

Article

Neuroeconomic Decisions in Cocoa Producers: Impact of Cooperative Innovation Methodology on Prospecting for Fair Trade Organic Niche as an Incentive for Agricultural Sustainability

Isaac Zúniga Aguilar 

Olave School of Business, Universidad Privada Boliviana, La Paz 3967, Bolivia; isaaczuniga@upb.edu

Abstract: This article focuses on analyzing the neuroeconomic decisions in cocoa producers and the impact of this methodology on the productivity of fair trade organic cocoa producers on the population of Nuevo Bambamarca, province of Tocache, Peru. The main elements of the methodology are the incentive phase of associativity, the alignment phase to macro trends, the prospecting phase of the country to be exported to, the prospecting phase of the type of niche market, the prospecting phase of fair participation, the innovation and design phase of the prototype, the standardization phase of the raw material technical specifications for collection, the strengthening phase the producer's commitment, the learning phase of the producer in crop management, and the evaluation phase of productivity in the field. This research study is pre-experimental, cross-sectional, explanatory, and descriptive. The experimental group made up of 20 fair trade organic cocoa producers of the Cooperativa Agroindustrial Naranjillo obtained on average a profitability of 143 EUR per campaign higher than the control group made up of 20 producers of conventional cocoa that did not belong to the cooperative who obtained a loss of -642 EUR per campaign, even with the same purchase price of 1.92 EUR per kg for both cases during the 2011 campaign. It is concluded that Hypothesis 1 is met, it shows that the cooperative innovation methodology of prospecting for fair trade organic niche encourages the productivity of producers of the experimental group with respect to the control group.



Citation: Zúniga Aguilar, I. Neuroeconomic Decisions in Cocoa Producers: Impact of Cooperative Innovation Methodology on Prospecting for Fair Trade Organic Niche as an Incentive for Agricultural Sustainability. *Sustainability* **2021**, *13*, 8373. <https://doi.org/10.3390/su13158373>

Academic Editors: Manfred Max Bergman and Mohammad Valipour

Received: 27 June 2021

Accepted: 22 July 2021

Published: 27 July 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



Copyright: © 2021 by the author. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

Keywords: neuroeconomic; prospecting; fair trade; organic; cocoa producers; agricultural sustainability

1. Introduction

Economic crises could be the ideal experimental context for analyzing the impact of learning theory on cooperative organizations, taking into account that change manifests itself from the process of decision-making in humans that initiate the adaptation of their microworlds [1] driven by emotional and rational aspects. For example, Cook [2] and Ortmann and King [3] when analyzing the effects of the decisions in the social sustainability of the cooperatives coincidences in their cycles of business describe the curve like a parable.

According to Kahneman's research [4], the business-focused decision-making process should be analyzed taking into account each human being from an emotional aspect that is part of system 1: called "Fast" that is guided by institutions, associations, metaphors, and impressions) and on the other hand system 2: called "Slow" (which is guided by focus, deliberation, and effort) that has to do with cognitively analyzing the results.

In this sense, the business decision-making process will allow us to understand and know human decisions in greater depth in coherence with what is raised by Branas-Garza and Cabrales on pages 29–30 [5] which takes into account the rational model with the evaluation of productivity indicators such as utility and loss and which is complemented by the heuristic model that seeks to refer to holistic competencies, related to the unconscious side of the brain. However, in this case, it is recommended being very cautious about identifying the best options without falling into biases or errors.

Peru is currently one of the world's leading producers of fine cocoa and 43% of its production comes from the San Martin region according to [6]. Tocache is the province and capital of the San Martin region with the highest presence of small agriculture, and about 49% of the population cultivate areas less than 5 hectares according to [7]. However, the context of the San Martin region in 2010 was very different, considered by USAID as one of the three regions of Peru with the highest production of illicit crops. The situation could have affected the microworlds of producers who have lived together under poverty and violence. After a pacification strategy in the area by the Peruvian government, the United Nations, and USAID, alternative crop programs such as cocoa, coffee, oil palm aimed at farmers in Tocache province were able to train and implement alternative crop programs, which may have motivated positive emotions in the farmer in the face of opportunities in the new scenario [8].

This research analyzes the evolution of the way cocoa farmers think in the Nuevo Bambamarca populated center of Tocache Province, Peru, taking into account the process of their decisions in the light of [9], Karl Friston's theory of self-organized criticism, considering their obvious ability to adapt and propose solutions as possible hypotheses in the face of the chaos they faced permanently over drug trafficking and terrorism in this area and which in some cases demonstrated their level of wisdom to seek solutions such as deciding to undertake (individual or collective) with lawful crops that would allow them to live in peace and with a greater quality of life.

The purpose of this study is to investigate the effects on the social sustainability of the cooperative through analyzing the effects on productivity that positive emotions could have as a result of cooperatively or individually undertaking the new crop and on the other hand, the impact of the cognitive aspect, related to evaluation of productivity results between the cocoa organic and fair trade of the producer's cooperative and the cocoa conventional of the individual producers. The emotional or cognitive neural aspects would influence the farmer's decision at various times and manifest its coherence or inconsistency in the farmer's decision-making process in the face of the changes that would have presented him with their microworlds and how the hypothesis planning would have led them to seek a solution in entrepreneurship on an individual (less structured) and cooperative level in a (more structured) manner with The Cooperative Innovation Methodology on Prospecting For Fair Trade Organic Niche, which in either case could lead them to incentivize sustainable agriculture and improve their quality of life [10].

In the same way, the cooperative level in a (more structured) approach then lines up with the principles of fair trade pursuing the following 17 sustainable development goals that are the base for improve the life of the humanity according to the United Nations as: 1. No Poverty, 2. Zero Hunger, 3. Good Health and Well Being, 4. Quality Education, 5. Gender Equality, 6. Clean Water and Sanitation, 7. Affordable and Clean Energy, 8. Decent Work and Economic Growth, 9. Industry Innovation and Infrastructure, 10. Reduced Inequalities, 11. Sustainable Cities and Communities, 12. Responsible Consumption And Production, 13. Climate Action, 14. Life Below Water, 15. Life On Land, 16. Peace, Justice and Strong Institutions, 17. Partnerships For The Goals, Fairtrade International (2021), to avoid problems identified in the cocoa supply chain such as forced labor, working conditions, fair wage impact on the producer's quality of life.

However, this does not guarantee that there is an impact on the customer's perception when it has contact with fair trade labels on supermarket shelves (Schouteten, J.J.; Gellynck, X.; Slabbinck.) [11].

Fair trade promotes cooperative and vertical integration through which producers buy very expensive products and sell very inexpensive products. In other words, in many cases, it is possible to sell its own brands directly to the customer according to Sexton and Iskow [12]. On the other hand, Doherty, in coincidence with Murphy Lacznack and Wood [13], argues that marketing in a truly cooperative company has a definable ethical basis based on the principles of justice, integrity, empathy, and respect that promote a fair trade transparency system that has had a positive effect on the quality of life of producers

mainly in Africa, supported by an increase in production and sales by 2004 and 2011 in the main products such as coffee, cocoa, bananas, and sugar, the main importers being the United Kingdom and the United States of America as mentioned by Wielechowskin and Roman [14]. This growth effect could be due to the influence of regulation and control in their thinking and that this aspect could condition producers' intention concerning the emotional aspect of their decisions according to Ajzen [15]. The main restrictions of fair trade would be explicit in its regulation that promoting collective entrepreneurship rather than individual entrepreneurship would be a fundamental requirement. It also promotes organic cultivation that restricts the use of chemical pesticides in cocoa production [16].

The productivity management of Western agri-food cooperatives could present some difficulties in monitoring production and this could impact on limited capacity. In the case of cocoa productivity, yields in producing countries such as Ghana average 2755 kg per 1.04 ha with a standard deviation of 2828.90 as reported by Kwabena Gyimah-Brempong, [17]. In the case of Peru, technology would have had an impact on improving productivity due to the influence of institutions such as UNOPS (United Nations), ICT (Institute of Tropical Crops), PDA (Alternative Development Program). According to Palma Moscosa, Linda Catalina [18], the pro-Amazon characterization of the San Martin region of Peru.

This study focuses on the population of Nuevo Bambamarca, province of Tocache, San Martin region of Peru with the sample of 20 cocoa producers in the experimental and control group (Table 1).

Table 1. Descriptive analysis. Characteristics of the participants in the sample ($n = 20$).

Alpha (Maximum Type I error)	$\alpha 0.030$
1- α /2—Two-tailed Trust Level	$1-\alpha/2 \times 0.985$
Z1- α /2—Patterned value	$Z1-\alpha/2 \times 2170$
Beta (Maximum Type II error)	$\beta 0.275$
1- β —Statistical Power	$1-\beta \times 0.725$
Z1- β —Patterned value	$Z1-\beta \times 0.598$
Group Variance 1	$s12 \times 256$
Group Variance 2	$s22 \times 256$
Proposed Difference	$x1-x2-28.2$
Calculated size for each group	$n \times 19.9$
Minimum size for each group	$n \times 20$

In all the San Martin region shows yield per hectare at three levels: (a) low yields, which are 20 percent and reach 500 kg/ha, which do not fertilize, rarely produce trees, low fertilization, and pest control; (b) average yields of 60 percent, which amount to 1500 kg/ha, which perform agronomic practices, integrated management of pest maintenance, benefits and control activities in a partial way, regular payment with minimum fertilization; (c) high yields, which are 20% and reach 2000 kg/ha to 4000 kg/ha (Tables 2 and 3) which apply high technology for maintenance activities of cocoa culture with good agronomic practices, with technical knowledge, fertilizer material and harvest every 15 days. To analyze the behavior of the agricultural production curve, it would be useful to cite the law of decreasing yields that considers the factors of production of the decreasing yield curve as land, water, labor, capital, seeds, fertilizer, pesticides, etc. describing non-distribution [19].

The cocoa production curve in research could identify organic producers and fair trade belonging to the cooperative (collective enterprise) that perform agronomic practices, integrated management of maintenance activities, profit and partial pest control, and regular fertilization with minimum fertilization as the conventional producers of (individual enterprises), but the factor of the methodology of cooperative innovation and exploration of niche markets would be added. According to Cook [2] and Ortmann and King [3], there would be an effect of the cooperative structure on efficiency. In this sense, the objective of the research is limited to identifying the subsequent results of productivity concerning

the two entrepreneurship decision alternatives (individual or collective) into the moving decision of the change of the coca and the entrepreneurship with the cocoa.

Table 2. Results of control group: conventional.

N°REG	Unit Price (USD × kg)	Unit Cost (USD × kg)	FIXED COSTS (USD × Year)	Y (Real Production) (kg × Ha)	Optimal Production (kg × Ha)	Y (Real Benefit) (USD × Ha)	Optimal Benefit (USD × Ha)	Social Gap (USD × Ha)
1	1.92	1.47	2112	1500	2000	768	1728	960
2	1.92	0.73	1333	1000	2000	587	2507	1920
3	1.92	1.23	656	1500	2000	2224	3184	960
4	1.92	1.95	1536	1200	2000	768	2304	1536
5	1.92	1.03	826	1300	2000	1670	3014	1344
6	1.92	1.22	533	700	2000	811	3307	2496
7	1.92	1.92	1984	1000	2000	64	1856	1920
8	1.92	1.25	640	1400	2000	2048	3200	1152
9	1.92	1.64	1000	1000	2000	920	2840	1920
10	1.92	1.60	992	1200	2000	1312	2848	1536
11	1.92	1.00	624	1800	2000	2832	3216	384
12	1.92	2.27	2080	1200	2000	224	1760	1536
13	1.92	1.76	800	1000	2000	1120	3040	1920
14	1.92	2.16	1200	1000	2000	720	2640	1920
15	1.92	1.36	480	900	2000	1248	3360	2112
16	1.92	1.60	1440	900	2000	288	2400	2112
17	1.92	1.28	640	1000	2000	1280	3200	1920
18	1.92	1.14	504	1000	2000	1416	3336	1920
19	1.92	1.87	1517	1200	2000	787	2323	1536
20	1.92	1.81	1421	1600	2000	1651	2419	768
Average	1.92	1.51	1116	1170	2000	1137	2724	1594

Table 3. Results of experimental group: fair trade and organic.

N°REG	Unit Price (USD × kg)	Unit Cost (USD × kg)	FIXED COSTS (USD × Year)	Y (Real Production) (kg × Ha)	Optimal Production (kg × Ha)	Y (Real Benefit) (USD × Ha)	Optimal Benefit (USD × Ha)	Social Gap (USD × Ha)
1	1.92	1.12	1224	1800	2000	2232	2616	384
2	1.92	1.40	789	1800	2000	2667	3051	384
3	1.92	1.78	920	1000	2000	1000	2920	1920
4	1.92	1.12	672	1000	2000	1248	3168	1920
5	1.92	1.01	1797	1200	2000	507	2043	1536
6	1.92	1.10	816	1800	2000	2640	3024	384
7	1.92	0.70	261	2000	2000	3579	3579	0
8	1.92	0.61	605	1200	2000	1699	3235	1536
9	1.92	1.07	678	1800	2000	2778	3162	384
10	1.92	1.51	909	1000	2000	1011	2931	1920
11	1.92	1.76	1156	1000	2000	764	2684	1920
12	1.92	1.05	885	1200	2000	1419	2955	1536
13	1.92	1.48	366	1000	2000	1554	3474	1920
14	1.92	1.89	976	1000	2000	944	2864	1920
15	1.92	1.30	504	1500	2000	2376	3336	960
16	1.92	1.03	819	1500	2000	2061	3021	960
17	1.92	0.89	800	1800	2000	2656	3040	384
18	1.92	1.01	1680	1500	2000	1200	2160	960
19	1.92	1.80	634	2000	2000	3206	3206	0
20	1.92	0.88	532	1500	2000	2348	3308	960
Average	1.92	1.23	851	1430	2000	1895	2989	1094

2. Literature Review

The mapping process is related to each identified decision-making moment faced by the farmer in Nuevo Bambamarca since the change from coca cultivation to cocoa (Figure 1):

The first Decision-Making or Legal Production (Figure 1) would be related to the farmer's decision-making process to grow a new lawful crop that demonstrates a change in the farmer's thinking about how to solve his poverty problem on a tender basis, the violence to which farmers were exposed by belonging to an illicit business chain such as coca could endanger his life and that of his family.

The decision of producers from the initial context of their microworlds would stop producing excessive volumes of coca that include them in the illicit chain. The change from coca to cocoa cultivation would positively influence the emotional aspect of the farmer in the face of the inherent benefits that emotional stability would bring for his life and that of his family as he undertakes a lawful crop like cocoa at USD 1.92 per kg, the same price of illicit cultivation as coca according to Sengue [1].

It is possible that positive emotion such as that pointed out by Glimcher and Rustichini [20], would have had an impact on the individual and collective entrepreneurship decision on farmers in Nuevo Bambamarca, Peru. On the one hand, individual entrepreneurship is driven by holistic competencies more enhanced with the self-realization of personal expectations and on the other hand, collective entrepreneurship driven by holistic competencies more aligned with the search for improvement of family life, empathy, self-control, emotional control consistent with cooperative principles that would be the basis for the formation of associations, cooperatives or hybrid models in some cases.

The Second Decision-Making of Illegal Production (Figure 1), is related to the decision alternative that farmers in Nuevo Bambamarca had to continue producing coca and maintain their relationship with the illicit chain. However, in this case, it was not fulfilled because they decided to change to grow cocoa.

The Third Decision-Making or Collective Entrepreneurship (Figure 1), would be related to identifying productivity efficiencies at the collective level concerning individual efficiencies. To analyze entrepreneurship decisions, it is necessary to take into account the conditions of context that influence the business decision [21] Zoltan and Audretsch. Farmers' decisions regarding real incentives of different kinds to assess efficiency in decisions to undertake at the individual and collective level in farmers in Nuevo Bambamarca could take as a premise the disjunction according to [22] that Rosenbaum, re-emphasized too.

On the one hand, (working with others), cooperating would promote a process of innovation within a context of globalization the interrelationship between workers, experts, employees. On the other hand, (between coworkers), competing among members of a business model such as workers, experts, employees could also generate levels of efficiency. In the case of farmers in Nuevo Bambamarca this has focused on generating productivity by cooperatively undertaking (focus on innovation and prospecting) and undertaking individually (focused on promoting competition among farmers for the sale of conventional cocoa during the annual campaign). Therefore, the debate we wanted to present in this study assumes that collaborative and competitive behavior is just as important for business in different situations as noted by [23] Beerman: "The value of competition in job performance cannot be underestimated" and in the case of business competition either.

However, the changes required by contemporary organizations, individual-based structures, as well as collective-based structures and, as a result, internal cooperative behavior cannot be underestimated according to [24] Allred and Milles, considering that both have an impact on productivity through entrepreneurship and, therefore, it might depend on the farmer's preferences to choose which of the types of entrepreneurship are in coherence with their emotional aspect, that is, with which of the two types of entrepreneurship he/she feels better.

Considering collective entrepreneurship, cooperative architecture could maximize efficiency in agriculture but would define different types of structures depending on surplus

ownership and distribution in accordance with Iliopoulos [25]. These aspects that could motivate producers to be part of the cooperative would be the additional income that could eventually be received by a farmer belonging to the cooperative such as the “surpluses” that are calculated after covering all annual costs and distributed among each farmer of the cooperative depending on the deliveries in kgs made by the farmers. On the other hand, the annual fair trade premium will depend on how many contracts in kgs with this certification have managed to sell the cooperative and that will make an additional impact for the farmer. However, the fate of the fair trade premium will depend on the decision and approval of the General Assembly concerning three possibilities: (1) invest fully in stress-reduction to improve productivity, (2) invest in training of cooperative member farmers and (3) distribute among farmers one factor per kg based on their deliveries to FLO International [26]. This is in accordance with three basic cooperative principles: (a) the user-owner principle: those who own and finance the cooperative are those who use the cooperative, (b) the use control principle: those who control the cooperative are those who use the cooperative, and (c) the user-benefits principle: The cooperative’s sole purpose is to provide distribute benefits [27].

The Fourth Decision-Making of an Individual Entrepreneur (Figure 1); farmers who decided to undertake individually with conventional cocoa received the same prices per kg, (around USD 1.92 per kg) as farmers who decided to belong to the Naranjillo Cooperative in Bambamarca district and who produced fair trade organic cocoa. It is therefore clear that the price variable did not represent any additional incentive. Sometimes cooperatives address market imperfections [28].

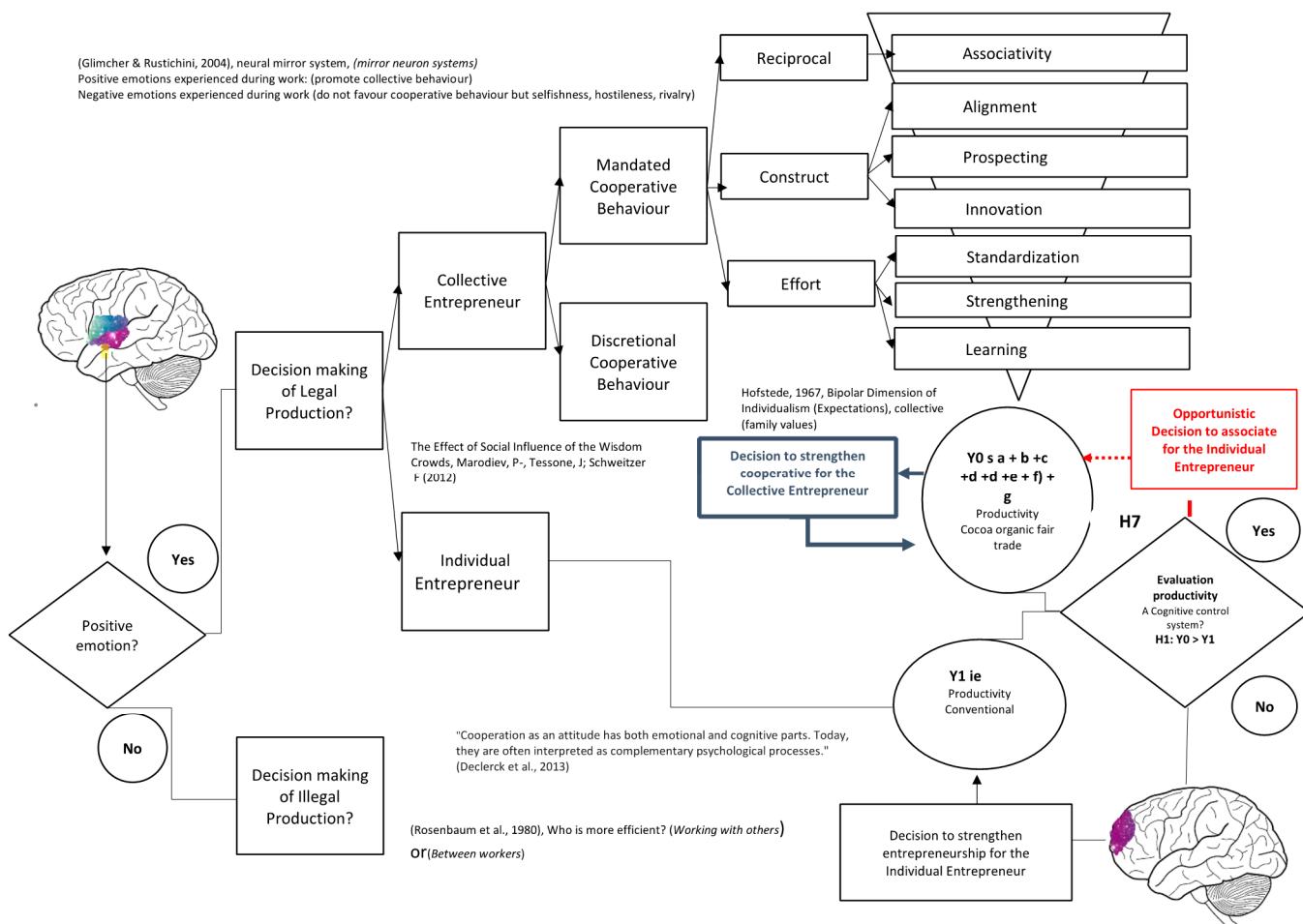


Figure 1. Research model: the cooperative innovation methodology on prospecting.

The Fifth Decision-Making or Discretionary Cooperative Behavior (Figure 1), is related to the behavior of the farmer who without obeying any rule or rule chooses to undertake cooperatively. It is perhaps influenced by the aspect of interculturality [29]. In the case of cocoa farmers who formed Nuevo Bambamarca, most farmers had ancestors or came mostly from the province of Cajamarca in the Peruvian Andes, and that in this context the variable of interculturality could have influenced the collective or individual behavior of the venture.

The sixth decision-making or mandated cooperative behavior (Figure 1), is by farmers who decided to belong to the cooperative that produces organic cocoa and fair trade could incentivize their productivity in a (more structured) way through: "The Cooperative Innovation Methodology on Prospecting For Fair Trade Organic Niche" through which they can participate in a chain that focuses on exporting to market niches and innovates with new pipelines through seven strategic phases such as phase 1: associativity, phase 2: alignment, Phase 3: prospecting, Phase 4: innovation, Phase 5: standardization, Phase 6: strengthening, Phase 7: learning to boost productivity. In the same way, Michael Cook [2] mentions structured management: "cooperative genius".

The Seventh Decision-Making or Evaluation who Produces More Productivity (Figure 1), is the research question in order to identify whether farmers in the fair trade organic cooperative who are managed through "The Cooperative Innovation Methodology on Prospecting For Fair Trade Organic Niche", and whether they have higher productivity than farmers who do not belong to the cooperative and who produce conventional cocoa.

3. Materials and Methods

This research study is experimental research, cross-sectional, descriptive explanatory. The main objective of this research is to demonstrate the effect of the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche improve the productivity of the cocoa producers organic and fair trade in eight phases by formulating variables for running good business experiments.

- The hypothesis rooted in observations, insights, or data (*decision making*);
- The experiment focused on a testable management action under consideration, the measurable variables (*productivity*);
- The experiment fits into the organization's overall learning agenda and strategic priorities (*Identify strong reasons for associativity*);
- The organization has a better understanding of what variables are causing which effects (alignment to macro trends, prospecting to a niche market, innovation, standardization of the raw material technical specification for collection, strengthening of the producer's commitment, learning of the producers in crop management).

3.1. Research Question

Will the Cooperative Innovation Methodology on the Prospecting For Fair Trade Organic Niche improve the productivity of the organic and fair trade cocoa producers more than conventional producers that do not belong to the cooperative?

Y0. $(a + b + c + d + e + f + g)$ (productivity of the entrepreneurship decision collective that depend of the variables of the Cooperative Innovation Methodology on the Prospecting For Fair Trade Organic Niche: (a) associativity, (b) alignment, (c) prospecting, (d) innovation, (e) standardization, (f) strengthening, (g) learning).

Y1. (Productivity of Entrepreneurship Decision individual).

Affirmative Hypothesis (H1). *The Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche improves the productivity of the cocoa producers organic and fair trade more than conventional producers who not belong to the cooperative.*

H1. $Y0 > Y1$.

Negative Hypothesis (H2). *The Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche did not improve the productivity of the cocoa producers organic and fair trade more than conventional producers who did not belong to the cooperative.*

In the case of organic cocoa and fair trade farmers who decided to belong to the Naranjillo Cooperative ([30] Note: This company was formerly known as Cooperativa Agraria Industrial Naranjillo. It has been recently acquired by Kulkao. Available online: <https://kulkao.com> (accessed on 23 July 2021)) were therefore managed by the cooperative innovation methodology of organic niche prospecting and fair trade. The question is whether business variables would have been taken into account in the methodological phases to strengthen productivity in the group of farmers belonging to the Naranjillo Cooperative in Nuevo Bambamarca.

To answer this question, it is important to analyze three functional characteristics or components of cooperation posed by Matuska and Landowska [31] and detailed below relating to the cooperative innovation methodology set out in (Figure 1). On the one hand: (1) Reciprocity according to Pinto, and Prescott [32]: Aspects of what is based on the behavior of exchange between members of a cooperative group in different ways. This has to do with what I will give and what I intend to receive as a farmer who is part of an associative or cooperative group, (2) Construction in concordance with Wegner [33]: “Describe the degree to which entities care about the overall objective rather than the individual objectives”. Cooperative relationships require the development of new products, services, and business models and (3) Effort by Salas, Sims, and Burke [34]: Cooperation is understood as an employee’s voluntary contribution to the successful realization of interdependent organizational tasks according to (Figure 1).

According to Matska and Landowska Pag. 87 [31], to understand the logic of collective thinking, it is necessary to take into account the economic aspect: “Economic discourse traditionally uses a concept of cooperation to explain the obvious benefits arising from the combination of joint activities of different groups of suppliers (e.g., workers, farmers, etc.) and consumers, covering production, distribution or trade. In terms of management, cooperation is defined as “the interaction of two or more individuals or organizations directed towards a mutually beneficial common goal, or an act or instance of working or acting together for a common purpose or benefit.

In this same sense, variables have been taken into account as associativity as a characteristic of groups that share the same cooperative interests and principles as pointed out by Davis and Donaldson [35] concerning what was pointed out in the case of Robert Owen “Innovated in technical production processes and related to employees and working conditions”, “It was moved by values focused on human beings and not capital”.

“This did not prevent him from applying the latest technologies and production techniques.” While in capitalism the medium is the human being and the end is capital, perhaps in cooperativism, the medium is capital and the end is the human being.

The main question raised by Professor Dr. Antón Costas in the inauguration speech of the Congress of Researchers in Social Economy and Cooperative CIRIEC 2020 at TecnoCampus Mataró was: “*Can this pandemic favor that new social contract that I believe our societies need to reconcile the capitalist system with social progress, with parliamentary liberal democracy and with planetary health?*” [36].

The associative and cooperative model in addition to a lifestyle that is summarized by cooperative principles as indicated by Davis and Donaldson [35] such as free adhesion, pluralism, singularity, etc., plant an alternative economic development in which capital could be put as a means and as an end to the human being.

To analyze the reasons why a farmer associates with an association or cooperative it might be interesting to analyze the improvement in the ability to negotiate better prices with those purchased at the collective level taking into account the rules of winning—winning that guarantees sustainability in business according to Nash [37], to sell larger volume scales at the team level, therefore, lower variable costs and to more easily dilute fixed

costs, to improve quality standards at the group level because investment for payment, technology and training can be costed at the group level.

To get a farmer to decide to freely adhere to a cooperative, it could be necessary to focus on niches of a market that allows them to access specialized markets, to finance the production volume chain with financing costs, and to achieve the export of their products at the group level.

To this end, it might be necessary to focus on innovating by adding value to what has no value, developing social brands, achieving the diversification of its products at the group level.

To operate market variables that could motivate the decision to opt for a type of collective entrepreneurship in farmers, the methodology of cooperative innovation and prospecting of organic fair trade niche markets has been increased.

To determine whether individual entrepreneurship or collective entrepreneurship would have higher productivity in cocoa farmers in the Tocache district, it was proposed to identify where the impact of the Cooperative Innovation and Prospecting Methodology on Organic Niches and Fair Trade on the productivity of organic cocoa and fair trade farmers belonging to the Naranjillo Cooperative was higher than the productivity of non-conventional cocoa farmers who did not belong to the Cooperative.

3.2. Determination of the Population and Sample Size

Population:

- Comprised 5000 families according to Minagri [38] and 2600 active producers according to Alvarado [39].
- Sample size: to calculate the sample size, the formula for media comparison was used, using data from a pilot study: $n = 20$ the minimum sample size found was 20 in the experimental group who were trained by the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche and 20 subjects per control group who were not trained by the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche. (Table 1).
- The sample size will depend on the expected effect (experimental group: 20 cocoa producer organic and fair trade).
- The control group: (20 conventional cocoa producers do not belong to the cooperative).
- The experimental evidence adds transparency to our decision-making process (results in profit in the experimental group and control groups).
- Random sampling was performed to choose the 20 producers of the experimental group and control group.
- To select the cocoa producers from the experimental group, the factor of the size of the farm with an average of 5 hectares was considered.
- The characteristics of the cocoa growers' farms in the experimental group and control group were the same because they are located in the same area of Nuevo Bambamarca that has the same climate, soil conditions, etc.
- The characteristics of the 20 cocoa producers in the experimental group would have an average level of yield. That is to say, they would be in 60% of the producers in the San Martin region who were trained by institutions like UNOPS (United Nations), ICT (Institute of Tropical Crops), PDA (Alternative Development Program), and this would allow them to earn a return of 1500 kg/ha [18].
- The characteristics of the 20 cocoa producers in the control group would have an average level of yield. That is to say, they would be among 60% of the producers in the San Martin region who were trained by institutions like UNOPS (United Nations), ICT (Institute of Tropical Crops), PDA (Alternative Development Program) and would allow them to earn a return of 1500 kg/ha [18].
- For the 20 producers of organic cocoa and fair trade belonging to the cooperative, they could impact their production curve with an additional factor called the coop-

erative structure to be represented in the Cooperative Innovation and Prospecting Methodology on Organic Niches and Fair Trade.

- For the 20 non-cooperative conventional cocoa producers, they would maintain their average yield production curve through agronomic practices, integrated management of maintenance, benefit, and pest control activities in a partial way, regular fertilization with minimal fertilization without the application of technology as classified in [18].
- To calculate the sample size, the formula for media comparison was used, using data from a pilot study.

3.3. Instrument

We used the questionnaire named “socially balanced” to conduct interviews. This asks questions about the sale price, cost of materials, cost of handmade, indirect cost and volume of the campaign, level of productivity, type of crop, member or not of the cooperative.

3.4. Phases of the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche

The incentive phase of associativity: In this phase (Figure 1) the training of the cooperative allowed them to implement entrepreneurship where it allowed them to have greater bargaining power, volumes needed to export, and quality standards of all the production of the group of farmers. However, to reach this business decision it is important to deepen those aspects on an emotional level, i.e., those holistic competencies found on the right side of the brain could have unconsciously influenced the farmer by predisposing them to associativity in the same way as assessing the predisposition to innovation as indicated in the holistic innovation methodology [40]. Therefore, what holistic skills might have influenced the farmer’s decision-making process? To answer this question, it would be important to address innovation from different holistic competencies that could be manifested in the willingness to generate a change in its scope by producers such as Stress Management, Belief of Being Creative, Self-Knowledge, Insight, Side-Disruptive Thinking, Intuition + Reason, High Automotive, Ease to Solve Problems, Constant Search for Ideas, Transgressive Attitude, Creative Leadership, Naive Thinking, Recognition Search, Life Improvement, and Level of Holistic Innovation according to Ponti and Ferras [41]. According to Kurzweil [42] there would be a structure of thought that would be the precursor to decisions organized according to a hierarchy of patterns and concepts. Similarly, there would be an ability to associate a pattern with an intrinsic part, when inputs from a lower-level pattern recognizer flow to a higher-level recognizer, the connection that is established as a “weight” indicating the importance that that particular element has in the pattern. For example, the highest level of correlation detected among some entrepreneurship competencies of producers of a cooperative in managing their own fields with producers of the same cooperative as directors was “Search for Life Improvement” which could explain the pattern of associativity from an intrinsic element of high importance by purpose [43]. The pattern structure would arise by the association of both concepts. Much of human behavior comes out as a by-product of adaptive mechanisms in the mind and brain [44].

It is possible that your need to feel more confident in your decisions by making them together, taking into account what Ranauht H. and Lorenz noted [45] regarding the fact that, “The wisdom of the multitudes refers to the phenomenon that the aggregate prediction or prognosis of a group of individuals can be surprisingly more accurate than most individuals in the group and sometimes that any of the individuals that make up it” or in other words that union makes force. However, as noted by Marodiev, Tessone and Schweitzer [46], this wisdom would depend on the configuration of its diversity and accuracy, that is, upon those who enter as members.

The alignment phase to macro trends: In this phase (Figure 1) and to analyze the influence of macro trends as a niche of organic consumption and fair trade on farmers’ motivation to strengthen their productivity we must take into account that in the case of organic certifications they establish a regulation that restricts farmers in the management of their organic cocoa fields and fair trade such as they should not use chemicals to feed

pests. In the case of fair trade certification, it assumes the restrictions of organic regulation and also considers the need to promote associativity in producers, and children should not work in the fields but must go to school. These limitations are set out in FLO International regulations and organic certification [26].

Considering that fair trade certification promotes associativity directly in its principalities, this factor could have been one of the key points in the Tocache district farmers' decisions.

However, it is important to mention that to take into account this control variable we should point out that the producers of Nuevo Bambamarca for the exhibition received during the purchase campaign from March to June 2020 the same price of 1.92 USD per kg, therefore, there should be no greater interest in producing organic and fair trade if, in the end, they obtained at the individual level both certified organic farmers and fair trade from the Naranjillo cooperative and conventional cocoa farmers who did not belong to the Naranjillo Cooperative.

However, it is also true that farmers of organic cocoa and fair trade of the Naranjillo Cooperative may have had the possibility of obtaining the fair trade premium according to the fair certification policy whose use depended on what the cooperative assembly approves respect for three predictability: one first possibility would be to invest in infrastructure, technology seeking to improve productivity.

The other alternative would be the investment in training of the cooperative's partners and finally, the direct distribution could also be approved as a direct incentive that is calculated as a premium per kilo that was delivered at the end of the campaign to each producer additionally. In the 2011 min of the general assembly of the Naranjillo Cooperative, it was approved to use 745,000 Peruvian soles that at the dollar exchange rate were 196,000 USD in return for 30% to apply for a non-refundable program called Agroideas that 1.8 million Peruvian soles that are approximately 484,000 USD would be used to repower the tanks of the industrial cocoa semi-finished plant. Projects of this nature may strengthen the unit of membership with the cooperative as mentioned by Michael Cook [2]. However, for the experience, farmers who joined the Naranjillo Cooperative, which already had the industrial plant but which locks with only 30% of its installed capacity and that its fixed costs as very high, had been achieving consecutive losses in the last two annual financial statements according to the revision of the financial statements of Naranjillo Cooperative in 2010 that were taken into account.

The prospecting phase of fair participation: In this phase (Figure 1) The management committee of the Naranjillo Cooperative could guarantee organic cocoa farmers and fair trade the possibility of getting the best margins with the additional fair trade premium at the end of the campaign. This took into account that the management team of the Naranjillo Cooperative had developed the strategic plan 2010–2020 that guaranteed the synchronization of its production chain from the field to reach the industrial plant could impact the best margin for farmers. Subsequently, the marketing of organic certified products and fair trade was necessary to market in specialized international fairs. Evidence was found that the Naranjillo Cooperative participated in the organic and fair trade specialized fair fairs such as Biofach 2010, Biofach 2011 [47] which were communicated by the producers as a need to motivate their involvement in their level of productivity.

The innovation and design phase of the prototype: In this phase (Figure 1) The management team's search for margins for the development of new products could have incentivized the farmer's productivity in the field. Regarding this phase, evidence was found that the management team had developed a variety of cocoa-based products such as organic chocolate fair trade Mechsaosha, chocolate organic fair trade Gran Inka, cocoa Bahia, and additionally the product line based on cocoa with the brand Justo Campos [48] which are known products in the area that could have motivated the producer's involvement in the field. These initiatives are aligned with innovation strategies such as those mentioned in Ponti and Ferras [40] and what Colom mentioned [49] concerning innovation initiatives to be promoted by cooperatives.

It is very important to promote a culture of experimentation in the organization in contact with international clients and to be the basis for new developments [50].

The standardization phase of the raw material technical specification for collection: In this phase (Figure 1) the commercial development achieved by the management team of the Naranjillo Cooperative by contacting international clients such as GEPA (Germany) [51], meant a source of pride for organic and fair trade farmers who belonged to the Naranjillo Cooperative and that this would have been an incentive for their involvement in productivity and boost the standardization of cocoa quality.

The strengthening phase of the producer's commitment: In this phase (Figure 1) the Naranjillo Cooperative had in its structure a family committee that was in charge of coming into contact with the families of farmers to monitor the levels of quality of life. These developed activities that could carry out parallel business activities such as: raising animals, bio-goals, etc. to strengthen the family economy and improve the quality of life of the farmer. The success of the family committee was the participation of the role of women in the development of activities. The active participation of the family committee could have impacted the involvement of a farmer in the productivity of the field. According to Franken and Cook [52] the most experienced directors and presidents seem to sacrifice performance to better serve partners, and also the training of directors improves financial performance. This effect is evident in one of the most developed cooperative sectors in Europe such as Spain; in FIMA 2020 [53], Isabel Bolmal Diaz, Director of the Directorate-General for Rural Development, Innovación announced the Spanish Rural Training Plan 2020 which aims to achieve at least 10% of them to have the degree of doctor.

The learning phase of the producers in crop management: In this phase (Figure 1) Naranjillo Cooperative had a producer strengthening committee that was in charge of technical assistants assigned by the sector responsible for training the farmer member of the cooperative in the management of productivity in the field such as preparation of the land, sowing of cocoa, pruning of the cocoa tree, payment, and management of pests taking into account the standards of organic certification and fair trade. The lessons taught could have created a link of commitment between (technical assistant–farmer) that could have favored the improvement in the productivity levels of the farmer in a contribution to the teaching. In the Acepat Cooperative (Peru), we can observe that the holistic competencies of entrepreneur impact the learning process of the students and maybe this effect is the same in the organic and fair trade cocoa producers of the cooperative Naranjillo, Zuñiga, I (2020): “Impacto de las Competencias Holísticas de Innovación Del Emprendedurismo en el Aprendizaje de la Economía” (Impact of Holistic Entrepreneurship Innovation Competencies on the Learning of the Economy) [54].

The evaluation phase of productivity in the field: In this phase (Figure 1) the Naranjillo cooperative had in its structure a Producer Strengthening committee that had in charge of the department of technical assistant sectors who monitored productivity in the farmer's field and which was subsequently compared to the registration of their deliveries in (kg). Therefore, this tour made it possible to know what the production potential of each production area was, including Nuevo Bambamarca. It also allowed calculating the current level of cocoa production and the optimal level of production that each farmer should have per hectare. Efficiencies in agri-food cooperatives would have to do with aspects such as production costs and the rights to share surpluses that would be based on the level of productivity that producers achieved. (Valentino, 2006) [55]. The production curve would have a behavior based on the law of decreasing yields that would describe a parable and that could reach optimal levels of 1500 kg/ha average in the Nuevo Bambamarca populated center, province of Tocache by good agronomic practices, integrated management of maintenance activities, benefit and control of pests partially, regular payment with minimal fertilization [18], and the cooperative structure (the Cooperative Innovation and Prospecting Methodology on Organic Niches and Fair Trade).

4. Results

4.1. Control Group Results

In the control group, the 20 conventional cocoa producers not belonging to the cooperative would impact the management of the average yield production curve through good agricultural practices not structured by a cooperative [2,18]. As a result, there could be a positive impact on the average production curve of 1170 kg/ha, with production minima of 700 kg/ha and production ceilings of 1800 kg/ha according to (Table 2).

The actual average point of production in the experimental group was $X_1 = 1170$ kg/ha, consisting of the 20 non-cooperative conventional cocoa producers who managed the production curve through good agricultural practices without cooperative structure [2,18], attained average benefits of $Y_1 = 1,1137$ USD per campaign (Figure 2).

The gap to achieving expected benefits between the actual average point of production 1137 USD and the expected average point of production 2724 USD in the control group was 1594 USD per year consisting of the 20 non-cooperative conventional cocoa producers who managed the production curve through good agricultural practices without structure [2,18] (Table 2).

The required average equilibrium point would be $X_e = 2722$ kg per ha in the control group, consisting of the 20 non-cooperative conventional cocoa producers who managed the production curve through good agricultural practices without cooperative structure [2,18] to cover an average fixed cost of $Y_e = 1116$ USD (Figure 2).

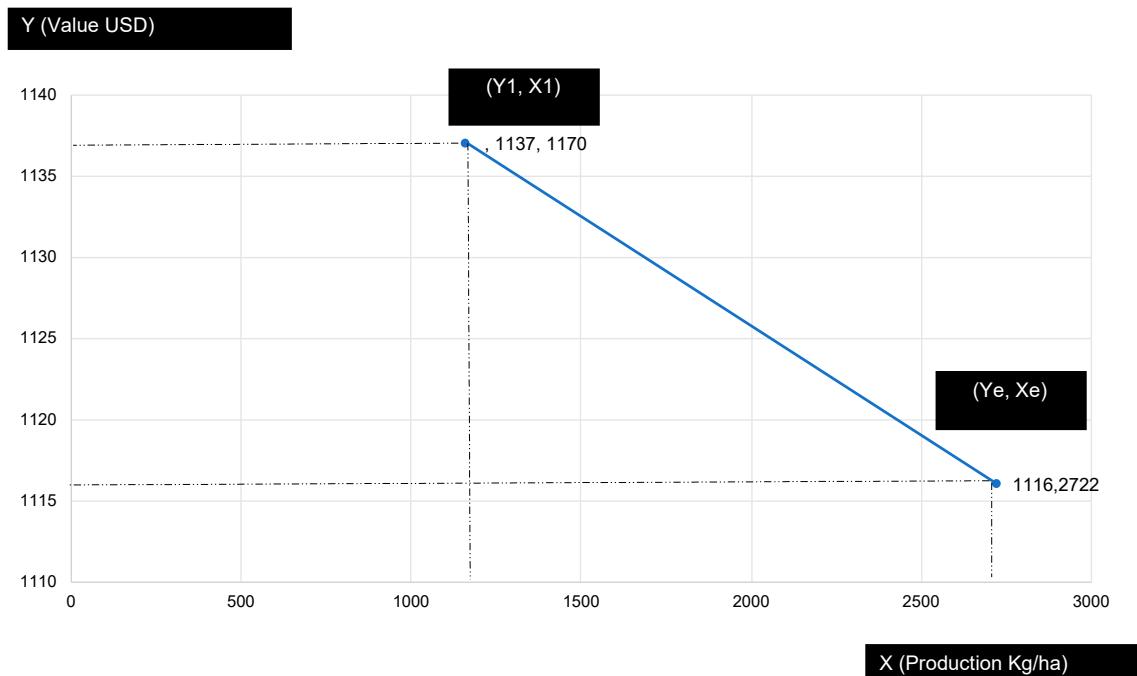


Figure 2. Graphic of results—control group.

4.2. Experimental Group Results

In the experimental group, the 20 producers of organic cocoa and fair trade belonging to the cooperative would impact the management of the average yield production curve through good agricultural practices structured by the cooperative (the Cooperative Innovation and Prospecting Methodology on Organic Niches and fair trade) [2,18]. As a result, there could be a positive impact on the average production curve of 1430 kg/ha between a minimum range of 1000 kg/ha and a maximum of 2000 kg/ha per (Table 3).

The expected average point of production of $X_0 = 1430$ kg/ha without technology intervention, in the experimental group consisting of the 20 cooperative organic cocoa and fair trade producers who managed the production curve through cooperative-structured

good agricultural practices (the Cooperative Innovation and Prospecting Methodology on Organic Niches and fair trade) [2,18] attained average benefits of $Y_0 = 1894$ USD per campaign (Figure 3).

The gap to achieving expected benefits between the actual average point of production and the expected average point of production in the experimental group was 1094 USD per year, in the experimental group, consisting of the 20 cocoa organic producers and trade that belong to the cooperative and who managed the production curve through good agricultural practices with cooperative structure [2,18] (Table 3).

The required average break-even point would be $X_e = 1230$ kg per ha in the experimental group, consisting of the 20 cocoa organic producers and fair trade belonging to the cooperative who managed the production curve through cooperative-structured good agricultural practices (the Cooperative Innovation and Prospecting Methodology on Organic Niches and fair trade) [2,18] to cover an average fixed cost of $Y_e = 851$ USD (Figure 3).

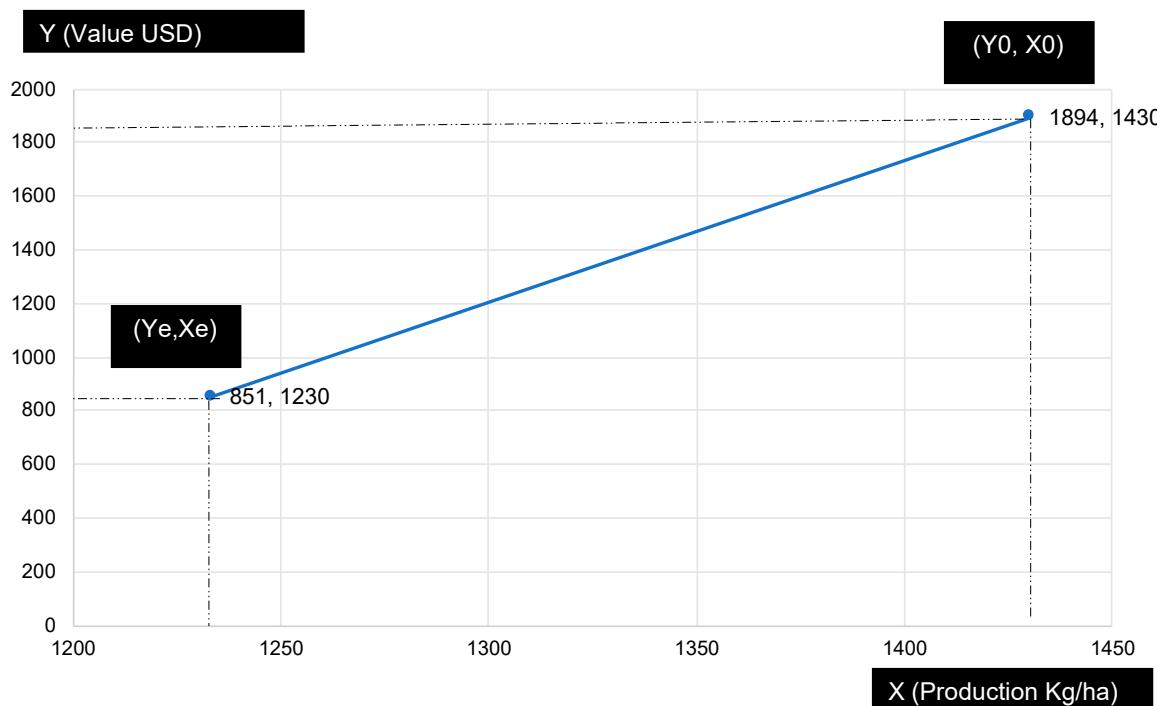


Figure 3. Graphic of results—experimental group.

4.3. Comparative Results

After analyzing the results in the experimental group formed by organic cocoa farmers who belong to the cooperative and the control group formed by conventional cocoa farmers who did not belong to the cooperative, it can be identified that the innovation methodology niche market prospecting cooperative was applied only by the experimental group and that collective entrepreneurship operates in this cooperative.

Sometimes the price could be an important and different variable in the organic and conventional market. However, in this case, the effect of the price was the same for the experimental group and the control group. Therefore, the price was not the real motivation for the producers to choose between collective entrepreneurship and individual entrepreneurship.

For the calculation of productivity in collective entrepreneurship (Y_0) and productivity in individual entrepreneurship (Y_1) the same price of 1.92 USD per kg (Table 4) was considered.

Organic cocoa production was very regulated with respect to some chemical insecticides that the producers could not use to take care of their cocoa trees from the pests.

In this case, the restrictions and difficulties in organic cocoa production would have had greater implications for the collective producers with their collective structure (Cooperative Innovation and Prospecting Methodology on Organic Niches and fair trade).

In the experimental group, productivity in units produced in (kg), in collective entrepreneurship (in farmers producing cocoa with organic fair trade certification of the cooperative) was $Y_0 = 205$ kg per campaign (Table 3). The experimental group obtained benefits and its results could strengthen the decisions of the producers regarding their choice of collective entrepreneurship.

In the experimental group, dollar productivity, in collective entrepreneurship (in farmers who produce cocoa with organic fair trade certification of the Cooperative) resulted in a benefit where: $Y_0 = 143$ USD per annual campaign (Table 4).

In the control group, it is possible for the farmer to manage the productivity by himself with the knowledge that he obtained in the individual experience that manifests itself from the process of decision-making in humans that initiate the adaptation of their microworlds driven by emotional and rational aspects.

The control group identifies the impact on the productivity of individual entrepreneurship (Y_1) (Figure 1). Conventional cocoa production was not very regulated regarding some chemical insecticides that the producers could use to protect their cocoa trees from pests. However, in this case, the facilities in conventional cocoa production, would not have a collective structure (Cooperative Innovation and Prospecting Methodology on Organic Niches and Fair Trade).

In the control group, productivity in units produced, in individual entrepreneurship (in farmers producing conventional cocoa that do not belong to the cooperative) is $Y_1 = -1583$ kg per campaign (Table 4). The control group obtained loss and it is results could weaken the decisions of the producers regarding their choice of individual entrepreneurship.

In the control group, dollar productivity, in individual entrepreneurship (in farmers producing conventional cocoa that do not belong to the cooperative) results in a loss where: $Y_1 = -642$ USD per annual campaign (Table 4).

The productivity assessment in units produced in (kg) of collective entrepreneurship (farmers producing cocoa with organic fair trade certification of the cooperative) is greater than the productivity in units produced in (kg) of individual entrepreneurship (farmers producing conventional cocoa) ($205 \text{ kg} > -1583 \text{ kg}$) ($Y_0 > Y_1$) (Table 4)

The dollar productivity assessment of collective entrepreneurship (farmers producing organic fair trade certified cocoa from the cooperative) is greater than the dollar productivity of individual entrepreneurship (farmers producing conventional cocoa) ($143 > -642$ USD) ($Y_0 > Y_1$) (Table 4).

Table 4. Comparative results.

Average	Legend	Experimental Group	Control Group
Unit Cost (USD)	Uc	1.23	1.51
Unit Price (USD)	UP	1.92	1.92
Unit Margin (USD)	Um	0.73	0.43
Fixed Costs (USD)	Fc	851	1116
Real Production (Unit)	Rp	1430	1170
Equilib. Production (Unit)	Ep	1230	2722
Optimal Production (Unit)	Op	2000	2000
Real Profit (USD per Unit)	Rp	1895	1137
Optimal Profit (USD per Unit)	Op	1460	2724
Social GAP (USD × Unit)	Sg	1094	1594
Productivity (Unit. per Campaign)	Pu	205	-1583
Productivity (USD per Campaign)	P\$	143	-642

As a result of the investigation, it was verified that it could not have any effect on the price of 1.92 USD per kg in the members of the experimental group consisting of organic

cocoa producers fair trade, because it is the same price that was paid to the members of the control group consisting of conventional cocoa producers who do not make up the cooperative. Therefore, this result does not have a confidence level as $p = 1000 > 0.045$. (Table 5).

A significance level of $p. 0.027 < 0.045$ was obtained. (Table 5) by the effect of the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche could have an average of the unit cost of production of 1.23 (USD/kg) in the experimental group consisting of producers of organic cocoa fair trade, which has a lower effect than fair trade on the average unit cost of production of 1.51 (USD/kg.) in the control group.

A significance level of $p. 0.159 < 0.045$ was obtained. (Table 5) as a result of the research, and it is ascertained that the effect of the application of the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche could have average fixed costs of 851 (USD × Year) made up of organic cocoa producers fair trade, with a lesser effect than the average fixed costs 1116 (USD × Year) consisting of conventional cocoa producers that do not make up the cooperative.

A significance level of $p. 0.026 < 0.045$ was obtained. (Table 5) as a result of the research, and it is ascertained that the effect of the application of the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche could have an average of production (and real production) of 1430 (kg/ha) made up of organic cocoa producers fair trade, with a greater effect than the average production (and real production) of 1170 (kg/ha) made up of conventional cocoa producers that do not make up the cooperative. (Table 5).

A significance level of $p. 0.008 < 0.045$ was obtained. (Table 5) as a result of the research, it is analyzed that the effect of the application of the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche could have an average of Benefits (Y Real Benefit) of 1895 (USD/ha) made up of organic cocoa producers fair trade, with a greater effect than the average profit (and real profit) of 1137 (USD/ha) made up of conventional cocoa producers that do not make up the cooperative. (Table 5).

Table 5. Results: p^* statistical test between experimental and control group; DE, standard deviation.

Variable	Experimental ($n = 20$)				Control ($n = 20$)				p^*
	Media	DE	Mínimo	Máximo	Media	DE	Mínimo	Máximo	
Unit Price (USD × kg)	1.92	0.00	1.92	1.92	1.92	0.00	1.92	1.92	1.000
Unit Cost (USD × kg)	1.23	0.37	0.61	1.89	1.51	0.41	0.73	2.27	0.027
FIXED COSTS (USD × Year)	851	385.46	261.00	1797.00	1116	538.16	480.00	2112.00	0.159
Y (Real Production) (kg × Ha)	1430	371.48	1000.00	2000.00	1170	275.49	700.00	1800.00	0.026
Y (Real Benefit) (USD × Ha)	1895	877.12	507.00	3579.00	1137	699.80	64.00	2832.00	0.008

* Statistical test used for group comparisons: U of Mann–Whitney. DE, standard deviation.

The results of the research evidence higher productivity of collective entrepreneurship that could be due among other causes to the impact of the cooperative structure on the efficiency of its members and that would be represented in the methodology of cooperative innovation and protection of niche markets.

The cooperative structure could be considered as a factor within the organic cocoa production curve and fair trade of the co-op producer, achieving a direct impact on the improvement of its average production of the organic cocoa producer and fair trade in ($Y_0 = 1430$ kg) (Figure 2) greater than the average production of the conventional cocoa producer of the non-cocoa co-operative in ($Y_1 = 1170$) (Figure 2).

Similarly, the results could indicate greater efficiency in the allocation of resources considering that the average unit cost of the cooperative's organic cocoa producers fair trade would be 1.23 USD per kilo lower than the average unit cost of the conventional cocoa producers who are not part of the cooperative, which would be 1.51 USD per kilo. The price paid to the organic cocoa producer's fair trade that is part of the cooperative

in the campaign was 1.92 USD per kilo, the same price paid to the conventional cocoa producer that is not part of the co-operative, so the impact on the average profitability of the organic cocoa producers' fair trade is 0.73 USD per kilo higher than the average profitability of the Conventional cocoa producers are 0.43 USD per kg (Table 4). The effect of cooperative structural management that would manifest in the productivity effect on organic cocoa producers and fair trade that would belong to the cooperative through the implementation of the cooperative innovation and niche protection methodology would affect optimizing efforts to overcome the equilibrium point that would be 1230 kg in the organic cocoa producer and fair trade that belongs to the cooperative was smaller than the equilibrium point of 2722 kg. that would be presented by conventional cocoa producers who were not part of the cooperative. (Table 4).

5. Discussion

The processes of human decisions according to Kahneman's research [4] explain the human neural mechanism by two processes. On the one hand, system 1, "fast", is guided by intuition, associations, metaphors, and impressions, and system 2, "slow", is guided by deliberation and effort. These two approaches could be the basis for understanding management decision-making in emotionally and cognitive organizations. If we review the decision-making process of cocoa farmers in Nuevo Bambamarca from its inception we find three important milestones.

The first milestone was when they decided to change illicit cultivation (coca) and chose to undertake lawful cultivation (cocoa). A second milestone was when they decided to undertake collectively or individually with this new crop and a third milestone was when they evaluated the results of their decisions which could cause them to reinforce their initial decision of entrepreneurship or change.

The decision to exchange illicit crops for lawful crops would be driven by positive emotions according to Glimcher and Rustichini [20] that stimulate the side of the brain (social cognition system: including brain structures such as superior temporal sulcus, anterior frontal media cortex, and amygdala) that make decisions to grow a crop [56].

In the second milestone, each farmer has likely decided to give the (emotional aspect) for the type of undertaken with which they felt most identified and more comfortable among the individual entrepreneurship options (where there is no supervision and the farmer proposes their strategies to produce) and another of collective endeavor (where there is a cooperative-managed structure that translates into quality standards and requirements that must be met by each member about the cooperative).

This study identifies the cooperative strategy called "The Cooperative Innovation Methodology on Prospecting For Fair Trade Organic Niche" with seven strategic phases such as phase 1: Associativity, phase 2: Alignment, Phase 3: Prospecting, Phase 4: Innovation, Phase 5: Standardization, Phase 6: Strengthening, Phase 7: Learning to boost productivity. Furthermore, if we analyze the decisions of the members of a cooperative taking into account the cooperative process called "cooperative genius" according to Michael Cook's perspective, 2018 [2] we can identify that North American cooperative organizations that are longest-lasting have healthy cooperative management that impacts on sustainability based on five phases: the first phase (Economic Justification) by which the reasoning behind the decision is analyzed. In a second phase (Organizational Design) the legal-business-organizational structure is adapted to the needs of the cooperative group. The third phase (Growth, Glory, and Heterogeneity) analyzes the preferences that are emerging in the members as time passes. The fourth phase are the causes of friction and fraction disturbance. The fifth phase concerns deciding the future of the cooperative that has to do with: (a) deciding on settlement, merger, bankruptcy, (b) maintaining the status quo with no change, (c) development, (d) reinvention or significant review. The training of their directives, the creation of dependency projects between the organizations and their members would demonstrate a process of permanent adaptation of the cooperative organization. It would therefore become clear that the second phase of organizational

design would result in a process of adaptation and learning of the members of the cooperative group at the collective intelligence level in cooperative organizations that would achieve greater sustainability. The approach with a structure that promotes growth through vertical integration has an impact on the quality of life of a cooperative model according to Cook [2].

The third milestone of the farmer's decision-making process would be the cognitive control system, centered on the lateral prefrontal cortex), which would help to elucidate the disjunction raised by Rosenbaum [22] regarding which type of group achieved the greatest efficiency. On the one hand, the collective groups (working with others) or the competency groups (between coworkers) had an individual vision. Analyzing the results (Table 1) of the research study can show that the experimental group consisting of organic farmers and fair trade belonging to the Naranjillo Cooperative would be more efficient at the productivity level than the control group made up of the (non-cooperative conventional cocoa farmers and both groups are found in Nuevo Bambamarca. The results to be evaluated are the productivity results of the experimental group was (143 USD per campaign), i.e., higher than the control group's productivity of (-642 USD per campaign) (Table 1) and that this was represented by ($Y_0 > Y_1$) that could strengthen the collective decision of the experimental group (farmers who belong to the cooperative), even though the price was the same (1.92 USD per kg) for the experimental group and the control group.

Another implication would be to investigate the coherence in the decision-making process between the emotional aspect and the cognitive aspect from start to finish. Karl Friston [7] comments in his theory of self-organized criticality, about the thin boundary between genius and madness when he points out that genius and orate propose disruptive solutions but in the case of genius there is coherence between what he feels and what he thinks, and in the case of orate there is no coherence between what he feels and what he thinks. For farmers producing fair trade organic cocoa belonging to the cooperative (experimental group), there may have been no change in the decision that the results obtained by farmers (which they wanted to achieve in productivity) are consistent with (as they wanted to achieve) that through controlled decisions [57].

However, for farmers producing conventional cocoa, they achieved a lower level of productivity and that could lead to a change in the decision of the entrepreneur or not. Considering the results of (Table 1), in the case of farmers producing conventional cocoa that does not belong to the cooperative (control group), in assessing and knowing that the results of their productivity are lower than that of the productivity of the experimental group, they could decide to change their status from individual entrepreneurship to collective entrepreneurship, which could redress an "opportunistic decision-making process" that would be driven by the cognitive aspect instead of the emotional aspect. There could be evidence that some members of cooperatives would demonstrate individual behavior and that their effect would lead to organizational inefficiency as manifested over long years in American cooperatives [25].

The other option is for the conventional cocoa farmer who does not belong to the cooperative (control group) who in coherence with their initial decision to undertake individually decides even though the results indicate that the productivity obtained in the individual undertaking is less than the collective undertaker; in the face of this, they decide to continue to strengthen their status as an individual undertaking. (Figure 1).

The change of decision to undertake individually by the way of undertaking collectively in the case of farmers in the (control group) would not ensure that they promote the strengthening of cooperativism within organizational incoherence by the planets of the effect of the social influence of the wisdom of crowds [45]. In this sense, for social influence to impact the wisdom of the crowds is that it points out how important it is to take into account the configuration of those who become part of the group to make collective wisdom have a social influence; in this case, the group is the cooperative. If the only reason for being part of the cooperative has to do with a cognitive aspect (achieving better results), and that for this I must sacrifice my desire to undertake individually, it is

very likely that since there is no coherence between the (emotional and cognitive aspect) at the time that does not achieve the results of greater productivity with the cooperative chooses to resign.

On the other hand, even if the farmer who decided to start collectively and be part of the cooperative would therefore have a greater demand and responsibility in terms of complying with the regulations of organic standards and fair trade. However, according to Brown and Richerson [58], it would have been discovered that this group would have greater satisfaction in complying with the rules: "Complying with norms "feels good" influence the brain in the same way as the act of receiving"; "Punishing by really hurting defectors (physically or monetarily) activates relative brain reward circuits more than the symbolism of the punishments; activations of the brain's reward circuitry in cited experiments allow the prediction behavioral outcomes—cooperation or lack thereof". This is consistent that the emotional decision-making process that is reinforced by cognitive in the cooperative's organic and fair trade farmers belongs to the experimental group.

The impact of the differences between neural patterns that make up mental models and their effect on the variable of interculturality of migrant farmers in the mountain range with the influence of the Andean world on their mental model would have been taken into account, would be more collective and there would be a greater propensity in this regard to undertaking collectively.

The coherence between the emotional aspect and the cognitive aspect in the decision-making process according to Glimcher and Rustichini [20] would be present in holistic competencies such as those planned by Matuska and Landowska [31] regarding empathy, self-recognition, emotional self-control, which could predispose the decision in the experimental group that would share neural patterns to collectivism and this could be addressed as the presence of organizational memory [42].

The presence of greater holistic competencies in the exhibition group (fair trade organic cocoa farmers) belonging to the cooperative versus the control group (non-cooperative conventional cocoa farmers) could be interpreted as a greater predisposition to innovation and change in the experimental group than in the control group. In this same sense, Rosembaum [22] argues that collective behavior goes in the sense of innovation taking into account the process of globalization.

The cocoa farmer's learning process would be permanent from the first milestone in which a change in the decision to opt for an alternative crop rather than illicit farming would be evident. In a second milestone, the decision-making process would be demonstrated according to the results (Table 2) that the decision to start the cocoa farmer collectively would be a rationally reinforced emotional decision regarding the farmer's decision to undertake individually (Figure 1).

The emotional decision to undertake growing individually could change by processing the rational aspect when the farmer would find that the results achieved at the individual productivity level were lower than the productivity results obtained by the farmers who collectively averaged. This change in the decision to undertake individually to undertake collectively would be identified as an opportunistic decision as it would show inconsistency between the emotional aspect and the cognitive aspect. (Figure 1).

However, in the case of a change of individual endeavor by collective entrepreneurship that would be given more for a cognitive process (in assessing productivity results are greater than at the collective level) and in which the initial emotional aspect that motivated the decision would be contradictory would represent an apprenticeship learning that would not guarantee a true achievement of learning in the farmer because his motivation would have been only economic but would not be committed to family principles and principles that shape cooperativism, so it would be likely that its disaffiliation can be given by verifying that at some point at the cooperative level that he cannot improve his economic situation, in accordance with Sengue [1].

On the other hand, the cooperative principles that would drive the emotional decision of the farmer seeking a cooperative lifestyle at a first moment by being part of

the cooperative since its emotional decision would be subject to reciprocity, effort, and build as required by the behavior that promotes cooperativism according to Matuska and Landowska (Page 98) [31] and then by verifying that the productivity results obtained are greater at the collective level than the productivity of farmers at the individual level would be identified as a decision to strengthen cooperativism (Figure 1).

This collective decision would be most prevalent in cooperatives in the growth phase as proposed by Cook [2] where social influence could have a positive effect on the wisdom of crowds by reducing the initial collective error that would be reflected in the opinion that the individual producer would form because it is aware that their individual entrepreneurship is less productive than collective entrepreneurship and, therefore, being part of the cooperative would be a decision. It would take most individual producers to know that collective productivity results are higher. However, the social influence that could be taken for not achieving the expected results in a cooperative could also cause a social influence, in this case, to lead the majority to the decision to disenroll if it succeeds in being influenced by this decision.

It is possible that one of the reasons that many agri-food cooperatives in North America according to Cook and in South Africa under Ortmann and King [2,3] and other parts of the world present a cycle of parable responding to the external context and internal degeneration that they face as a result of their members' collective decisions would be influenced by a process of social influence in the crowds following a consensus and that the decisions of the majority would not always be the best and would reduce the collective error raised by Mavrodiev and Schweitzer, [59]. The context in which collective decisions would be made would depend on the initial situation from which the initial parameter would start (Size of the collective error in which the decision is made).

If the collective error is very high, for example, that false idea like having very high inventories of products are shared as a result would signal high profitability and a good cocoa campaign for the cooperative, which is not necessarily so because it depends on the rotation of these same inventories and the level of throughput that can impact profitability in the context of continuous improvement that Goldratt and Cox poses [60].

This new knowledge could be updated by new members joining the organization with management experts and could influence the wisdom of the crowds socially by making the initial idea change and reaching a consensus that would impact on reducing the initial collective error and making collective decisions about not keeping inventories high and seeking to sell this product immediately; it would achieve greater rotation, greater throughput, and consequently greater profitability.

If the collective error is very low, for example, as a result of achieving the goal of collecting the cocoa beans needed to meet the contracts of the cooperative, a higher price for organic cocoa and a lower price for conventional cocoa would be paid because the markets to which they are directed also have higher demands in the case of the organic niche. However, given competition in the purchase market, the price that would be paid to producers of organic cocoa and conventional cocoa would be the same. Faced with this fact, the new members of the cooperative in their quest to solve a short-term problem decide to pay for it during the campaign for organic cocoa and conventional cocoa, which makes them achieve their goal of collecting conventional cocoa beans and organic cocoa. However, this fact could have increased the initial collective error by generating the false perception that both products such as organic cocoa and conventional cocoa have the same costs and could generate a level of demotivation on the cooperative's producer by continuing to grow organic cocoa.

This false perception in the producer would increase the collective error of the collective decision by deciding to pay the same price for conventional cocoa beans (Table 2) and organic cocoa beans (Table 3) as per Mavrodiev and Schweitzer [59].

It is also important to analyze that the experimental group organic cocoa producers achieved higher levels of production than the non-cooperative conventional cocoa producers, although the price paid was the same and could have influenced the level of

demotivation. Consequently, the level of individual conviction of the producer could be evidenced by cultivating organic cocoa and belonging to the cooperative.

This group would not be influenced by the conventional cocoa producer external to the cooperative that would reflect less production in the research results and this could show us that when collective decisions are accentuated in the precepts of the knowledge of the crowds, collective influence does not impact on the wisdom of the crowds when there is no collective error.

That is to say, the group of organic cocoa producers belonging to the cooperative is convinced that the only way to achieve surplus results at the individual level in the management of their farms is to achieve high levels of production aided by the control and monitoring of the Cooperative's Methodology that would impact on "Learning phase" (Figure 1).

Finally, the group of farmers who joined the cooperative who are impacted by the seven phases of the methodology of cooperative innovation and organic prospecting and fair trade could be evidence of the positive effect that in this case is affected by the social influence of the wisdom of crowds [45] when members joining the cooperative are driven by a process of consistent decision-making between the emotional aspect and the rational aspect (commitment to comply with the standards and standards set out in the cooperative innovation and prospecting methodology) with which the results were achieved.

Comparing the "cooperative genius" business cycle curve of the cooperative leader identified by Michael Cook [2] with the producer's declining yield curve in the field facing limited resources as stated by Marshall are coincidences in the description of the parable. Therefore, it could be inferred that producers manage their cooperatives by taking into account the hierarchy of neural patterns that they could have learned inconspicuously when managing their agricultural fields (Figure 4). According to the research study applied cooperative learning theory, a high correlation index was identified between the producers as managers who ran the cooperative and the co-operative producers like farmers and managers of their fields according to Kurzweil [39].

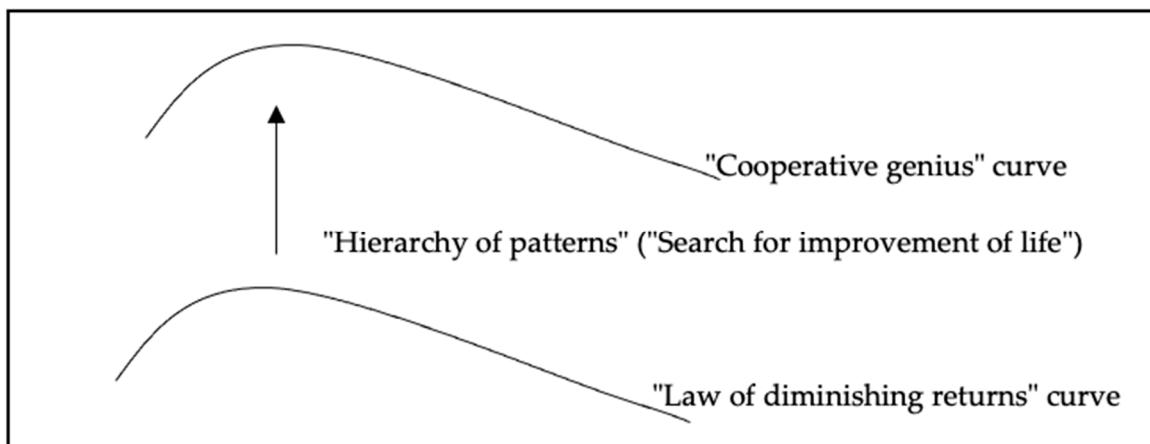


Figure 4. Hierarchy of patterns and comparative curves.

The management of production costs is key in the case of producers as growers to manage the decreasing yield curves optimally and in the case of producers as managers the costs of influencing the structure of governance of agribusiness cooperatives [61].

This new study has attempted to investigate the effects on the social sustainability of the cooperative through analyzing the effects on productivity that the emotional decisions could have.

It is really interesting to review the impact of the emotional aspect in the cognitive aspect related to evaluation of productivity results between the cocoa organic and fair trade of the producer's cooperative and the cocoa conventional of the individual producers. However, the real challenge that remains for future research is to analyze whether the

coherence between the emotional and rational aspects would help to strengthen individual conviction in moments where social influence would try to impact the wisdom of crowds.

One could also find explanations for producers' behavior as individual entrepreneurs from an element of analysis of economic theory that finds some of their explanations from evolutionary biology which identifies man as a rational, self-sufficient, and selfish individual who seeks competition between individuals that can lead to a society that works better and pursues an ideal optimal state.

According to these premises, it could be stated that the origin of the producer's behavior is their individual business. However, perhaps the emotional aspect could favor their collective behavior that could be analyzed in future research [62].

In the research study both the experimental group and the control group were based on the same price conditions and good practices applied in the field were the same as agronomic practices, integrated management of maintenance activities, benefit and control of pests partially, regular fertilization with minimum fertilization according to Palma Moscosa, Linda Catalina [18]. However, the cooperative structure was present in the experimental group through the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organization Niche that could have contributed to greater efficiency geared towards continuous improvement (Goldratt, 2012) [60]. Considering that, the impact on the business cycle of the experimental group allows for better KPIs than the control group in lower production costs, higher production volume, higher productivity, and higher profitability aligned with organic niche standards and fair trade.

A likely update of the research study would be to identify that organic and fair trade cocoa producers belonging to the cooperative of average yields could reach 2000 kg per hectare due to the effects of the cooperative structure [2] as an important factor in the cocoa production curve and that this would reflect how collective entrepreneurship would be more productive than individual entrepreneurship confirming the research study hypothesis.

6. Limitations

More precision in the results could be obtained if the study had been transactional and the sample was larger. However, a representative sample of the populated center of Nuevo Bambamarca of the Province of Tocache has been considered that was homogeneous and had similar characteristics as small units of production (less than 5 hectares).

7. Conclusions

It is concluded that Hypothesis 1 is fulfilled.

The Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche generated a significant ($p = 0.008 < 0.045$) impact in Y (Real Benefits) (USD \times Ha) on the productivity of producers of the organic fair trade cocoa bean (experimental group) over the group of conventional cocoa bean producers who did not belong to the cooperative (control group) (Table 5).

As a result of the research, it is analyzed that the effect of the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche application could have average benefits (Y Real Benefit) of 1895 (USD/ha) made up of organic cocoa fair trade producers, with a greater effect than the average benefits (Y Real Benefit) of 1137 (USD/ha) consisting of conventional cocoa producers that do not make up the co-operative with a confidence level of $p = 0.008 < 0.045$. (Table 4). This is the reason why the Cooperative Innovation Methodology on the Prospecting for Fair Trade Organic Niche generated a significant impact on the productivity of the field of the cocoa bean organic fair trade (experimental group).

The decision making process in the experimental group (organic and fair-trade cocoa producers of the cooperative) was more productive on average than the control group (conventional cocoa producers that not belong to the cooperative). In consequence, collective entrepreneurship impacts more in sustainable agriculture than individual entrepreneurship.

Funding: This research received funding from Universidad Privada Boliviana, 19 February 2021.

Informed Consent Statement: Informed was obtained from all subjects involved in the study.

Data Availability Statement: Data is not publicly available, though the data may be made available upon request from the corresponding author.

Acknowledgments: We acknowledge support from Universidad Privada Boliviana (Bolivian Private University), the University of Lleida, and the University of Zurich. Special thanks to Antonio Colom, Eduard Cristobal, Claudio Tessone, Sergio García-Agreda for your important support, and Leonardo Galvez for English language translation, editing and proofreading.

Conflicts of Interest: The author declares no conflict of interest.

References

1. Senge, P.M. *The Fifth Discipline*; Granica Editions: Mexico City, Mexico, 1998; p. 490.
2. Cook, M.L. A Life Cycle Explanation of Cooperative Longevity. *Sustainability* **2018**, *10*, 1586. [CrossRef]
3. Ortmann, G.F.; King, R.P. Agricultural Cooperatives I: History, Theory, and Problems. In *Agrekon*; University of KwaZulu-Natal: Pietermaritzburg, South Africa, 2007.
4. Kahneman, D. *Thinking Fast and Slow—The Neuroscience Behind Good Decision-Making*; Penguin Books: New York, NY, USA, 2001.
5. Branas-Garza, P.; Cabrales, A. *Experimental Economics*; Princeton University Press: Plagrave Macmillan, UK, 2015.
6. Ministerio de Desarrollo Agrario y Riego del Perú. Estudio del Cacao en el Perú y en el Mundo, un Análisis de la Producción y el Comercio. 2016. Available online: <https://www.minagri.gob.pe/portal/analisis-economico/analisis-2016?download=10169:estudio-del-cacao-en-el-peru-y-en-el-mundo>. (accessed on 22 July 2021).
7. Instituto Nacional de Estadística e Informática. Iv Cenago Censo Nacional Agrario, Producción Nacional, Informe Técnico. Perú. 2017. Available online: <http://proyectos.inei.gob.pe/web/documentospublicos/resultadosfinalesvcenago.pdf> (accessed on 22 July 2021).
8. USAID (2012–2016): U.S. Development Cooperation Strategy of Peru. Available online: <https://www.usaid.gov/sites/default/files/documents/1862/PeruCDCS.pdf> (accessed on 22 July 2021).
9. Friston, K. The free-energy principle: A unified brain theory? *Nat. Rev. Neurosci.* **2010**, *11*, 127–138. [CrossRef]
10. Fairtrade International. Sustainable Development Goals (SDGs). Available online: <https://www.fairtrade.net/issue/sdgs> (accessed on 22 July 2021).
11. Schouteten, J.J.; Gellynck, X.; Slabbinck, H. Do Fair Trade Labels Bias Consumers’ Perceptions of Food Products? A Comparison between a Central Location Test and Home-Use Test. *Sustainability* **2021**, *13*, 1384. [CrossRef]
12. Sexton, R.; Iskow, J. *Factors Critical to the Success or Failure of Emerging Agricultural Cooperatives*; Giannini Foundation Information Series; Department of Agricultural and Resource Economics, University of California: Davis, CA, USA, 1988.
13. Doherty, B. *A Truly Co-Operative Venture: The Case of Co-Operative Food*; Symphonia. Emerging Issues in Management; University of Milano-Bicocca: Milano, Italy, 2007. [CrossRef]
14. Wielechowski, M.; Roman, M. The Essence Of Fair Trade And Its Importance in The World Economy. *Wars. Univ. Life Sci. SGGW Oeconomia* **2012**, *11*, 47–57.
15. Ajzen, I. *The Theory of Planned Behaviour: Reactions and Reflections*; Taylor & Francis: Karnataka, India, 2011.
16. Eco-Logica: Organic Cocoa Production Manual. 2012. Available online: http://www.eco-logica.com/app/download/13009875_278/Manual+Producci%C3%B3n+Cacao+Org%C3%A1nico.pdf?t=1470685615. (accessed on 22 July 2021).
17. Gyimah-Brempong, K. Scale elasticities in Ghanaian cocoa production. *Appl. Econ.* **1987**, *19*, 1383–1390. [CrossRef]
18. Moscosa, P.; Catalina, L. Niveles de Productividad y Rentabilidad Del Cultivo Cacao (*Theobroma Cacao L.*) En La Región San Martín: 2000–2016. EPL-EP Thesis, Trabajo Académico Para Optar El Título de Economista, Lima, Perú, 2018.
19. Marshall, A. Principios de Economía. 1998. Available online: <https://eet.pixel-online.org/files/etranslation/traduzioni/spagna/Marshall,%20Principios%20de%20economia.pdf> (accessed on 23 July 2021).
20. Glimcher, P.; Rustichini, A. The consilience of brain and decision. *Science* **2004**, *306*, 447–452. [CrossRef]
21. Acs, Z.J.; Audretsch, D.B. *Handbook of Entrepreneurship Research*; School of Public Policy, George Mason University: Fairfax, VA, USA, 2010.
22. Rosenbaum, M.; Moore, D.; Cotton, J.; Cook, M.; Heiser, R.; Shovar, N.; Gray, M. Group productivity and process: Pure and mixed rewards structures and task interdependence. *J. Personal. Soc. Psychol.* **1980**, *39*, 626–642. [CrossRef]
23. Beersman, B.; Hollenbeck, J.L.; Humphrey, S.E.; Moon, H.; Conlon, D.E.; Ilgen, D.R. Cooperation, competition, and team performance: Toward a contingency approach. *Acad. Manag. J.* **2003**, *6*, 572–590. [CrossRef]
24. Allred, B.B.; Snow, C.C.; Miles, R.E. Characteristics of managerial careers in the 21st century. *Acad. Manag. Exec.* **1996**, *10*, 17–27. [CrossRef]
25. Iliopoulos, C. Ownership and Governance in Agricultural Cooperatives: An Update. In *AGRERI Working Paper*; Agricultural Economics Research Institute: Athens, Greece, 2015.
26. Flo International: Fair Trade Criterion for Cocoa. 2012. Available online: https://files.fairtrade.net/standards/SPO_EN.pdf (accessed on 23 July 2021).

27. Dunn, J.R. Basic cooperative principles and their relationship to selected practices. *J. Agric. Coop.* **1988**, *3*, 83–93.
28. Su, Y.; Cook, M.L. Price stability and economic sustainability—Achievable goals? A case study of Organic Valley. *Am. J. Agric. Econ.* **2015**, *97*, 635–651. [CrossRef]
29. Hofstede, G. *Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations across Nations*; Sage Publications: Thousand Oaks, CA, USA, 2011.
30. Cooperativa Agraria Industrial Naranjillo. Available online: <https://www.naranjillo.com/> (accessed on 23 July 2021).
31. Matuska, E.; Landowska, A. Cooperation as a core competency. The neuro-economic approach. In Proceedings of the Scientific Papers, 12th International Scientific Conference Human Potential Development, Klaipėda, Lithuania, 27–28 May 2015; pp. 136–148; Retrieved on 2 June 2015.
32. Pinto, M.B.; Pinto, J.K.; Prescott, J.E. Antecedents and Consequences of Project Team Cross-functional Cooperation. *Manag. Sci.* **1993**, *9*, 1281–1297. [CrossRef]
33. Wegner, D.M. A computer network model of human transactive memory. *Soc. Cogn.* **1995**, *3*, 319–339. [CrossRef]
34. Salas, E.; Sims, D.E.; Burke, C.S. Is there a “big five” in teamwork? *Small Group Res.* **2005**, *36*, 555–599. [CrossRef]
35. Davis and Donaldson: Cooperative Management. 2010. Available online: <https://www.birmingham.ac.uk/Documents/college-social-sciences/social-policy/IASS/housing/international-journal-cooperative-management.pdf> (accessed on 23 July 2021).
36. Anton Costas: Inaugural Conference International Congress of Researchers in Social Economy. 2020. Available online: http://ciriec.es/wp-content/uploads/2020/07/CIRIEC_Congreso_Mataro_programa_10.07.20.pdf (accessed on 23 July 2021).
37. Nash, J.F. Non-Cooperative Games. Ph.D. Thesis, Dissertation Princeton University, Princeton, NJ, USA, 1950.
38. Minagri. 2014. Available online: <https://www.minagri.gob.pe/portal/decreto-supremo/ds-2014/10837-decreto-supremo-n-004-2014-minagri> (accessed on 23 July 2021).
39. Alvarado, J. SOS FAIM y las Organizaciones Productoras de Cacao y Café en el Perú: Un Sistema desde La Perspectiva de la Acción Colectiva y La Teoría de las Cooperativas 1995–2015. 2015. Available online: <http://www.coeeici.org.pe/wp-content/uploads/2016/09/SOS-FAIM-y-las-organizaciones-de-productores-de-Cafe-y-Cacao-en-el-Peru.pdf> (accessed on 23 July 2021).
40. Zuñiga, I. Impact of the Holistic Innovation Methodology on the Creativity. *Proceedings* **2019**, *38*, 19.
41. Franc, P.; Xavier, F. *Passion for Innovating*; Standard: Barcelona, Spain, 2008; p. 290.
42. Kurzweil, R. Cómo Crear Una mente: El secreto del pensamiento humano. 2013, A. Accommodating two worlds in one organization: Changing board models in agricultural cooperatives. *Manag. Decis. Econ.* **2013**, *32*, 321.
43. Zuñiga, I. *Theory of Learning in Cooperatives: Impact of Entrepreneurship of Grassroots Organizations on Holistic Innovation Competencies of ACEPAT Executives*, Peru, XVIII International Congress of Researchers in Social Economy; CIRIEC: Mataró, Spain, 2020; ISBN 978-84-121210-1-8.
44. Chiao, J.Y.; Blizinsky, K.D. Culture-gene coevolution of individualism-collectivism and the serotonin transporter gene. *Proc. R. Soc. B Biol. Sci.* **2010**, *277*, 529–537, Retrieved on 11 September 2013. Available online: <https://royalsocietypublishing.org/doi/10.1098/rspb.2009.1650> (accessed on 23 July 2021). [CrossRef]
45. Rauhut, H.; Lorenz, J. The wisdom of crowds in one mind: How individuals can simulate the knowledge of diverse societies to reach better decisions. *J. Math. Psychol.* **2011**, *55*, 191–197. [CrossRef]
46. Marodiev, P.; Tessone, J.; Schweitzer, F. *Effects of Social Influence on the Wisdom of Crowds*; Cornell University: New York, NY, USA, 2012.
47. Biofach Fair. Available online: <https://www.biofach.de/en> (accessed on 23 July 2021).
48. Brand Justo Campos. Available online: <https://compuempresa.com/marca/justo-campos-naranjillo-peru-5D47A8215DDB67B2> (accessed on 23 July 2021).
49. Colom, A. Organizational innovation and domestication of the Internet and ICT in the rural world, with new collective and social utilities. The figure of telecenter and Telework. *CIRIEC-Spain J. Public Soc. Coop. Econ.* **2004**, *49*, 77–116.
50. Stefan, H.T. *Experimentation Works the Surprising Power of Business Experiments*; Harvard Business Review Press: Boston, MA, USA, 2020.
51. GEPA. Available online: <https://www.gepa.de/home.html> (accessed on 23 July 2021).
52. Franken, J.R.V.; Cook, M.L. A Descriptive Summary of Cooperative Governance and Performance. *USA J. Coop.* **2017**, *32*, 23–45.
53. *Fima International Fair of Agricultural Machinery: VII National Forum for Rural Development*; FIMA: Zaragoza, Spain, 2020.
54. Zuñiga, I. *Impacto de las Competencias Holísticas de Innovación Del Emprendedorismo en el Aprendizaje de la Economía Social*; XVIII Congreso Internacional De Investigadores en Economía Social; CIRIEC: Mataró, Spain, 2020; ISBN 978-84-121210-1-8.
55. Valentino, V. Why are cooperatives important in agriculture? An organizational economics perspective. *J. Inst. Econ.* **2007**, *3*, 55–69.
56. Declerck, C.H.; Boone, C.; Emonds, G. When do people cooperate? The neuroeconomics of prosocial decision making. *Brain Cogn.* **2013**, *1*, 95–117. [CrossRef] [PubMed]
57. Cook, M.L.; Iliopoulos, C. Generic solutions to coordination and organizational costs: Informing cooperative longevity. *J. Chain Netw. Sci.* **2016**, *16*, 19–27. [CrossRef] [PubMed]
58. IGI Global. Bryan Christiansen and Lechman. In *Neuroeconomics and the Decision-Making Process, United States of America by Business Science*; IGI Global: Hershey, PA, USA, 2016; ISBN 978146669908.
59. Mavrodiev, P.; Schweitzer, F. Enhanced or distorted wisdom of crowds? An agent-based model of opinion formation under social influence. *Swarm Intell.* **2021**, *15*, 31–46. [CrossRef]

-
60. Goldratt, E.M.; Cox, J. *The Goal: A Process of Ongoing Improvement*; North River Press: Great Barrington, MA, USA, 2012; ISBN 0-88427-061-0.
 61. Iliopoulos, G.; Hendrike, G.W.J. Influence costs in agribusiness cooperatives. *Int. Stud. Manag. Organ.* **2009**, *39*, 60–80. [[CrossRef](#)]
 62. Gowdy, J.M.; Dollimore, D.E.; Wilson, D.S.; Witt, U. Economic cosmology and the evolutionary challenge. *J. Econ. Behav. Organ.* **2013**, *90*, S11–S20. [[CrossRef](#)]