Andrei Bonamigo

A MANAGEMENT MODEL FOR DAIRY PRODUCTION BASED ON THE ECOSYSTEM BUSINESS CONCEPT

These submitted to the Post-Graduation in Production Engineering from the Federal University of Santa Catarina as a partial requirement for obtaining a Doctoral degree in Production Engineering.
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Florianópolis
2017

Bonamigo, Andrei
A management model for dairy production based on the ecosystem business concept / Andrei Bonamigo ; orientador, Fernando Antônio Forcellini, coorientador, Helio Aisenberg Ferenhof, 2017.
140 p.

Tese (doutorado) - Universidade Federal de Santa Catarina, Centro Tecnológico, Programa de Pós Graduação em Engenharia de Produção, Florianópolis, 2017.

Inclui referências.

1. Engenharia de Produção. 2. Milk. 3. Dairy cows. 4. Dairy farms. 5. Business ecosystem. I. Antônio Forcellini, Fernando . II. Aisenberg Ferenhof, Helio . III. Universidade Federal de Santa Catarina. Programa de Pós-Graduação em Engenharia de Produção. IV. Título.

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This doctoral these was considered appropriate for obtaining doctor title in production engineering, and approved in final form by the Postgraduate Program in Production Engineering.

Florianopolis, december 1, 2017.

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This work is dedicated to my fiancée, classmates and my dear parents.

ACKNOWLEDGEMENTS

First, I would like to express my sincere appreciation to Dr. Fernando Antonio Forcellini and Dr. Helio Aisenberg Ferenhof for his continuous support and leadership during this learning process. In addition to Professor Rafael Tezza, for the support and guidance.

I thank God for being my guide and giving wisdom, patience and commitment to the achievement of my goals. Thank you also for keeping my family and my bride always by my side, providing support.

I gratefully acknowledge the financial support from CAPES (Coordination for the Improvement of Higher Education Personnel) and CNPQ (National Council of Technological and Scientific Development).

I cannot forget all my PPGEP colleagues for the lessons and exchanges of experiences that we enjoy in the laboratory, in the classroom and in the traditional *churrasco* on Fridays. They will be unforgettable!

I thank my colleagues of doctor students and master students, who together share learning moments, writing, and symposiums. Thank you also for the patience of all and respect that you have always had with me.

I would like to thank my colleagues and friends who were the "bridge" for me to get here, especially to my friends and colleagues: Prof. Ricardo Máximo Anzolin, Prof. Fábio Lazzarotti, Prof. César Augustus Winck, Prof. Simone Sehnem; Prof. Eliane Filippin; Prof. Vando Ferreira Lopes and Prof. Silvana Meneghini. You were the incentive since graduation that pushed me to move forward on the academic path. Thank you very much!

"*Os que se encantam com a prática sem a ciência são como os timoneiros que entram no navio sem timão nem bússola, nunca tendo certeza do seu destino*".

(Leonardo da Vinci, 1519)

RESUMO

A produção leiteira é uma das principais atividades da agricultura de subsistência familiar em Santa Catarina (SC). Santa Catarina é o quinto maior produtor de leite do Brasil e tem alto potencial de crescimento nos próximos anos. Por outro lado, algumas barreiras limitam o desenvolvimento da atividade. Com o objetivo de mitigar essas barreiras, este estudo propõe um modelo de gestão para produção leiteira baseado no conceito *business ecosystem*. Para alcançar esse objetivo, a abordagem metodológica foi planejada e estabelecida em nove artigos científicos. Para cada um deles, um método específico foi adotado, implementando a metodologia composta por nove fases. Na primeira fase (Artigo 1), foi realizada uma revisão da literatura para identificar a aplicabilidade do conceito *business ecosystem* na atividade láctea a partir das interações e/ou colaboração entre os atores do ambiente de produção leiteira. Em seguida, procurou-se diagnosticar as barreiras do sistema de produção leiteira a partir do conceito *business ecosystem*, por meio de uma revisão sistemática da literatura (Artigo 2). Na terceira fase (Artigo 3), realizou-se uma busca bibliográfica sistemática, limitada ao estado SC, a fim de encontrar barreiras que limitam a produção leiteira. Então, diagnosticou-se as barreiras encontradas empiricamente via estudo de caso (Artigo 4); A quinta e sexta fase, buscou verificar a presença de barreiras de produção leiteira no campo (Artigo 5 e Artigo 6); Em seguida, foi desenvolvido um *framework*, onde os atores serão capazes de reconhecer os fatores-chave para o desenvolvimento da produção leiteira, a fim de melhorar a relação entre os atores no ecossistema leiteiro, nesta etapa, também os fatores-chave foram testados na fazenda por meio da consulta com especialistas do sector lácteo (Artigo 7); Em seguida, verificou-se a relação entre as barreiras e os fatores-chave da produção leiteira (Artigo 8). Com base nos resultados desta tese, foi desenvolvido e testado um modelo de gestão baseado na perspectiva do conceito business ecosystem (Artigo 9). Do modelo, é possível contribuir para resolver os problemas que dificultam o desenvolvimento da produção leiteira. A partir dos resultados apresentados, é possível orientar os *players* que compõem a cadeia de valor do leite na tomada de decisões, bem como apoiar outros *players* que compõem o ecossistema de negócios láctero na definição de estratégias a serem desenvolvidas de forma cooperativa, ou seja, , através a co-criação de valor.

Palavras-chave: Barreiras. Vacas leiteiras. Leite. Fazendas leiteiras. *Business ecosystem*.

RESUMO EXPANDIDO

Introdução

A produção leiteira, é uma das principais atividades de subsistência da produção familiar em Santa Catarina. O Estado é o quinto maior produtor de leite do país e apresenta elevadas perspectivas de crescimento para os próximos anos, por outro lado algumas barreiras do setor precisam ser superadas para atender as crescentes demandas do setor. A partir da interação entre múltiplos atores do ambiente de negócios leiteiro, o presente estudo objetiva propor um modelo de gestão para a produção leiteira a partir da ótica do conceito *business ecosystem*, de modo que os atores que o compõem possam cocriar valor e se desenvolverem de forma conjunta. Santa Catarina, embora representativo na produção láctea, carece de aprimoramentos no sistema produtivo, uma vez que a falta de gestão na atividade, impacta na falta de qualidade, acesso a novas tecnologias e na agregação de valor aos produtos orindos do leite. Diante do exposto, esta tese tem como objetivo principal propor um modelo de gestão para a produção leiteira baseado no conceito *business ecosystem*, uma vez que este conceito, é análogo a teoria da ecologia, como em sistemas naturais, o *business ecosystem*, deve atrair diferentes tipos de recursos e transformá-los de modo que o valor seja cocriado e os ganhos compartilhados entre os atores que junto cooperam.

Objetivos

O objetivo principal desta tese é propor um modelo de gestão para a produção leiteira com base no conceito *business ecossystem*. Para o alcance deste objetivo principal, foram propostos os seguintes objetivos específicos: a) Avaliar o uso do conceito *business ecosystem* na produção de leite como mecanismo para mitigar os fatores limitantes da atividade e impulsionar o desenvolvimento do setor; b) Diagnosticar a produção leiteira para listar as principais barreiras de produção, de modo que estudos adicionais podem ser realizados para mitigar as barreiras encontradas; c) Avaliar as barreiras da produção leiteira em Santa Catarina, na perspectiva do conceito *business ecosystem*; d) Verificar se as barreiras expostas por Bonamigo; Ferenhof e Forcellini (2016), em seu artigo de revisão da literatura, são empiricamente confirmados em um caso de estudo; e) Diagnosticar as barreiras de produção leiteira em Santa Catarina a partir do conceito *business ecosystem* na prática; f) Desenvolver um *framework*, onde os atores serão capazes de reconhecer os fatores-chave para o desenvolvimento da produção leiteira, a fim de

melhorar a relação entre os atores no ecossistema leiteiro; g) Verificar a relação entre barreiras e fatores-chave da produção de leite; e h) Propor e testar um modelo de gestão para produção leiteira baseado no conceito *business ecosystem*.

Metodologia

Para atender o objetivo principal desta tese que compreende propor um modelo de gestão para a produção leiteira baseado no conceito *business ecossystem* foi conduzido um conjunto de revisões da literatura de forma sistemática, coletas e analises de dados impíricos e testes estatísticos. A coleta de dados compreendeu entrevistas com *experts* do setor leiteiro, como produtores, universidades, centros de pesquisa, cooperativas de produtores leiteiros, prefeituras, dentre outros atores que compõem o ecossistema de produção leiteiro. Os achados serviram de base para a construção do modelo de gestão proposto.

Resultados e Discussão

Com base nos achados no percurso metodológico apresentado, foi possivel apontar que o conceito *business ecosystem* apresenta vantagens para a produção leiteira, uma vez que contribui para a cooperação dos atores do sistema leiteiro e para a inovação do setor. Diante disso, foi encontrado na literatura as barreiras que limitam o desenvolvimento do setor leiteiro em nível mundial e em Santa Catarina. Em seguida as barreiras foram testadas e avaliadas na prática. Por outro lado, foram identificados e testados na prática os fatores-chave para o desenvolvimento da atividade leiteira. Adicionalmente, foi possivel identificar uma relação inversa entre barreiras e os fatores-chave, ou seja, por meio de testes estatisticos constatou-se que os fatores-chave quando estimulados, mitigam as barreiras do setor lácteo. A partir dos achados, foi possivel construir e testar o modelo de gestão para a produção leiteira a partir da ótica do conceito *business ecosystem.*

Considerações Finais

O objetivo principal desta tese foi propor um modelo de gestão para a produção leiteira com base no conceito *business ecossystem*. A partir dos achados teóricos e práticos para o desenvolvimento desta tese, foi conduzida a construção do modelo de gestão que leva em conta as barreiras e os fatores-chave do setor lácteo. O modelo proposto é caracterizado como uma contribuição para a área acadêmica e prática, pois apresenta uma maneira estruturada de direcionar os *players* do setor para impulsionar o desenvolvimento da produção leiteira. Em vista do

exposto, o modelo orienta os atores da atividade leiteira a co-criarem valor de forma mútua e se desenvolverem de forma conjunta. A partir disso, entende-se que o objetivo geral dessa tese foi alcançado. Adicionalmente, o modelo direciona para a mitigação da barreiras da atividade láctea e permite que os *players* obtenham subsídios para a tomada de decisões em ações estratégicas no setor leiteiro, de modo que os entraves do setor sejam mitigados. Haja vista o que precede, uma vez que os atores do setor de produtos lácteos cooperem, os fatores adversos ao desenvolvimento do setor, como dificuldades de acesso a novas tecnologias, recursos financeiros e conhecimentos, podem ser mitigados, diante que os *players* quando cooperam de foram conjunta os riscos e vantagens são compartilhados.

Palavras-chave: Barreiras. Vacas leiteiras. Leite. Fazendas leiteiras. *Business ecosystem.*

ABSTRACT

Dairy production is one of the main activities of family subsistence agriculture in Santa Catarina (SC). Santa Catarina is the fifth largest milk producer in Brazil and has high potential for growth in the coming years. On the other hand, some barriers limit the activity development. Seeking to mitigate these barriers, this study proposes a management model for dairy production based on business ecosystem concept. To achieve this objective, the methodological approach was planned and established into nine scientific articles. For each of them, one specific method was adopted, thrust the methodology consisting of nine phases. The first phase (Article 1), a literature review was conducted to identify applicability of business ecosystem concept in the dairy business from an analysis of the interactions and/or collaboration between multi-agent dairy production environment. Then, sought to diagnose dairy production system barriers from the business ecosystem concept, through a systematic literature review (Article 2). The third phase (Article 3) a systematic literature search was conducted, limited to the SC state in order to find barriers which limit the development dairy production. Then, We diagnose the barriers found empirically by a case study (Article 4); The fifth and sixth phase, we checked the dairy production barriers presence at farm (Article 5 and Article 6); Then we develop a theoretical framework, where the actors will be able to recognize the key factors for the development of dairy production, in order to improve the relationship between the actors in the dairy ecosystem, in this stage, we also the key factors were tested at farm through consultation with experts from the dairy sector (Article 7); Then we check the relationship between the barriers and the key factors of dairy production (Article 8). Based on the findings of this thesis, we developed and tested a management model based the business ecosystem concept perspective (Article 9). From the model we it is possible to contribute to solving the problems that hinder the dairy production development. From the results presented, it is possible to guide the players that make up the milk value chain in decision making, as well as to support other players that make up the dairy business ecosystem in the definition of strategies to develop in a cooperative way, ie, through the value co-creation.

Keywords: Barriers. Dairy cows. Milk. Dairy farms. Business ecosystem.

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LIST OF ABBREVIATIONS AND ACRONYMS

CAPES Coordination for the Improvement of Higher Education Personnel
CIDASC: Integrated Agricultural Development Company of Santa Catarina
COPÉRDIA: Cooperative Production and Consumption Concórdia Ltda
EMBRAPA: Brazilian Agricultural Research Corporation
EPAGRI: Rural Extension and Agricultural Research Enterprise
FAO: Food and Agriculture Organization of the United Nations
IBGE: Brazilian Institute of Geography and Statistics
IFAMR: International Food and Agribusiness Management Association
IN: Normative Instruction
MAPA: Ministry of Agriculture, Livestock and Food Supply
OCESC: Organization of Cooperatives of the State of Santa Catarina
OECD: Organization for Economic Co-operation and Development
RBS: Systematic bibliographic review
SC: Santa Catarina

SUMMARY

1. INTRODUCTION

This chapter is organized in four sub-items, among them the research problem presentation, justification, objectives and the thesis structure.

1.1 RESEARCH PROBLEM PRESENTATION

Dairy production shows a high growth potential, where approximately 150 million production units worldwide are involved in milk production (FAO, 2016).

The dairy production system in Brazil has growth potential. Production is expected to grow at an annual rate of 1.9%. This corresponds to a yield of 38.2 billion liters of raw milk at the end of the period 2020/21 (MAPA, 2011).

The SC State is the fouth largest Brazilian dairy producer where this activity is presented as one of the most important sources of income. SC represented 8% of dairy production in Brazil, and in 2014 had a production of 2.983.250 liters, which represents R$2.687.978,00 in value to the state's economy (WINCK; NETO, 2009; IBGE, 2014; IBGE, 2017).

Although the outlook for the dairy sector are positive, some industry barriers limit the dairy industry to develop. For Batalha and Scarpelli (2001), rural production is still seen more as a result of the nature forces than of scientific management.

The management lack among the multiple actors in the dairy production system has been demonstrated as a barrier to the sector development. For example: the lack of cooperation and interaction among cooperatives producer, government agencies, dairy producers, hulling industries derived from milk, universities, research institutes, customers and consumers.

This adverse condition has been shown to be a problem for the production dairy system development, which limits the actors of the dairy system to innovate and develop the activity (Moore, 2006; Mazzarol; Limnios; Reboud, 2013; Winck, 2013; Bonamigo, Andrei; Ferenhof, Helio Aisenberg; Forcellini, Fernando Antônio, 2016b; Dolinska; D'aquino, 2016).

Factors that characterize this problem are linked to poor quality milk, low productivity, rural exodus, environmental factors and access to limited new technologies (Eastwood, C.; Chapman, D.; Paine, M., 2012;

Kilelu; Klerkx; Leeuwis, 2013; Novo *et al.*, 2013; Lamprinopoulou *et al.*, 2014; Bonamigo, Andrei; Ferenhof, Helio Aisenberg; Forcellini, Fernando Antônio, 2016b).

To mitigate the barriers of the dairy sector, it was opted to use the business ecosystem concept as an alternative to promote development of the sector through value co-creation between multiple agents in the dairy sector.

From the presented problem, this thesis proposes a management model for dairy production from the business ecosystem concept.

1.2 THE BUSINESS ECOSYSTEM CONCEPT

The business ecosystem has its genesis in the ecology theory. As in natural systems, the business ecosystem, should attract different resources types and turn them so that the value is co-created (Moore, 1993).

The business ecosystem concept, can be defined as a set of actors that interact, like the government, customers, universities, cooperatives, producers, institutes and other stakeholders to co-create value in a shared manner (Moore, 1993; 1996; Peltoniemi; Vuori, 2004; Li, 2009).

According to Zhong e Nieminen (2015), this has been proposed as a concept to discuss service innovations in high-tech industries as “an economic community of interacting organizations that collaborate and compete across various industries” (Moore, 1996).

The business ecosystem, characterize a system where the population develops through coevolution with the environment resulting in self-organization and adaptation to the environment (Peltoniemi; Vuori, 2004). Co-create value among multiple actors in the business environment, has the advantages with: benefits and shared management, difficulty imitability by competition, greater access ease to resources and and possible maintenance of the actors, from accordance with business strategy (Andrews; Hahn, 1998; Rainbird, 2004). In order to conceptualize co-creation, Hearn e Pace (2006) identify some factors in the conceptualization of different conceptions of value creation. Table 1

Table 1: Comparing key strategy elements for different conceptions of value creation

Strategy elements	Supply chain	Value chain	Value ecology
Customers	Consumers	Consumers	Consumers, suppliers, competitors, etc.
Environment	Static/stable	Static/stable	Chaotic/uncertain
Focus	Supply side or demand side, not both	Supply and demand sides	Supply and demand sides
Value creation	Limited emphasis on value creation	Emphasizes a value creation approach which adds value at every node	Emphasizes a holistic approach to value creation throughout the ecosystem
Relationship type	Vertical integration	Timid teaming	Dynamic and evolving
Risk	Low	Medium	High
Profit focus	Increase own profits	Increase own profits	Increase ecosystem profits
Cost focus	Minimize own cost	Optimize own cost	Share costs
Knowledge leverage	Within the enterprise	Within the enterprise	Across the ecosystem
Knowledge approach	Storing	Hoarding	Sharing
Resource approach	Defending	Guarding	Sharing
Time orientation	Short-term	Long-term	Long-term
Key driver	Cost	Revenue	Knowledge

Souce: Hearn e Pace (2006) apud Andrews e Hahn (1998) and Rainbird (2004)

In this sense, the business ecosystem management, involves the platforms business creation and maintenance, so that knowledge, resources, costs, as well as risks, are shared with the players of platforms business, so that when these companies act in an interconnected way innovation boost happens through the exchange of knowledge, skills and resources (Riemer; Klein, 2006; Li, 2009).

The inter-organizational design of a business platform is based on the diffusion of the flow of knowledge among the heterogeneous actors of the ecosystem. This platform can take many forms. Its evolution

requires the identification of the structuring element, a component of the supply chain platform, for example, that will structure the industrial platform. The knowledge flows allow a platform to move from the supply chain to the industrial platform, contributing to the emergence of a business ecosystem (Attour; Peruta, 2016).

Still in relation to knowledge management in a business platform, Ferenhof; Bonamigo e Forcellini (2016) point out that "effective management of the network of actors that make up the ecosystem is a *sinequanon* condition for boosting value creation in a business environment".

On the other hand, knowledge can in risk in the business ecosystem, when there is no effective knowledge management, since it can be leaked and/or passed on to players who can use it outside the business environment. In this sense, ecosystem leadership should plan to: plan entry; permanence; and the exit of the participants in the business platform so that the risks are mitigated (Ferenhof; Bonamigo; Forcellini, 2016).

1.3 THE MILK AGROINDUSTRIAL CHAIN

Agribusiness emphasizes the interdependence between farmers and entrepreneurs in the buyers' process and sellers (PINAZZA; ARAÚJO, 1993). Thus, the productive system actors upstream and downstream are becoming increasingly important as the agroindustrial activity has been modernizing. Given this, agribusiness began to be analyzed through a systemic vision, forming a big network of interrelationships with the economy rest.

In this sense, the productive chain concept was developed as a systemic vision tool, so that it represents a system aimed at supplying a market and/or customer with the products coming from this system (CASTRO et al. 1996; CRISTO, 2002). Thus, any modification in one of the elements of the system can affect the whole system behavior (SOUZA; KLIEMANN, 2002).

For Pacheco et al., (2012) the resources correct management is extremely important in the dairy system, mainly to minimize the activity costs; maximizing profits and increasing profitability.

For this, it is necessary to use management tools, as Batalha et al. (2005) points out, citing, for example, quality management and production planning and control, which standardize into and inter-

property standards and procedures of a given production network and communication open channels with customers and suppliers, are essential to reduce the variability of the quantity and production quality support in decision making.

Regarding the dairy production chain, there is a large contingent of small and medium-sized economic agents, who are responsible for a large part of milk and dairy production. In view of this, rural production units have serious difficulties in achieving the production and scale standards imposed by the new regulations and by the large agribusinesses, because they require high investments in facilities, hygiene and refrigeration equipment, specialized plants and management new forms (HEMME et al., 2010; WINCK, 2013; CHEN, et al., 2014).

An effective adaptation on the individual modes of governance on the dairy chain stages could be achieved after appropriate research into specific technological, economic, behavioral and institutional development factors (BACHEV; HRABRIN, 2011).

The dairy chain demands adequacy a multi-agent interaction since market trends such as the search for organic products and by-products demand the search for new technologies, skills, and knowledge that alone the link in the dairy chain is limited. Based on the foregoing, the general objective and the specific objectives for this thesis were proposed.

1.4 OBJECTIVES

1.4.1 General Objective

Propose of a management model for dairy production based on the business ecosystem concept.

1.4.2 Specific objectives

a) Evaluate the use the business ecosystem concept in dairy production as a mechanism to mitigate the limiting factors and boost the development in this sector;

b) Diagnose dairy production in order to list the main barriers of production, so further studies can be carried to mitigate the barriers outlined;

c) Diagnose the barriers of dairy production in Santa Catarina, from the perspective of the business ecosystem;

d) Verify if the barriers exposed by Bonamigo; Ferenhof e Forcellini (2016), in their literature review article, are empirically confirmed in a study case;

e) Diagnose the barriers dairy production in Santa Catarina from the business ecosystem concept in field;

f) Develop a theoretical framework, where the actors will be able to recognize the key factors for the development of dairy production, in order to improve the relationship between the actors in the dairy ecosystem;

g) Check the relationship between barriers and key factors of dairy production; and

h) Propose and to test a management model for dairy production based on business ecosystem concept.

1.5 JUSTIFICATION

More than economic, the dairy sector has social prominence within the economy. It is sometimes the only income source on smallholdings; jobs generator in all the production chain segments; and producer permanence guarantee in the rural environment, mainly for the familiar farmers (RAUTA, 2015).

For Muniz et al., (2013) milk and its derivatives deserve to be highlighted as a foods group of great nutritional value, since they are considerable sources' proteins of high biological value, besides containing vitamins and minerals. In addition, it is recommended, mainly, to achieve the calcium intake daily adequacy, a nutrient that, among other functions.

In this sense, the milk processing segment, that is, the agro-industry is a contributor to the commodities value aggregation (CHRISTENSEN et al., 1996), since it is an iteration point between the final consumer needs, the distribution requirements, the transformation particularities of raw materials into foodstuffs and the improvement process adoption to the product and process development (RÉVILLON, 2004).

The dairy market is characterized as an oligopsony, that is, where there are on the one hand many milk producers lacking information or low access to them, who initiate in the milk activity in an informal way, without power of bargaining, support, and assistance (RAUTA, 2015). Faced with this, it is justified to emphasize the dairy producer, due to the need to be competitive in the market the contexts of management and rural properties planning, since quality factors, productivity and profitability impact on the competitive agricultural enterprise efficiency (ZYLBERSZTAYN, NEVES; 2000).

According to Rauta (2015), the dairy production chain is directly implicated by market nuances, which influence - to a greater or lesser extent - production, milk quality and agent relationships. Professionalization is necessary, starting with creating coordinated policies for the dairy farming development, with the competitiveness objective in the national and international market. It is due to the need for changes, especially in the organization sense and management of the milk production chain, that the study is justified.

When studying the models related to dairy production, none of them presented a model for dairy production management based on the business ecosystem concept, which points to a research gap to be filled. Therefore, the study intention is justified in order to contribute to a management model for the dairy production system, so that the dairy production system management is improved.

1.6 THESIS STRUCTURE

This thesis proposal is divided into seven chapters, namely:

Chapter 1: The introduction is presented, includes the research problem presentation, objectives, justification and structure of thesis;

Chapter 2: Presents the methodology proposed structure to develop the thesis in the form of an articles collection. In this chapter are presented the methodological procedures used in the nine articles developed.

Chapter 3: “Applicability analysis of the business ecosystem concept in dairy production based on a systematic literature review”. From the problem identification found in the literature regarding the dairy production system development, it was sought to evaluate the applicability of the business ecosystem concept in the dairy production system as a way to contribute in the problem solution.

This study resulted in an article in evaluation to the II Simpósio internacional de inovação em cadeias produtivas do agronegócio. The acceptance confirmation is in Annex A.

Chapter 4: "Dairy production diagnosis from the perspective of business ecosystem: state of the art in 2016", was found three categories of barriers that limits productivity, dairy quality deficiency and lack of cooperation between actors of dairy ecosystem. From the findings in this study were identified new opportunities for future studies.

The article was published in The Brazilian Journal of Operations & Production Management (BJO&PM).

Chapter 5: "Dairy production diagnosis in Santa Catarina, Brazil, from the perspective of business ecosystem", this study aimed to identify barriers in a specific region of Brazil, SC. In SC predominates the family farm. Furthermore, the dairy production activity is of great importance, because it is the main source of income for these families, as well as an alternative to the permanence these people in the field.

The results the study present the barriers that limit the development of dairy production in SC, from the business ecosystem concept. The results of this work are presented in the published article in the British Food Journal.

Chapter 6: "Dairy ecosystem barriers exposed- A case study in a family production unit at Santa Catarina western", this study aimed to verify if the barriers of Dairy production, are empirically confirmed in a family dairy production unit in Santa Catarina. The production unit is a reference model in the West of SC, which management is characterized by working in a cooperative manner with others players in dairy business environment.

The results of this work are presented in the published article in Rural & Agribusiness Organizations Journal.

Chapter 7: "Evaluation the dairy production barriers in Santa Catarina", the present study aimed to assess the dairy production barriers in the field with the dairy sector experts. A data collection has been performed in the field with the dairy sector experts in Santa Catarina. We consulted 67 experts in the dairy sector through a structured questionnaire. The results confirmed the presence in the field these barriers, but it was not possible to carry out in-depth statistical tests due to the sample size limitation.

The results of this work are presented in the published article in VII Simpósio de Engenharia de Produção do Vale do São Francisco – Juazeiro - BA.

Chapter 8: "Diagnosis the dairy production barriers in Santa Catarina", This study aims to present a diagnosis empirical of barriers found in the literature that limit the development dairy production in Santa Catarina.

This was done in two steps. The first took place directly with the dairy sector experts in a dairy industry event in Mesoregion West of SC conducted by Rural Extension and Agricultural Research Enterprise (EPAGRI).

In the second stage, were collected through an electronic questionnaire sent to the experts. a first telephone contact was made with experts, including: dairy cooperatives, dairy, dairy traders, researchers and government institutions, to present the research, objective, respondent contribution importance and requested the e-mail contact for document send.

We obtained a total of 305 valid questionnaires. The results were then tabulated. These provided the basis for the statistical analysis.

Chapter 9: "Theoretical management framework for dairy production in the light of the business ecosystem", from drivers for the development of dairy production found in the literature, it was proposed a Theoretical management framework to leverage the dairy production system from the business ecosystem concept. This study aims also to diagnose the key factors in field, namely, the drivers for boost the development of dairy production identified in the literature, and identify the existence other key factors for the sector development from the perspective specialists in field. The test was through interviews/consultations with the experts of dairy sector.

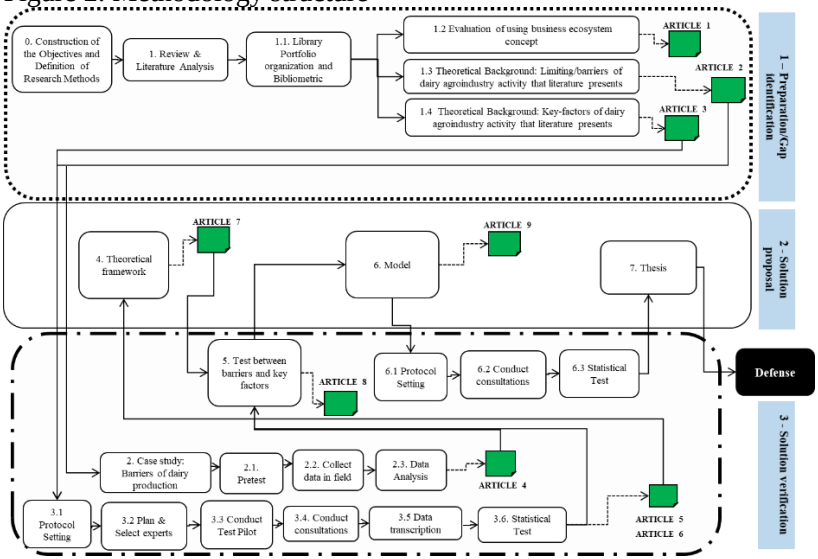
Chapter 10: "Relationship between barriers and impulsions of dairy production". This phase aims to verify the relationship between the barriers and the drivers of dairy production. The test was performed using statistical software based on barriers and drivers for the dairy production development.

Chapter 11: "Management model for dairy production based on business ecosystem concept". Based on the findings in the previous chapters, we developed and tested a management model for the dairy ecosystem from the business ecosystem concept. After, we conduct the model evaluation in the field, with experts from the dairy sector.

2 METHODOLOGICAL PROCEDURES

In order to meet the objective of this thesis, which is to propose a management model for dairy production based on the ecosystem business concept, I followed the three steps: 1. Preparation/Gap identification; 2. Solution proposal and 3. Solution verification. Figure 2.

Figure 2: Methodology structure



Source: the author, based in Merriam (1998); Lakatos e De Andrade Marconi (2001); Flick (2009); Gil (2010); Cauchick *et al.* (2012); Yin (1994) and (Ferenhof, 2015).

In the first stage, was sought Preparation / Gap identification in the literature through systematic literature reviews based on journals, scientific event articles, doctoral dissertations, and master's dissertations. At this stage, a better understanding of the business ecosystem concept, its possible contributions to the dairy ecosystem and the research problem characterization was sought. At this stage, it was possible to define strategies to develop the later the study stages.

Additionally, in this first phase, was sought to recognize the world dairy sector barriers, then the search was narrowed in greater depth in the dairy sector of Santa Catarina/Brazil. The identification of these barriers served as a basis for conducting the next the study steps.

Once the research problem was found, the barriers of the dairy sector were identified and recognized the potential contributions of the business

ecosystem concept applied in the dairy production system was identified, it was conducted to Solution proposal. For the proposal construction, the following steps were carried out: In this step, a theoretical framework was constructed, which presents the key factors for the dairy sector development. A statistical test was then conducted to assess whether key factors that mitigate dairy sector barriers. The findings in the statistical test and in the previous steps served as the basis for the construction of the management model for the dairy ecosystem, based on the business ecosystem concept.

For the purpose of Solution verification, was conducted the third stage of the study. In this phase of the thesis, data were collected in the field with experts from the dairy sector, with the intention of performing statistical tests to confirm the constructs presented in the previous phases of the study and to obtain a better understanding of the dairy system in practice. In addition, the statistical tests carried out on the data obtained in the field were the basis for evaluating the consistency and applicability of the management model proposed in this thesis.

Once the management model was presented, the empirical test was conducted. From data collected in the field with experts from the dairy sector, statistical tests were conducted to evaluate the consistency of the proposed model. The data collection focused on on events related to milk activity, such as congresses, fairs, and symposiums. In opportunity, it was possible to collect data from several players that make up the dairy ecosystem, such as producers, city halls, universities, researchers, agencies extensionists, transporters, and merchants.

The better detail methodological procedures used in each one stage of this thesis is presented in the course of the next chapters.

CHAPTER 3 – "APPLICABILITY ANALYSIS OF THE BUSINESS ECOSYSTEM CONCEPT IN DAIRY PRODUCTION BASED ON A SYSTEMATIC LITERATURE REVIEW"

In order to goal the objective of this thesis, which comprises "A management model for dairy production based on the ecosystem business concept", in the first step, an exploratory search was first carried out in the literature, next, a bibliographic review was carried out to identify the potential contributions that the business ecosystem concept presents for the dairy agroindustrial sector. The results this study is presented in Article 1.

This work was presented and published in the Proceedings of the II Simpósio internacional de inovação em cadeias produtivas do agronegócio - 2016. Symposium theme: Innovation and Technology in Agribusiness as an Alternative for Economy of Brazil.

In addition, this work is book chapter part entitled: "Inovação e tecnologia no agronegócio como alternativa para a economia do Brasil" ISBN number 978-85-7061-862-7.

APPLICABILITY ANALYSIS OF THE BUSINESS ECOSYSTEM CONCEPT IN DAIRY PRODUCTION BASED ON A SYSTEMATIC LITERATURE REVIEW

Andrei Bonamigo, Helio Aisenberg Ferenhof, Fernando Antônio Forcellini

Abstract: World dairy production has promising growth for the next decades. In order to boost even more, some actions need to be taken regarding to the factors that limit the development of the activity. This study aims to assess the relevance of using the business ecosystem concept in dairy production as a mechanism to mitigate limiting factors and boost the development of this sector. Based on a systematical literature search it was possible to identify its applicability from an analysis of the interactions and / or collaboration between multi-agent milk production. From 1266 retrieved on scientific databases, the resulting bibliographic portfolio analysis presented 14 studies, which support that the business ecosystem concept can be used as an alternative to boost the sector and mitigate potential risks. The works in question, indicate the interaction between the actors in the dairy ecosystem and innovation as a factor to develop this system.

Key-Words: Dairy production, business ecosystem, barriers, milk production, dairy chain, dairy business ecosystem.

1 INTRODUCTION

The world dairy sector shows growth potential. Per capita consumption is currently 83 kg, 3 kg over 77 kg that was consumption for 34 years. All the increase in per capita consumption came from developing countries (ALEXANDRATOS; BRUINSMA, 2012).

However to meet this growing milk demand, the current production system needs improvement, such as better quality milk production, milk production rates, new technologies, among other factors that enable technological innovation in the sector (RODRIGUES; ALBAN, 2013; RYHANEN; SIPILAINEN; YLATALO, 2013; WINCK, 2013; WANG; CHEN; KLEIN, 2015).

Based on the issue exposed, this study analyzes the possible applicability of the business ecosystem concept in the dairy production system as an alternative to enhance this sector.

A business ecosystem can be defined as an economic community supported by a foundation of organizations and individuals, including government, universities / research institutes, industry players and other stakeholders that cooperate together to co-creation of value (MOORE, 2006; RIEMER; KLEIN, 2006; GALATEANU; AVASILCAI, 2013).

Enhancement in the way that farmers, suppliers, agro-industries, produce became possible through the value co-creation. It sets efficiency and performance improvements standards of the entire chain and meets the growing demands from dairy products (XHOXHI et al., 2014; BONAMIGO; FERENHOF; FORCELLINI, in press).

2 METHODOLOGY

The methodology used for the study comprises two stages. The first was conducted a systematic literature review, to recognize the state of the art on the subject. Then, the content analysis composed by 1) Pre-analysis; 2) Exploration material or coding and; 3) treatment of results, inference and interpretation, as recommended by Bardin (2011) was performed as detailed in the following.

The systematic review followed the approach of Jesson, Matheson and Lacey (2011), that have proposed six principles for systematic reviews, which are as follows:

(1) Mapping the field through a scoping review.

(2) Comprehensive search.

(3) Quality assessment, which comprises the reading and selection of the papers.

(4) Data extraction, which refers to the collection of relevant data and the capturing of the data into a pre-designed extraction sheet.

(5) Synthesis, which comprises the synthesis of the extracted data to show the known and to provide the basis for establishing the unknown.

(6) Write-up.

First the search strategy was developed, composing the research question of interest, the keywords, and a set of inclusion and exclusion criteria. The query for this research was ("milk production" OR "dairy production" OR "dairy industry" OR "dairy farm*" OR "dairy chain") AND (management OR business OR governance OR "business ecosystem") AND (model OR framework). The inclusion criteria were peer-reviewed academic papers in English, Portuguese languages and the databases used were Compendex, Emerald, ISI Web of Science and Scopus. The exclusion criteria were gray literature such as reports, books, and non-academic research, and content in languages other than the presented ones. Furthermore, a spreadsheet was produced consisting of aspects related to the use of the business ecosystem concept to assist daily production.

Second, one of the authors accessed the four databases and searched using query resulted by the combinations of the keywords set. Seeking for combinations of these

keywords in the title, keywords and abstract. Is highlighted that the search on the databases where made on May 19, 2016. And returned 1266 documents that 67 where duplicated, resulting into 1199 documents as can be seen on Table 1.

Table 1 - General documents distribution by Database

Data base	Frequency
ISI Web of Science	1049
Scopus	122
Compendex	54
Emerald	41
Total	**1266**
Duplicated	67
Final Total	**1199**

Source: Authors

Third, to filter the documents, each of the researchers physically examined the title, abstracts and keywords of all documents to make sure that they actually fell within the research scope. This reduced the number of documents to 230, which fulfilled the criteria and were then analyzed.

Fourth, the 230 documents were full read by each of the authors. By doing the reading the authors found that 221 documents weren't aligned with the research. Reducing to 9 documents. Additionally, the authors checked the references of those 9 documents and found other 5 works referenced that was aligned with the theme and was included into the final bibliographic portfolio. Later then, the 14 documents were coded and analyzed according to the content analysis criteria as specified by (Bardin, 2011).

Fifth, in the sequence, the individual data were synthesized into one single spread sheet. Later, each instigator independently worked across the merged sheet to check for consistency regarding the coding of the context unit and record unit. Our different understandings were shared and discussed during our discussion cycles.

Sixth, the final stage of our review process was devoted to the write-up of the findings.

3 RESULTS AND DISCUSSION

Based on the systematic literature review, the resulting bibliographic portfolio shows fourteen documents, as can be seen on Table 2, which forms the base to analysis.

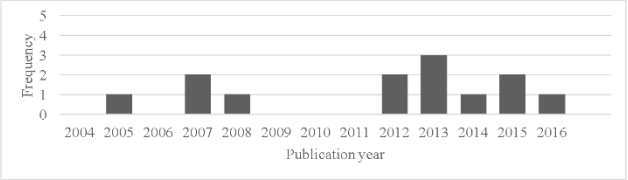
Table 2 – Bibliographic Portfolio

ID	Author	Year	Title	Journal
1	Dolinska, A. and d'Aquino, P.	2016	Farmers as agents in innovation systems. Empowering farmers for innovation through communities of practice	Agricultural Systems
2	Schneider, S. and Gazolla, M.	2015	Seeds and Sprouts of Rural Development: Innovations and Nested Markets in Small Scale On-Farm Processing by Family Farmers in South Brazil	Constructing a New Framework for Rural Development
3	Wang, J., Chen, M. and Klein, P. G.	2015	China's Dairy United: A New Model for Milk Production	American Journal of Agricultural Economics
4	Lamprinopoulou, C., Renwick, A., Klerkx, L., Hermans, F. and Roep, D.	2014	Application of an integrated systemic framework for analysing agricultural innovation systems and informing innovation policies: Comparing the Dutch and Scottish agrifood sectors	Agricultural Systems
5	Bošková, I.	2013	Collaboration in the Czech dairy chain	Agris On-line Papers in Economics and Informatics
6	Ryhanen, M., Sipilainen, T. and Ylatalo, M.	2013	Cooperation in business activities on dairy farms in south Ostrobothnia, Finland	Economic Science for Rural Development: Production and Cooperation in Agriculture / Finance and Taxes
7	Kilelu, C. W., Klerkx, L. Leeuwis, C.	2013	Unravelling the role of innovation platforms in supporting co-evolution of innovation: Contributions and tensions in a smallholder dairy development programme	Agricultural Systems
8	Eastwood, C. R., Chapman, D. F. and Paine, M. S.	2012	Networks of practice for co-construction of agricultural decision support systems: Case studies of precision dairy farms in Australia	Agricultural Systems
9	Colurcio, M., Wolf, P., Kocher, P. Y. and Spena, T. R.	2012	Asymmetric relationships in networked food innovation processes	British Food Journal
10	Bachev, H.	2008	Integration of dairy farms in the supply chain in Bulgaria	Society and Economy
11	Hansson, H.	2007	Strategy factors as drivers and restraints on dairy farm performance: Evidence from Sweden	Agricultural Systems
12	Valeeva, N. I., Huirne, R. B. M., Meuwissen, M. P. M. and Oude Lansink, A. G. J. M.	2007	Modeling farm-level strategies for improving food safety in the dairy chain	Agricultural Systems
13	Parrott, L., Lacroix, R. and Wade, K. M.	2003	Design considerations for the implementation of multi-agent systems in the dairy industry	Computers and Electronics in Agriculture
14	Somda, J., Kamuanga, M. and Tollens, E.	2005	Characteristics and economic viability of milk production in the smallholder farming systems in The Gambia	Agricultural Systems

Source: Authors.

In a first analysis of the documents, can be seen that in the last five years there is a greater concentration of published papers related to the theme, as shown in Figure 1. This seems to indicate a greater interest of the scientific community on the subject.

Figure 1: Publications vs Year



Source: Authors

Following the content analysis, two unit's records were generated, and classified the context units, totaling fifteen context units. as can be seen on Table 3.

Table 3: Analysis units

Record Unit	Context Unit	Author	Frequency
Cooperation between actors	Dairy farmers working in a cooperative way gets advantages and competitiveness.	Bošková (2013)	11
	Interventions based on multi-agent settings, should make space for farmers to collectively build their participation in the platform activities.	Dolinska e D'aquino (2016)	
	Cooperation brings innovation and differentiation resulting in added value to food.	Schneider e Gazolla (2015)	
	Dairy farmers need resources, and alone these are limited, cooperation is an alternative to solve this challenge.	Ryhanen; Sipilainen e Ylatalo (2013)	
	Farmers learn through interaction with a contacts network, inside and outside the farm.	Eastwood; Chapman e Paine (2012)	
	The farmers' integration has been associated with the need of progressive changes in the race of animals, production technology, work organization, and these led to elevate income, production quality, stability, sell and prices, animal care and environment. Also provide the possibility of modernization and adaptation to the formal requirements that demand activity.	Bachev (2008)	
	The performance of a link in the chain dairy can being limited to another actor downstream or upstream.	Hansson (2007)	
	The multi-agent approach is highly suitable for the creation of a decision support system for dairy production, being important the system flexibility and extension are important	Parrott; Lacroix e Wade (2003)	

	The dairy cattle integration system in China has overcome problems related to quality. The model is transforming small production units, in high production potential.	Wang; Chen e Klein (2015)	
	The government can influence in the chain, by creating incentives and policy for food security, among other measures.	Valeeva *et al.* (2007)	
	Results suggest that the active cooperation with customers, especially in innovation networks supports to create opportunities for small and medium size food producers.	Colurcio *et al.* (2012)	
Innovation	Innovation in farming systems focuses primarily on interactions and learning between farmers and other actors	Kilelu; Klerkx e Leeuwis (2013)	4
	Systemic failures in terms of interactions and skills of the actors, as well as market structures and incentives for innovation were revealed in the agro-industrial system.	Lamprinopoulou *et al.* (2014)	
	The innovation co-evolution is a highly dynamic process with multiple interaction strains and unexpected effects, being the distributed nature of intermediation between multiple actors important to address some of these emergency tensions on different actors interfaces	Dolinska e D'aquino (2016)	
	Constraints to increased productivity include lack of technology improvement at the farm level and weak institutional support.	Somda; Kamuanga e Tollens (2005)	

Source: Authors

In order to identifying possible contributions that the business ecosystem may present to the dairy production system, each of the two records units were discussed.

3.1 Possible contributions from the business ecosystem concept in dairy production

From the content analysis it was possible to identify the possible contributions of the business ecosystem concept from the perspective of two context units: the interaction between the actors and innovation.

The interaction between producers in a cooperative form presents as value co-creation way between dairy farmers, enabling the knowledge exchange between the actors (BOŠKOVÁ, 2013). In some countries such as Brazil, cooperation between small dairy producers led to the formation of agro-industrial cooperatives, such as the Cooperative Production and Consumption Concordia (COPÉRDIA) and Aurora cooperative; which allow producers bargain best input prices and better commercializing milk pricing, originated from these small production units.

Interactions between producers and even among multiple-agents such as universities, research centers, consumers, customers and agribusiness enables the value co-creation in the dairy system (MOORE, 2006; KILELU; KLERKX; LEEUWIS, 2013; DOLINSKA; D'AQUINO, 2016). That means, work in network, allows the actors in the dairy system to

have access to resources, which alone are limited (RYHANEN; SIPILAINEN; YLATALO, 2013).

The resources and / or knowledge sharing among the actors of the dairy business ecosystem, i.e. interactions between the various actors in this environment, configures a business platform. This platform permits to minimize deficiencies related to the dairy industry, such as: lack of quality need for genetic improvement limited production technologies, and low productivity (MOORE, 2006; MAZZAROL; LIMNIOS; REBOUD, 2013; DOLINSKA; D'AQUINO, 2016).

Regarding innovation, the business ecosystem concept offers advantages by promoting the interaction between the actors of the dairy business environment. In the business ecosystem, the actors can interact to innovate, through the exchange of knowledge, experiences and resources, which acting individually, they are limited (KILELU; KLERKX; LEEUWIS, 2013).

The lack of a holistic look at the dairy ecosystem, has highlighted systemic failures in terms of interactions and responsibilities between the actors, also to the market structure and incentives for innovation (LAMPRINOPOULOU; RENWICK et al., 2014).

Innovation in dairy ecosystem, drives the improvement of new products, processes and services in dairy production making it more competitive (KILELU; KLERKX; LEEUWIS, 2013; DOLINSKA; D'AQUINO, 2016). For SOMDA; KAMUANGA e TOLLENS (2005) lack of innovation is seen as the main limiter of increase for the sector's productivity.

5. FINAL THOUGHTS

This study aimed to analyze the applicability of the business ecosystem concept in the dairy production system as an alternative to improve this system. Through a systematic literature review, supported by content analysis were proposed two units records to evaluate the dairy ecosystem, being: the interaction between the actors in the business environment and innovation.

Through this study it was possible to identify potential contributions of the business ecosystem concept in the dairy production system, so that the obstacles related to lack of cooperation between the actors for the value co-creation are mitigated. This cooperation between the actors comprises multiple players such as universities, research institutes, agro-industries, consumers, producers, manufacturing industries, cooperatives, among others.

The holistic approach that the business concept ecosystem introduces, boosts the knowledge and / or resources exchange, which an actor acting individually would be restricted to themselves and should work harder to compensate for their limitations in order to develop the dairy production.

As an opportunity for future studies, it is proposed to make a literature review in order to identify the main barriers of the dairy sector from the business ecosystem concept and beyond, propose a framework to overcome those barriers.

REFERENCES

ALEXANDRATOS, N.; BRUINSMA, J. **World agriculture towards 2030/2050: the 2012 revision.** ESA Working paper Rome, FAO. 2012

BACHEV, H. Integration of dairy farms in the supply chain in Bulgaria. **Society and Economy**, v. 30, n. 1, p. 93-109, 2008.

BARDIN, L. **Análise de conteúdo**. 3. reimp. Lisboa: Ediçoes, v. 70, 2011.

BONAMIGO, A.; FERENHOF, H. A.; FORCELLINI, F. A. Dairy production diagnosis in Santa Catarina, Brazil, from the perspective of business ecosystem. **British Food Journal, in press**.

BOŠKOVÁ, I. **Collaboration in the czech dairy chain**. Agris On-line Papers in Economics and Informatics, v. 5, n. 4, p. 35-45, 2013.

COLURCIO, M. et al. Asymmetric relationships in networked food innovation processes. **British Food Journal,** v. 114, n. 5, p. 702-727, 2012.

DOLINSKA, A.; D'AQUINO, P. Farmers as agents in innovation systems. Empowering farmers for innovation through communities of practice. **Agricultural Systems,** v. 142, p. 122-130, 2016.

EASTWOOD, C. R.; CHAPMAN, D. F.; PAINE, M. S. Networks of practice for co-construction of agricultural decision support systems: Case studies of precision dairy farms in Australia. **Agricultural Systems,** v. 108, p. 10-18, 4// 2012.

GALATEANU, E.; AVASILCAI, S. Business ecosystems architecture. **Fascicle of Management and Technological Engineering,** v. 22, n. 1, p. 79-84, 2013.

HANSSON, H. Strategy factors as drivers and restraints on dairy farm performance: Evidence from Sweden. **Agricultural Systems,** v. 94, n. 3, p. 726-737, Jun 2007.

JESSON, J.; MATHESON, L.; LACEY, F. M. **Doing your literature review**: Traditional and systematic techniques. Sage, 2011.

KILELU, C. W.; KLERKX, L.; LEEUWIS, C. Unravelling the role of innovation platforms in supporting co-evolution of innovation: contributions and tensions in a smallholder dairy development programme. **Agricultural systems,** v. 118, p. 65-77, 2013.

LAMPRINOPOULOU, C. et al. Application of an integrated systemic framework for analysing agricultural innovation systems and informing innovation policies: Comparing the Dutch and Scottish agrifood sectors. **Agricultural Systems,** v. 129, p. 40-54, 2014.

MAZZAROL, T.; LIMNIOS, E. M.; REBOUD, S. Co-operatives as a strategic network of small firms: Case studies from Australian and French co-operatives. **Journal of Co-operative Organization and Management,** v. 1, n. 1, p. 27-40, 2013.

MOORE, J. F. Business ecosystems and the view from the firm. **Antitrust Bull.,** v. 51, p. 31, 2006.

PARROTT, L.; LACROIX, R.; WADE, K. M. Design considerations for the implementation of multi-agent systems in the dairy industry. **Computers and Electronics in Agriculture,** v. 38, n. 2, p. 79-98, Feb 2003.

RIEMER, K.; KLEIN, S. Network management framework. In: (Ed.). **Managing dynamic networks**: Springer, 2006. p.17-66.

RODRIGUES, L. G.; ALBAN, L. Tecnologias de produção de leite utilizadas no Extremo-Oeste Catarinense. **Race: revista de administração, contabilidade e economia,** v. 12, n. 1, p. 171-198, 2013.

RYHANEN, M.; SIPILAINEN, T.; YLATALO, M. COOPERATION IN BUSINESS ACTIVITIES ON DAIRY FARMS IN SOUTH OSTROBOTHNIA, FINLAND. In: EGLITE, A. (Ed.). **Economic Science for Rural Development**: Production and Cooperation in Agriculture / Finance and Taxes, 2013. p.69-75. (Economic Science for Rural Development).

SCHNEIDER, S.; GAZOLLA, M. Seeds and Sprouts of Rural Development: Innovations and Nested Markets in Small Scale On-Farm Processing by Family Farmers in South Brazil. In: (Ed.). **Constructing a New Framework for Rural Development**, 2015. p.127-156.

SOMDA, J.; KAMUANGA, M.; TOLLENS, E. Characteristics and economic viability of milk production in the smallholder farming systems in The Gambia. **Agricultural Systems,** v. 85, n. 1, p. 42-58, 7// 2005.

VALEEVA, N. I. et al. Modeling farm-level strategies for improving food safety in the dairy chain. **Agricultural Systems,** v. 94, n. 2, p. 528-540, 5// 2007.

WANG, J.; CHEN, M.; KLEIN, P. G. China's Dairy United: A New Model for Milk Production. **American Journal of Agricultural Economics,** v. 97, n. 2, p. 618-627, Mar 2015.

WINCK, C. A. Impactos do pagamento pela qualidade na cadeia produtiva do leite na região Oeste de Santa Catarina. 122 (Doctor Thesis). **Agronegócios**, University Federal of Rio Grande do Sul. 2013.

XHOXHI, O. et al. The Determinants of Intermediaries' Power over Farmers' Margin-Related Activities: Evidence from Adana, Turkey. **World Development,** v. 64, p. 815-827, 2014.

CHAPTER 4 – "DAIRY PRODUCTION DIAGNOSIS FROM THE PERSPECTIVE OF BUSINESS ECOSYSTEM: STATE OF THE ART IN 2016"

From the identification of the potential contributions that the business ecosystem concept presents to the dairy production ecosystem, being: better management of the players of this business ecosystem and also to drive innovation in the dairy sector, we carried out the second the study stage.

For the model construction that this thesis proposes, we seek to identify the existing obstacles in the dairy sector from the dairy business ecosystem approach.

At this stage, in the literature review sought to diagnose the barriers that limit the dairy production sector, in light of the business ecosystem concept. The study results are presented in Article 2. This article was published in the Brazilian Journal of Operations & Production Management, V. 14, pp.74-80, 2017.

Brazilian Journal of Operations & Production Management 14 (2017), pp 74-80

BJ O&PM

ABEPRO

ISSN 2237-8960
Brazilian Journal of Operations & Production Management

DAIRY PRODUCTION DIAGNOSIS FROM THE PERSPECTIVE OF BUSINESS ECOSYSTEM: STATE OF THE ART IN 2016

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ABSTRACT

In the pursuit of identify ways for a better understanding the barriers of the dairy production system, we sought to diagnose them from the perspective of the business ecosystem concept, through a systematic literature review. Thus, we use content analysis to serve as the basis for analysis and discussion of the barriers of dairy production. Resulting a total of fifteen barriers, properly presented and discussed. In addition, we provide some insights to mitigate these barriers. The study presents contribution to the development of dairy production by providing assistance to develop strategies for producers' cooperatives, government agencies, milk producers, hulling industries products from milk. Based on the perspective of the business ecosystem is possible to have a broader view of the scenario where dairy production occurs and recognize the barriers of dairy production system. And once identified these barriers, it is possible to devise strategies to eliminate or mitigate these barriers.

Keywords: dairy chain; business ecosystem; barriers; value co-creation; dairy production.

ABEPRO
DOI: 10.14488/BJOPM.2017.v14.n1.a8

Brazilian Journal of Operations & Production Management
Volume 14, Número 1, 2017, pp. 74-80
DOI: 10.14488/BJOPM.2017.v14.n1.a8

1. INTRODUCTION

Approximately 150 million production units worldwide are involved in dairy production. In most developing countries, milk is produced by small farmers, and dairy production contributes to the livelihoods of household food security and nutrition (FAO, 2016).

The dairy production activities have many positive aspects, but it is necessary to overcome some obstacles, such as low milk quality and low productivity, to be development of the activity (RODRIGUES *et* ALBAN, 2013; WINCK, 2011).

In the pursuit of identify ways for a better understanding the barriers and relationships in the dairy production system, we sought theoretical support in the business ecosystem concept. The business ecosystem comprises a set of organizations that co-evolve through co-creation of value in a business environment. This analogy is related to the comparison of biological ecosystems (MOORE, 1993; GALATEANU *et* AVASILCAI, 2013).

In the face of problems, this article aims to make a diagnosis of dairy production, in order to identify the development barriers, from the perspective of the business ecosystem. By examining the nature of relationships within the dairy production, it is possible to identify ways they can improve the livelihoods of farmers, trading standards, efficiency and performance of the entire chain (XHOXHI *et al.*, 2014).

In this sense, the importance of this study is given by a better understanding of the players that compose the dairy business ecosystem. Once the interaction between them is better understood, and alsothe barriers that surround it, it is possible to think and plan actions mitigating these obstacles. In addition, the holistic view permits a whole system to understand, and this helps in structuring and designing strategies to drive the sector development.

For Bonamigo *et al.* (2016), the business ecosystem concept applicability in the dairy production system is presented as means to manage this system to its development. Both biological ecosystems, as the business ecosystems have a community that lives or works in specific environmental conditions.

These systems are based on fair relations between the partners. Of which the business ecosystem, relates through the formation of a business platform, consisting of: universities, research centers, public organizations, unions, suppliers, consumers, and others who can exchange knowledge and encourage the co-creation of value between the actors who form the business platform (GALATEANU *et* AVASILCAI, 2013; MOORE, 1993, PELTONIEMI *et* VUORI, 2005).

The holistic approach that the business concept ecosystem introduces, boosts the knowledge and/or resources exchange, which an actor acting individually would be restricted to themselves and should work harder to compensate for their limitations in order to develop the dairy production.

As the problematic presented regarding the dairy agribusiness system exposes evidence that the development of the sector is related to management of the actors included in this environment and their relationships. Based on that, we come with the following research question: What are the barriers that limit the development of dairy production? In order to answer it, this study aims to diagnose dairy production in order to list the main barriers of production, so further studies can be carried to mitigate the barriers outlined.

2. METHODOLOGY

The methodology used for the study comprises two stages. The first was conducted a systematic literature review, to recognize the state of the art on the subject. Then, the content analysis composed by 1) Pre-analysis; 2) Exploration material or coding and; 3) treatment of results, inference and interpretation, as recommended by Bardin (2011) was performed as detailed in the following.

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(6) Write-up.

First, we mapped the literature by composing the research questions of interest, the keywords, and a set of inclusion and exclusion criteria. The query for this research was ([milk OR "dairy chain" OR "agribusiness milk" OR "dairy farms"] AND [risk OR threats]). The inclusion criteria were peer-reviewed academic papers in English, Portuguese languages, and the databases used were Emerald, Scopus, Scielo, and Web of Science, which executes the query on the topic, keywords, or abstracts. We excluded gray literature such as reports, books, and non-academic research, and content in languages other than the presented ones. Furthermore, a spreadsheet was produced consisting of key aspects related to the diagnosis of daily production.

Brazilian Journal of Operations & Production Management
Volume 14, Número 1, 2017, pp. 74-80
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Second, one of us accessed the four databases and searched using query resulted by the combinations of the keywords set. We seek for combinations of these keywords in the title, keywords and abstract. We highlight that the search on the databases were made on March 14, 2016. And returned 1229 documents where 90 where duplicated, resulting into 1139 papers.

Third, each of us physically examined the title, abstracts and keywords of the respective papers to make sure that they actually fell within our scope of interest. This reduced the number of documents to 37, which fulfilled our criteria and were then analyzed.

Fourth, the 37 papers were read by each of the authors, and coded according to the content analysis criteria as specified by (BARDIN, 2011).

Fifth, in the sequence, the individual data were synthesized into one single spread sheet. Later, each instigator independently worked across the merged sheet to check for consistency regarding the coding of the context unit and record unit. Our different understandings were shared and discussed during our discussion cycles. These discussion cycles led to a further reduction of the number of papers. At the end, 9 empirical papers formed the basis for analysis (Table 1).

Sixth, the final stage of our review process was devoted to the write-up of the findings.

3. RESULTS AND DISCUSSION

From the analysis of the articles, three units records were generated, and classified the context units, totaling fifteen context units,as can be seen on Table 2.

Based on the content analysis, we discuss each of the three record units in order to identifying barriers and factors that influence the diary activity.

3.1 Barriers limiting the development of dairy activity

From the content analysis, it was possible to identify barriers for the development of dairy farming. Figure 1 represents the distribution of the characterization of the barriers in each of the record units, and the source of this information.

Regarding the barriers, three subsequent register units were created: 1) Lack of cooperation between actors of the chain, 2) milk quality deficiencies, and 3) Productivity limitations.

The unit of context revealed that the barriers related lack of cooperation between the actors of dairy production as one of the main issues. And to mitigate or eliminate it, became clear the need for improvement of network innovation (Dolinska *et* d'Aquino 2016; Smits *et* Kuhlmann 2004). It also shows that the coupling between the actors of the same level, as is the case of producers, and multiple actors that exchange knowledge in the chain can be harmful if it is disconnected (EASTWOOD *et al.*, 2012). This is what prevents actors to co-create and innovate in the milk production environment and overcome the adverse effects of the activity. Given the above, it became clear the need in managing of the actors in these environment (LAMPRINOPOULOU *et al.*, 2014; KILELU *et al.*, 2013).

This lack of management among the participants of the business environment prevents them to obtain substantial economic rewards. If there is a management of these actors there will be more likely to generate potential

Table 1. Resulting bibliographic portfolio

Code	Author	Year	Title	Journal
1	Somda *et al.*	2005	Characteristics and economic viability of milk production in the smallholder farming systems in The Gambia	Agricultural Systems
2	Novo, *et al.*	2013	Feasibility and competitiveness of intensive smallholder dairy farming in Brazil in comparison with soya and sugarcane: Case study of the Balde Cheio Programme	Agricultural Systems
3	Eastwood *et al.*	2012	Networks of practice for co-construction of agricultural decision support systems: Case studies of precision dairy farms in Australia	Agricultural Systems
4	Saenger *et al.*	2013	Contract farming and smallholder incentives to produce high quality: experimental evidence from the Vietnamese dairy sector	Agricultural Economics
5	Dolinska *et* d'Aquino	2016	Farmers as agents in innovation systems. Empowering farmers for innovation through communities of practice	Agricultural Systems
6	Lamprinopoulou *et al.*	2014	Application of an integrated systemic framework for analysing agricultural innovation systems and informing innovation policies: Comparing the Dutch and Scottish agrifood sectors	Agricultural Systems
7	Kilelu *et al.*	2013	Unravelling the role of innovation platforms in supporting co-evolution of innovation: Contributions and tensions in a smallholder dairy development programme	Agricultural Systems
8	Valeeva *et al.*	2007	Modeling farm-level strategies for improving food safety in the dairy chain	Agricultural Systems
9	Colurcio *et al.*	2012	Asymmetric relationships in networked food innovation processes	British Food Journal

Source: The authors own

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Volume 14, Número 1, 2017, pp. 74-80
DOI: 10.14488/BJOPM.2017.v14.n1.a8

Table 2. Limiters of dairy production

Record Unit	Context Unit	Frequency
Lack of cooperation between the chain actors	A3 - Lack of coupling ability between the actors of the network. Each player is limited to its capacity for innovation.	10
	A3 - Interaction through technological innovation systems for knowledge exchange.	
	A5 - Farmers co not have enough interaction with other actors, and this is presented as an element that hampers innovation	
	A5 - Disconnected networks that provide access to innovation and resources	
	A5- Limited access to knowledge sources.	
	A5- Interventions based on multi-agent settings, such as innovation platforms, you can build the business development.	
	A6- Need for active interaction in a wider network of actors involved.	
	A7 - Lack of value chain interaction reinforcement, to increase productivity at farm level.	
	A9 - The network innovation has benefits that can include skills, enhancing learning, new ideas and co-development.	
	A9 - Continuous cooperation with corporate clients triggers a process of knowledge creation that leads to learning and improvement through innovation.	
Milk quality deficiencies	A2 - Introduction of technologies for intensive dairy production provides a viable option for small farmers with farms of medium size.	3
	A4 -Dairy industry demand new and efficient ways for high-quality source material. The use of contracts is a common practice to improve the quality of milk.	
	A8 - Improving food security in hygienic conditions, is linked to good practice, cleaning and disinfection, as well as monitoring programs, they contribute to the improvement and performance of dairy farming.	
Productivity limitations	A1 - Increased productivity includes the lack of improvec technology and weak institutional support.	2
	A2 - Introduction of technologies for intensive dairy production provides a viable option for small farmers with farms of medium size.	

Source: Research data

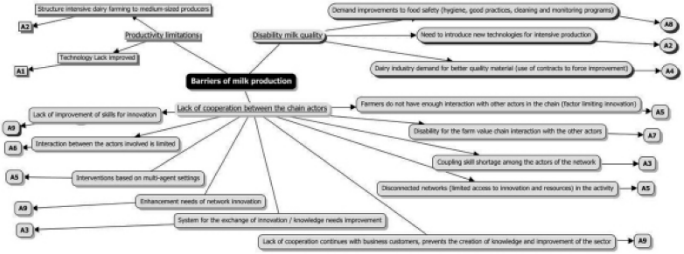

Figure 1. Barriers of dairy production system
Source: Research data.

innovations in dairy production. This innovation potential can be stimulated by specific factors such as technological advances, dissemination of knowledge and managerial skills (MOORE, 1996; BONAMIGO *et al.*, 2016).

The lack of improved technology and structure of dairy production system appears as another sector barrier. This lack of technology can impact on industry productivity rates. Since non-use makes them raise production costs, because of the inefficiency of the production process (DOLINSKA *et* D'AQUINO, 2016; SAENGER *et al.*, 2013; NOVO *et al.*, 2013). These impacts, limiting the dairy sector competitiveness, as well as in the dairy basins business sustainability and/or regions that predominate family agriculture in this activity. One of these limitation consequences is that the producer may end up choosing to leave the field and migrate to urban areas, resulting in the rural exodus.

In relation to milk quality aspects provide the product quality does not create differential and is a source of competitive advantage. As the quality established by law, with the aim of ensuring food safety for consumers. Meet regulatory requirements, the steps of the production process, transport and storage of milk, is a determining factor for a better quality of milk (WINCK, 2009; WINCKLER, 2011; VALEEVA *et al.*, 2007).

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DOI: 10.14488/BJOPM.2017.v14.n1.a8

As pressure to mitigate problems related to poor quality of milk delivered by producers, some agribusinesses dairy opted to implement contracts for payment of milk to the producer by the quality of the milk supplied, ie, the higher the quality indices delivered better remuneration generated for the dairy producer (WINCK, 2009; SCHIPMANN *et* QAIM, 2011), an example of the normally applied criterion is the somatic cell count found in milk.

The lack of milk quality may limit raw milk and/or milk products exportation because they do not meet the minimum specifications for the entry of these products into the destination countries. In addition, we can highlight that this lack of milk quality impacts on the food properties that contain milk, such as vitamins, protein, fat and lactose.

Regarding the productivity limiters, poor organization of activity among producers, can be a barrier, since it is related to the human factor. An example of this occurs in the Brazilian dairy system, where there is a predominance of family agriculture. This requires a better organization of the production chain, because the fact of being familiar limits the activity of accessing resources, technologies, and guidelines of good manufacturing practices (GHOSH *et* MAHARJAN, 2004; FISCHER *et al.*, 2011).

This problematic in some countries, including Brazil, was overcome by creating producer cooperatives, which facilitates the bargain purchase inputs, allocation of production, and better organization of dairy farming by producers cooperating in this system, and at the same time are suppliers and customers of the cooperative system (CHADDAD, 2007; JUNQUEIRA *et* GIMENES, 2009).

Moore (1997) considers that each company, by cultural factors wishes to maintain their autonomy. As well as remain reserved about their future plans. To work in a cooperative way, they must balance this desire with the need to work with each other, considering that the coordination between the actors of the business environment generates competitive advantage. In this sense, the business ecosystem is an enabler for a better stakeholders' management which comprise the dairy environment. By having this understanding is it possible to transpose the dairy sector barriers.

4. FINAL TOUGHTS

This study aimed to diagnose the barriers of dairy production from the perspective of the business ecosystem. We found three categories of barriers productivity limitations, milk quality deficiency and lack of cooperation between actors of the chain.

Regarding the category lack of cooperation between the actors, the ten identified barriers are linked to limited knowledge and cooperation exchange and, this constraint the development of dairy production. Because without sharing knowledge, tools, procedures, techniques, best practices, investments, opportunities, with the hole ecosystem, they cannot be boosted by the benefits of value co-creation.

We also observed that the barriers linked to quality and productivity can be solved through systemic interaction between the actors in this business environment. The business ecosystem, as its essence, is appropriate to mitigate the barriers found in dairy production. Once it has a systemic look at the whole business environment, the players and their role can be identified. With that information, can be developed strategies for integration between the actors of the ecosystem, for instance universities, research centers, cooperatives, financial agencies, farmers, transporters, among others. The union of all those players can excel the skills, knowledge and process by the complement and interaction between the actors. When using the perspective of the business ecosystem, the system can be seen through an arrangement in which the actors interact with each other to form a business platform. The formation of this platform, is aimed to boost the exchange of knowledge and co-creation among the actors that make up the dairy production environment. This platform can develop a systematic way of exchanging knowledge among all the stakeholders and encourage them to co-creation of value in dairy production.

Based on the barriers presented in our study, government initiatives can be traced to encourage the actors in the dairy ecosystem to form business platform. For instance, the interaction of dairy producers with technological institutes /universities can mitigate the barriers linked to lack of the dairy industry technology.

Regarding the barriers linked to the quality, the co-creation between dairy producers with manufacturers of machinery/equipment for the milking process/handling, can reduce problems related to quality of milk supplied to dairy agribusiness. At this point it is noteworthy that provide milk quality is no longer differential to increase the payment of milk to the producer. Meet the standards of quality and food safety established in legislation is indispensable for the national and/or international market. In this sense, the dairy production system demand actions to incorporate new technologies, so that the producer gets greater economic gains and reduce production costs.

We identified fifteen barriers that are limiting the production and innovation and categorize them into three groups. From this classification, we must plan actions to overcome these barriers. This transposition is essential to the growth and strengthening of the entire dairy ecosystem.

Dairy ecosystem players, when acting in a cooperative way, may form a business platform, in order to boost knowledge, technologies and resources exchange. Once the player acting individually is limited to access these, which can impact on business continuity.

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Based on the barriers faced by this study, it is possible to present some opportunities for future studies. One of them is to make a diagnosis in dairy production in a defined scope, for example, in a region, state or country to recognize the problems encountered and outline actions. Another is to verify the theoretical barriers in practice in order to confirm or refute them. In addition to this, develop a reference model for the formation and management of business platforms in the ecosystem in dairy production and also relate the results in the theory in relation to the practical environment, limited to a geographic region.

ACKNOWLEDGEMENTS

We the authors would like to thank CAPES (Coordination for the Improvement of Higher Education Personnel) and CNPQ (National Counsel of Technological and Scientific Development) for the scholarships financial support. This was fundamental for the present study development.

REFERENCES

Bardin, L. (2011). Análise de conteúdo, Lisbon.

Batalha, M. O.; Silva, A. L. (2007). Gerenciamento de sistemas agroindustriais: definições, especificações, especificidades e correntes metodológicas. In: Batalha, M. O. (Coord.). Gestão agroindustrial. 3. ed. São Paulo: Editora Atlas, pp. 1-62.

Bonamigo, A.; Ferenhof, H. A.; Forcellini, F. A. (2016). Applicability analysis of the business ecosystem concept in dairy production based on a systematic literature review. II Simpósio Internacional de Inovação em Cadeias do Agronegócio, Caxias do Sul. Agosto 26, 2016, pp.1-10.

Chaddad, F. R. (2007). Cooperativas no agronegócio do leite: mudanças organizacionais e estratégicas em resposta à globalização. Organizações Rurais & Agroindustriais, Vol. 9, No. 1, pp. 69-78.

Colurcio, M.; Wolf, P.; Kocher, P. Y.; Spena, T. R. (2012). Asymmetric relationships in networked food innovation processes. British Food Journal. Vol. 114, No. 5, pp. 702-727.

Dolinska, A.; d'Aquino, P. (2016). Farmers as agents in innovation systems. Empowering farmers for innovation through communities of practice. Agricultural Systems, Vol. 142, No. 1, pp. 122-130.

Eastwood, C. R.; Chapman, D. F.; Paine, M. S. (2012). Networks of practice for co-construction of agricultural decision support systems: Case studies of precision dairy farms in Australia. Agricultural Systems Vol. 108, No. 1, pp. 10-18.

FAO (2016). Mil production. Food and Agriculture Organization of the United Nations, Available in: <http://www.fao.org/agriculture/dairy-gateway/milk-production/en/#.VwZh9aQrLIW> Accessed in: 07/04/16.

Fischer, A.; Junior, S. S.; Sehnem, S.; Bernardi, I. (2011). Produção e produtividade de leite do Oeste catarinense. Revista de administração, contabilidade e economia, Vol.10, No. 2, pp. 337-362.

Galateanu, E.; Avasilcai, S. (2013). Business Ecosystems Arhitecture. Annals of the Oradea University, Vol. 22, No. 1, pp. 79-84.

Ghosh, A. K.; Maharjan, K. L. (2004). Development of Dairy Cooperative and Its Impacts on Milk Production and Household Income: A Study on Bangladesh Milk Producers' Cooperative Union Limited. Journal of International Development and Cooperation, Vol. 10, No. 2, pp. 193-208.

Jesson, J. K., Matheson, L.; Lacey, F. M. (2011). Doing Your Literature Review: Traditional and Systematic Techniques, Sage, Los Angeles.

Junqueira, C. P.; Gimenes, R. M. T. (2009). Cooperativa Agroindustrial Lar: conciliando a doutrina cooperativista e a competitividade de mercado. Revista Ciências Empresariais Unipar, Vol. 10, No. 2, pp. 315-345.

Kilelu, C.W.; Klerkx, L.; Leeuwis, C. (2013). Unravelling the role of innovation platforms in supporting co-evolution of innovation: Contributions and tensions in a smallholder dairy development programme. Agricultural Systems. Vol. 118, No. 1, pp. 65-77.

Lamprinopoulou, C.; Renwick, A.; Klerkx, L.; Hermans, F.; Roep, D. (2014). Application of an integrated systemic framework for analysing agricultural innovation systems and informing innovation policies: Comparing the Dutch and Scottish agrifood sectors. Agricultural Systems, Vol. 129, No. 1, pp. 40-54.

McNulty, T.; Zattoni, A.; Douglas, T. (2013). Developing corporate governance research through qualitative methods: a review of previous studies, Corporate Governance: An International Review, Vol. 21, No. 2, 183-198.

Moore, J. (1993). Predators and Prey: The New Ecology of Competition, Harvard Business Review, Vol. 4, No. 1, pp.13-23.

Novo, A.M.; Slingerland, M.; Jansen, K.; Kanellopoulos, A.; Giller, K. E. (2013). Feasibility and competitiveness of intensive smallholder dairy farming in Brazil in comparison with soya and sugarcane: Case study of the Balde Cheio Programme. Agricultural Systems, Vol. 121, No. 1, pp.63-72.

Peltoniemi, M.; Vuori, E. (2004). Business ecosystem as the new approach to complex adaptive business environments. In Proceedings of eBusiness research forum; Vol. 18 pp. 267-281.

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Volume 14, Número 1, 2017, pp. 74-80
DOI: 10.14488/BJOPM.2017.v14.n1.a8

Rodrigues, L. G.; Alban, L. (2013). Tecnologias de produção de leite utilizadas no Extremo-Oeste Catarinense. Revista de administração, contabilidade e economia, Vol.12, No. 1, pp. 171-198.

Saenger, C.; Qaim, M.; Torero, M.; Viceisza, A. (2013). Contract farming and smallholder incentives to produce high quality: experimental evidence from the Vietnamese dairy sector. Agricultural Economics, Vol. 44, No. 3, pp.297-308.

Schipmann, C.; Qaim, M. (2011). Supply chain differentiation, contract agriculture, and farmers' marketing preferences: The case of sweet pepper in Thailand. Food Policy, Vol. 36, No. 5, pp. 667-677.

Smits, R.; Kuhlmann, S. (2004). The rise of systemic instruments in innovation policy. International Journal of Foresight and Innovation Policy, Vol. 1, No. 1-2, pp. 4-32.

Somda, J.; Kamuanga, M.; Tollens, E. (2005). Characteristics and economic viability of milk production in the smallholder farming systems in The Gambia. Agricultural Systems, Vol. 85, No. 1, pp. 42-58.

Valeeva, N. I.; Huirne, R. B. M.; Meuwissen, M. P. M.; Oude Lansink, A. G. J. M. (2007). Modeling farm-level strategies for improving food safety in the dairy chain. Agricultural Systems Vol. 94, No. 2, pp. 528-540.

Winck, C. A. (2013). Impactos do pagamento pela qualidade na cadeia produtiva do leite na região Oeste de Santa Catarina (Doctor Thesis). Agronegócios, University Federal of Rio Grande do Sul, pp. 122.

Winckler, N. C. (2011). A coopetição entre propriedades rurais da cadeia produtiva do leite no Oeste Catariense (Master Thesis). Agronegócios, University Federal of Rio Grande do Sul, pp. 91.

Xhoxhi, O.; Pedersen, S. M.; Lind, K. M.; Yazar, A. (2014). The Determinants of Intermediaries' Power over Farmers' Margin-Related Activities: Evidence from Adana, Turkey. World Development Vol. 64, No. 1, pp. 815-827.

CHAPTER 5 – "DAIRY PRODUCTION DIAGNOSIS IN SANTA CATARINA, BRAZIL, FROM THE PERSPECTIVE OF BUSINESS ECOSYSTEM"

Based the barriers found in the global dairy ecosystem, from the light of the business ecosystem concept, we make a cut to a particular milk basin, in order to identify the region studied characteristics. The clipping region was the Santa Catarina dairy basin, Brazil.

The choice this cut to a region was to identify the peculiarities of this region, due to the relevance of the dairy production system to the state economy and the Brazilian market representativeness.

We emphasize the need to limit to a dairy basin, in order to verify if there is the difference in relation to the barriers found in the global level. This information will be of relevance for the construction and model use that this thesis aims to propose.

The study results are set out in Article 3. This paper was published in the British Food Journal, v. 118, n. 9, pp. 2086-2096, 2016.

DAIRY PRODUCTION DIAGNOSIS IN SANTA CATARINA, BRAZIL, FROM THE PERSPECTIVE OF BUSINESS ECOSYSTEM[1]

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Received 13 April 2016
Revised 4 May 2016
Accepted 6 May 2016

Abstract

Purpose – The purpose of this paper is to diagnose the barriers of dairy production system of Santa Catarina from the perspective of the business ecosystem concept.

Design/methodology/approach – The study consists of a bibliographic systematic review of the dairy production from the perspective of the business ecosystem. To analyze the resulting portfolio, the authors used the content analysis proposed by Bardin (2011), which served as the basis for analysis and discussion of the barriers of dairy production.

Findings – The authors identified a total of 19 barriers related with dairy production activity in Santa Catarina, they are properly presented and discussed. In addition, some ways to mitigate these barriers.

Research limitations/implications – This study may not have enabled a complete coverage of all existing peer-reviewed articles in the field of dairy production. Yet, it seems reasonable to assume that the review process covered a large proportion of studies available.

Originality/value – It is the first study that identifies barriers to the development of dairy production in Santa Catarina using as an analytical lens the business ecosystem. And once identified these barriers, it is possible to devise strategies to eliminate or mitigate these barriers.

Keywords Milk, Dairy industry, Business ecosystem, Dairy chain, Dairy farms, Milk production
Paper type Literature review

1. INTRODUCTION[2]

The Brazilian dairy production system, has growth potential. Production is expected to grow at an annual rate of 1.9 percent. This corresponds to a yield of 38.2 billion liters of raw milk at the end of the period 2020/2021 (MAPA, 2011). And Santa Catarina is the fifth largest milk producer in the country, where this activity is presented as an important source of income. Santa Catarina represents 8 percent of milk production in Brazil, and in 2014 had a production of 2,983,250 liters, which totaled R$ 2,687,978.00 in value to the state's economy (Winck and Neto, 2009; IBGE, 2014).

Although dairy production has growth potential, it also presents obstacles that can impede growth factors, being related to poor quality and limited productivity. These should be mitigated to be sustainable development of the activity in Santa Catarina (Rodrigues and Alban, 2013; Winck, 2013). According to Batalha and Silva (2007), is essential to create and/or implement scientific actions to improve the management of agricultural production, since the rural production system is still understood as a transformation environment where the
outcome is more a product of natural forces than scientific management. Therefore, we seek to better understand the barriers limiting the development of the dairy production system in Santa Catarina. To have a holistic view of the system was adopted the business ecosystem concept as analysis lens.

A business ecosystem can be defined as an economic community supported by a foundation of organizations and individuals, including industry players, government, universities/research institutes and other stakeholders that interact together to co-creation of value (Moore, 1993; Riemer and Klein, 2006; Galateanu and Avasilcai, 2013). It is an emerging concept analogized from biology, it moves beyond market

positioning and industrial structure by having three major characteristics: symbiosis, platform and co-evolution (Li, 2009).
Analyze the dairy production system from the perspective of the business ecosystem concept, can be beneficial, because it is concerned to co-create value and understand the whole production system, well as the relationship between the actors, in other words the interconnected system (Peltoniemi and Vuori, 2005). The improvement of dairy production through the co-creation of value, makes it possible to improve the ways of production regarding farmers, suppliers, agro-industries, by improving the standards of efficiency and performance of the entire chain (Xhoxhi et al., 2014).
The set of interactions between the players, so that they can co-create value form a business platform. In this platform, it is possible to make exchanges of knowledge and boost innovation (Moore, 1993; Peltoniemi and Vuori, 2005; Galateanu and Avasilcai, 2013). In which, it aims to leverage knowledge and technology between the actors that compose it (Li, 2009).
The presented problematic concerning the dairy agribusiness system of Santa
Catarina, exposes hints that one ways to leverage the development of the sector is related to management of the actors engaged in this business environment and their interactions.
Therefore, this study seeks to diagnose the dairy production of Santa Catarina, to rank the main barriers of production in order to mitigate the barriers highlighted.

2. METHODOLOGY[3]

The methodology used for the study comprises two stages. The first was conducted a systematic literature review, to recognize the state of the art on the subject. Then, the content analysis composed by pre-analysis; exploration material or coding and; treatment of results, inference and interpretation, as recommended by Bardin (2011) was performed as detailed in the following.

Our systematic review followed Jesson et al. (2011) six principles for systematic reviews, which are as follows:
(1) mapping the field through a scoping review;
(2) comprehensive search;
(3) quality assessment, which comprises the reading and selection of the papers;
(4) data extraction, which refers to the collection of relevant data and the capturing of the data into a pre-designed extraction sheet;
(5) synthesis, which comprises the synthesis of the extracted data to show the
known and to provide the basis for establishing the unknown; and
(6) write-up.

First we mapped the literature by composing the research questions of interest, the keywords, and a set of inclusion and exclusion criteria. The query for this research was ((milk or "dairy chain" or "agribusiness milk" or "dairy farms") and (risk or threats) and (Santa Catarina)). The inclusion criteria were peer-reviewed academic papers in English, Portuguese languages, and the databases used were Emerald, Scopus, Scielo, Brazilian Digital Library of Theses and Dissertations, ISI Web of Science, ProQuest and Ebesco, which executes the query on the topic, keywords or abstracts. We excluded gray literature such as reports, books, and non-academic research, and content in
languages other than the presented ones. Furthermore, a spread sheet was produced consisting of key aspects related to the diagnosis of daily production.
Second, one of us accessed the four databases and searched using query resulted by the combinations of the keywords set. We seek for combinations of these keywords in the title, keywords and abstract. We highlight that the search on the databases where made on March 28, 2016. And returned 742 documents that 211 where duplicated, resulting into 531 papers as can be seen on Table I.[4]

Table 1- Resulting bibliographic portfolio

Data base	Number of works found
ProQuest	652
Ebsco	12
Emerald	4
ISI Web of Science	39
Scopus	32
Base Digital Brasileira de Teses e Dissertações	3
Total	**742**

Source: Authors.

Third, each of us physically examined the title, abstracts and keywords of the
respective papers to make sure that they actually fell within our scope of interest.[5]
This reduced the number of documents to 16, which fulfilled our criteria and were then analyzed. Fourth, the 16 documents were read by each of the authors. By doing the reading the authors checked the references of those 16 documents and found other two works referenced that was aligned with the theme and was included into the final bibliographic portfolio. Later then, the 18 documents were coded and analyzed according to the content analysis criteria as specified by Bardin (2011).
Fifth, in the sequence, the individual data were synthesized into one single spread sheet. Later, each instigator independently worked across the merged sheet to check for consistency regarding the coding of the context unit and record unit. Our different understandings were shared and discussed during our discussion cycles. These discussion cycles led to a further reduction of the number of papers. At the end, 18 empirical papers formed the basis for analysis (Table II).

Table 1 - Limiters of dairy production in Santa Catarina[6]

Code	Authors	Year	TITLE		Documents
A1	Costa, *et al.*,	2013	A survey of management practices that influence production and welfare of dairy cattle on family farms in southern Brazil		Journal of Dairy Science
A2	Rodrigues and Alban	2013	Tecnologias de produção de leite utilizadas no Extremo-Oeste Catarinense		Revista de Administração, contabilidade e economia
A3	Winck	2012	Impactos do pagamento pela qualidade na cadeia produtiva do leite na região Oeste de Santa Catarina		Doctoral Thesis
A4	Fischer, *et al.*,	2011	Produção e produtividade de leite do oeste catarinense		Revista de Administração, contabilidade e economia
A5	Winckler	2011	A coopetição entre propriedades rurais da cadeia produtiva do leite no Oeste Catariense		Master Thesis

A6	Winck and Neto (2009)	2009	Diagnóstico da adequação de propriedades leiteiras em Santa Catarina às normas brasileiras de qualidade do leite		Revista de Ciências Agroveterinárias
A7	Machado; Pereira; Kichel	2006	Situação atual da qualidade do leite em Santa Catarina		Book chapter
A8	Mello	2004	Transformações sociais recentes no espaço rural do Oeste de Santa Catarina: migração, sucessão e celibato		Sociedade Brasileira de Economia, Administracao e Sociologia Rural
A9	Ferrari	2003	Agricultura familiar, trabalho e desenvolvimento no oeste de Santa Catarina		Master Thesis

Source: Authors.

Sixth, the final stage of our review process was devoted to the write-up of the findings.

3. RESULTS AND DISCUSSION[7]

From the analysis of the articles, four unit's records were generated, and classified the context units, totaling 15 context units as can be seen on Table III.

Table 3: Limiters of dairy production[8]

Record Unit	Context Unit	Frequency
Lack of cooperation between the chain actors	**A1** - Lack of support for farmers	8
	A1 - Management needs in various sectors of activity	
	A5 - Lack of financial capital	
	A5 - Dairy industries do not cooperate with producers	
	A3 – Lack improvement of technological procedures on rural properties	
	A3 – Needs present in the producer industry relationship, it demands changes in production structure.	
	A9 - Lack of productive reorganization to add value to products for entry into new markets.	
	A9- There is a need for inter-institutional cooperation, avoiding waste of efforts in parallel and competing actions.	
Milk quality deficiencies	**A6** – Need for changes in the producer's attitude to the adoption of appropriate techniques for operating the process.	5
	A5 - Milk payment made by production rate and quality	
	A3 - There is a pressure for improving the quality of raw material, in national and international environments. There are pressures of formal institutions, represented by national legislation (IN 51 and IN 62) and the rules in force in importing countries of milk and dairy products.	
	A3 – Some dairy industries implemented payment programs with incentives and	

	penalties related to milk quality in order to encourage producers to improve the quality	
	A7 – There is a need to improve the quality of refrigerated raw milk produced in Santa Catarina, from the family farm until their arrival in the industries platform.	
Rural Exodus	**A8-** The strong rural exodus is seen in the 1990s, it can be considered a clear indicator of the crisis now facing agriculture in Santa Catarina, in particular, family farming.	4
	A9- Low pay activity, acts as a repulsive force and emptying factor of rural areas	
	A2 - There is a tendency of labor shortage	
	A9- Rural youth no longer identifies the farming profession as a natural choice to carry out their life projects, as in the past.	
Productivity limitations	**A4** - Dairy production in Brazil is based predominantly in semi-extensive systems and intensive grazing and needs improvement.	2
	A5 - Low education of dairy farmers	

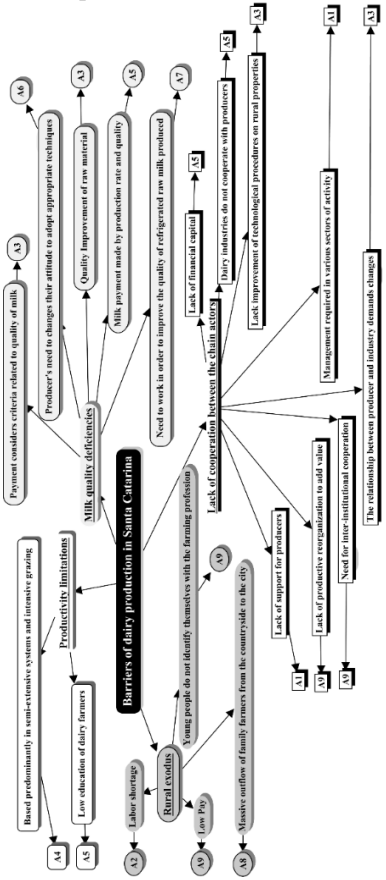
Source: Authors.

Based on the content analysis, we discuss each of the four record units in order to identifying barriers and factors that influence the diary activity.

3.1 BARRIERS LIMITING THE DEVELOPMENT OF DAIRY ACTIVITY IN SANTA CATARINA

From the content analysis, it was possible to identify barriers for the development of dairy farming in Santa Catarina. Figure 1 represents the distribution of the characterization of the barriers in each of the record units, and the source of this information. [9]

Figure. 1 Barriers of milk production of Santa Catarina[10]



Regarding barriers four subsequent register units were created: lack of cooperation between the business ecosystem actors, milk quality deficiencies, rural exodus and productivity limitations.[11]

[12]The limited interaction between the dairy business environment actors of Santa Catarina, being them producers, dairy cooperatives, financial agencies and input suppliers, makes clear the need for management of those actors, which go beyond commercial relations between the links downstream and upstream of the actors of the dairy ecosystem (Smits and Kuhlmann, 2004; Yu et al., 2011; Winckler, 2011; Dolinska and Aquino, 2016).

According to Ferrari (2003) the lack of reorganization of the dairy production system impacts on the development of dairy farming. In the perspective of Winck (2013), mechanisms for better interaction between the interfaces of the actors are needed, for example, provide technical support for developing or implementing production best practices. Could be also cited, provide financial support for: inclusion of new production technologies and/or, business expansion. Deficient interaction between participants of business ecosystem prevents the ecosystem as a whole, to get economic rewards through value co-creation, for instance innovation through cooperation between the actors in the dairy ecosystem (Moore, 1996).

In technological aspects, rural activity still shows more as a result of nature efforts than the implementation of scientific methods (Batalha and Silva, 2007). The introduction of new production techniques, processes and human capital arising from other actors of the business environment, are necessary to bring new insights and knowledge to farmers and extension workers in order to improve the management of farm systems pasture, feed management and animal welfare (Costa et al., 2013).

The lack of inclusion of new technologies in the dairy production system, has made it to be less attractive for producers. Because the use of technology can help the manufacturer to use the same production area to produce more milk, with the sameamount of resources available (Ferrari, 2003; Figueiredo and Paulillo, 2006).

On the other hand, the growth of new technology may impact the milk production rate, once high production costs, are derived from the limited use of new techniques such as for animal feed, artificial insemination and

herd management (Saenger et al., 2013; Novo et al., 2013; Costa et al., 2013; Dolinska and Aquino, 2016). Historically the availability of technology to farmers of Santa Catarina dairy production are low because of the lack of incentives, lack of technological offer, lack of interest by the developers/manufacturer. Also the farmers have a limited income to invest in new technology and, the lack of cooperation with other actors reduce the possibility to share technology and knowledge in a low-cost or free of charge. Other aspect is related with the low schooling of the producers.

Regarding the barrier of rural exodus, it is emphasized that in Santa Catarina family dairy production is predominant, which features the production of milk in small production units. In Santa Catarina, the dairy production is the main activity responsible for reducing the migration of farmers to large urban centers (Fischer et al., 2011).

The growing rural exodus in Santa Catarina, have highlighted the existence of property in the absence of a successor. Fact that can reveal difficulties in the continuity of family production units (Silvestro et al., 2001; Mello et al., 2003; Ghosh and Maharjan, 2004).

A study conducted in western Santa Catarina by Rodrigues and Alban (2013) has pointed out that most of the people involved with the dairy activity are elderly people on average 50 years. Therefore, there are few young people working in the activity, which can be an indicator that in the future may occur manpower shortage.

Consequently, there need to hire this, resulting in change in the profile of properties, from family to business (Rodrigues and Alban, 2013). The young people of Santa Catarina when move away from country side to the cities, to improve their studies, they have contact and access to goods and services that augment their life quality.[13]

Thus, they do not want to lose those aspects on returning to the country side. The same occurs when they live in order to find better job opportunities. For the small family producers earn strength and representativeness, producer cooperatives were created. In Santa Catarina exist today 14 cooperatives (OCESC, 2016). The cooperatives facilitate

the bargain purchase inputs, allocation of production and better organization of dairy farming by producers cooperating in this system.
At the same time, they are suppliers and customers of the cooperative system (Chaddad, 2007; Junqueira and Gimenes, 2009).
Milk is a highly perishable product, and all sectors of the production chain influences the final product quality (Winck and Neto, 2009). Within the dairy chain, the producer appears as the most vulnerable link to meet the quality requirements. The dairy producer, demands improvement in handling milk, comprising collection and storage.
A large proportion of dairy agribusinesses, choose to create payment policies that consider quality aspects. The aim of improving the quality of raw milk was taken based on the rules imposed by the Brazilian National Normative (IN 51 and IN 62) and the rules in importing countries of milk and dairy products. An example of these quality aspects, we can consider the control of subclinical mastitis, hygiene and cooling of milk (Winck, 2013).
However, to meet the standards in normative instruction, training of farmers and their access to credit to finance the production it is necessary (Figueiredo and Paulillo, 2006).[14]
Study by Costa et al. (2013) with dairy farmers in southern Brazil, concludes that for dairy production develop, policy makers and extension agencies should prioritize: help farmers make changes in infrastructure and practices in order to comply with the Brazilian legislation on quality standards milk and milking; promote the adoption of 4. Final thoughts
The aim of this study was to diagnose the barriers of dairy production in SantaCatarina, from the perspective of the business ecosystem.
We chose to use as an analytical lens the business ecosystem, because it presents a systemic vision of the whole, which includes not only the chain of dairy production value, but also those with indirect roles in the ecosystem, such as other industries producing companies or complementary equipment, outsourcing companies, regulatory agencies, financial institutions, research institutes, universities, media and even competitors. The creation and maintenance of a business platform, can

help to reduce the lack of cooperation between the business ecosystem actors, so that the actors in the business environment, interconnected, can co-evolve and achieve economic gains and sustain the over time.

From this perspective, we find 19 barriers that limit the development of dairy production in Santa Catarina. These barriers are linked to productivity factors, interaction between the actors and quality of the raw material.

Based on the eight barriers, listed at this work, that are related with lack of cooperation between the actors, we observed that from the interests of small farmers' agribusiness cooperatives were created, such as: Cooperative Production and Consumption Concórdia (COPERDIA) and Aurora cooperative. These cooperatives help small producers to obtain representative to work in a collaborative way. However, to achieve maximum potential production, it is necessary to interact with other players, forming a business ecosystem. This view and interaction of all, facilitate access/introduction of new technologies, knowledge sharing and best practices, improve the procurement process and the flow of production.[15]

Regarding the five barriers associated with milk quality deficiencies, the government have been investing at Santa Catarina. There are government actions that seek to introduce technologies/knowledge for the dairy sector. Many of these actions comes from two state-owned companies, the Brazilian Agricultural Research Corporation (EMBRAPA) and the Company Integrated Agricultural Development of Santa Catarina, but so far such actions happen isolated, for instance not taking into account all the actors, focussing only on parts of the production chain. This fact limits that other business ecosystem actors cooperate and co-create value together. The government could take advantage of those identified barriers to plan actions taking into consideration the whole business ecosystem, promoting the empowerment of all players.

To solve some of the issues pointed out by the barriers identified, innovations can emerge from the cooperative relations between the business ecosystem actors. It canmake dairy production more competitive

and perennial. Those actors' interactions canassist in understanding better the customer demands and needs and lead to develop a new product to meet those requirements. We observed from the literature review that Santa Catarina dairy production needs to innovate, make improvement on animals genetics, implement management actions and improve the use of new technologies in order to maximize the sector's productivity.

Before the creation of the Brazilian normative instructions IN 51 and IN 62, the quality of milk could be low, because of the lack of standardization and regulation.

Producers who had adopted in their management process best practices, such as hygiene, milk packaging, automatic process for milk milking, obtained competitive advantages. This is no longer valid, because all producers must meet the national legislation, it is mandatory. Those normatives regulate the quality of the milk and set standards for production.[16]

In relation of the four rural exodus barriers, as in other activities of the agricultural sector, family dairy production is facing sustainability issues, the successors coming from family farms no longer demonstrate interest in staying in the activity, so leave the country side and go in search of new opportunities in urban centers. The genesis of this problem, presents evidence that this fact is related to low attractiveness of the sector, compensation factors, and cultural issues, as rural youth no longer identify themselves as a farmer.

In the long run that the reduced country side labor, will require a restructuring of the production system, through family foreign labor contracting. This factor forces the dairy production system to readjust its actors so that this obstacle can be overcome.

In reference of the two productivity limitations barriers, the exchange of knowledge and technology between the actors as recommended by the concept of business ecosystem can assist to mitigate or even eliminate it, and should be taken in consideration.

Based on the barriers highlighted by this study, it is possible to present some opportunities for future studies. One of them is to carry out a field study in Santa
Catarina to identify how the interfaces of the actors are related, and can be characterized as a business ecosystem. A second study could empirically validate the barriers identified by this work and also check if emerges others. A third propose a management model for co-creation of value in the dairy production environment, in order to mitigate the barriers faced.

REFERENCES[17]

Bardin, L. (2011), "Análise de Conteúdo", Lisbon.

Batalha, M.O. and Silva, A.L. (2007), "Gerenciamento de sistemas agroindustriais: definições, especificações, especificidades e correntes metodológicas", in Batalha, M.O. (Ed.), Gestão agroindustrial, 3rd ed., Editora Atlas, São Paulo, pp. 1-62.

Chaddad, F.R. (2007), "Cooperativas no agronegócio do leite: mudanças organizacionais e estratégicas em resposta à globalização", Organizações Rurais & Agroindustriais, Vol. 9 No. 1, pp. 69-78.

Costa, J.H.C., Hötzel, M.J., Longo, C. and Balcão, L.F. (2013), "A survey of management practices that influence production and welfare of dairy cattle on family farms in southern Brazil", Journal of Dairy Science, Vol. 96 No. 1, pp. 307-317.

Dolinska, A. and d'Aquino, P. (2016), "Farmers as agents in innovation systems. Empowering farmers for innovation through communities of practice", Agricultural Systems, Vol. 142, pp. 122-130.

Ferrari, D.L. (2003), “Agricultura familiar, trabalho e desenvolvimento no oeste de Santa Catarina”, doctoral dissertation, Campinas State University, Campinas.

Figueiredo, J.C. and Paulillo, L.F. (2006), “Gênese, modernização e reestruturação do complexo Agroindustrial lácteo brasileiro”, Revista Organizações Rurais Agroindustriais, Vol. 7, pp. 173-187.

Fischer, A., Junior, S.S., Sehnem, S. and Bernardi, I. (2011), “Produção e produtividade de leite do Oeste catarinense”, Revista de Administração, Contabilidade e economia, Vol. 10 No. 2, pp. 337-362.

Galateanu, E. and Avasilcai, S. (2013), “Business ecosystems architecture”, Annals of the Oradea University, Vol. 22 No. 1, pp. 79-84.

Ghosh, A.K. and Maharjan, K.L. (2004), “Development of dairy cooperative and its impacts on milk production and household income: a study on Bangladesh milk producers’ cooperative union limited”, Journal of International Development and Cooperation, Vol. 10 No. 2, pp. 193-208.

IBGE (2014), “Estado”, available at: www.ibge.gov.br/estadosat/temas.php?sigla¼sc&tema¼pecuaria2014 (accessed March 1, 2016).[18]

Jesson, J.K., Matheson, L. and Lacey, F.M. (2011), Doing Your Literature Review: Traditional and Systematic Techniques, Sage, Los Angeles, LA.

Junqueira, C.P. and Gimenes, R.M.T. (2009), “Cooperativa Agroindustrial Lar: conciliando a doutrina cooperativista e a competitividade de mercado”, Revista Ciências Empresariais UNIPAR, Vol. 10 No. 2, pp. 315-345.

Li, Y.-R. (2009), “The technological roadmap of Cisco’s business ecosystem”, Technovation, Vol. 29, pp. 379-386.

Machado, H.G.P., Pereira, I.B. and Kichel, M.S. (2006), “Situação atual da qualidade em Santa Catarina”, in Mesquita, A.J., Durr, J.W. and Coelho, K.O. (Eds), Perspectivas e avanços da qualidade do leite no Brasil, Vol. 1, Talento, Goiânia, pp. 73-82.

MAPA (2011), “Brasil projeções do Agronegócio 2010/2011 A 2020/2021”, available at: www.agricultura.gov.br/arq_editor/file/Ministerio/gestao/projecao/PROJECOES%20DO%20AGRONEGOCIO%202010-11%20a%202020-21%20-%202_0.pdf (accessed March 15, 2016).

Moore, J.F. (1993), “Predators and prey: the new ecology of competition”, Harvard Business Review, Vol. 71 No. 3, pp. 75-83.

Moore, J.F. (1996), The Death of Competition: Leadership and Strategy in the Age of Business Ecosystems, Harper Collins Publishers, New York: NY.

Novo, A.M., Slingerland, M., Jansen, K., Kanellopoulos, A. and Giller, K.E. (2013), “Feasibility and competitiveness of intensive smallholder dairy farming in Brazil in comparison with soya and sugarcane: case study of the Balde Cheio Programme”, Agricultural Systems, Vol. 121 No. 121, pp. 63-72.

OCESC (2016), “Busca por cooperativas”, available at: www.ocesc.org.br/cooperativas_busca/(accessed May 3, 2016).

Riemer, K. and Klein, S. (2006), “Network management framework”, in Klein, S. and Poulymenakou, A. (Eds), Managing Dynamic Networks, Springer, Berlin, pp. 17-66.[19]

Rodrigues, L.G. and Alban, L. (2013), “Tecnologias de produção de leite utilizadas no Extremo-Oeste Catarinense”, Revista de administração, contabilidade e economia, Vol. 12 No. 1, pp. 171-198.

Saenger, C., Qaim, M., Torero, M. and Viceisza, A. (2013), “Contract farming and smallholder incentives to produce high quality: experimental evidence from the Vietnamese dairy sector”, Agricultural Economics, Vol. 44 No. 3, pp. 297-308.

Smits, R. and Kuhlmann, S. (2004), “The rise of systemic instruments in innovation policy”, International Journal of Foresight and Innovation Policy, Vol. 1 Nos 1-2, pp. 4-32.

Winck, C.A. (2013), “Impactos do pagamento pela qualidade na cadeia produtiva do leite na região Oeste de Santa Catarina”, doctor thesis, Universidade Federal do Rio Grande do Sul, Porto Alegre, March 11.[20]

Winck, C.A. and Neto, A.T. (2009), “Diagnóstico da adequação de propriedades leiteiras em Santa Catarina às normas brasileiras de qualidade do leite”, Revista de Ciências Agroveterinárias,
Vol. 8 No. 2, pp. 164-172.

Winckler, N.C. (2011), “A coopetição entre propriedades rurais da cadeia produtiva do leite no Oeste Catariense”, Revista Brasileira de Gestão e Desenvolvimento Regional, Vol. 9 No. 1,pp. 44-66.

Xhoxhi, O., Pedersen, S.M., Lind, K.M. and Yazar, A. (2014), “The determinants of intermediaries’ power over farmers’ margin-related activities: evidence from Adana, Turkey”, World
Development, Vol. 64, pp. 815-827.

Yu, J., Li, Y. and Zhao, C. (2011), "Analysis on structure and complexity characteristics of electronic business ecosystem", Procedia Engineering, Vol. 15, pp. 1400-1404.

Further Reading

Mello, M.A. (2006), "Transformações sociais recentes no espaço rural do Oeste de Santa Catarina: migração, sucessão e celibato", 44th Congress Sociedade Brasileira de Economia, Administração e Sociologia Rural (SOBER) Fortaleza, July 23-27.

Peltoniemi, M. and Vuori, E. (2004), "Business ecosystem as the new approach to complex adaptive business environments", Proceedings of eBusiness Research Forum, Vol. 18,
pp. 267-281.

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CHAPTER 6 – "DAIRY ECOSYSTEM BARRIERS EXPOSED - A CASE STUDY IN A FAMILY PRODUCTION UNIT AT WESTERN SANTA CATARINA"

From the obstacles identification that limit the dairy production development, found in the literature, an empirical evaluation was made, through a case study.

The aim this study was to seek a better behavior dairy ecosystem barriers understanding in a family dairy production unit that has the characteristic of acting cooperatively. Through this study, it was possible to identify how this player managed to overcome some barriers of dairy production, as well as to highlight the positive benefits derived from overcoming the barriers that limit the dairy sector development.

The study findings are contained in Article 4. This work was published in Rural and Agroindustrial Organizations Journal, v. 19, n. 1, 2017.

DAIRY ECOSYSTEM BARRIERS EXPOSED - A CASE STUDY IN A FAMILY PRODUCTION UNIT AT WESTERN SANTA CATARINA, BRAZIL

ABSTRACT

Dairy production is one of the main sources of income for Santa Catarina family farms, and has growth potential for the coming years. On the other hand, for the sector to grow and develop, some industry barriers need to be overcome. Based on the barriers exposed by Bonamigo; Ferenhof and Forcellini (2016) in their literature review article, we aim to empirically confirm this scenario in a case study with a dairy family farm. From the data collected in the case study, we performed a content analysis, which served as a basis for reflection and discussion of the barriers in the dairy sector. Fourteen context units were found, which empirically confirmed the presence of those barriers. We also identify some advantages that the studied dairy production unit obtained by overcoming these barriers, such as economic gains, quality improvement, and competitive advantages.

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Recebido em: 26/07/2016. Aprovado em: 13/02/2017.
Avaliado pelo sistema *double blind review*
Avaliador científico: Luiz Eduardo Gaio
DOI: 10.21714/2238-68902017v19n1p001

Keywords: Dairy Production, Inhibitors, Barriers, Family Farming, Business Ecosystem.

1 INTROCTION

The Santa Catarina State is the fifth largest milk producer in the country, which represents 8% of milk production in Brazil and has a prospect potential growth (Winck; Neto, 2009; Mapa, 2011; Ibge, 2013). To maintain and /or maximize production rates, some sector barriers must be overcome.

According to Bonamigo; Ferenhof and Forcellini (2016), Santa Catarina's dairy sector barriers are linked to: 1) lack of cooperation between the business ecosystem actors, 2) milk quality deficiencies, 3) rural exodus and 4) productivity limitations. These barriers can be overcome through actors' interaction in the dairy business ecosystem that includes not only the milk value production chain, but also those with indirect roles in the ecosystem, such as companies from other industries that produce complementary products or equipment, outsourcing companies, regulatory agencies, financial institutions, research institutes, universities, media and even competitors.

The interaction between the actors in the dairy production system, only limits trade relations between the downstream and upstream production chain links, a factor which hinders the value co-creation between the actors, and prevents the sector development (Primo, 1999; Moore, 2006; Lamprinopoulou *et al.*, 2014; Dolinska; D'aquino, 2016; Kohtamäki; Partanen, 2016).

Based on the presented problem, we aimed to verify if the barriers exposed by Bonamigo; Ferenhof and Forcellini (2016), in their literature review article, can be empirically confirmed. For this, we interviewed a family dairy production unit located in western of Santa Catarina state, Brazil.

2 METHODOLOGY

The methodology used for the study comprises three stages. The first was conducted an exploratory search in the literature about value co-creation among multiple actors in the dairy ecosystem.

In the second stage, we seek to better understand the barriers' empirical existence in a case study. For this step was followed the recommendations proposed Yin (2013).

The case was limited to a reference production facility in the western region of Santa Catarina, Brazil, which is characterized in co-creating value with other dairy ecosystem actors. We checked with Agricultural Research and Rural Extension Company of Santa Catarina (EPAGRI), which property should be studied. The indicated one has more than eight years' experience in the dairy business and more than forty years in agricultural

production. Its average daily production is 600 liters per day and all the work comes from the producer family members.

Data collection consisted of an interview with the farm owner at his property, based on semi-structured interview and document analysis. In order to develop the interview instrument, we based the dairy sector barriers presented by Bonamigo; Ferenhof and Forcellini (2016). Prior to the interview was carried out a pilot test with experts in the field. Corrections were made in the research protocol. Later then, the interview was recorded and then transcribed to perform the content analysis.

The third stage the content analysis was conducted, which allowed the inference. For this, we followed the steps proposed by Bardin (2011), 1) Pre-analysis; 2) Exploration material or coding and; 3) treatment of results, inference and interpretation, detailed in item 4 of this article.

3 DAIRY FARMING IN SANTA CATARINA

Santa Catarina Milk production constitutes an important economic and social activity that allows a regular financial support to small producers, contributing to their maintenance in the field and reduce the rural exodus (Santos; Marcondes; Cordeiro, 2007; Winck, 2013).

More than 73% of the national milk production is concentrated in the South and Southeast of Brazil. The west geographic mesoregion of Santa Catarina is one of the most promising areas in terms of production and milk productivity. This region is characterized by the production structure base, consisting of agricultural and agro-industrial activities, especially the grain farming, swine farming, poultry farming, cutting cattle and, milk (Fischer *et al.*, 2011).

Regarding milk producing establishments, the concentration of properties with up to 100 hectares is 89.1% in the western Santa Catarina, against 87.3% in Santa Catarina state and 78% in Brazil. The dairy herd in western Santa Catarina is also concentrated in small farms. Establishments with up to 20 hectares account for 72.1% of milk production in the region, against 70.4% in Santa Catarina and 33.4% in the national average, which shows the importance of dairy farming for small properties at the region (Fischer *et al.*, 2011).

3.1 Barriers Limiting the Development of Dairy Activity in Santa Catarina

Bonamigo; Ferenhof and Forcellini (2016) expose barriers that limit the dairy sector in Santa Catarina, based on a literature review, which are represented in Figure 1.

The barrier linked to lack of cooperation between the dairy production actors makes clear the need for network innovation improvement (Smits; Monteny; Van Duinkerken, 2003; Dolinska; D'aquino, 2016). The lack of interaction between authors, like the producers, dairy cooperatives, retail is being shown disconnected, a factor that limits knowledge and innovation exchange in the sector (Eastwood; Chapman; Paine, 2012), which prevents the actors to co-create and innovate in the dairy production environment and overcome the activity adverse effects.

There is a lack of organized dairy production system, which should add value and support the entry into new markets. This lack is impacting on the dairy production development (Ferrari, 2003). A better interaction between the actors is needed, such as providing technical support for good production practices as well as financial support in order to include new production technologies and business expansion (Rodrigues; Alban, 2013; Winck, 2013; Dolinska; D'aquino, 2016).

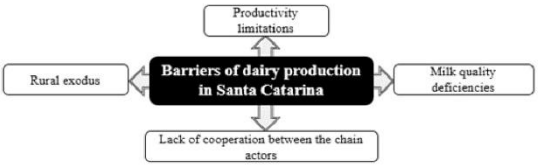

FIGURE 1 – Barriers limiting the development of dairy activity in Santa Catarina
Source: adapted from Bonamigo; Ferenhof and Forcellini (2016)

This management lack between the participants in the business ecosystem prevents the ecosystem as a whole to get economic rewards through the co-creation of value, for instance, innovation through cooperation among the actors in the dairy ecosystem (Moore, 1996).

According to Winck (2013), most of the dairy producers of the state are located in western Santa Catarina region, constituting of family farming, the region's model with properties of up to 30 hectares, and there is a predominance of women's work who are responsible for the activities related to milk. For the author, among these farmer's families, over 65% are not interested in continuing with the production or keep the property running. This is a problem that is getting worse over time, not just in the region or state but throughout Brazil (Stropasolas, 2011).

As in other agricultural sector activities, family dairy production is facing sustainability issues. The successors coming from family farms no longer demonstrate an interest in staying in the activity, therefore they leave the countryside, searching for new opportunities at urban centers (Bonamigo; Ferenhof; Forcellini, 2016).

The new technologies can help the manufacturer to use the same production area to produce more milk with the same amount of resources available (Ferrari, 2003; De Carvalho Figueiredo; Paulillo, 2011). With this new technologies increase, producers can boost milk productivity, reduce animal feed costs, incorporate new management techniques and improve herd management, which positively impacts the activity economic earnings (Novo *et al.*, 2013; Saenger *et al.*, 2013; Winck, 2013)

Regarding quality, milk is a highly perishable product and all production chain sectors influence the final product quality (Winck; Neto, 2009). Within the dairy chain, the producer appears as the most vulnerable link to meet the quality requirements and they are demanded to improve milk handling, comprising the collection and storage (Bonamigo; Ferenhof; Forcellini, 2016).

Some initiatives by dairy agribusinesses, such as payment policies that consider milk quality aspects have been proposed in order to improve the milk delivered quality by the producer. Regulations regarding milk quality are imposed by the Brazilian National Normative (IN 51 and IN 62) and by the rules of each importing country. Can be considered as an example of quality control, subclinical mastitis aspects, milk hygiene, and cooling (Costa et al., 2013; Winck, 2013).

4 BARRIERS VERIFICATION IN A PRACTICAL CASE

Based on the input data content analysis, four a priori units were selected, as proposed by Bonamigo; Ferenhof and Forcellini (2016). Based on the barriers called here record units we identified fourteen context units, as can be seen in Table 1.

The limited interaction between the dairy ecosystem actors, such as research institutes, universities, EPAGRI, SEBRAE, EMBRAPA, cooperatives, among other actors, prevents the ecosystem as a whole to get economic rewards through value co-creation, or innovate together (MOORE, 2006; MAZZAROL; LIMNIOS; REBOUD, 2013).

We could observe that the studied production unit sought knowledge with other actors in the dairy ecosystem as a way to restructure the farm. They feel that the milk production is an alternative to keep the family in the countryside because corn and swine' production are in crisis. Those statements are aligned with Fischer; Junior et al. (2011).

From the respondent perception, the cooperation between producers, the management and the co-creation among the actors in the dairy ecosystem has advantages for his property and also for the municipalities development. This argument lines up with Costa et al., (2009), where they state that the interaction between the actors contributes to the Brazilian agribusiness progress and can improve life quality, keeping people in the countryside for a sustainable regional development.

Cooperation in the studied production unit is shown as a way to motivate the family members to stay in the countryside and also to increase economic gains. On the other hand, the respondent noted that the limited expertise of some dairy ecosystem actors, such as technical assistance provided by the producers' cooperatives and suppliers of inputs, prevents the producer to cooperate with these actors. Therefore, it needs improvement.

Regarding rural exodus, the respondent points out that producers have resistance to change. For instance, an inclusion of new production techniques, and when the first difficulties appear, they tend to give up and choose to leave the countryside. For the respondent, milk has become an incentive to keep the farmer at the countryside, but it depends on the orientation of parents and the support that the property offers to the future successors. This respondent perception is in accordance with Mello and Schmidt (2003) and Ghosh and Maharjan (2004).

TABLE 1 – Barriers encountered at the family dairy production unit

Record Unit	*Context Unit	Frequency
Lack of cooperation between the chain actors	"The lack of cooperation between producers in our region makes a difference for the producer and for the city. Furthermore, good producer cooperatives would help the business development"	4
	"Assistance by the city hall and supporting bodies for producers, the staff is low-skilled"	
	"Companies need more trained professionals (they are in the basics)"	
	"Our relationship with cooperatives does not have many advantages, and is limited to the purchase of medicines and some raw material"	
Rural exodus	"Dairy farming was an alternative that kept us in the field when there was a crisis in swine and corn farming. We often think about leaving agriculture"	4
	"People have resistance to change traditional production methods and give up at the first difficulty, leaving the field"	
	"Production cost increases considerably"	
	"Rural exodus: the milk is encouraging to hold the producer but depends heavily on parental guidance. If the business is structured, the young keep the continuity and does not leave the countryside"	
Milk quality deficiencies	"Quality should be more rigorous because it qualifies the manufacturer and thereby add more product values"	3
	"The future business is organic milk, and we are focusing on it, albeit slowly, because our region has no such demand and market, but it demands quality"	
	"Milk quality is important for recovery and, greater gains are possible by quality not by quantity"	
Productivity limitations	"Production cost has increased considerably"	3
	"The region producers have no interest in seeking knowledge"	
	"The producer puts too much effort on focusing in practice and ends up leaving aside the theory. The theory is what makes the producer better and makes you a rural entrepreneur"	

Source: Authors *Translated from Portuguese

Since most members involved in dairy farming in Santa Catarina are elderly people, there are few young people working in the activity. This condition, according to Rodrigues and Alban (2013) indicates that in the future manpower shortage may occur at the countryside. Regarding milk quality shortcomings, in the respondent perception, the quality parameters should be more rigorous so the milk producer is awarded, obtaining then, a higher valuation. In this sense, the regulations imposed by the Brazilian National Normative (IN 51 and IN 62) and by the rules of importing countries are considered a quality factor that generates differential and a greater producers' appreciation (Winck, 2013).

Although there is an increase in milk production cost, some initiatives have been created by the producers to add value to their products, for instance, the organic milk production. According to Saucier; Parsons and Inwood (2016) the organic milk market provides opportunities for a new kind of relationship between the dairy system actors, given that the prices paid for milk are more stable, once it promotes a close business relationship with producers, processors and other dairy system stakeholders.

The production of organic milk has environmental benefits because it uses a small amount of pesticides and phosphorus (Thomassen et al., 2008). In this sense, the offer of products derived from milk with differentiated quality, as in the case of organic milk, allows the consumer to look for organic products, offering healthy products with improved nutritional aspects (Hill; Lynchehaun, 2002).

Regarding productivity limitations, the respondent points out that his property obtained benefits with the introduction of new production techniques, such as artificial insemination, and the handling of animals. Furthermore, the separation of animals by age, food quality and vaccines made it possible to increase production. These statements are aligned with Fischer; Junior et al. (2011).

The respondent indicated that the knowledge exchange with other dairy ecosystem actors, allowed all unit members to professionalize the activity through a

theoretical and scientific integration. From this progress, it is emphasized that the use of theoretical concepts makes the best producer, featuring it in a rural entrepreneur.

5 FINAL THOUGHTS

We aimed to verify if the barriers exposed by Bonamigo; Ferenhof and Forcellini (2016) are empirically confirmed. For this, we based our research on a case study with a family dairy production unit located in western Santa Catarina state, Brazil. As a result, we could confirm the presence of the barriers at the studied family production unit. In addition, we identified some benefits that the property obtained by overcoming these constraints.

We observed that cooperation between multiple dairy ecosystem actors has boosted economic gains, knowledge, and learning of the studied property. In this sense, we noted that the interaction between the various dairy sector actors creates competitive advantages through the introduction of new technologies and management techniques, which on the contrary, is limited if the producer acts individually.

Another point that we observed, related to cooperation between the actors, was that even with the little interaction that this property had, it assisted in the introduction of new technologies and innovation, a fact that motivated the producer interviewed to remain with rural activities and to develop and overcome the barrier linked to rural exodus.

Regarding the milk quality barrier, we observed that the studied property obtained gains because of the quality delivered. This was possible by the training and lectures coming from the interaction with government agencies that allowed the producer professionalization. Those lectures help them to meet customer requirements and also the Brazilian regulations (IN51 and IN62) that establish milk quality requirements. This compliance quality added more value to the product delivered to customers.

With respect to the productivity barrier, we observed that the production unit obtained benefits, such as lower production costs to implement management techniques and the management of animals.

We observed that the pursuit for overcoming the dairy sector barriers presented by Bonamigo; Ferenhof and Forcellini (2016) allowed the studied property to increase economic gains, increase professionalization, and motivated family members to stay in the countryside.

As an opportunity for future studies, we suggest replicating the present case study in different geographical regions with sizes of diversified production units. A second study could propose a value co-creation development platform as a reference model for the dairy production ecosystem.

6 REFERENCES

BARDIN, L. **Análise de conteúdo**. Lisboa: Ediçoes 70, 2011. 229 p.

BONAMIGO, A.; FERENHOF, H. A.; FORCELLINI, F. A. Dairy production diagnosis in Santa Catarina, Brazil, from the perspective of business ecosystem. **British Food Journal,** Bradford, v. 118, n. 9, p. 1-12, 2016.

COSTA, J. H. C. et al. A survey of management practices that influence production and welfare of dairy cattle on family farms in southern Brazil. **Journal of Dairy Science,** Champaign, v. 96, n. 1, p. 307-317, Jan. 2013.

DOLINSKA, A.; D'AQUINO, P. Farmers as agents in innovation systems. Empowering farmers for innovation through communities of practice. **Agricultural Systems,** Essex, v. 142, p. 122-130, Feb. 2016.

EASTWOOD, C.; CHAPMAN, D.; PAINE, M. Networks of practice for co-construction of agricultural decision support systems: case studies of precision dairy farms in Australia. **Agricultural Systems,** Essex, v. 108, p. 10-18, Apr. 2012.

FERRARI, D. L. **Agricultura familiar, trabalho e desenvolvimento no oeste de Santa Catarina.** 2003. 194 f. Dissertação (Mestrado em Desenvolvimento Econômico, Espaço e Meio Ambiente)-Instituto de Economia, Universidade de Campinas, Campinas, 2003.

FIGUEIREDO, J. de C.; PAULILLO, L. F. Gênese, modernização e reestruturação do complexo agroindustrial lácteo brasileiro. **Organizações Rurais & Agroindustriais,** Lavras, v. 7, n. 2, p. 173-187, maio/ago. 2011.

FISCHER, A. et al. Produção e produtividade de leite do Oeste catarinense. **Race**: revista de administração, contabilidade e economia, Joaçaba, v. 10, n. 2, p. 337-362, jul./dez. 2011.

GHOSH, A. K.; MAHARJAN, K. L. Development of dairy cooperative and its impacts on milk production and household income: a study on bangladesh milk producers' cooperative union limited. **Journal of International Development and Cooperation,** Oxford, v. 10, n. 2, p. 193-208, 2004.

HILL, H.; LYNCHEHAUN, F. Organic milk: attitudes and consumption patterns. **British Food Journal,** Bradford, v. 104, n. 7, p. 526-542, 2002.

BARDIN, L. **Análise de conteúdo**. Lisboa: Ediçoes 70, 2011. 229 p.

BONAMIGO, A.; FERENHOF, H. A.; FORCELLINI, F. A. Dairy production diagnosis in Santa Catarina, Brazil, from the perspective of business ecosystem. **British Food Journal,** Bradford, v. 118, n. 9, p. 1-12, 2016.

COSTA, J. H. C. et al. A survey of management practices that influence production and welfare of dairy cattle on family farms in southern Brazil. **Journal of Dairy Science,** Champaign, v. 96, n. 1, p. 307-317, Jan. 2013.

DOLINSKA, A.; D'AQUINO, P. Farmers as agents in innovation systems. Empowering farmers for innovation through communities of practice. **Agricultural Systems,** Essex, v. 142, p. 122-130, Feb. 2016.

EASTWOOD, C.; CHAPMAN, D.; PAINE, M. Networks of practice for co-construction of agricultural decision support systems: case studies of precision dairy farms in Australia. **Agricultural Systems,** Essex, v. 108, p. 10-18, Apr. 2012.

FERRARI, D. L. **Agricultura familiar, trabalho e desenvolvimento no oeste de Santa Catarina.** 2003. 194 f. Dissertação (Mestrado em Desenvolvimento Econômico, Espaço e Meio Ambiente)-Instituto de Economia, Universidade de Campinas, Campinas, 2003.

FIGUEIREDO, J. de C.; PAULILLO, L. F. Gênese, modernização e reestruturação do complexo agroindustrial lácteo brasileiro. **Organizações Rurais & Agroindustriais,** Lavras, v. 7, n. 2, p. 173-187, maio/ago. 2011.

FISCHER, A. et al. Produção e produtividade de leite do Oeste catarinense. **Race**: revista de administração, contabilidade e economia, Joaçaba, v. 10, n. 2, p. 337-362, jul./dez. 2011.

GHOSH, A. K.; MAHARJAN, K. L. Development of dairy cooperative and its impacts on milk production and household income: a study on bangladesh milk producers' cooperative union limited. **Journal of International Development and Cooperation,** Oxford, v. 10, n. 2, p. 193-208, 2004.

HILL, H.; LYNCHEHAUN, F. Organic milk: attitudes and consumption patterns. **British Food Journal,** Bradford, v. 104, n. 7, p. 526-542, 2002.

INSTITUTO BRASILEIRO DE GEOGRAFIA E ESTATÍSTICA. **Produção da pecuária municipal.** Rio de Janeiro: IBGE, 2013. 108 p.

KOHTAMÄKI, M.; PARTANEN, J. Co-creating value from knowledge-intensive business services in manufacturing firms: the moderating role of relationship learning in supplier–customer interactions. **Journal of Business Research,** Athens, v. 69, n. 7, p. 2498-2506, July 2016.

LAMPRINOPOULOU, C. et al. Application of an integrated systemic framework for analysing agricultural innovation systems and informing innovation policies: comparing the Dutch and Scottish agrifood sectors. **Agricultural Systems,** Essex, v. 129, p. 40-54, July 2014.

MAZZAROL, T.; LIMNIOS, E. M.; REBOUD, S. Co-operatives as a strategic network of small firms: case studies from Australian and French co-operatives. **Journal of Co-operative Organization and Management,** Oxford, v. 1, n. 1, p. 27-40, Sept. 2013.

MELLO, M. A.; SCHMIDT, W. A agricultura familiar e a cadeia produtiva do leite no Oeste catarinense: possibilidades para a construção de modelos heterogêneos. In: PAULILO, M. I. S.; SCHMIDT, W. **Agricultura e espaco rural em Santa Catarina**. Florianopolis: Ed. UFSC, 2003. p. 71-98.

MINISTÉRIO DA AGRICULTUA, PECUÁRIA E ABASTECIMENTO. Brasil **Projeções do Agronegócio 2010/2011 a 2020/2021**. Brasília: Embrapa, 2011. 13 p.

MOORE, J. F. Business ecosystems and the view from the firm. **The Antitrust Bulletin,** Amsterdam, v. 51, n. 1, p. 31-75, 2006.

NOVO, A. M. et al. Feasibility and competitiveness of intensive smallholder dairy farming in Brazil in comparison with soya and sugarcane: case study of the balde cheio programme. **Agricultural Systems,** Essex, v. 121, p. 63-72, 2013.

PRIMO, W. M. Restrições ao desenvolvimento da indústria brasileira de laticínio. In: VILELA, D.; BRESSAN, M. **Restrições técnicas, econômicas e institucionais ao desenvolvimento da cadeia produtiva do leite no Brasil.** Brasília: MCT, 1999. p. 71-127.

RODRIGUES, L. G.; ALBAN, L. Tecnologias de produção de leite utilizadas no Extremo-Oeste Catarinense. Race: revista de administração, contabilidade e economia, Joaçaba, v. 12, n. 1, p. 171-198, 2013.

SAENGER, C. et al. Contract farming and smallholder incentives to produce high quality: experimental evidence from the Vietnamese dairy sector. **Agricultural Economics,** Amsterdam, v. 44, n. 3, p. 297-308, May 2013.

SANTOS, O. D.; MARCONDES, T.; CORDEIRO, J. **Estudo da cadeia do leite em Santa Catarina:** prospecção e demandas. Florianópolis: Epagri, 2007. 90 p.

SAUCIER, O. R.; PARSONS, R. L.; INWOOD, S. Redefining the farmer-processor relationship: the story of organic cow. **Enterprise and Society,** Cambridge, v. 17, n. 2, p. 358-392, June 2016.

SMITS, M. C. J.; MONTENY, G. J.; VAN DUINKERKEN, G. Effect of nutrition and management factors on ammonia emission from dairy cow herds: models and field observations. **Livestock Production Science,** Amsterdam, v. 84, n. 2, p. 113-123, Dec. 2003.

STROPASOLAS, V. L. Os desafios da sucessão geracional na agricultura familiar. **Revista Agriculturas**, Rio de Janeiro, v. 8, n. 1, p. 26-29, mar. 2011.

THOMASSEN, M. A. et al. Life cycle assessment of conventional and organic milk production in the Netherlands. **Agricultural Systems,** Essex, v. 96, n. 1/3, p. 95-107, Mar. 2008.

WINCK, C. A. **Impactos do pagamento pela qualidade na cadeia produtiva do leite na região Oeste de Santa Catarina**. 2012. 119 f. Tese (Doutarado em Agronegócios) - Universidade Federal do Rio Grande do Sul, Porto Alegre, 2012.

WINCK, C. A.; THALER NETO, A. Diagnóstico da adequação de propriedades leiteiras em Santa Catarina às normas brasileiras de qualidade do leite. **Revista de Ciências Agroveterinárias,** Lages, v. 8, n. 2, p. 164-172, jul./dez. 2009.

CHAPTER 7 – "EVALUATION THE DAIRY PRODUCTION BARRIERS IN SANTA CATARINA"

Once the behavior of the barriers in the dairy ecosystem has been verified through a case study, we seek to delve into the verification of the barriers of milk production in practice, in order to confirm or refute the theory. For this evaluation, we conducted two tests. The first one that is found in this chapter, and a second test that will be presented in chapter 8 of this thesis.

The confirmation or refutation of the theory is fundamental for the construction of the management model that this thesis aims to propose since the barriers it will be a basic's element to build the model.

The study results are in Article 5. This work was introduced and published in VII Simpósio de Engenharia de Produção do Vale do São Francisco – SEPVASF, 2017 in Juazeiro – BA.

VII SIMPÓSIO DE ENGENHARIA DE PRODUÇÃO DO VALE DO SÃO FRANCISCO

28 a 30 de Março de 2017

Juazeiro - BA

EVALUATION THE DAIRY PRODUCTION BARRIERS IN SANTA CATARINA

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Abstract

The growing demand for dairy products, indicates to the need of Santa Catarina dairy sector improve its production system. From the barriers of dairy production in Santa Catarina, found in literature by Bonamigo; Ferenhof e Forcellini (2016b), the present study aimed to assess these barriers in the field with the dairy sector experts. Based on the consultation with 67 experts in the dairy sector through a structured questionnaire, it was possible to confirm the presence those barriers in the field and beyond these, we identify more three barriers. They are: 1) the lack of public policies; 2) the lack professionalism of producers, and 3) the high production cost.

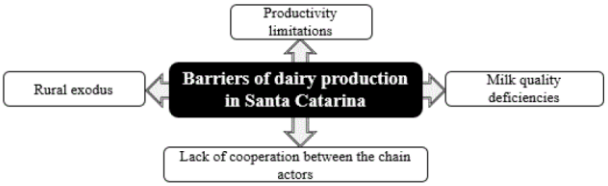
Key-words: Barriers in dairy sector; Business ecosystem, Dairy production; Santa Catarina State.

1. Introduction

The dairy sector in Brazil is one the most important sectors of the economy, with creating jobs for millions of Brazilians (ALVIM et al., 2002). The activity in the country is distributed throughout the national territory. The Santa Catarina state, is the fifth largest milk producer in country, which corresponds to an amount of 2,983,250,000 liters of milk in 2014. (IBGE, 2016).

From a systematic literature review, Bonamigo; Ferenhof and Forcellini (2016), identified four barriers that limit the development of dairy sector in Santa Catarina, from the perspective of business ecosystem concept, being them: 1) Lack of cooperation between the chain actors, 2) Milk quality deficiencies, 3) Rural exodus and, 4) Productivity limitations. Figure 1.

Figure 1: Barriers in the dairy production in Santa Catarina



Source: adapted from Bonamigo; Ferenhof and Forcellini (2016)

The business ecosystem concept, comprises a set of business environment organizations, which interact together to co-create value and grow. This analogy is compared to the biological ecosystem (MOORE, 1993; PELTONIEMI; VUORI, 2004; MOORE, 2006; GALATEANU; AVASILCAI, 2013; DOLINSKA; D'AQUINO, 2016; KOHTAMÄKI; PARTANEN, 2016).

Regarding Lack of cooperation between the chain actors, it is verified that the limited iteration between the players of the dairy ecosystem, limits the actors to access new technologies, knowledge and to add value to their products (MOORE, 1993, MOORE, 2006).

With regard to Milk quality deficiencies, dairy production demands the adoption of appropriate techniques for the operational process in the dairy production unit (dairy farmer). The dairy production of Santa Catarina, shows an opportunity for a greater aggregation of Value of dairy products, from a milk of better quality produced, so that the Brazilian Normative Instruction is met (IN 51 and IN 62) (WINCK; NETO, 2009; WINCK, 2013).

In relation to Rural Exodus, young people no longer identify themselves in rural activity, which impacts on the lack of labor in the field. In this sense, it is evident a change of the profile of the dairy product, from a small production unit, to a business system, with hired labor (RODRIGUES, ALBAN, 2013).

In the aspect of Productivity limitations, low professional training for dairy producers is a fragility in sector, which limits the producer to increase his economic gains (WINCKLER, 2011), in this sense, Fischer et al. (2011) corroborate, pointing out that the milk productivity can increase with the use of genetic improvement, feeding and management technologies, increasing production.

Based on these barriers found in the literature, this study aims to verify in the field, the occurrence of these and identify others that may arise

2. Methodology

Aiming to verify in the field the barriers of milk production in Santa Catarina, proposed by Bonamigo; Ferenhof e Forcellini (2016b), It was used as research strategy, a Survey, which comprises a means for obtaining data or information about characteristics, actions or opinions of certain people group (FINK, 2015).

To this end, we developed an instrument for data collection, which included the preparation of a semi-structured questionnaire with answers open in order to identify new barriers and, with scalar responses, according to Likert (1932), to verify the barriers previously identified.

Regarding the open questions aimed at finding new barriers in the dairy sector, we used content analysis, based on Bardin (2011). The content analysis composed by 1) Pre-analysis; 2) Exploration material or coding and; 3) treatment of results, inference and interpretation, as recommended by Bardin (2011) was performed as detailed in the following. The analysis units were defined the posteriori.

For analysis, the responses linked the barriers already found in the literature, we rely on descriptive statistics in order to describe the data found (OSTLE, 1963; HAIR JR et al., 2005; DEVORE, 2015).

3. Results and discussions

3.1 Data collect instrument application

After defining an initial questionnaire, a pretest was conducted. This was done with the dairy sector experts. After performed the tests and adjusted the document, the data were collected in the field. The data collection was performed in two stages. The first leg took place directly with the experts dairy sector in a dairy sector event in West of Santa Catarina performed by Rural Extension and Agricultural Research Enterprise (EPAGRI).

In the second stage, Data collection was performed by means of electronic questionnaire sent to the experts. In this last, we conducted a first telephone contact with experts, including: dairy cooperatives, dairy, dairy traders, researchers and government institutions, to present the research objective, importance of the interviewee's contribution and we asked your e-mail contact for form submission.

In the first stage, we get to a total of 33 answers, as via electronic questionnaire, returned 34 responses. A total amount of 67 responses.

After the collected data, this were organized an electronic spreadsheet for analysis and discussion.

3.2 Experts consulted profile

The geographical distribution of the experts consulted by state region is presented in Table 1.

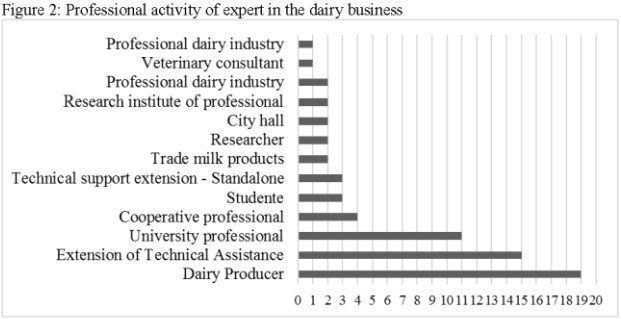
Table 1: Geographical distribution of the experts consulted

Region	Percentage consulted
West	58%
Midwest	32%
Florianópolis	5%
Northeast	2%
Planalto Serrano	2%
North	2%

Source: the authors

In relation to professional practice time, predominated professionals with more than five years in activities related to dairy business (79.10%) between one to three years 11.94% and between three to five years 8.95% of the sample. Regarding the professional activity, of expert in the dairy business, these are diversified. Figure 2.

Figure 2: Professional activity of expert in the dairy business



Source: the authors

3.3 Verification of the dairy production barriers in Santa Catarina

When we questioned the experts about the barriers that limit the development dairy production in Santa Catarina, the results obtained are in Table 2.

Table 2: Position of specialists

Barriers of dairy production	Disapprove strongly	Disapprove	Undecided	Approve	Strongly approve
Lack of cooperation between the chain actors	*4,48%*	*11,94%*	*14,93%*	*43,28%*	*25,37%*
Milk quality deficiencies	*2,99%*	*13,43%*	*11,94%*	*38,81%*	*32,84%*
Rural exodus	*4,48%*	*11,94%*	*16,42%*	*34,33%*	*32,84%*
Productivity limitations	*5,97%*	*13,43%*	*20,90%*	*35,82%*	*23,88%*

Source: the authors

Regarding the barrier of lack of cooperation between the actors of the ecosystem, adding the answers approve and approve strongly, totaled to 68.65%, which indicates that this barrier is shown in the field. The presence this barrier, hinders the development of the activity, since limit the parts to interact, exchange knowledge, experiences, new techniques, technological capability and innovate the through value co-creation (BRYCESON; SLAUGHTER, 2010; POLÁKOVÁ; KOLÁČKOVÁ; TICHÁ, 2015; BONAMIGO; FERENHOF; FORCELLINI, 2016b; a).

According Kouwenhoven; Nallab e Von Losoncz (2012) the value chain challenges are not limited to a single company. Cooperation between the actors in the dairy ecosystem, allows for greater potential for innovation, since the interaction between universities, research centers, customers, industries provides benefits to all stakeholders in the business environment, which when acting individually would have greater difficulties, higher costs, limited access to resources and knowledge (MALIK; GEORGHIOU; GRIEVE, 2011; DEHÁQUIZ et al., 2012; MINH; HJORTSØ, 2015).

In aspects of quality problems, adding the taste responses and approve strongly, it amounted to 71,65%, already in summing the responses of disapprove and disapprove strongly totaling 16,42%, this sense the quality problems are evidenced in dairy production in Santa Catarina.

The Santa Catarina dairy sector has shown great challenges to suit the quality requirements imposed by the Brazilian Normative Instruction (IN 51 and IN 62) to improve the quality of raw milk, among others imposed by domestic market and / or international in the case to export (WINCK, 2013).

In milk quality aspects, the producer, is the player of the dairy production system, which needs to be more professionalization, management techniques in the process of milking, handling and storing milk (DA ROSA; QUEIROZ, 2007; WINCK; NETO, 2009; DE CARVALHO FIGUEIREDO; PAULILLO, 2011; WINCK, 2013).

For rural exodus, the answers strongly approve and approve, resulted in an amount of 67,17%, in this sense, the experts confirm that barrier in the dairy sector. According to Ferenhof et al. (2015) this fact shows the importance, for the developing actions aimed at society as a whole.

In Santa Catarina, the concern with the rural exodus has been accentuated by the existence of properties without a successor. Fact that may show difficulties in the continuity of family production units, production system this, which predominates in the State (MELLO; SCHMIDT, 2003; GHOSH; MAHARJAN, 2004).

For Rodrigues e Alban (2013), for those involved with the dairy activity, are elderly people, there are few young people working in the activity, what there is be an indicator that in the future may occur manpower shortage, therefore there will be the need to hire this, which may result in increased production costs and a change in the profile of dairy farms, ceasing to be familiar to entrepreneurial.

In what concerns the productivity limitations, there was the presence of this barrier in field, a total of 35.82% of skill approve this barrier and a total of 23.88% strongly endorse that barrier. The presence this barrier, impact in production increase, this limited rate of productivity is closely linked to the degree of innovation in the enterprises (DE MORI; BATALHA; ALFRANCA, 2014). The same authors point out that in small dairy production units, have not a defined communication channel to present the sector's needs, or tools and techniques of support.

Although some initiatives in the dairy sector of Santa Catarina have been made, like the producer cooperatives, to strengthen the forces of small producers (family), a greater intensification is necessary, with respect to the increasing requirements related to quality assurance, health and environmental concerns (BAU MACEDO, 2015).

3.4 Found barriers new

When asked the experts, if they recognized other barriers that limit the development of dairy production in Santa Catarina beyond the four presented, were identified more three barriers. Table 3.

Table 3: Found barriers new

Record unit	Context Unit	Frequency
The lack of public policies	Lack of encouragement from the government	09
	Failure to public politics	
	Specialized technical assistance and competent for the sector	
	Lack of incentives for rural producers	
	Need for public initiatives aimed at technical assistance and rural extension in production systems; little governmental incentives to produce other ways such as, for example, agroecology production.	
	Lack technical assistance and rural extension	
	Financial assistance from government agencies to support research in all stages of the production chain	
	A lack of motivation for investments in the sector	
	Few assistance public politics to support dairy farms	
The lack professionalism of producers	Lack of technical producer capacity	09
	Lack of technical empowerment for producers	
	Producer does not realize the property as a company	
	Organization / technification of producers	
	Lack of organization by the dairy farmers	
	High dependence on external inputs to the property of the farmer	
	Inappropriate production system	
	Producers have difficulty in adopting new technology	
	Producers need enablement	
The high production cost	High production cost	06
	High cost of inputs to the animals	
	Order to maintain a product quality and meet the standards has high costs.	
	High Cost to feed animals	
	Relationship between quality of milk and the price paid / received.	
	High production cost, coupled with low price received by the producer, generates economic instability in the activity.	

Source: the authors

Regarding the Insufficient barrier of public policies, in accordance with the opinion of the experts, they point out that the lack of government incentives for the dairy sector, this limits the development of the activity, with impact strictly in the absence of technical support to producers, incentives, investments in the sector and access to financial resources for the various stages of the dairy chain milk production. For Fischer (2014) the government has an

impact on agribusiness, so this can help and promote the adoption of intrinsic attributes in the agroindustry sector companies and corroborate to its development.

Regarding the lack professionalism of producers, Da Rocha (2002) considered as a process in evolution toward a higher level of formality, which can be translated in terms of the organizational structure development to the organizational management.

In the business evolution process, planning is an important factor to transform the informal business model in an entrepreneurial business, being that it considers factors for management as changes in the economy, in the habit of consumers, technology, the climate behavior, the costs, and the availability of products demand and other changes and brings numerous benefits which can be obtained by organized way to plan, forcing the producer to think about the future of its business, anticipating problems before they happen (MARION; SEGATTI, 2005).

In the aspect linked to the high cost of production in the agricultural market price is usually set by the buyer, on the other hand the necessary inputs and resources to the production process have the swings that presents a challenge for the dairy production sector (HOFER et al., 2009). In this sense, to reduce costs, the actor's dairy ecosystem must eliminate waste from your business, that is, all activities that do not add value to the customer must be eliminated or reduced to the maximum, to improve their economic gains (ZOKAEI; SIMONS, 2006; WOMACK; JONES, 2010; GOBINATH; ELANGOVAN; DHARMALINGAM, 2015).

4. Final considerations

This study aimed to verify the barriers of milk production in Santa Catarina presented by Bonamigo; Ferenhof e Forcellini (2016b) in field. From the opinion of sixty-seven experts from the dairy sector, it was possible to identify the position of these experts regarding the barriers in dairy sector found in literature.

With the results of the study, it was possible to confirm the presence of barriers in practice, that is, these were approved by experts of the dairy sector, these being: 1) Lack of cooperation between the chain actors, 2) Milk quality deficiencies, 3) Rural exodus and, 4) Productivity limitations.

The barriers stemming from the literature, were exposed to a group of respondents, and these confirmed the existence of the same. We cannot generalize affirming that these barriers occur anywhere, whether on the farm, industry, commerce, or any player in the dairy business ecosystem. But, this may indicate that they exist and must be studied so that they can be confirmed statistically, in order to arrive at a generalization.

Besides the four barriers verified, by means of studying we found more three barriers that limit the development of milk production, among them: 1) The lack of public policies, 2) The lack professionalism of producers, and 3) The high production cost.

The confirmation of these barriers by experts in the dairy sector, make it possible to trace improvements to these obstacles are overcome. In this regard, the findings in this study, it is possible to conduct further studies to mitigate the barriers diagnosed in practice. In this sense the business ecosystem concept is an alternative, by presenting a holistic approach throughout the dairy business environment.

Some opportunities for future studies we identified. The proposition of a management model that drives the development of dairy production, so that these barriers can be overcome. Another study would verify these barriers in other regions and / or countries, so that a comparison can be made.

References

ALVIM, R. S., MARTINS, M. C., MUSTEFAGA, P. S., VILELA, D., BRESSAN, M. GOMES, A. Desempenho da cadeia produtiva do leite no Brasil–visão dos produtores. *O agronegócio do leite e políticas públicas para o seu desenvolvimento sustentável. EMBRAPA, Juiz de Fora-MG*, 2002.

BARDIN, L. Análise de conteúdo. 3. reimp. *Lisboa: Ediçoes*, v. 70, 2011.

BAU MACEDO, L. O. The role of social capital for the governance of hybrid forms in agribusiness: an analysis of Brazilian beef alliances. *Evolutionary and Institutional Economics Review*, v. 12, n. 2, p. 307-327, Dec 2015.

BONAMIGO, A.; FERENHOF, H. A.; FORCELLINI, F. A. Applicability analysis of the business ecosystem concept in dairy production based on a systematic literature review. *II Simpósio Internacional de Inovação em Cadeias do Agronegócio*, 2016a. Caxias do Sul. agosto 26, 2016 – agosto 27, 2016. p.1-10.

_____. Dairy production diagnosis in Santa Catarina, Brazil, from the perspective of business ecosystem *British Food Journal*, v. 118, n. 9, p. 1-12, 2016b.

BRYCESON, K. P.; SLAUGHTER, G. Alignment of performance metrics in a multi-enterprise agribusiness: Achieving integrated autonomy? *International Journal of Productivity and Performance Management*, v. 59, n. 4, p. 325-350, 2010.

DA ROCHA, C. H. M. Profissionalização x modernização: um estudo de caso de uma empresa familiar do setor têxtil. 2002.

DA ROSA, L. S.; QUEIROZ, M. I. Avaliação da qualidade do leite cru e resfriado mediante a aplicação de princípios do APPCC. *Ciênc. Tecnol. Aliment.*, v. 27, n. 2, 2007.

DE CARVALHO FIGUEIREDO, J.; PAULILLO, L. F. Gênese, modernização e reestruturação do complexo agroindustrial lácteo brasileiro. *Organizações Rurais & Agroindustriais*, v. 7, n. 2, 2011.

DE MORI, C.; BATALHA, M. O.; ALFRANCA, O. Technological capability: An index model and application to wheat agro-industrial complex firms. *Producao*, v. 24, n. 4, p. 787-808, 2014.

DEHÁQUIZ, M., ESPERANZA, J., BERMÚDEZ, C., TERESA, L., RODRÍGUEZ, C. FELIPE, L. Environmental management model for small dairies in the Industrial Corridor of Boyaca (Colombia). *Agronomia Colombiana*, v. 30, n. 1, p. 141-148, 2012.

DEVORE, J. L. *Probability and Statistics for Engineering and the Sciences*. Cengage Learning, 2015.

DOLINSKA, A.; D'AQUINO, P. Farmers as agents in innovation systems. Empowering farmers for innovation through communities of practice. *Agricultural Systems*, v. 142, p. 122-130, 2016.

FERENHOF, H. A.; DUST, S.; ZANIBONI BIALECKI, M.; SELIG, P. M. Intellectual capital dimensions: state of the art in 2014. *Journal of Intellectual Capital*, v. 16, n. 1, p. 58-100, 2015.

FINK, A. *How to conduct surveys: A step-by-step guide*. Sage Publications, 2015.

FISCHER, B. B. Confiança, sistemas de certificação e atributos intrínsecos em relacionamentos interorganizacionais: uma discussão teórica orientada para o ambiente dos agronegócios. . *RACE-Revista de Administração, Contabilidade e Economia*, v. 13, n. 2, 2014.

GALATEANU, E.; AVASILCAI, S. Business ecosystems architecture. *Fascicle of Management and Technological Engineering*, v. 22, n. 1, p. 79-84, 2013.

GHOSH, A. K.; MAHARJAN, K. L. Development of Dairy Cooperative and Its Impacts on Milk Production and Household Income: A Study on Bangladesh Milk Producers' Cooperative Union Limited. *Journal of International Development and Cooperation*, v. 10, n. 2, p. 193-208, 2004.

GOBINATH, S.; ELANGOVAN, D.; DHARMALINGAM, S. Lean manufacturing issues and challenges in manufacturing process– a review. *International Journal of ChemTech Research*, v. 8, n. 1, p. 45-51, 2015.

HAIR JR, J. F.; BABIN, B.; MONEY, A. H.; SAMOUEL, P. *Fundamentos de métodos de pesquisa em administração*: Porto Alegre: Bookman 2005.

HOFER, E.; RAUBER, A. J.; DIESEL, A., WAGNER, M. Gestão de Custos aplicada ao agronegócio: Culturas temporárias. *Contabilidade Vista & Revista*, v. 17, n. 1, p. 29-46, 2009.

IBGE. Estados. 2016. Disponível em: < http://www.ibge.gov.br/estadosat/temas.php?sigla=sc&tema=pecuaria2014 >. Acesso em: 09 jun. 2016.

KOHTAMÄKI, M.; PARTANEN, J. Co-creating value from knowledge-intensive business services in manufacturing firms: The moderating role of relationship learning in supplier–customer interactions. *Journal of Business Research*, v. 69, n. 7, p. 2498-2506, 7// 2016.

KOUWENHOVEN, G.; NALLAB, V. R.; VON LOSONCZ, T. L. Creating sustainable businesses by reducing food waste: A value chain framework for eliminating inefficiencies. *International Food and Agribusiness Management Review*, v. 15, n. 3, p. 119-138, 2012.

LIKERT, R. A technique for the measurement of attitudes. *Archives of psychology*, 1932.

MALIK, K.; GEORGHIOU, L.; GRIEVE, B. Developing new technology platforms for new business models: Syngenta's partnership with the University of Manchester. *Research Technology Management*, v. 54, n. 1, p. 24-31, 2011.

MARION, J. C.; SEGATTI, S. Gerenciando custos agropecuários. *Custos e Agronegócio On line*, v. 1, n. 1, p. 2-8, 2005.

MELLO, M. A.; SCHMIDT, W. A agricultura familiar e a cadeia produtiva do leite no Oeste catarinense: possibilidades para a construção de modelos heterogêneos. *Agricultura e Espaço Rural em Santa Catarina. Florianópolis: UFSC*, p. 1-19, 2003.

MINH, T. T.; HJORTSØ, C. N. How Institutions Influence SME Innovation and Networking Practices: The Case of Vietnamese Agribusiness. *Journal of Small Business Management*, v. 53, p. 209-228, 2015.

MOORE, J. F. Predators and prey: a new ecology of competition. *Harvard business review*, v. 71, n. 3, p. 75-83, 1993.

_____. Business ecosystems and the view from the firm. *Antitrust Bull.*, v. 51, p. 31, 2006.
OSTLE, B. Statistics in research. *Statistics in research.*, n. 2nd Ed, 1963.

PELTONIEMI, M.; VUORI, E. Business ecosystem as the new approach to complex adaptive business environments. *Proceedings of eBusiness research forum*, 2004. Citeseer. p.267-281.

POLÁKOVÁ, J.; KOLÁČKOVÁ, G.; TICHÁ, I. Business model for Czech agribusiness. *Scientia Agriculturae Bohemica*, v. 46, n. 3, p. 128-136, 2015.

RODRIGUES, L. G.; ALBAN, L. Tecnologias de produção de leite utilizadas no Extremo-Oeste Catarinense. *Race: revista de administração, contabilidade e economia*, v. 12, n. 1, p. 171-198, 2013.

WINCK, C. A. *Impactos do pagamento pela qualidade na cadeia produtiva do leite na região Oeste de Santa Catarina*. 2013. 122 (Doctor Thesis). Agronegócios, University Federal of Rio Grande do Sul

WINCK, C. A.; NETO, A. T. Diagnóstico da adequação de propriedades leiteiras em Santa Catarina às normas brasileiras de qualidade do leite. *Revista de Ciências Agroveterinárias*, v. 8, n. 2, p. 164-172, 2009.

WINCKLER, N.C. "A coopetição entre propriedades rurais da cadeia produtiva do leite noOeste Catariense", Revista Brasileira de Gestão e Desenvolvimento Regional, Vol. 9 No. 1, pp. 44-66, 2011.

WOMACK, J. P.; JONES, D. T. *Lean thinking: banish waste and create wealth in your corporation*. Simon and Schuster, 2010.

ZOKAEI, K.; SIMONS, D. Performance improvements through implementation of lean practices: a study of the UK red meat industry. *International Food and Agribusiness Management Review*, v. 9, n. 2, p. 30-53, 2006.

CHAPTER 8 – "DAIRY PRODUCTION BARRIERS DIAGNOSIS IN SOUTHERN BRAZIL"

Although in the previous stage the presence of the barrier was confirmed by the experts of the dairy sector, it was observed the need to carry out a new consultation, since the number of answers obtained was insufficient to carry out statistical tests. Among the tests, we can highlight the exploratory factorial analysis and confirmatory factorial analysis.

Therefore, a new data collection was conducted with the using statistical tools intention to analyze the data. In this second stage of collection, 310 experts from the dairy sector were consulted, among producers, cooperatives, universities, research centers, government institutions, agribusiness, city halls, among others.

The study findings are set out in Article 6. The paper was accepted in a qualified journal in the area. This moment is in the press. The proof is showed in Annex II.

CHAPTER 9 – "DAIRY PRODUCTION BOOSTER FRAMEWORK IN THE LIGHT OF THE BUSINESS ECOSYSTEM"

From the verification and confirmation of dairy production barriers in practice, we seek to identify the key factors that drive dairy production development. The key factors recognition to developing the milk activity has supported the management model construction;

To identify the key-factors, we conduct a bibliographical review. Were found seven key factors that drive the dairy production development. Next, we developed a Framework for dairy production, from the perspective of the business ecosystem concept. Then, we performed a practical test, in order to confirm or refute the presence of these boosters in practice.

The study findings are set out in Article 7. The paper is currently under evaluation in a qualified journal in the area.

CHAPTER 10 - “RELATIONSHIP BETWEEN BARRIERS AND KEY FACTORS OF DAIRY PRODUCTION IN SANTA CATARINA”

Based on the key factors to developing the dairy production presented in the proposed Framework for the dairy production development from the perspective of the business ecosystem concept and on the barriers, that limit the development of milk production, we search to verify by means of statistical tests whether the boosters mitigate the Barriers to dairy production.

The test was performed through an exploratory factorial analysis and modeling of structural equations via PLS (Partial Least Squares). Based on the findings, it was possible to verify that boosters mitigate and/or eliminate barriers to dairy production.

We can highlight, that the confirmation that the drivers will mitigate the barriers of the dairy sector will be a guideline for the model construction.

The study findings are set out in Article 8. The paper is currently under evaluation in a qualified journal in the area.

CHAPTER 11 - "MANAGEMENT MODEL FOR DAIRY PRODUCTION BASED ON BUSINESS ECOSYSTEM CONCEPT"

Based the main objective of this thesis, which is to propose a management model for dairy production from on business ecosystem concept, we carried out previous eight steps, to identify theoretical constructs in order to better understand the dairy business ecosystem, its obstacles, its drivers and some guidelines which can contribute to the dairy production system improvement.

For the model construction, we carried out two bibliographical reviews, with the intention of recognizing the existing models applied in the Dairy Production System, and the existing models from the perspective of the business ecosystem concept. From the documents portfolio found, we conduct the content analysis. Then, we started the construction of the model.

Once the management model is proposed, we conduct the model evaluation in practice, through the dairy sector specialists.

The study findings are set out in Article 9. The paper is currently under evaluation in a qualified journal in the area.

12. CONCLUSIONS

The main objective of this thesis was to propose a management model for dairy production based on the ecosystem business concept. Regarding originality, once the lacuna involved in the dairy production system management has been identified, this study points to the absence of a model that serves as a reference for the dairy ecosystem players management, based in the business concept ecosystem.

Based on the theoretical findings and empirical findings to the development of this thesis, a management model was constructed that takes into account the barriers and the dairy sector key-factors.

The proposed model is characterized as an advance since it presents a structured way to direct the sector players to boost the dairy production development. In view of the above, the model guides the players to co-create value in a mutual way, and to develop jointly. From this, it is understood that the general objective this thesis was achieved.

In relation the specific objectives, the literature reviews series, and content analyses were conducted to better understand the sector's problems, among them the sector scientific management lack, quality problems, and interaction between the actors that make up the dairy activity.

The methodological path followed to reach the main objective of this thesis, allowed important contributions to the milk activity management. Once the research problem was formulated, it was sought to better understand the phenomena, by means of a case study at a reference dairy production unit in Santa Catarina. In this study, it was possible to diagnose the dairy sector barriers in practice. From the findings, one can evidence the adherence of the proposition of the management model to the solution of the problem found.

In addition, the recognition and testing empirical of seven key factors, these allow mitigating the dairy sector development obstacles. From the recognition the key factors, dairy sector barriers, and practical tests the construction of the management model for the dairy sector was conducted.

To ensure the proposed model consistency, an empirical consultation was conducted with 450 experts from the dairy sector, in order to evaluate the model. Based on the test findings, it was possible to show the robustness and the proposed model adequacy in empirical condition.

Based on the proposed and tested model, it was possible to show that the model contributes to mitigating the problems found in the dairy production ecosystem through better management of the sector. In this sense, we can highlight that the model stimulates the co-creation of value and innovation among the dairy sector players, through iteration between them.

Given the above in this thesis, it can be seen that the proposed management model allows the players to make the decision making and plan strategic actions in the dairy sector so that the sector obstacles are mitigated.

In view of the above, once the actors in the dairy sector cooperate, factors averse to the development of the sector, such as access to new technologies, financial resources, and new knowledge can be mitigated since they can jointly develop and merit value.

12.1CONTRIBUTIONS

In relation to originality, this was evidenced by systematic and exploratory literature reviews, since no evidence was found of: models, frameworks and barriers identification and key factors (drivers) to develop dairy production from the business ecosystem concept and also the management model proposal in the business ecosystem concept perspective;

Based on what was evidenced by this study, one can contribute to better management in the entire dairy business ecosystem. Through the actors' management that is in this ecosystem, to improve rural job prospects, the processes, people, and technology in order to reduce rural exodus, the product's cost and increase milk quality.

In relation the improve in sector, highlight: improvement in the process and product development, in the specific case the milk and derivatives; Boost innovation through engagement of industry players, applying business ecosystem concept in the dairy production system.

In front of the showed, it is possible to provide support for the actors in the dairy sector to decision-making, such as government, universities, research institutions, cooperatives, and producers, so that the industry barriers can be mitigated; And indicate insights for further studies, on the business platforms formation in the dairy production system.

12.2 LIMITATIONS

Among the limitations of the study, one cannot generalize the results from the study to a global view, since the data collection was limited to the Santa Catarina dairy production.

To mitigate these constraints, the perspectives, such as that of the advisor and the co-advisor, were considered as a strategy to deal with this limitation.

12.3 RECOMMENDATIONS FOR FUTURE STUDIES

Future research related to the dairy production management topic can be developed to "motivate" dairy ecosystem players to form a business platform for value creation. In this sense, this thesis proposes a first step from the proposed management model and tested for a better understanding of the contributions of the concept of business ecosystem in the dairy sector, factors that limit milk production, milk activity key factors and their relationships. Thus, this research lays an important basis for further investigation into this topic.

During the construction of this study, some study opportunities were identified. First, propose a manual to guide and manage dairy ecosystem players for the formation of business platforms and value creation. Second, replicate the test of the proposed management model in other regions and countries, in order to evaluate the behavior of the model. Third, replicate the study in other agribusiness environments in order to verify the existence or not of the barriers and key factors identified in the dairy production ecosystem.

REFERENCES

ABRAMOVAY, R. et al. *Juventude e agricultura familiar: desafios dos novos padrões sucessórios*. Edições Unesco, 1998.

ADNER, R.; KAPOOR, R. Value creation in innovation ecosystems: How the structure of technological interdependence affects firm performance in new technology generations. *Strategic Management Journal***,** v. 31, n. 3, p. 306-333, 2010.

ALENCAR, E. et al. Complexos agroindustriais, cooperativas e gestão. *Organizações Rurais & Agroindustriais***,** v. 3, n. 2, 2001.

ALIZADEH, N.; DARIANI, H. E.; SMIDA, A. Business Ecosystem, a Secured Strategy to Gain Competitive Advantage According to SMOCS Model. *International Business Research***,** v. 10, n. 8, p. 72, 2017.

ALVAREZ, A.; ARIAS, C. Technical efficiency and farm size: a conditional analysis. *Agricultural Economics***,** v. 30, n. 3, p. 241-250, 5// 2004.

ANDERSON, D. R. et al. *An introduction to management science: quantitative approaches to decision making*. Cengage learning, 1991.

ANDREWS, P. P.; HAHN, J. Transforming supply chains into value webs. *Strategy & Leadership***,** v. 26, n. 3, p. 7, 1998.

ANNANPERÄ, E.; LIUKKUNEN, K.; MARKKULA, J. Innovation in evolving business ecosystem: A case study of information technology-based future health and exercise service. *International Journal of Innovation and Technology Management***,** v. 12, n. 4, 2015.

ASSIS, R. L. D. Desenvolvimento rural sustentável no Brasil: perspectivas a partir da integração de ações públicas e privadas com base na agroecologia. *Economia Aplicada***,** v. 10, n. 1, p. 75-89, 2006.

ATTOUR, A.; PERUTA, M. D. Architectural knowledge: Key flows and processes in designing an inter-organisational technological platform. *Knowledge Management Research and Practice***,** v. 14, n. 1, p. 27-34, 2016.

AYENEW, Y. A. et al. Performance and limitation of two dairy production systems in the North western Ethiopian highlands. *Tropical animal health and production***,** v. 41, n. 7, p. 1143-1150, 2009.

BACHEV, H. Dairy value chain management in Bulgaria. *Available at SSRN 1793348*, 2011.

BALCÃO, L. F. et al. Characterisation of smallholding dairy farms in southern Brazil. *Animal Production Science***,** v. 57, n. 4, p. 735-745, 2017.

BANASZEWSKA, A. et al. A comprehensive dairy valorization model. *Journal of Dairy Science***,** v. 96, n. 2, p. 761-779, 2013.

BARDIN, L. Análise de conteúdo. 3. reimp. *Lisboa: Ediçoes***,** v. 70, 2011.

BATALHA, Mário Otávio; BUAINAIN, Antônio Márcio; SOUZA FILHO, HM de. *Tecnologia de gestão e agricultura familiar*. BATALHA, M. O e FILHO, HM de S (org). Gestão Integrada da Agricultura Familiar. São Carlos. EdUFSCar, 2005.

BAU MACEDO, L. O. The role of social capital for the governance of hybrid forms in agribusiness: an analysis of Brazilian beef alliances. *Evolutionary and Institutional Economics Review***,** v. 12, n. 2, p. 307-327, Dec 2015.

BAYEMI, P. H.; WEBB, E. C. An integrated method for improving the dairy production sector in developing countries: The case of Cameroon. *Tropical Animal Health and Production***,** v. 41, n. 4, p. 525-534, 2009.

BENDAOUD, M.; LECOMTE, C.; YANNOU, B. A methodological framework to design and assess food traceability systems. *International Food and Agribusiness Management Review***,** v. 15, n. 1, p. 103-126, 2012.

BENKLER, Y. *The wealth of networks: How social production transforms markets and freedom*. Yale University Press, 2006.

BOEHLJE, M.; DOEHRING, T.; SONKA, S. Farmers of the future: Market segmentation and buying behavior. *International Food and Agribusiness Management Review***,** v. 8, n. 3, p. 52-68, 2005.

BOEHLJE, M.; ROUCAN-KANE, M.; BRÖRING, S. Future agribusiness challenges: Strategic uncertainty, innovation and structural change. *International Food and Agribusiness Management Review***,** v. 14, n. 5, p. 53-81, 2011.

BONAMIGO, A.; FENHOF, H. A.; FORCELLINI, F. A. DAIRY ECOSYSTEM BARRIERS EXPOSED - A CASE STUDY IN A FAMILY PRODUCTION UNIT AT WESTERN SANTA CATARINA, BRAZIL. *Organizações Rurais & Agroindustriais***,** v. 19, n. 1, p. 1-7, 2017.

BONAMIGO, A.; FERENHOF, H. A.; FORCELLINI, F. A. Applicability analysis of the business ecosystem concept in dairy production based on a systematic

literature review. *II Simpósio Internacional de Inovação em Cadeias do Agronegócio*, 2016a. Caxias do Sul. agosto 26, 2016 – agosto 27, 2016. p.1-10.

_____. Dairy production diagnosis in Santa Catarina, Brazil, from the perspective of business ecosystem *British Food Journal***,** v. 118, n. 9, p. 1-12, 2016b.

BONAMIGO, A.; FERENHOF, H. A.; FORCELLINI, F. A. Dairy production diagnosis in Santa Catarina, Brazil, from the perspective of business ecosystem. *British Food Journal***,** v. 118, n. 9, p. 2086-2096, 2016.

BONAMIGO, A.; FERENHOF, H. A.; FORCELLINI, F. A. DAIRY PRODUCTION DIAGNOSIS FROM THE PERSPECTIVE OF BUSINESS ECOSYSTEM: STATE OF THE ART IN 2016. *Brazilian Journal of Operations & Production Management***,** v. 14, n. 1, p. 74-80, 2017.

BONAMIGO, A.; FERENHOF, H. A.; FORCELLINI, F. A. *Evaluation the dairy production barriers in Santa Catarina*. VII SIMPÓSIO DE ENGENHARIA DE PRODUÇÃO DO VALE DO SÃO FRANCISCO. Juazeiro - BA. 1**:** 1-13 p. 2017.

BONAMIGO, A. et al. Dairy production booster framework in the light of the business ecosystem. *in press***,** v. XX, n. XXXX, p. XXXX, 2017.

BONAMIGO, A. et al. DAIRY PRODUCTION BOOSTER FRAMEWORK IN THE LIGHT OF THE BUSINESS ECOSYSTEM. *Agricultural Systems*, in press-a.

BONAMIGO, A. et al. RELATIONSHIP BETWEEN BARRIERS AND KEY FACTORS OF DAIRY PRODUCTION IN SANTA CATARINA. *XXXXX***,** v. XXXX, in press-b.

BOSKOVÁ, I. Collaboration in the Czech Dairy Chain. *Agris on-line Papers in Economics and Informatics***,** v. 5, n. 4, p. 35, 2013.

BROWN, T. A. *Confirmatory factor analysis for applied research*. Guilford Publications, 2014.

BRYCESON, K. P.; SLAUGHTER, G. Alignment of performance metrics in a multi-enterprise agribusiness: Achieving integrated autonomy? *International Journal of Productivity and Performance Management***,** v. 59, n. 4, p. 325-350, 2010.

BUAINAIN, A. M.; ROMEIRO, A. R.; GUANZIROLI, C. Agricultura familiar e o novo mundo rural. *Sociologias***,** v. 5, n. 10, p. 312-347, 2003.

CAIAZZA, T. V., JOHN L. STANTON et al. A model for measuring technology capability in the agrifood industry companies. *British Food Journal***,** v. 118, n. 6, p. 1422-1461, 2016.

CANÇADO, A. C.; TENÓRIO, F. G.; PEREIRA, J. R. Gestão social: reflexões teóricas e conceituais. *Cad. EBAPE. BR***,** v. 9, n. 3, p. 681-703, 2011.

CARPINETTI, L. C. R.; MIGUEL, P. A. C.; GEROLAMO, M. C. *Gestão da qualidade ISO 9001: 2008: princípios e requisitos*. Atlas, 2009.

CASTRO, A. M. G.; PAEZ, M. L. A.; GOMES, G. C.; CABRAL, J. R. Priorização de demandas da clientela de P&D em agropecuária. *Revista de Administração*. São Paulo, v. 31, n. 2, abr./jun. 1996.

CAUCHICK, P. A. C. et al. *Metodologia de pesquisa em engenharia de produção e gestão de operações*. 2012.

CHARLEBOIS, S.; HARATIFAR, S. The perceived value of dairy product traceability in modern society: An exploratory study. *Journal of Dairy Science***,** v. 98, n. 5, p. 3514-3525, 2015.

CHEN, C.; ZHANG, J.; DELAURENTIS, T. Quality control in food supply chain management: An analytical model and case study of the adulterated milk incident in China. *International Journal of production economics***,** v. 152, p. 188-199, 2014.

CHIN, W. W. The partial least squares approach to structural equation modeling. *Modern methods for business research***,** v. 295, n. 2, p. 295-336, 1998.

CHRISTENSEN, C. M.; BOWER, J. L. Customer power, strategic investment, and the failure of leading firms. *Strategic management journal*, p. 197-218, 1996.

CLARYSSE, B. et al. Creating value in ecosystems: Crossing the chasm between knowledge and business ecosystems. *Research Policy***,** v. 43, n. 7, p. 1164-1176, 2014.

COHEN, J. Statistical power analysis for the behavior science. *Lawrance Eribaum Association*, 1988.

CONNER, D. S.; LEVINE, R. Circles of association: The connections of community-based food systems. *Journal of Hunger and Environmental Nutrition***,** v. 1, n. 3, p. 5-25, 2006.

COSTA, J. H. C. et al. A survey of management practices that influence production and welfare of dairy cattle on family farms in southern Brazil. *Journal of Dairy Science***,** v. 96, n. 1, p. 307-317, 2013.

CRISTO, C. M. P. N. Cadeia produtiva: marco conceitual para apoiar a prospecção tecnológica. In: *Anais do XXII Simpósio de Gestão da Inovação Tecnológica.* Salvador, v. 156, 2002. n.156, p. 53-56

DE MORI, C.; BATALHA, M. O.; ALFRANCA, O. Technological capability: An index model and application to wheat agro-industrial complex firms. *Producao***,** v. 24, n. 4, p. 787-808, 2014.

DEHÁQUIZ, M. et al. Environmental management model for small dairies in the Industrial Corridor of Boyaca (Colombia). *Agronomía Colombiana***,** v. 30, n. 1, p. 141-148, 2012.

DEN HARTIGH, E.; TOL, M.; VISSCHER, W. The health measurement of a business ecosystem. *Proceedings of the European Network on Chaos and Complexity Research and Management Practice Meeting*, 2006. p.1-39.

DERVILLÉ, M.; ALLAIRE, G. Change of competition regime and regional innovative capacities: Evidence from dairy restructuring in France. *Food Policy***,** v. 49, p. 347-360, 2014.

DICTIONARY, C. *Cambridge dictionaries online* 2017.

DICTIONARY, O. E. *Oxford English dictionary online*: JSTOR 2007.

DJEKIC, I. et al. Environmental life-cycle assessment of various dairy products. *Journal of Cleaner Production***,** v. 68, p. 64-72, 2014.

DOLINSKA, A.; D'AQUINO, P. Farmers as agents in innovation systems. Empowering farmers for innovation through communities of practice. *Agricultural Systems***,** v. 142, p. 122-130, 2016.

DRUCKER, P. F. *People and performance: The best of Peter Drucker on management*. Routledge, 1995.

EASTWOOD, C.; CHAPMAN, D.; PAINE, M. Networks of practice for co-construction of agricultural decision support systems: Case studies of precision dairy farms in Australia. *Agricultural Systems***,** v. 108, p. 10-18, 2012.

EASTWOOD, C. R.; CHAPMAN, D. F.; PAINE, M. S. Networks of practice for co-construction of agricultural decision support systems: Case studies of precision dairy farms in Australia. *Agricultural Systems***,** v. 108, p. 10-18, 4// 2012.

FAO. Milk production. . Unitad States, 2016. Disponível em: < http://www.fao.org/agriculture/dairy-gateway/milk-production/en/#.VwZh9aQrLIW >. Acesso em: 07.04. 2016.

FERENHOF, H. A. *UM MODELO PARA IDENTIFICAR DESPERDÍCIOS DE CONHECIMENTO RELACIONADOS À PERFORMANCE DOS PORTFÓLIOS DE PROJETOS*. 2015. 250 f.

(Doutorado em Engenharia de Produção). Programa de Pós- Graduação em Engenharia de Produção, Universidade Federal de Santa Catarina, Florianópolis, Santa Catarina, Brasil.

FERENHOF, H. A.; BONAMIGO, A.; FORCELLINI, F. A. Ecossistema de negócios: o conhecimento pode estar em risco. In: MACEDO, M.;TEIXEIRA, C. S., *et al* (Ed.). *Gestão do conhecimento e capital intelectual em habitats de inovação*: Novas Edições Acadêmicas, v.1, 2016. cap. 2,

FERENHOF, H. A. et al. Intellectual capital dimensions: state of the art in 2014. *Journal of Intellectual Capital***,** v. 16, n. 1, p. 58-100, 2015.

FERENHOF, H. A.; FERNANDES, R. F. Desmistificando a revisão de literatura como base para redação científica: Método SSF. *Revista ACB***,** v. 21, n. 3, 2016.

FERRANTE, V. L. S. B.; ALMEIDA, L. M. D. M. C. ASSENTAMENTOS RURAIS COMO CELEIROS DA CANA: POR ONDE CAMINHA A REFORMA AGRÁRIA? *RURIS-Revista do Centro de Estudos Rurais-UNICAMP***,** v. 3, n. 1, 2009.

FERRARI, D. L. *Agricultura familiar, trabalho e desenvolvimento no oeste de Santa Catarina. 2003*. 2003. Dissertação (Mestrado em Desenvolvimento Econômico, Espaço e Meio Ambiente)-Instituto de Economia, UNICAMP, 2003. Disponível em:< http://www.bibliotecadigital.unicamp.br/document

FERRARI, D. L. et al. Agricultores familiares, exclusão e desafios para inserção econômica na produção de leite em Santa Catarina. *Informações Econômicas, São Paulo***,** v. 35, n. 1, p. 22-36, 2005.

FINKENZELLER, K.; HANDBOOK, R. Radio-frequency identification fundamentals and applications. *Chippenham: John Wiley & Son*, 1999.

FISCHER, A. et al. Produção e produtividade de leite do Oeste catarinense. *Race: revista de administração, contabilidade e economia***,** v. 10, n. 2, p. 337-362, 2011.

FISCHER, A.; MARINI, D.; WINCK, C. A. Percepção das normas da vigilância sanitária pelos agricultores familiares de Joaçaba, Herval d'Oeste e Luzerna. *Gestão & Regionalidade***,** v. 32, n. 95, p. 18, 2016.

FLICK, U. *An introduction to qualitative research*. Sage, 2009.

FOLINAS, D.; MANIKAS, I.; MANOS, B. Traceability data management for food chains. *British Food Journal***,** v. 108, n. 8, p. 622-633, 2006.

FORNELL, C.; LARCKER, D. F. Structural equation models with unobservable variables and measurement error: Algebra and statistics. *Journal of marketing research*, p. 382-388, 1981.

GARVER, M. S.; MENTZER, J. T. Logistics research methods: employing structural equation modeling to test for construct validity. *Journal of business logistics***,** v. 20, n. 1, p. 33, 1999.

GAWER, A.; CUSUMANO, M. A. Industry platforms and ecosystem innovation. *Journal of Product Innovation Management***,** v. 31, n. 3, p. 417-433, 2014.

GIANNI, M.; GOTZAMANI, K.; VOUZAS, F. Food integrated management systems: dairy industry insights. *International Journal of Quality & Reliability Management***,** v. 34, n. 2, p. 194-215, 2017.

GIL, A. C. Métodos e técnicas de pesquisa social. In: (Ed.). *Métodos e técnicas de pesquisa social*: Atlas, 2010.

GODINHO, R. F.; CARVALHO, R. D. C. R. • Gestão de sistemas de produção de leite. *Revista Ciência et Praxis***,** v. 2, n. 03, p. 77-82, 2017.

GOMES, S. T. Diagnóstico e perspectivas da cadeia produtiva do leite no Brasil. *Viçosa: UFV, 2003a*, 2003.

GOODLAND, R. The concept of environmental sustainability. *Annual review of ecology and systematics***,** v. 26, n. 1, p. 1-24, 1995.

HAIR, J. F. et al. *Análise multivariada de dados*. Bookman Editora, 2009.

HAIR JR, J. et al. Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European Business Review***,** v. 26, n. 2, p. 106-121, 2014.

HAIR JR, J. F. et al. *A primer on partial least squares structural equation modeling (PLS-SEM)*. Sage Publications, 2016.

HEARN, G.; PACE, C. Value-creating ecologies: understanding next generation business systems. *Foresight***,** v. 8, n. 1, p. 55-65, 2006.

HEMME, T.; JOACHIM O. 2010. Status and prospects for smallholder milk production. A global perspective: FAO, Roma (Italia).

HENDERSON, J.; KULATILAKA, N. The Concept of Platforms" and "The Economics of Platforms", Chapters 2 and 3. *Intelligence at the Edge (Forthcoming)*, 2004.

HENSELER, J.; RINGLE, C. M.; SINKOVICS, R. R. The use of partial least squares path modeling in international marketing. *Advances in international marketing***,** v. 20, n. 1, p. 277-319, 2009.

HEYDER, M.; THEUVSEN, L. Determinants and Effects of Corporate Social Responsibility in German Agribusiness: A PLS Model. *Agribusiness***,** v. 28, n. 4, p. 400-420, Fal 2012.

HILL, H.; LYNCHEHAUN, F. Organic milk: attitudes and consumption patterns. *British Food Journal***,** v. 104, n. 7, p. 526-542, 2002.

HU, L. T.; BENTLER, P. M. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal***,** v. 6, n. 1, p. 1-55, 1999.

IANSITI, M.; LEVIEN, R. Strategy as ecology. *Harvard business review***,** v. 82, n. 3, p. 68-81, 2004.

IBGE. "Estado". 2014. Disponível em: < http://www.ibge.gov.br/estadosat/temas.php?sigla%BCsc&tema%BC >. Acesso em: May, 30

JENNINGS, D. WATTAM, Stuart. *Decision-making: an integrated approach. London: Pitman Publishing*, 1994.

JESSON, J.; MATHESON, L.; LACEY, F. M. *Doing your literature review: Traditional and systematic techniques*. Sage, 2011.

JHONATTAS LANGE, M. et al. Typology of dairy production systems based on the characteristics of management in the Region of West Paraná. *Semina: Ciências Agrárias***,** v. 37, n. 1, 2016.

JUNIOR, V. W. Y. et al. Os novos arranjos do êxodo rural: a evasão temporária de jovens agricultores familiares gaúchos. *Congresso do Saber*, 2006. p.1-11.

JUPESTA, J.; HARAYAMA, Y.; PARAYIL, G. Sustainable business model for biofuel industries in Indonesia. *Sustainability Accounting, Management and Policy Journal***,** v. 2, n. 2, p. 231-247, 2011.

KATO, I.; SMALLEY, A. *Toyota Kaizen methods: Six steps to improvement*. CRC press, 2010.

KILELU, C. W.; KLERKX, L.; LEEUWIS, C. Unravelling the role of innovation platforms in supporting co-evolution of innovation: contributions and tensions in a smallholder dairy development programme. *Agricultural systems***,** v. 118, p. 65-77, 2013.

KORPELA, K. et al. A management and orchestration model for integrating Digital Business Ecosystems. *International Journal of Integrated Supply Management***,** v. 8, n. 1/2/3, p. 24-51, 2013.

KOUWENHOVEN, G.; NALLAB, V. R.; VON LOSONCZ, T. L. Creating sustainable businesses by reducing food waste: A value chain framework for eliminating inefficiencies. *International Food and Agribusiness Management Review***,** v. 15 , n. 3, p. 119-138, 2012.

KRUG, E. E. B. Estudo para identificação de benchmarking em sistemas de produção de leite no Rio Grande do Sul. 2001.

LAKATOS, E. M.; DE ANDRADE MARCONI, M. *Metodologia do trabalho científico: procedimentos básicos, pesquisa bibliográfica, projeto e relatório, publicações e trabalhos científicos*. 2001.

LAMPRINOPOULOU, C. et al. Application of an integrated systemic framework for analysing agricultural innovation systems and informing innovation policies:

Comparing the Dutch and Scottish agrifood sectors. *Agricultural Systems***,** v. 129, p. 40-54, 2014.

LÉIS, C. M. D. Desempenho ambiental de três sistemas de produção de leite no sul do Brasil pela abordagem da avaliação do ciclo de vida. 2013.

LIKER, J. K. *The toyota way*. Esensi, 2004.

LIKERT, R. A technique for the measurement of attitudes. *Archives of psychology*, 1932.

LUNING, P. A.; MARCELIS, W. J. A conceptual model of food quality management functions based on a techno-managerial approach. *Trends in Food Science and Technology***,** v. 18, n. 3, p. 159-166, 2007.

MACHADO, R. T. M. *Rastreabilidade, tecnologia da informação e coordenação de sistemas agroindustriais*. 2000. Universidade de São Paulo

MALAFAIA, G. C.; DE AZEVEDO, D. B.; DOS SANTOS, A. S. The Business Model in Agro industry of Milk in the Stare of Rio Grande do Sul. *Review of Business Management***,** v. 10, n. 29, p. 365-375, 2008.

MALIK, K.; GEORGHIOU, L.; GRIEVE, B. Developing new technology platforms for new business models: Syngenta's partnership with the University of Manchester. *Research Technology Management***,** v. 54, n. 1, p. 24-31, 2011.

MANIKAS, I.; MANOS, B. Design of an integrated supply chain model for supporting traceability of dairy products. *International journal of dairy technology***,** v. 62, n. 1, p. 126-138, 2009.

MARCH, S. T.; SMITH, G. F. Design and natural science research on information technology. *Decision support systems***,** v. 15, n. 4, p. 251-266, 1995.

MARCON, G. C. et al. ASPECTOS PRODUTIVOS E PERCEPÇÃO SANITÁRIA DE PRODUTORES DE LEITE DO NORTE MATO-GROSSENSE Productive aspects and sanitary perception of dairy farmers from northern Mato Grosso State, Brazil. *Revista Acadêmica: Ciência Animal***,** v. 10, n. 2, p. 123-128, 2017.

MAZZAROL, T.; LIMNIOS, E. M.; REBOUD, S. Co-operatives as a strategic network of small firms: Case studies from Australian and French co-operatives. *Journal of Co-operative Organization and Management***,** v. 1, n. 1, p. 27-40, 2013.

MENEGAZ, E. Análise dos coeficientes de desempenho técnico e econômico que caracterizam as unidades produtoras benchmark na atividade leiteira. 2005.

MERRIAM, S. B. *Qualitative research and case study applications in education. Revised and expanded from*. ERIC, 1998.

MILES, M. B.; HUBERMAN, A. M. *Qualitative data analysis: An expanded sourcebook*. Sage, 1994.

MINH, T. T.; HJORTSØ, C. N. How Institutions Influence SME Innovation and Networking Practices: The Case of Vietnamese Agribusiness. *Journal of Small Business Management***,** v. 53, p. 209-228, 2015.

MOORE, J. F. Predators and prey: a new ecology of competition. *Harvard Business Review***,** v. 71, n. 3, p. 75-86, 1993.

_____. *The death of competition: leadership and strategy in the age of business ecosystems*. HarperCollins Publishers, 1996.

_____. Business ecosystems and the view from the firm. *Antitrust Bull.***,** v. 51, p. 31, 2006.

MUEHLHOFF, E.; BENNETT, A.; MCMAHON, D. *Milk and dairy products in human nutrition*. Food and Agriculture Organization of the United Nations (FAO), 2013.

Muniz, L. C.; Madruga, S. W, Araújo, C. L. Consumo de leite e derivados entre adultos e idosos no Sul do Brasil: um estudo de base populacional. C*iênc Saúde Coletiva*. v.18, n:12, p. 3515-3522, 2013.

MURCIA, H. H. Agribusiness model approach to territorial food development. *Agronomía Colombiana***,** v. 29, n. 1, p. 125-132, 2011-04 2011.

NDAMBI, O. A. et al. Milk production systems in Central Uganda: a farm economic analysis. *Tropical animal health and production***,** v. 40, n. 4, p. 269-279, 2008.

NEY, M. G.; HOFFMANN, R. Educação, concentração fundiária e desigualdade de rendimentos no meio rural brasileiro. *Revista de Economia e Sociologia Rural***,** v. 47, n. 1, p. 147-181, 2009.

NOVO, A. M. et al. Feasibility and competitiveness of intensive smallholder dairy farming in Brazil in comparison with soya and sugarcane: Case study of the Balde Cheio Programme. *Agricultural systems***,** v. 121, p. 63-72, 2013.

OECD/FAO. *OECD-FAO Agricultural Outlook 2015-2024*. http://www.fao.org/3/a-i4738e.pdf 2015.

ORGANIZATION, W. H. *Global and regional food consumption patterns and trends*. WHO Technical Report Series. 916**:** 1-17 p. 2009.

PACHECO, F. W. et al. A cadeia produtiva do leite: um estudo sobre a organização da cadeia e análise de rentabilidade de uma fazenda com opção de comercialização de queijo ou leite. *RRCF*, Fortaleza, v. 3, n. 1, jan./jun. 2012.

PARROTT, L.; LACROIX, R.; WADE, K. M. Design considerations for the implementation of multi-agent systems in the dairy industry. *Computers and electronics in agriculture***,** v. 38, n. 2, p. 79-98, 2003.

PELTONIEMI, M.; VUORI, E. Business ecosystem as the new approach to complex adaptive business environments. *Proceedings of eBusiness research forum*, 2004. Citeseer. p.267-281.

PEREIRA, G. A. et al. Cálcio dietético: estratégias para otimizar o consumo. *Revista Brasileira de Reumatologia***,** v. 49, n. 2, p. 164-171, 2009.

PINAZZA, L.A.; ARAÚJO, N. B. *Agricultura na virada do século XX: visão de agribusiness*. São Paulo: Globo, 1993. 166 p.

POLÁKOVÁ, J.; KOLÁČKOVÁ, G.; TICHÁ, I. Business model for Czech agribusiness. *Scientia Agriculturae Bohemica***,** v. 46, n. 3, p. 128-136, 2015.

POWELL, D. et al. Lean Six Sigma and environmental sustainability: the case of a Norwegian dairy producer. *International Journal of Lean Six Sigma***,** v. 8, n. 1, p. 53-64, 2017.

PRAKASH, S. et al. Risk analysis and mitigation for perishable food supply chain: a case of dairy industry. *Benchmarking: An International Journal***,** v. 24, n. 1, p. 2-23, 2017.

RAINBIRD, M. A framework for operations management: the value chain. *International Journal of Physical Distribution & Logistics Management***,** v. 34, n. 3/4, p. 337-345, 2004.

RAUTA, J. *Modelo de gestão para melhoria do relacionamento comercial entre produtores de leite e laticínios*. 2015. 151 (Masters in Administration). Universidade do Oeste de Santa Catarina

RÉVILLION, J. P. P. *Análise dos sistemas setoriais de inovação das cadeias produtivas de leite fluido na França e no Brasil.* 2004. 196 Tese (Doutorado) – Programa de PósGraduação em Agronegócios, Universidade Federal do Rio Grande do Sul, Porto Alegre, 2004.

RIEMER, K.; KLEIN, S. Network management framework. In: (Ed.). *Managing dynamic networks*: Springer, 2006. p.17-66.

RIES, E. *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*. Crown Business, 2011.

ROBINSON, J. P.; SHAVER, P. R.; WRIGHTSMAN, L. S. Criteria for scale selection and evaluation. *Measures of personality and social psychological attitudes***,** v. 1, n. 3, p. 1-16, 1991.

RODRIGUES, L. G.; ALBAN, L. Tecnologias de produção de leite utilizadas no Extremo-Oeste Catarinense. *Race: revista de administração, contabilidade e economia***,** v. 12, n. 1, p. 171-198, 2013.

RODRIGUES, L. G.; FROEMMING, L. M. S.; SEHNEM, S. O relacionamento de indústrias leiteiras com seus Stakeholders externos com Abordagem da Matriz Estratégica de Agribusiness (MEA). *Estudos Sociedade e Agricultura***,** v. 24, n. 1, 2016.

ROSA, D. et al. Qualidade do leite em amostras individuais e de tanque de vacas leiteiras. *Arq Inst Biol São Paulo***,** v. 79, n. 4, p. 485-493, 2012.

SAENGER, C. et al. Contract farming and smallholder incentives to produce high quality: Experimental evidence from the Vietnamese dairy sector. *Agricultural Economics***,** v. 44, n. 3, p. 297-308, 2013.

SAUER, J.; GORTON, M.; WHITE, J. Marketing, cooperatives and price heterogeneity: evidence from the CIS dairy sector. *Agricultural Economics***,** v. 43, n. 2, p. 165-177, 2012.

SEL, Ç.; BILGEN, B. Quantitative models for supply chain management within dairy industry: a review and discussion. *European Journal of Industrial Engineering***,** v. 9, n. 5, p. 561-594, 2015.

SILVESTRO, M. L. et al. *Os impasses sociais da sucessóio hereditária na agricultura familiar*. Empresa de Pesquisa Agropecuária e ExtensÒ Rural de Santa Catarina, Florianópolis (Brasil). CPPP/EpagriMinistÚrio de Desenvolvimento Agrário, Brasília (Brasil). NEAD/MDA. 2001

SOMDA, J.; KAMUANGA, M.; TOLLENS, E. Characteristics and economic viability of milk production in the smallholder farming systems in The Gambia. *Agricultural systems***,** v. 85, n. 1, p. 42-58, 2005.

SOUZA, S. O. KLIEMANN N., F. J. Desenho e análise da cadeia produtiva de vinhos finos gaúchos. Em *Anais do ENANPAD*, Trabalhos completos do Encontro [CD]. Rio de Janeiro, 2002.

STRÆTE, E. P. Modes of qualities in development of speciality food. *British Food Journal***,** v. 110, n. 1, p. 62-75, 2008.

TEIXEIRA, J. C. Modernização da agricultura no Brasil: impactos econômicos, sociais e ambientais. *Revista Eletrônica AGB-TL***,** v. 1, n. 2, p. 21-42, 2005.

TOURRAND, J.-F. et al. Produção leiteira em área de fronteira agrícola da Amazônia: o caso do município de Uruará. In: (Ed.). *Amazônia : meio ambiente e desenvolvimento agrícola*. Brasília: Embrapa-SPI/Belém, 1994. p.345-386.

TRIENEKENS, J. H. Agricultural value chains in developing countries a framework for analysis. *International Food and Agribusiness Management Review***,** v. 14, n. 2, p. 51-82, 2011.

UMBERGER, W. J.; THILMANY MCFADDEN, D. D.; SMITH, A. R. Does altruism play a role in determining US consumer preferences and willingness to pay for natural and regionally produced beef? *Agribusiness***,** v. 25, n. 2, p. 268-285, 2009.

VAN DER STRAETEN, B. et al. Impact of policy-induced structural change on milk quality: evidence from the Flemish dairy sector. *Journal of dairy research***,** v. 76, n. 02, p. 234-240, 2009.

VENTURI, P. H.; DE SOUZA, D. C. Sucessão geracional na agricultura familiar: causas da evasão dos jovens no campo. *I Semana de Ensino Pesquisa e Extensão*, 2016. Araquari, SC. IFC - Araquari. p.1-5.

WINCK, C. A. *Impactos do pagamento pela qualidade na cadeia produtiva do leite na região Oeste de Santa Catarina*. 2013. 122 (Doctor Thesis). Agronegócios, University Federal of Rio Grande do Sul

WINCK, C. A.; NETO, A. T. Diagnóstico da adequação de propriedades leiteiras em Santa Catarina às normas brasileiras de qualidade do leite. *Revista de Ciências Agroveterinárias***,** v. 8, n. 2, p. 164-172, 2009.

WINCKLER, N. C. *A coopetição entre propriedades rurais da cadeia produtiva do leite no Oeste Catariense*. 2011. Universidade Federal do Rio Grande do Sul

WINN, M. I.; POGUTZ, S. Business, Ecosystems, and Biodiversity: New Horizons for Management Research. *Organization and Environment***,** v. 26, n. 2, p. 203-229, 2013.

WOMACK, J. P.; JONES, D. T. *Lean thinking: banish waste and create wealth in your corporation*. Simon and Schuster, 2010.

YANG, R.; TANG, F. Restructuring Business Ecosystem Via Internet Thinking. *Management & Engineering*, n. 24, p. 16-23, Sep 2016 2016.

YIN, R. K. *Case study research: Design and methods*. Sage publications, 1994.

ZABAZNOVA, T. A. et al. Mechanism of rural entrepreneurship development on the base of micro-business. *Asian Social Science***,** v. 10, n. 23, p. 168-177, 2014.

ZHANG, X.; ARAMYAN, L. H. A conceptual framework for supply chain governance: An application to agri-food chains in China. *China Agricultural Economic Review***,** v. 1, n. 2, p. 136-154, 2009.

ZHONG, J.; NIEMINEN, M. Resource-based co-innovation through platform ecosystem: experiences of mobile payment innovation in China. *Journal of Strategy and Management***,** v. 8, n. 3, p. 283, 2015.

ZYLBERSZTAJN, D.; NEVES, M. F. E*conomia e Gestão de Negócios Agroalimentares*. São Paulo: Pioneira, 2000.

APPENDIX I

GUIA PARA ENTREVISTA SEMIESTRUTURADA – ESTUDO DE CASO

COCRIAÇÃO DE VALOR NO ECOSSITEMA LEITEIRO: ESTUDO DE CASO EM UMA UNIDADE DE PRODUÇÃO FAMILIAR LOCALIZADA NO MEIO OESTE DE SANTA CATARINA

Objetivo: Compreender as vantagens e desvantagens da cocriação de valor em uma unidade produção leiteira familiar.

PERFIL DA PROPRIEDADE

1. Entrevistado:
2. Data:
3. Nome da propriedade:
4. Endereço:
5. Há quanto tempo trabalha no meio rural? E na produção leiteira?
6. Qual é o grau de formação do responsável pela produção
7. Qual a sua satisfação com a pecuária leiteira na atualidade?
8. Produção média mensal da propriedade?

COOPERAÇÃO ENTRE ATORES DO ECOSSITEMA DE NEGÓCIOS LEITEIRO

9. Recebe ou recebeu alguma assistência técnica de alguma entidade na área de leite?
10. Se recebe assistência técnica, de qual (is) entidades (exemplo: Laticínio/Cooperativa; Epagri/Cidasc; Prefeitura; Particular. Outro
11. Como iniciou essa cooperação?
12. Teve que investir nessa cooperação?
13. Quais as vantagens que você identifica quanto atua / atuou em cooperação com a outros agentes do setor leiteiro?
14. Alguma desvantagem?
15. Na sua opinião, trabalhar de forma cooperada, lhe motivou a ampliar ou reduzir a produção de leite?
16. De que forma você rebe informações sobre a produção leiteira?
17. Qual o destino do leite produzido?
18. Recebe assistência técnica do seu cliente? Quantas vezes recebeu assistência técnica nos últimos doze meses?

PERGUNTAS GERAIS

19. Acontecem cursos/palestras/treinamentos na área de pecuária leiteira em sua região?

20. Quais as maiores dificuldades que você encontra na atividade?
21. Você acha que recebe suporte suficiente de outros agentes do setor leiteiro para desenvolver seu negócio leiteiro?
22. Na sua opinião há falta de capital financeiro e/ou fontes de acesso a capital financeiro limitados para aprimorar a produtividade do seu rebanho?
23. Na sua opinião o setor leiteiro recebe ou tem acesso a novas tecnologias? Isso é um problema para o desenvolvimento da atividade?
24. Pela sua experiência, na produção leiteira, quais são as principais barreiras que a produção leiteira que sua propriedade enfrenta?
25. Dentre todas as melhorias que sua produção vem implementando, você acha que a parceria ou cooperação entre outros atores do sistema de produção leiteiro, foram relevantes?
26. Dentre as barreiras que limitam o desenvolvimento da produção leiteira apresentadas.

Barreira
Falta de Cooperação entre os atores do setor
Problemas de Qualidade
Êxodo Rural
Limitações de Produtividade

27. Dentre aos fatores chave para o desenvolvimento da produção leiteira apresentados o que condiz com sua percepção.

Fator chave
Arranjo (organização) dos atores
Inovação
Meio ambiente
Aspectos sociais
Rastreabilidade
Qualidade dos alimentos
Capacidade tecnológica

APPENDIX II

QUESTIONÁRIO: DIAGNÓSTICO À CAMPO DAS BARREIRAS E FATORES CHAVE PARA O DESENVOLVIMENTO DA PRODUÇÃO LEITEIRA EM SANTA CATARINA

Prezado profissional do setor leiteiro,

Esse questionário, tem por objetivo **diagnosticar à campo as barreiras e os fatores chave para o desenvolvimento do sistema de produção leiteiro em Santa Catarina.** Sua participação é de grande importância para alcançarmos o objetivo do estudo, e também para contribuirmos para o desenvolvimento desse setor em Santa Catarina.

Esta pesquisa esta sendo conduzida, por Andrei Bonamigo, aluno do doutorado do Programa de Pós-Graduação em Engenharia de Produção da Universidade Federal de Santa Catarina (UFSC), sob orientação do Prof. Dr. Fernando A. Forcellini e Dr. Helio A. Ferenhof. O tempo estimado para responder este questionário é de no máximo cinco minutos.

1. PERFIL DO ENTREVISTADO

1.1 **Nome (opcional):** _____ **Cidade:** _____

1.2 **Em qual região você atua na atividade leiteira?**

( ) Litoral ( ) Planalto Serrano ( ) Grande Florianópolis
( ) Meio-Oeste ( ) Nordeste ( )Vale do Itajai
( ) Extremo Oeste ( ) Sul ( )Planalto Norte

1.3 **Qual é o seu nível de formação:**

( ) Fundamental ( ) Curso Superior
( ) Ensino médio ( ) Pós-graduação
( )Outro: _____

1.4 **Qual é a sua atuação profissional relacionada a produção leiteira?**

( ) Produtor ( ) Profissional de cooperativa de produtores
( ) Pesquisador ( ) Agente de instituições governamentais (Cidasc, Epagri, Embrapa)
( ) Estudante
( ) Profissional de instituto de pesquisa ( ) Comércio de produtos lácteos
( ) Profissional de universidade ( ) Outro: _____.

1.5 **Há quantos anos atua com atividades relacionadas a produção leiteira?**

( ) Menos de um ano; ( ) Entre três a cinco anos
( ) Entre um ano à três anos ( ) Mais de cinco anos

2. BARREIRAS DA PRODUÇÃO LEITEIRA

2.1 **Dentre as barreiras que limitam o desenvolvimento da produção leiteira apresentadas abaixo, assinale com um "X" a alternativa que condiz com sua percepção.**

Barreira	Aprovo fortemente	Aprovo	Indeciso	Desaprovo	Desaprovo fortemente
Falta de Cooperação entre os atores do setor					
Problemas de Qualidade					
Exodo Rural					
Limitações de Produtividade					

2.2 **Na sua opinião, além destas barreiras apresentadas, há outros fatores que limitam o desenvolvimento da produção leiteira em Santa Catarina? Se sim, descreva abaixo.**

3. FATORES CHAVE PARA O DESENVOLVIMENTO DA PRODUÇÃO LEITEIRA EM SANTA CATARINA

3.1 **Dentre aos fatores chave para o desenvolvimento da produção leiteira apresentados abaixo, assinale com um "X" a alternativa que condiz com sua percepção.**

Fator chave	Aprovo fortemente	Aprovo	Indeciso	Desaprovo	Desaprovo fortemente
Arranjo (organização) dos atores					
Inovação					
Meio ambiente					
Aspectos sociais					
Rastreabilidade					
Qualidade dos alimentos					
Capacidade tecnologica					

3.2 **Na sua opinião, além destes fatores chave, há outros fatores chave para o desenvolvimento da produção leiteira em Santa Catarina? Se sim, descreva abaixo.**

APPENDIX III

QUESTIONARIO: BARREIRAS E IMPULSIONADORES DA PRODUÇAO LEITEIRA

Prezado profissional do setor leiteiro,
Esse questionário, tem por objetivo identificar as barreiras e impulsionadores da produção leiteira. Sua participação é de grande importância para alcançarmos o objetivo do estudo, e também para contribuirmos para o desenvolvimento desse setor em Santa Catarina.
Esta pesquisa está sendo conduzida, por Andrei Bonamigo, aluno do doutorado do Programa de Pós-Graduação em Engenharia de Produção da Universidade Federal de Santa Catarina (UFSC), sob orientação do Prof. Dr. Fernando A. Forcellini e Dr. Helio A. Ferenhof. O tempo estimado para responder este questionário é de no máximo cinco minutos.

1. PERFIL DO ENTREVISTADO

1.1 **Nome (opcional):** _____ **Cidade:** _____

1.2 **Em qual região você atua na atividade leiteira:** _____

1.3 **Qual é o seu nível de formação:**

( ) Fundamental
( ) Ensino médio
( ) Curso Superior
( ) Pós-graduação
( )Outro: _____

1.4 **Qual é a sua atuação profissional relacionada a produção leiteira?**

( ) Produtor
( ) Pesquisador
( ) Estudante
( ) Profissional de instituto de pesquisa
( ) Profissional de universidade
( ) Profissional de cooperativa de produtores
( ) Agente de instituições governamentais (Cidasc, Epagri, Embrapa)
( ) Comércio de produtos lácteos
( ) Outro: _____.

1.5 **Há quantos anos atua com atividades relacionadas a produção leiteira?**

( ) Menos de um ano;
( ) Entre um ano à três anos
( ) Entre três a cinco anos
( ) Mais de cinco anos

2. FATORES CHAVE (IMPULSIONADORES) PARA O DESENVOLVIMENTO DA PRODUÇAO LEITEIRA EM SANTA CATARINA

3.1 **Dentre aos fatores chave para o desenvolvimento da produção leiteira apresentados abaixo, assinale com um "X" a alternativa que condiz com sua percepção.**

Dimensão	Na sua opinião, você concorda que a/o:	Agreva fortemente	Agreva	Indiferente	Desagreva	Desagreva fortemente
Arranjo (organização) dos atores	O desenvolvimento da produção leiteira, depende da administração dos envolvidos com a atividade leiteira?					
	A parceria de fornecedores, clientes, produtores, prefeituras, permite melhorar o sistema de produção leiteiro?					
	Trabalhar de forma cooperativista, permite obter vantagens para a produção leiteira?					
	Trocar experiência, conhecimento com cooperativas, produtores, e institutos de pesquisa contribui para a melhoria da produção leiteira?					
Inovação	Ter acesso a conhecimento é importante para a inovação na atividade leiteira?					
	Uma melhor organização da produção leiteira, pode ser criada a partir da inovação?					
	A inovação é realmente importante para o desenvolvimento da atividade leiteira?					
	Criar novos processos e produtos, traz benefícios para a produção leiteira?					
Meio ambiente	Ser sustentável, ou seja, produzir sem agredir o meio ambiente, é relevante para o negócio?					
	Gestão de recursos naturais influencia meu negócio?					
	O uso de agrotóxico impacta negativamente o meu negócio?					
	A produção orgânica apresenta vantagens para o meu negócio?					
Aspectos sociais	A atividade leiteira contribui para o desenvolvimento da minha região?					
	A disponibilidade de mão de obra, influencia no desenvolvimento da atividade?					
	O bem-estar do produtor no campo, é relevante para desenvolver a atividade leiteira?					
Rastreabilidade	Rastreabilidade dos alimentos tem relação com o desenvolvimento da atividade leiteira?					
	Sistema de rastreabilidade de alimentos é relevante na atividade leiteira?					
	Rastrear a origem de animais, insumos, genética em toda a produção leiteira, apresenta vantagens para o setor?					
Qualidade dos alimentos	Qualidade dos produtos finais tem impacto no desenvolvimento da produção leiteira?					
	Um leite com qualidade tem valorização de mercado?					
	Critérios de qualidade bem definidos, contribuem para a produção leiteira?					
Capacidade tecnológica	Por meio de conhecimentos técnicos é possível melhorar meu negócio?					
	Capacitar-se tecnologicamente, contribui para o desenvolvimento da atividade leiteira?					
	Acesso a tecnologias contribui para o crescimento da atividade leiteira?					

2.1. Na sua opinião, além destes fatores chave, há outros fatores chave para o desenvolvimento da produção leiteira? Se sim, descreva abaixo.

_____
_____

3. BARREIRAS DA PRODUÇÃO LEITEIRA

3.1 **Dentre as barreiras que limitam o desenvolvimento da produção leiteira apresentadas abaixo, assinale com um "X" a alternativa que condiz com sua percepção.**

Dim.	Na sua opinião, você concorda que a/o:	Agrava fortemente	Agrava	Indiferente	Desagrava	Desagrava fortemente
Falta de Cooperação	Falta de cooperação entre os produtores, é uma barreira do setor leiteiro?					
	Atuar individualmente, é uma barreira no setor leiteiro?					
	A falta de colaboração entre produtores, institutos de pesquisa, cooperativas e universidades dificulta a melhoria da atividade leiteira:					
Problemas de Qualidade	A falta de adoção de técnicas adequadas na produção leiteira, é uma barreira do setor leiteiro?					
	Pagamento de leite produzido por qualidade, traz benefícios para o setor leiteiro?					
	A baixa qualidade do leite final, se apresenta como uma barreira do setor leiteiro?					
Êxodo Rural	O forte êxodo rural, impacta na atividade leiteira?					
	Baixa remuneração da atividade, é um fator do esvaziamento do meio rural?					
	Os jovens rurais já não identificam na profissão de agricultor a escolha natural para realizar seus projetos de vida, isso impacta na atividade leiteira?					
	A atividade leiteira auxilia em evitar evasão do campo?					
Limitações de Produtividade	O sistema de pastagem é uma barreira do setor?					
	Baixa escolaridade dos produtores leiteiros, é uma barreira do setor?					
	Falta de acesso de tecnologias como inseminação limitam o aumento da produtividade do Sistema leiteiro?					
Insuficiência de políticas públicas	Incentivos da parte do governo, influencia no desenvolvimento da atividade leiteira?					
	A falta de assistência técnica especializada, limita o desenvolvimento da atividade leiteira?					
	Falta de incentivo e políticas públicas para setor rural, impacta negativamente no desenvolvimento da atividade leiteira?					
	Limitada ajuda financeira dos órgãos públicos para subsidiar pesquisas na produção leiteira, impacta no desenvolvimento da atividade leiteira?					
Profissionalização dos produtores	Baixa capacidade técnica dos produtores, dificulta o desenvolvimento do sistema leiteiro?					
	A falta de gestão organizada entre os produtores de leite, dificulta a atividade leiteira?					
	A falta de conhecimento, limita a atividade leiteira?					

3.2 **Na sua opinião, além destas barreiras apresentadas, há outros fatores que limitam o desenvolvimento da produção leiteira? Se sim, descreva abaixo.**

_____

_____

_____

APPENDIX IV

QUESTIONÁRIO: MODELO DE GESTÃO PARA A PRODUÇÃO LEITEIRA

Prezado profissional do setor leiteiro,
Esse questionário, tem por objetivo avaliar o modelo de gestão para a produção leiteira que está em construção por Bonamigo, Ferenhof, Tezza e Forcellini. Sua participação é de grande importância para alcançarmos o objetivo do estudo, e também para contribuirmos para o desenvolvimento do setor leiteiro.

Esta pesquisa está sendo conduzida, por Andrei Bonamigo, aluno do doutorado do Programa de Pós-Graduação em Engenharia de Produção da Universidade Federal de Santa Catarina (UFSC), sob orientação do Prof. Dr. Fernando A. Forcellini e Dr. Helio A. Ferenhof. O tempo estimado para responder este questionário é de 20 minutos.

ELEMENTOS DE INFLUÊNCIA PARA O DESENVOLVIMENTO DA PRODUÇÃO LEITEIRA

1. **Dentre os elementos abaixo, você considera estes impactantes para o desenvolvimento da produção leiteira? Assinale com um "X" a alternativa que condiz com sua percepção.**

Na sua opinião, você concorda que a/o:	Aprovo fortemente	Aprovo	Indeciso	Desaprovo	Desaprovo fortemente
Reconhecer as necessidades do cliente, pode melhorar a gestão do negócio?					
O acesso ao suporte técnico, pode ajudar a melhorar minha atividade de atuação?					
A forma que gerencio o meu negócio pode melhorar a satisfação do consumidor de produtos leiteiros?					
A melhoria do setor leiteiro, pode oportunizar a oferta de novos serviços e ganhos econômicos?					
A integração com meus fornecedores e clientes, pode melhorar meu negócio?					
O domínio técnico ajuda a desenvolver novos produtos?					
O acesso a conhecimento e recursos técnicos permite criar diferencial competitivos?					
A qualidade dos produtos e serviços pode ser intensificada, quando há domínio técnico?					
A diversidade de canais de acesso aos produtos e serviços impacta na melhoria do setor leiteiro?					
Os serviços logísticos ofertados ao cliente, podem favorecer o desenvolvimento do setor lácteo?					
No seu negócio há alguma mecanismo para reconhecer as necessidades do mercado consumidor leiteiro?					
A comunicação com os atores do setor leiteiro, são impactantes para o negócio leiteiro?					
O cooperação no setor leiteiro, permite contribuir positivamente para o desenvolvimento do setor leiteiro?					
O incentivo público, universidades e cooperativas, e assistência técnica, favorece a inovação e melhoria do setor leiteiro?					
As condições de mercado, podem orientar o setor lácteo a se desenvolver?					
Parceiros capacitados, contribui para desenvolver a atividade leiteira?					
Pessoas capacitadas, permite melhorar o setor leiteiro?					
A disponibilidade de pessoas com conhecimento técnico e prático contribuem para desenvolver a atividade leiteira?					
Eliminar as perdas dos processos, é vantajoso para desenvolver o setor leiteiro?					
A melhoria no fluxo de valor, impacta positivamente no desenvolvimento do setor?					
Reconhecer e tratar as barreiras do setor de produção leiteiro são importantes para o negócio se desenvolver?					
Planejar e controlar os processos de produção, contribui para melhorar o setor?					
Resolver problemas e melhorar continuamente os processos e produtos conduz a aprendizagem?					
Identificar os problemas do setor leiteiro e solucioná-los, contribuem para melhorar o desempenho da atividade leiteira?					
A experiência do profissional leiteiro, facilita identificar e tratar os problemas do setor?					
O pensamento voltado a melhoria contínua contribui para desenvolver a produção leiteira?					
Trabalhar com olhar voltado as necessidades do cliente e/ou consumidor de produtos leiteiros, permite desenvolver a atividade leiteira?					
O resultado do desenvolvimento de uma filosofia ao invés da aplicação de técnicas, permite melhorar continuamente a atividade leiteira?					
A liderança na atividade leiteira, é importante para o setor leiteiro desenvolver-se?					

FATORES CHAVE (IMPULSIONADORES) PARA O DESENVOLVIMENTO DA PRODUÇÃO LEITEIRA

2. **Dentre aos fatores chave para o desenvolvimento da produção leiteira apresentados abaixo, assinale com um "X" a alternativa que condiz com sua percepção.**

Na sua opinião, você concorda que a/o:	Aprovo fortemente	Aprovo	Indeciso	Desaprovo	Desaprovo fortemente
O desenvolvimento da produção leiteira, depende da administração dos envolvidos com a atividade leiteira?					
A parceria de fornecedores, clientes, produtores, prefeituras, permite melhorar o sistema de produção leiteiro?					
Trabalhar de forma cooperativista, permite obter vantagens para a produção leiteira?					

Trocar experiência, conhecimento com cooperativas, produtores, e institutos de pesquisa contribui para a melhoria da produção leiteira?					
Ter acesso a conhecimento é importante para a inovação na atividade leiteira?					
Uma melhor organização da produção leiteira, pode ser criada a partir da inovação?					
A inovação é realmente importante para o desenvolvimento da atividade leiteira?					
Criar novos processos e produtos, traz benefícios para a produção leiteira?					
Ser sustentável, ou seja, produzir sem agredir o meio ambiente, é relevante para o negócio?					
Gestão de recursos naturais influencia meu negócio?					
O uso de agrotóxico impacta negativamente o meu negócio?					
A produção orgânica apresenta vantagens para o meu negócio?					
A atividade leiteira contribui para o desenvolvimento da minha região?					
A disponibilidade de mão de obra, influencia no desenvolvimento da atividade?					
O bem-estar do produtor no campo, é relevante para desenvolver a atividade leiteira?					
Rastreabilidade dos alimentos tem relação com o desenvolvimento da atividade leiteira?					
Sistema de rastreabilidade de alimentos é relevante na atividade leiteira?					
Rastrear a origem de animais, insumos, genética em toda a produção leiteira, apresenta vantagens para o setor?					
Qualidade dos produtos finais tem impacto no desenvolvimento da produção leiteira?					
Um leite com qualidade tem valorização de mercado?					
Critérios de qualidade bem definidos, contribuem para a produção leiteira?					
Por meio de conhecimentos técnicos é possível melhorar meu negócio?					
Capacitar-se tecnologicamente, contribui para o desenvolvimento da atividade leiteira?					
Acesso a tecnologias contribui para o crescimento da atividade leiteira?					

BARREIRAS DA PRODUÇÃO LEITEIRA

3 Dentre as barreiras que limitam o desenvolvimento da produção leiteira apresentadas abaixo, assinale com um "X" a alternativa que condiz com sua percepção.

Na sua opinião, você concorda que a/o:	Aprovo fortemente	Aprovo	Indeciso	Desaprovo	Desaprovo fortemente
Falta de cooperação entre os produtores, é uma barreira do setor leiteiro?					
Atuar individualmente, é uma barreira no setor leiteiro?					
A falta de colaboração entre produtores, institutos de pesquisa, cooperativas e universidades dificulta a melhoria da atividade leiteira:					
A falta de adoção de técnicas adequadas na produção, é uma barreira do setor leiteiro?					
Pagamento de leite produzido por qualidade, traz benefícios para o setor leiteiro?					
A baixa qualidade do leite final, se apresenta como uma barreira do setor leiteiro?					
O forte êxodo rural, impacta na atividade leiteira?					
Baixa remuneração da atividade, é um fator de esvaziamento do meio rural?					
Os jovens rurais já não identificam na profissão de agricultor a escolha natural para realizar seus projetos de vida, isso impacta na atividade leiteira?					
Baixa escolaridade dos produtores leiteiros, é uma barreira do setor?					
Falta de acesso de tecnologias como inseminação limitam o aumento da produtividade do Sistema leiteiro?					
A falta de acesso ao crédito financeiro, limita o desenvolvimento da atividade leiteira?					
Baixa escolaridade dos produtores leiteiros, é uma barreira do setor?					
Falta de acesso de tecnologias como inseminação limitam o aumento da produtividade do Sistema leiteiro?					
A automatização das operações podem melhorar a produtividade leiteira?					

PERFIL DO ENTREVISTADO

1.1 Nome (opcional): _____ **Cidade:** _____

1.2 Em qual região você atua na atividade leiteira: _____

1.3 Qual é o seu nível de formação:

( ) Fundamental
( ) Ensino médio
( ) Curso Superior
( ) Pós-graduação
( ) Outro: _____

1.4 Qual é a sua atuação profissional relacionada a produção leiteira?

( ) Produtor
( ) Pesquisador
( ) Estudante
( ) Profissional do instituto de pesquisa
( ) Profissional de universidade
( ) Profissional de cooperativa de produtores
( ) Agente de instituições governamentais (Cidasc, Epagri, Embrapa)
( ) Comércio de produtos lácteos
( ) Outro: _____.

1.5 Há quantos anos atua com atividades relacionadas a produção leiteira?

( ) Menos de um ano;
( ) Entre um ano a três anos
( ) Entre três a cinco anos
( ) Mais de cinco anos

APPENDIX V

Article 9: Findings exploratory factorial analysis

Variable	Factor1	Factor2	Factor3	Uniqueness
i4		0,5354		0,6235
i7		0,5397		0,5895
i8		0,5033		0,6002
i9		0,5598		0,578
i10		0,5116		0,6165
i12		0,5449		0,5715
i16		0,5037		0,6015
i17		0,529		0,5524
i18		0,5169		0,5657
i20		0,5714		0,6038
i21		0,6638		0,4761
i22		0,6738		0,4084
i23		0,7008		0,4206
i24		0,6394		0,4798
i25		0,6468		0,4167
i26		0,6031		0,5283
i27		0,604		0,5313
i29		0,5111		0,6249
i33	0,5797			0,4816
i34	0,6803			0,3733
i35	0,6097			0,4627
i36	0,604			0,4857
i37	0,534			0,5184
i42	0,6643			0,4925
i43	0,6421			0,5139
i44	0,6692			0,4388
i45	0,5753			0,4896
i46	0,5455			0,5098
i47	0,5741			0,5033
i48	0,6948			0,4066
i49	0,5742			0,5882
i50	0,6761			0,4224
i51	0,7635			0,3305
i52	0,7909			0,299
i53	0,8026			0,2643
i58	0,5339			0,5513
i60			0,5381	0,5509

i61			0,5657	0,5297
i62			0,5852	0,5382
i63			0,7103	0,4698
i64			0,696	0,4206
i65			0,6241	0,49
i66			0,8028	0,3296
i67			0,7179	0,3829
i68			0,5473	0,427

(blanks represent abs(loading)<.5)

ANNEX I

Andrei Bonamigo
<andreibonamigo@gmail.com>

Permissão - Pedido de direitos autorais

Andrei Bonamigo <andreibonamigo@gmail.com> Mon, Oct 16, 2017 at 12:08 PM

To: Marcia da Cruz <marciarohrcruz@gmail.com>

Prezada Profa. Marcia Rohr Cruz,

Em primeiro lugar, gostaria de agradecer muito a atenção gentil e o seu contributo para o desenvolvimento do II Simpósio Internacional de Inovação em

Cadeias Produtivas do Agronegócio - SIICPA.

Estou na fase final da tese de doutorado em engenharia de produção pela Universidade Federal de Santa Catarina – UFSC. Minha tese será em formato de coleção de artigos. No entanto, eu preciso da autorização para usar o artigo, que foi publicado no II SIICPA. Consa abaixo os dados do artigo.

Se for necessário qualquer outro procedimento para obter a autorização, por favor, informe-me, para providenciar imediatamente o que é necessário.

Muito obrigado.

Atenciosamente,

Prof. Andrei Bonamigo
Universidade do Oeste de Santa Catarina - UNOESC
Doutorando em Engenharia de Produção – UFSC

GEPPS - Grupo de Engenharia de Produto, Processo e Serviço-
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ORCID: http://orcid.org/0000-0002-6670-9755

Andrei Bonamigo
<andreibonamigo@gmail.com>

Permissão - Pedido de direitos autorais

Marcia Rohr da Cruz <marciarohrcruz@gmail.com> Tue, Oct 17, 2017 at 2:12 PM
To: Andrei Bonamigo <andreibonamigo@gmail.com>

Andrei.

Obrigada a você pelas contribuições e por nos prestigiar. Este email serve como comprovante.

Estou a disposição.

Abraço
[Quoted text hidden]
--

Marcia

ANNEX II

Gmail

Andrei Bonamigo <andreibonamigo@gmail.com>

British Food Journal - Decision on Manuscript ID BFJ-06-2017-0359.R1

3 messages

British Food Journal <onbehalfof+cgriffith+cardiffmet.ac.uk@manuscriptcentral.com>

Wed, Aug 30, 2017 at 8:00 AM

Reply-To: cgriffith@cardiffmet.ac.uk
To: andreibonamigo@gmail.com, andrei.bonamigo@edu.sc.senai.br, helio@igci.com.br, rafaeltezza@yahoo.com.br, forcellini@gmail.com

30-Aug-2017

Dear Mr. Bonamigo:

It is a pleasure to accept your manuscript entitled "DAIRY PRODUCTION BARRIERS DIAGNOSIS IN SOUTHERN BRAZIL" in its current form for publication in British Food Journal.

By publishing in this journal, your work will benefit from Emerald EarlyCite. This is a pre-publication service which allows your paper to be published online earlier, and so read by users and, potentially, cited earlier.

Please go to your Author Centre at https://mc.manuscriptcentral.com/bfj (Manuscripts with Decisions for the submitting author or Manuscripts I have co-authored for all listed co-authors) to complete the copyright assignment form. We cannot publish your paper without this. All

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Thank you for your contribution. On behalf of the Editors of British Food Journal, we look forward to your continued contributions to the Journal.

Yours sincerely,
Prof. Christopher Griffith
Editor, British Food Journal
cgriffith@cardiffmet.ac.uk

ANNEX III

Andrei Bonamigo <andreibonamigo@gmail.com>

Submission to IFAMR completed successfully

Marijn van der Gaag International Food and Agribusiness Management Review <ifamr@wageningenacademic.com> Wed, Aug 2, 2017 at 1:15 PM

Reply-To: Marijn van der Gaag International Food and Agribusiness Management Review <ifamr@wageningenacademic.com>

To: Andrei Bonamigo <andreibonamigo@gmail.com>

Dear Andrei Bonamigo:

This email is to confirm that you have successfully completed your submission, titled

DAIRY PRODUCTION BOOSTER FRAMEWORK IN THE LIGHT OF THE BUSINESS ECOSYSTEM

to International Food and Agribusiness Management Review.

Now that your submission is complete, we have disabled further access to it via the online submission form. This means that neither you nor any other person can access it. Your submission has been transferred to a 'secure holding tank' at International Food and Agribusiness Management Review.

Thus, the url we sent you in the first confirmation email will no longer work. This is to protect your anonymity and ensure the confidentiality of your submission, subject to the technical caveats that you agreed to at step 1 of the submission (i.e. that it is impossible to offer a 100% guarantee of confidentiality).

The secure holding tank where your submission has been transferred is inspected periodically by the staff at International Food and Agribusiness Management Review.

Once a staff member inspects it and verifies that your submission is complete, your manuscript is readable, and your submission is appropriate for this journal, it will be assigned a Manuscript ID number and an editor who will be in charge of it. You will receive email confirmation once an editor has been assigned and the editor determines that your submission is appropriate for the journal and merits having experts assigned to review it. This first stage of the review process could take several weeks.

Note that your manuscript ID number will be different from the submission ID number your submission has been temporarily assigned, 2304, to uniquely identify it while it is awaiting final inspection in the secure holding tank at International Food and Agribusiness Management Review.

If you have questions about your submission, please contact Marijn van der Gaag International Food and Agribusiness Management Review <ifamr@wageningenacademic.com>.

However please let a reasonable period of time elapse before making further inquiries (say at least 10 days), since the staff of International Food and Agribusiness Management Review is not always

able to
inspect the submission holding tank on a daily basis.

Sincerely,

Marijn van der Gaag
International Food and Agribusiness Management Review
<ifamr@wageningenacademic.com>

ANNEX IV

Andrei Bonamigo
<andreibonamigo@gmail.com>

IFAMR: Decision Letter - MS 20170076
2 messages

Gerhard Schiefer <schiefer@uni-bonn.de> Sun, Nov 5, 2017 at 12:37 PM

Reply-To: Gerhard Schiefer <schiefer@uni-bonn.de>

To: Andrei Bonamigo <andreibonamigo@gmail.com>

Cc: schiefer@uni-bonn.de

Dear Andrei:

Attached you will find a decision letter for your manuscript, MS 20170076, entitled, "DAIRY PRODUCTION BOOSTER FRAMEWORK IN THE LIGHT OF THE BUSINESS ECOSYSTEM." When you revise and resubmit your manuscript please also make sure that the references and reference list are according to the latest journal guidelines, which can be found on the IFAMR website (https://ifama.org/resources/Documents/IFAMRGuidelines2017.pdf).

If you have any questions regarding this decision, please do not hesitate to contact me.

Thank you for considering the International Food and Agribusiness Management Review as a publication outlet for your research.

Sincerely,

Gerhard Schiefer
Exec. Editor IFAMR
International Food and Agribusiness Management Review, University of Bonn, Germany

IFAMA Business Office
<ifamr@wageningenacademic.com>
Web: http://www.ifama.org

Decision to submitter (Revise and Resubmit) (template id dec_rfr)

Attachments:

Decision letter
Editor's report
Table Response to Reviewers

ANNEX V

ORGANIZAÇÕES RURAIS & AGROINDUSTRIAIS

UNIVERSIDADE FEDERAL DE LAVRAS
DEPARTAMENTO DE ADMINISTRAÇÃO E ECONOMIA
ORGANIZAÇÕES RURAIS E AGROINDUSTRIAIS

AUTORIZAÇÃO

Venho, por meio desta, e na qualidade de Editor chefe da Revista **Organizações Rurais e Agroindustriais**, ISSN 2238-6890, autorizar, na parte que me cabe, ao Sr. **Andrei Bonamigo**, CPF 010.197.519-83, primeiro autor do artigo intitulado "**Dairy Ecosystem Barries Exposed - A Case Sutdy in a Family Production Unit at Western Santa Catarina, Brazil**, publicado em nossa edição de volume 19, número 1, das páginas 1 a 7 do ano de 2017, a utilizar o mesmo artigo em sua tese de doutorado, com título "**A Managemente Model For Dairy Production Based on the Ecosystem Business Concept**", haja vista ser uma tese em formato de ensaios científicos, a ser defendida no Programa de Pós-Graduação em Engenharia de Produção (PPGEP), da Universidade Federal de Santa Catarina.

O artigo objeto dessa autorização possui outros dois autores, sendo eles: Hélio Aisenberg Ferenhof e Fernando Antônio Forcellini. Vale ressaltar, portanto, que essa autorização é apenas a parte de responsabilidade dessa revista.

Permaneço a disposição para demais esclarecimentos.

Atenciosamente,

RENATO SILVERIO CAMPOS

EDITOR DA REVISTA "ORGANIZAÇÕES RURAIS E AGROINDUSTRIAIS"

PROFESSOR ADJUNTO C-1

Lavras, 17 de Outubro de 2017.

Organizações Rurais & Agroindustriais - Revista Científica de Administração da UFLA

ISSN: 2238-6890 (edição on-line)
Universidade Federal de Lavras - UFLA - Departamento de Administração e Economia
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Comentários e sugestões: revistadae@dae.ufla.br

ANNEX VI

Andrei Bonamigo <andreibonamigo@gmail.com>

Permission - Copyright request

Chris Tutill <ctutill@emeraldgroup.com> Tue, Oct 17, 2017 at 6:03 AM
To: "andreibonamigo@gmail.com" <andreibonamigo@gmail.com>
Cc: "cgriffith@cardiffmet.ac.uk" <cgriffith@cardiffmet.ac.uk>

Dear Andrei,

Thank you for your email.

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Thank you
&
Kind Regards,

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ANNEX VII

DIRETÓRIO ACADÊMICO DE ENGENHARIA DE PRODUÇÃO – DAEP

Av. Antônio C. Magalhães, 510, Country Club, Juazeiro – BA.

daep@univasf.edu.br

Juazeiro-BA, 07 de Novembro de 2017.

Objeto: Cessão de direitos autorais

Por meio deste, o Diretório Acadêmico de Engenharia de Produção (DAEP/UNIVASF) ora CEDENTE, titular dos direitos autorais sobre a OBRA intitulada "*EVALUATION THE DAIRY PRODUCTION BARRIERS IN SANTA CATARINA*" publicada nos ANAIS DO SIMPÓSIO DE ENGENHARIA DE PRODUÇÃO DO VALE DO SÃO FRANCISCO (SEPVASF), de autoria de Andrei Bonamigo, Helio Aisenberg Ferenhof e Fernando Antônio Forcellini, cede à Andrei Bonamigo, parcialmente, os direitos autorais referentes à OBRA em questão.

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Atenciosamente,

Pedro Vieira Souza Santos

Presidente DAEP

ANNEX VIII

Gmail — Andrei Bonamigo <andreibonamigo@gmail.com>

Permissão - Pedido de direitos autorais

Editorial Team BJOPM <bjopm.journal@gmail.com> Wed, Nov 8, 2017 at 10:16 AM
To: Andrei Bonamigo <andreibonamigo@gmail.com>

Bom dia, professor Andrei Bonamigo.

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Editorial Team
Brazilian Jounal of Operations & Production Management
http://bjopm.emnuvens.com.br/bjopm/
bjopm.journal@gmail.com

Em 7 de novembro de 2017 15:24, Andrei Bonamigo <andreibonamigo@gmail.com> escreveu:

Boa tarde Prof. Osvaldo,

Tudo bem?

Tem algum retorno do pedido apresentado no e-mail anterior?
obrigado

Att.

Prof. Andrei Bonamigo
Universidade do Oeste de Santa Catarina - UNOESC
Doutorando em Engenharia de Produção - UFSC
GEPPS - Grupo de Engenharia de Produto, Processo e Serviço-www.gepps.ufsc.br
Mestre em Administração - UNOESC
Especialista em Engenharia de Produção - TUPY/SOCIESC
Graduado em Fabricação Mecânica - SENAI

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