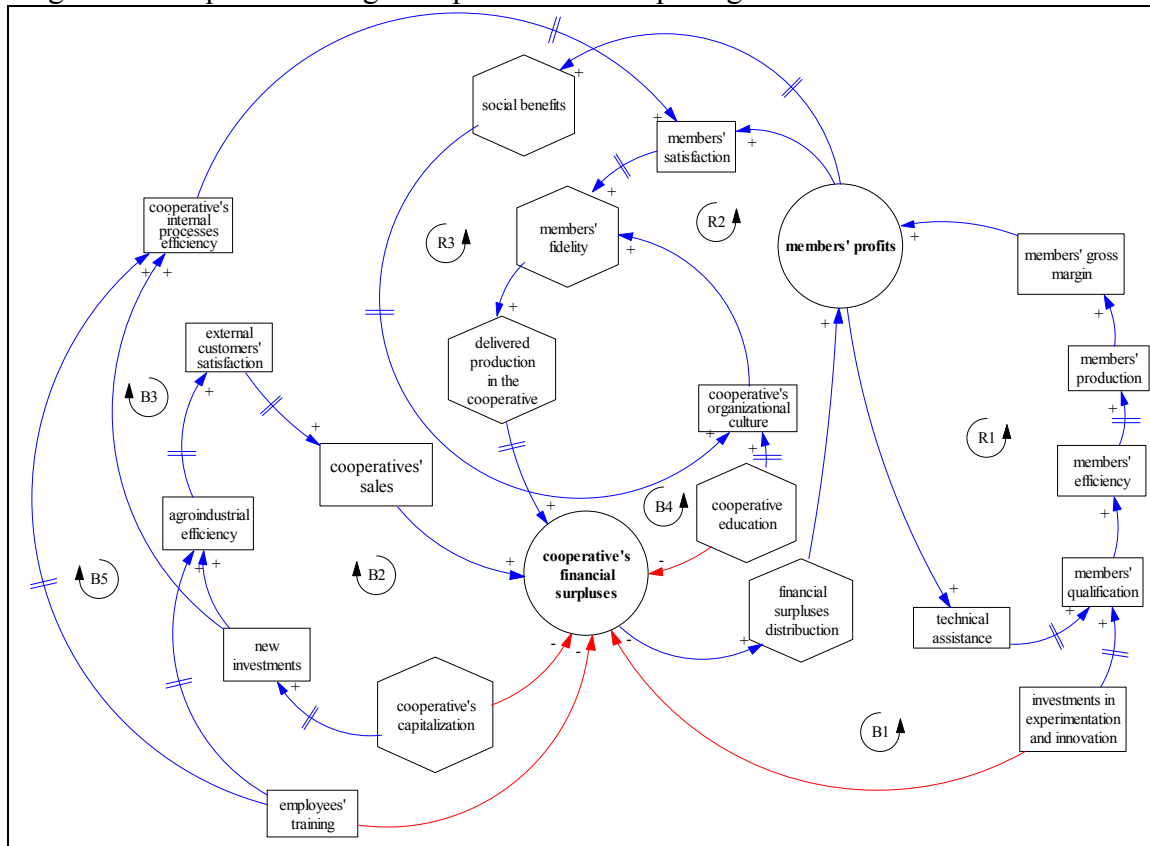
The same strategic map developed is illustrated in Figure 10, but now in the frame of the BSC and considering six basic perspectives. In addition to the traditional four BSC perspectives of *Growth and Learning, Internal Processes, Customers and Financial*, are also considered the perspective of *Relationship with Members* and the *Social* perspective. These six perspectives include two distinct structures. The first represented by the cooperative and the second by all the individual member's ventures, each one with its own goal of economic income. In the case of cooperative structure, the strategic map considers the relations within the internal environment, composed by the members and employees, and also relations with the external environment, composed by the customers. The essence of the map lies in the systemic balance between goals and objectives of the members and the cooperative itself.

The proposed strategic map considers in the perspective *Relationship with Members*, key variables for the balance of goals of the cooperative and the members. These variables are represented by hexagons in the axis of the map, such as members' fidelity, delivered production in the cooperative, cooperative's capitalization, cooperative education, and distribution of the cooperative's financial surpluses.

Figure 10 – Proposed Strategic Map in BSC Format
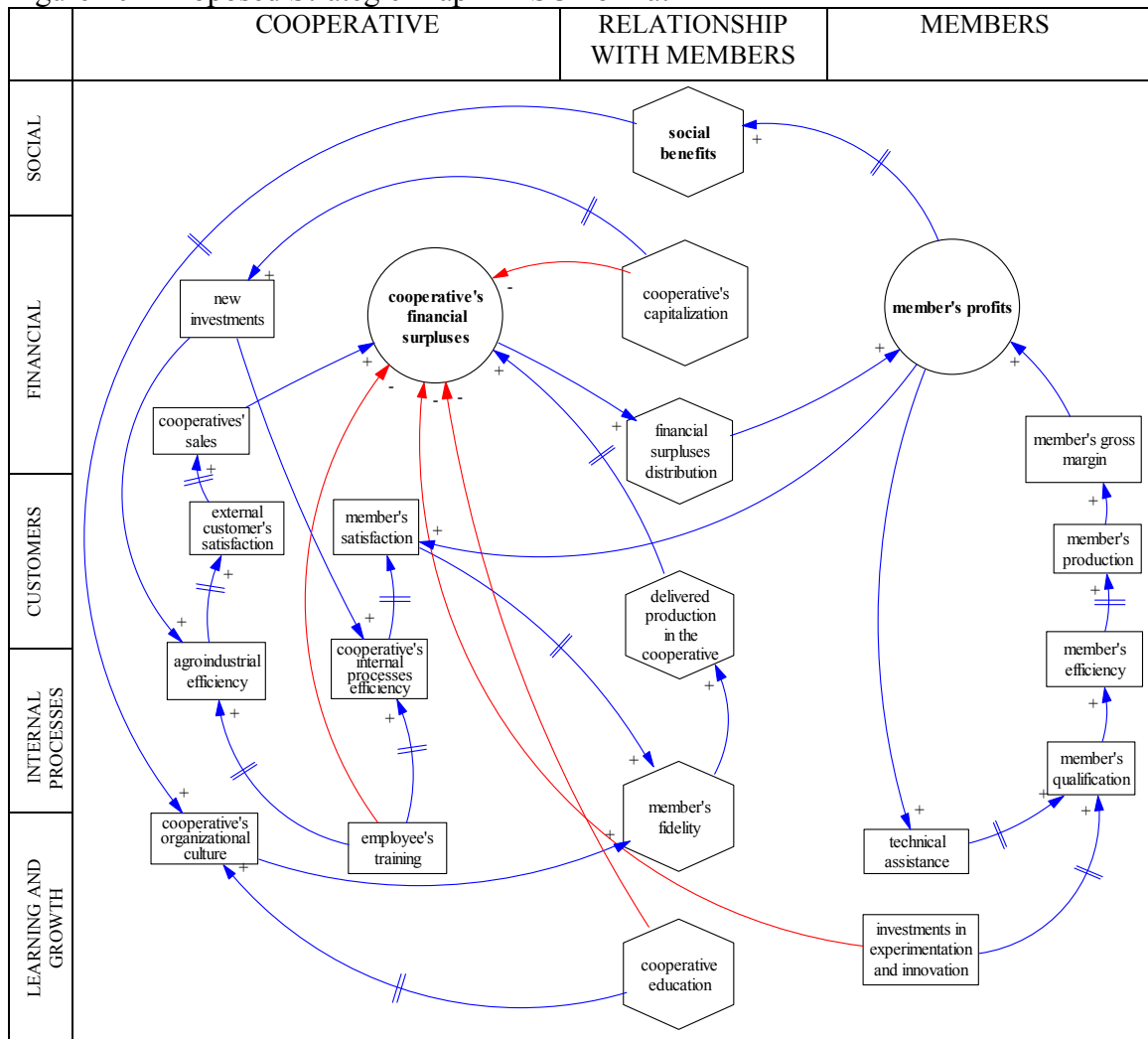
The proposed strategic map clarifies that the definition of goals for agro-industrial cooperatives involves delicate balances. For instance, a cooperative must balance the goal of increasing its net income with the goal of offering attractive prices to the members, that are the suppliers of raw materials. Other example: a cooperative must search for a balanced arrangement between the members' distribution of surpluses and the capitalization of the cooperative itself, increasing its ability to perform new investments.

This situation approaches the archetype described by Senge (2000) called "Success to the successful." For this archetype, two activities compete for limited resources. The more successful one becomes, the more resources wins, leaving the other to starve. The general principle of this archetype is the search for an overall goal for a balanced achievement of the two activities. Figure 11 illustrates the structure of the archetype "Success to the successful" adapted to agro-industrial cooperatives, that based the proposed model.

Figure 11 – Archetype Succes to the successful adapted to agro-industrial cooperatives
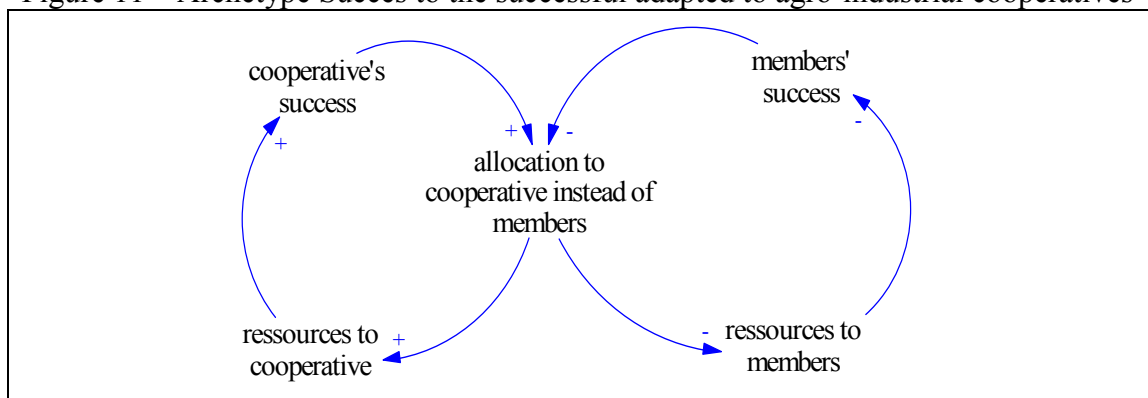
In the perception of the experts interviewed, the strategic map presents high to very high adherence with the reality of agro-industrial cooperatives in Province of Paraná – Brazil, as can be seen in the chart 1.

Chart 1 – Experts perception about the strategic map global adherence

	None	Very Low	Low	Medium	High	Very high
	0	1	2	3	4	5
R1 – Technical Assistance						
R2 – Fidelity						
B1 – Experimentation and innovation						
B2 – Capitalization – industrialization						
B3 - Capitalization – services						
B4 – Cooperative education						
B5 – Employees training						
R3 – Social benefits						
Global adherence of strategic map						

In the perception of the managers interviewed, the strategic map also presents high to very high adherence with the reality of the empirical reality of the agro-industrial cooperative that was researched through field work, as can be seen in the chart 2.

Chart 2 – Managers perception about the strategic map global adherence

	None	Very low	Low	Medium	High	Very high
	0	1	2	3	4	5
R1 – Technical Assistance						
R2 – Fidelity						
B1 – Experimentation and innovation						
B2 – Capitalization – industrialization						
B3 - Capitalization – services						
B4 – Cooperative education						
B5 – Employees training						
R3 – Social benefits						
Global adherence of strategic map						

The strategic map also provides the important issue that the capitalization of the cooperative represents to the generation of resources for new investment in agribusiness. The agro-industrial cooperatives compete in competitive markets, including large competitors with high economic power. To maintain their competitiveness in these markets, agro-industrial cooperatives depend on investments in new industries, distribution structures, and selling and marketing channels.

Another important aspect to be highlighted in the proposed strategic map is its potential for explanation of an important core competence of agro-industrial cooperatives, which lies in the ability to develop strong structure of suppliers of raw materials for agro-industrialization, and so to coordinate agribusiness productive chains.

6. Conclusions

In this article, a strategic map based on the concepts of BSC and System Dynamics, adapted for agro-industrial cooperatives, is proposed. This is a generic map, which considers critical processes in this type of organization, such as the balance of goals, which are not always convergent, between the cooperative and the members. At the same time that the members operate with the cooperatives, attempting to increase the economic result of their individual ventures; the cooperatives depend on the accumulation of surpluses for their capitalization, aiming to make further investments that will provide the maintenance of their competitiveness in the competitive markets where they operate.

A proper understanding of the causal relationships between the variables proposed in the strategic map becomes crucial, and its application as a strategy management tool in the agro-industrial cooperatives may prove to be an important management tool, as it makes use of important and well-regarded concepts of strategy management, provided by the BSC associated with System Dynamics.

The possibility of applying the proposed strategic map depends on the deepening of the studies, the definition of indicators to adequately assess each variable envisioned in the proposed strategic map, as well as the adaptation and application to real cases of agro-industrial cooperatives, through the action-research method.

Finally, the proposed conceptual strategic map serves as a basis for further research aimed at developing a quantitative simulating model, using the stocks and flows language of the System Dynamics.

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