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The organizational capabilities of rural enterprises, incremental innovation, and the university's contribution

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This paper analyzes the relationship between the market orientation and the entrepreneurial orientation in regards to the business performance of rural enterprises, considering the mediation of incremental innovation process and the moderation of the amount of employees with university level, as well as the collaboration needed between the university and the enterprise in terms of organizational capabilities. A survey using Likert scales was employed, composing items of latent variables of a reflective-formative structural model. The sample of 208 Brazilian rural enterprises was processed using the structural equation models by the partial least squares method in predicting the results. The verification of empirical data provides evidence to confirm the theoretical model and hypotheses. The strong use of organizational capabilities leads to an improved business performance. Incremental innovation has no mediating effect on organizational capabilities and business performance. The university staff does not moderate the organizational capabilities to improve business performance. The collaborative relationship between the university and the enterprise moderates the relationship between entrepreneurial orientation and business performance. The limitation of the study is the restriction of the sample and that the results should not be generalized to other regions; however, they present significant practical implications of the importance of relationships between the university and the enterprise.

Key word: Entrepreneurial orientation, market orientation, incremental innovation, business performance, partial least squares.

INTRODUCTION

In order to obtain greater competitive advantage and remain in agribusiness, rural businesses must implement a set of actions to explore opportunities, adjust and adapt production processes and products to buyers' needs through continuous attention to innovation efforts, leading to a better business performance (Hult et al., 2004).

Changes in the competitive environment, along with new demand from buyers and the incorporation of new technologies and products have led to uncertainties and turbulent environments (Atuahene-Gima and Ko, 2001). The market orientation is a company's response to improving its efficiency and effectiveness (Narver and Slater, 1990). In addition, an entrepreneurial posture emerges with prospects of new opportunities in either processes or products, assuming calculated risks (Wiklund and Shepherd, 2005). These organizational capabilities must be balanced and combined with the innovation process, so that its effects are reflected in the business outcome. On the other hand, for the innovation process, companies need to acquire trained personnel who bring in knowledge, such as a stronger link with institutions like the university that facilitates innovative efficiency. This study focuses on Brazilian rural enterprises, as they represent a key sector in the Brazilian economy. Rural businesses are the producers of the agriculture and livestock sectors and account for 23% of GDP, 27% of jobs, and 44% of Brazilian exports (CEPEA, 2014). Brazil is the third largest global producer of chickens, has the second largest cattle herd in the world, occupies the top ranking in soybean foreign sales, and its grain production is estimated to reach 193.8 million tons in 2014 (Brazil, 2013). With the growth of management and technology in rural enterprises, this sector has gained economies of scale with rural entrepreneurs becoming specialized, and the industry of agricultural equipment expanding and new production technologies introduced (Buainain et al., 2014).

Given these featured observations of the Brazilian agribusiness, this research seeks to understand the processes of competitive development in rural enterprises, adjusting them to the market and innovations; considering the support and provision of qualified personnel and the transfer of knowledge offered by the university. The objectives of this paper are to analyze rural enterprises relationships based on the use of market orientation, entrepreneurial orientation, and the mediation of incremental innovation in business performance; and analyze the effect of moderating university staff training as well as the university-enterprise relationship based on organizational capabilities and business performance.

The results achieved provide a substantial basis for the establishment and strengthening of public policy, technology and management, adding to the possible connections of universities using the triad of teaching, research and extension, effectively and contributory way the development of rural enterprises.

The main contribution of this paper comes from the analysis of the strategic capabilities of rural enterprises, an economic sector of great importance to a developing country, with few specific academic studies in the empirical understanding of how they get the knowledge and skills necessary to extend the technology and management, joint with input suppliers, machinery and equipment, and how to incorporate knowledge by hiring university graduates and, the use of infrastructure and research universities

Organizational capabilities

Organizational capabilities are those that give the company an understanding of its business environment and of competitive actions that are essential to support the needs and desires of buyers, taking advantage of opportunities that arise for new processes and products.

Market orientation

The market orientation (MO) has the characteristic of providing maximum value to the buyer, which results in determining the competitive advantage and the focus on innovation. For Narver and Slater (1990), MO is an ongoing process in the pursuit of efficiency and organizational effectiveness that develops organizational behaviors as a response to exogenous factors of the market that affect current and future needs and desires of buyers (Lee and Tsa, 2005). Thus, the market orientation contributes to the organizational capabilities of the company when it delivers the most value to the buyer, optimizing its internal and external processes (Hult et al., 2004), which influence the improvement of the company's operation (Beheshti, 2004) and has a tendency to improve business performance (Kohli and Jaworski, 1990).

Entrepreneurial orientation

The entrepreneurial orientation (EO) from the company's point of view is to adopt strategies that differ from the others. Covin and Slevin (1991), Lumpink and Dess (1996), and Wiklund and Shepherd (2005) agree that EO is a combination of three sub-dimensions: Innovation, proactiveness, and risk acceptance. The welcoming of entrepreneurial strategies reflects the combination of competitive actions and creativity in order to achieve higher levels of technology and business management, capitalizing on opportunities to be a pioneer before competitors (Venkatraman, 1989).

In entrepreneurial orientation (EO), innovation applied in the company and understood as the power of originality and creativity, reflects the competitive actions to support new ideas, discoveries, experiments, and the creation of processes and products different from existing practices and technologies (Wiklund and Shepherd, 2005). If there is an understanding that EO is a competitive feature of the company, it can contribute to business performance.

Incremental innovation

Incremental Innovation (II) can be understood as the action of the company in making small changes in technology and management, enabling improvements in customer benefits. This innovation arises because of the reduction in risk due to the certainty of the common market and the objective related to clients' needs (Valle and Vázquez-Bustelo, 2009). This type of innovation is characterized by small technical changes supported by knowledge, experience, and existing capabilities in the company. II contemplates adding value to the company through the incorporation of new processes and products; improved relationships with suppliers and buyers; and new procedures and methods of management, marketing, organization and market strategies. Incremental Innovation has aspects related to processes, products, and management that are also linked to MO. In addition, when looking outside of the company in regards to changes in competitors and buyers, their competitive strategies may include EO. The assumption of mediation relationships between II, MO, and EO suggests the following hypotheses:

H_{1a}: The incremental innovation (II) can mediate the relationship between market orientation (MO) and business performance (BP).

H_{1b}: The incremental innovation (II) can mediate the relationship between entrepreneurial orientation (EO) and business performance (BP).

H_2: Incremental innovation (II) positively influences Business Performance (BP).

The university's role in business performance improvement

The university is recognized as the main generator of knowledge and of its dissemination to interested parties. It has the necessary infrastructure and complementary resources to meet the needs of the research and development demanded by entrepreneurs for both the basic and specific knowledge (Bjerregaard, 2009); necessary foundations in order to reinforce technical competences of firms and to collaborate in the resolution of concrete problems of the innovation process (Minshall et al., 2007). Assuming this consideration, the university also plays the role of an economic development agent when interacting with companies and provides means of fostering knowledge transfer. Enterprises establish non-competitive agreements with the university, leveraging cooperative research in order to deepen or solve a real problem, or obtain advantage in a determined market opportunity (Benedetti and Torkomian, 2009).

In general, the university's main contribution to enterprises is the provision of qualified people with basic university education. These graduates may specialize in major activities of the rural business, offering knowledge and skills that will positively reflect on the efficiency and implementation of innovation, as well as on business results. Graduates have solid and flexible education enough to adapt to the needs of technological changes and new requirements of the buyers and society. These professionals transfer to rural business potential for sustainable knowledge to implement any activity in introducing innovation (Audretch and Lehmann, 2006). It is understood that the higher is the staff with university level, the greater the innovation process in rural business (Leiponen, 2006). With this, the following hypotheses are presented:

H_3: The higher the number of employees (NE) with a university education, the better the business performance (BP).

H_{4a}: The number of employees (NE) with a university education moderates the positive relationship between market orientation (MO) and business performance (BP).

H_{4b}: The number of employees (NE) with a university education moderates the positive relationship between entrepreneurial orientation (EO) and business performance (BP).

Another contribution made by the university to companies is the provision of professional services, such as consulting, technical support, research, continuous education, and the use of equipment and infrastructure. When determining the cooperation between the university and companies, the provision of solutions occurs through an exchange of technical-scientific knowledge and through business practice, requiring considerable efforts from both parties to achieve expected results (Segatto-Mendes and Mendes, 2006). The use of university services and knowledge by companies can take place in many ways; contributing to developing innovation, which ranges from cooperation technology agreements, research contracts, use of scientific discoveries in new businesses, employment licenses for university patents, consulting, training services for technical and management staff, among others (Tecchio et al., 2010). The different collaboration methods between the university and rural enterprises evaluated in this study are shown in Table 1.

The various forms of cooperation, which may be required by the university, lead to the easiness and the intensity with which a company develops its organizational capacities and its innovation processes. We propose the following hypotheses:

H_5: The greater the collaborative link between the university and the company (Univ), the better the business performance (BP).

H_{6a}: The collaboration between the university and the company (Univ) moderates the positive relationship between market orientation (MO) and business

Table 1. Possible collaboration methods between the university and the rural enterprise.

Type of collaboration	Collaboration factors	Description
Consulting services	Consulting services, technical support	Assistance in different areas of the company
Academic research	Cooperative research; hiring for research; development and innovation (R&D+i). Products licensing; University *spin-off* or *spin-out*	Participation in R&D+i projects; new technologies, processes or products; improvements that are transferred to the market; Creation of businesses based on findings originated in the university
Continuous education and training services	Academic education specific to the professional area; trainings and specific courses; lectures and conferences	Incorporation of academic and scientific personnel in the rural enterprise; Education and training specific to the working personnel, inside or outside the rural enterprise
Infrastructure and equipment	Utilization of infrastructure, laboratories, and scientific equipment	R&D+i activities facilitated through the provision of material resources; offering solutions to technological problems; offer information and services for innovation development
Incorporation of academic scholars	Supply university professionals.	Professional staff made up of university graduates; Offer academic graduates internships and opportunities to put in practice.

Source: Adapted from Rapini (2007) and Ferraretto and Muñoz (2009).

performance (BP).

H_{6b}: The collaboration between the university and the company (Univ) moderates the positive relationship between entrepreneurial orientation (EO) and the business performance (BP).

Proposed theoretical model

Given the considerations obtained from literature and the suggested hypotheses, a proposal for a reflective-formative theoretical model of second order is proposed as shown in Figure 1, in which all variables are treated as latent, without the representation of their reflective items.

MATERIALS AND METHODS

The study began with a review of existing and available literature correlated to the subject. With the theoretical argument obtained, we opted to use the method of hypothetical-deductive research of quantitative nature, testing sets of hypotheses with the primary data collected in rural enterprises in the state of Mato Grosso do Sul, Brazil.

For data collection, a survey was conducted through a questionnaire with items that make up the latent variables used in this paper based on previous studies of organizational capabilities and services provided by universities, containing the identification of the demographic characteristics of rural enterprises. The questionnaire was reviewed by specialized teachers in the subject, and examined and approved by the Ethics Committee for Human Beings (Protocol 440,909 of September 16th 2013). The form was given to rural entrepreneurs or their representatives from February to April 2014, by intermediaries of scholars on their last semester of management, agronomy, and veterinary, as well as by Master's students in production and agribusiness management. The database considered of 208 complete and verified questionnaires collected in 45 out of the 79 existing municipalities in Mato Grosso

do Sul, from a collection of 61,664 agricultural establishments (IBGE, 2007). The sampling error is estimated at 6.8% for a 95% confidence level, and has a 50% probability of positive responses. All respondents were assured confidentiality of their responses, and that data would be combined and processed as a whole and used in scientific research.

The latent variables and their independent items followed the main measurement proposals of the explored literature. Collaboration between business-university (Univ) was measured by a dichotomous scale: 1 = Yes, 0 = No, with the possibility of cooperation between them. The NE with a university education is a percentage ratio scale of people with a university degree and the total employees in the rural enterprise. The latent variable of EO was measured by six items proposed by Naman and Slevin (1993), and nine items for MO were indicated by Narver and Slater (1990), both variables using the Likert scale and the 7 points of agreement (1 = strongly disagree to 7 = strongly agree). For II, six items from Wang and Ahmed (2004) were recommended, using the Likert 7-point scale (1 = no innovation to 7 = many innovations). The perceived BP followed the proposal of Gonzáles-Benito et al. (2009) with the Likert 7-point scale (1 = much worse than the competitor to 7 = much better than the competitor). In Table 3 are presented the items that compose the latent variables MO, EO, II, and BP of theoretical model.

A first assessment of the data collected from the 208 questionnaires was carried out to confirm the unidimensionality of the reflective latent variable; in other words, if it could be represented by a factor using the statistical technique of factor analysis, with the varimax rotation method, using SPSS v. 22. The fit of the observed items followed the criteria proposed by Hair et al. (2009). It was considered as a good fit for the latent construct when: The Kaiser-Meyer-Olkin test (KMO) > 0.5 and Bartlett test of sphericity significance with $p < 0.05$; factor loadings > 0.5; Cronbach's alpha, $\alpha > 0.7$; measure of sampling adequacy, MSA > 0.5; communality > 0.5; variance explained (ve) > 50%.

Afterwards, the theoretical model, reflective-type formation (Figure 1), was tested using the SmartPLS 2.0, a software for solving structural equation modeling using the method of partial least squares (Ringle et al., 2005). The choice was based on the characteristics of the proposed model; that of presenting latent variables and items that did not meet the assumption of the normal
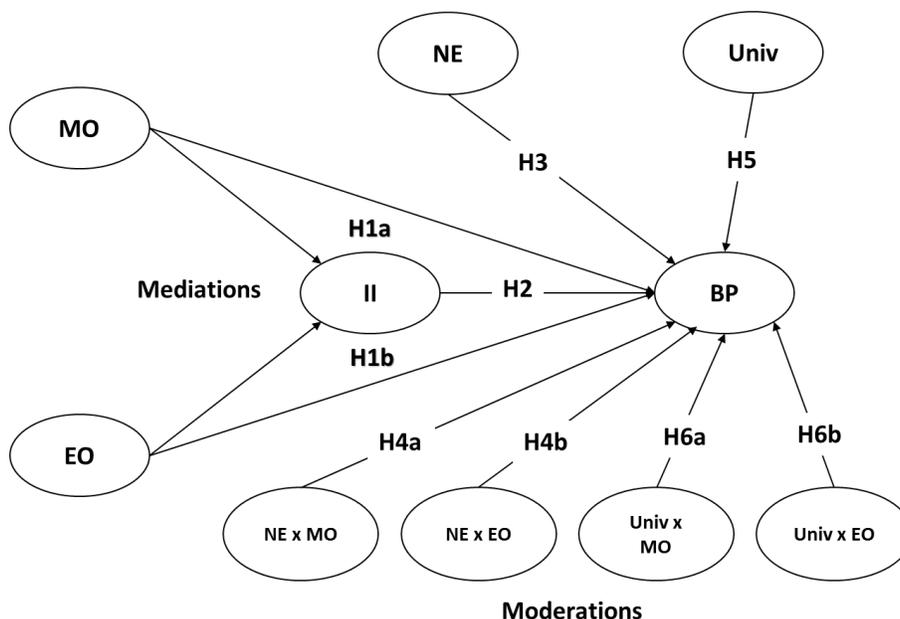
Figure 1. Structured reflective-formative theoretical model of second order and proposed hypotheses.

distribution, and the goal being the prediction of relations of the following latent variables: MO, EO and BP (Hair et al., 2014). This concept of partial least squares provides greater robustness when using the matrices of variance, for this purpose, rather than based on the estimated covariance matrix model, for example, using the AMOS software.

In order to verify the fitting of the measurement model, the procedures and reference values recommended by Ringle et al. (2014) were employed. The convergent validity was verified by the average variance extracted (AVE), accepting the latent variables with AVE > 0.5. The discriminant validity was obtained by comparing the square root of the AVE value of the latent variable with the Pearson linear correlation of other latent variables. There is discriminant validity when the square root of the AVE is greater than the correlation of other latent variables. The reliability of the model was verified by Cronbach's alpha ($\alpha > 0.70$) and the composite reliability (CR) of CR> 0.70.

The consistency of the structural model was performed by verifying the following: The path coefficient, the Pearson coefficient of determination (R^2), and the predictive validity (Q^2), as proposed by Hair et al. (2014). The path coefficients (Γ) represent the links between the latent variables, and are the hypothetical relationships proposed in the model. As the model is tested using correlations (r) and linear regressions, the null hypotheses are for the linear correlations Ho: r = 0, and for the path coefficients Ho: Γ = 0. If p < 0.05, the null hypothesis is rejected. Thus, these values are standardized and their significance is assessed by the empirical value *t* statistic compared to the two-tailed critical value (t = 1.96) with a 5% significance level, obtained with the bootstrapping technique using 1,000 resampling. The Pearson coefficient of determination (R^2) evaluates the amount of variance that the endogenous variables explain in the model. In the R^2 classification, values of 0.25, 0.50 and 0.75 are considered respectively as weak, moderate and substantial evaluation levels (Hair et al., 2014:175). The predictive validity (Q^2) measures the accuracy of the model, whereas values of 0.02, 0.15 and 0.35 indicate that an exogenous latent variable respectively has a small, medium or large predictive relevance (Hair et al. 2014: 184).

The analysis of the influence of mediation between the independent and dependent variables was performed using the Sobel test, described by Hair et al. (2014), rejecting the hypothesis that the effect is null; therefore assuming the statistic value *z* should be greater than ± 1.96. To obtain the values of path coefficients and of their standard errors, the mediation variable was inserted and removed in the model; both cases being performed.

RESULTS AND DISCUSSION

Sample characterization

The rural business is typified as a production unit with economic activity in the agriculture sector, using to a greater or lesser extent, technologies and management methods in the production process without distinguishing it as a family, employer or business unit or even by their civil classification: Private or limited company. Table 2 summarizes the main segments of the responding companies.

Out of the 208 responses, 71.5% of respondents considered themselves partner or owner, which strengthens the quality of evaluations of organizational capabilities and the relationship with external agents and universities, since they are responsible for the external environmental analysis and their competitive strategies (Porter, 2009) and the use of different skills and resources of companies for the development of new capabilities when facing environmental changes (Barney and Hesterly, 2008).

In regards to their employees' university education, 51.2% have not completed this level. When checking the

Table 2. Demographic characteristics of the sample of rural enterprises.

Indicator	Variable	Nº	Variable %
	Partner/owner	149	71.5
Respondent	Director/supervisor/manager	48	23.2
	Other position	11	5.3
	Up to 100 ha	56	27.1
Area of rural enterprise	101 to 1,500 ha	102	48.8
	More than 1,500 ha	50	24.2
	Up to 9	156	74.9
Number of employees	10 to 19	27	13.0
	20 to 49	17	8.2
	More than 50	8	3.8
	0%	106	51.2
Percentage of employees with a university degree	1 to 20%	55	26.6
	21 to 40%	25	12.1
	41 to 80%	22	10.1
Activity sector of the rural enterprise	Agriculture	65	31.2
	Livestock	143	68.8

crossing between categorical variables of the rural business area versus the percentage of employees with a university education using the chi-square test, it was observed that there are significant differences between them (x^2 = 28.867, gl = 12, p = 0.004); indicating that the larger the area of the rural business, the higher the number of staff with a university degree. These results may indicate the possible difficulty of implementing innovations (Tecchio et al., 2009) or to provide the basis of scientific knowledge for exploring the external technologies and their relationship with universities (Reis, 2008; Leiponen, 2006), especially for small rural enterprises.

Exploratory factor analysis of the latent variables

A factorial evaluation separate of the latent variables EO, MO, II and BP was performed, calculating Cronbach's measure of alpha reliability for the set of items at the discretion of the elimination of the item that would undermine the reliability of the set. The concepts NE and Univ are composed of only one item; therefore their reliability indicators and factoring were not calculated (Table 3). Items that have not reached communalities ≥ 0.500 were removed. It appears that the extracted indicators of the exploratory factor analysis provide higher values than those considered as a good fit of the data; accepting the reflective measurement model of the latent variable with its items, assuming the EO, MO, II, and BP unidimensionalities.

Analysis of theoretical model

The theoretical model was verified with the help of SmartPLS 2.0 and converged after five interactions, when a stable model was found. The discriminant validity in the estimation of independence among latent variables was performed using the Fornell-Larcker criterion, described in the works of Ringle et al. (2014: 63) and Hair et al. (2014:105-106). The values indicated in Table 4 provide evidence of discriminant validity, since the square roots of AVEs are greater than the Pearson correlations between the latent variables.

The convergent validity of the model as indicated in Table 4 and verified by the AVEs of the latent variables, are greater than 0.50. The values of AVEs explain that the items are positively correlated with their respective latent variables, assuming the model is directed towards a satisfactory result. The internal consistency assessed by composite reliability (CR) and by Cronbach's alpha has values above 0.70, appropriate to state that the sample is reliable to represent the model.

Still in Table 4 in the evaluation of the structural model, the Pearson coefficients of determination (R^2), which determine the portion of variance explained in the exogenous variables, have values considered as moderate effect according to Hair et al. (2014) for II (R^2= 0.426) and for BP (R^2= 0.362). The quality of the prediction of the model evaluated by Q^2 indicates that for both endogenous latent variables BP (Q^2= 0.240) and II (Q^2= 0.262), the predictive relevance is between medium and high, justifying a good model. Therefore, with the

Table 3. Measurements for commonalities and reliability of latent variables and its items.

Latent variable	Items	Commonalities	Indicators
Incremental innovation (II)	Q15a Strategy	0.623	KMO = 0.866
	Q15b Management	0.714	Bartlett = 617.32
	Q15c Organization	0.689	p ≤ 0.001
	Q15d Marketing	0.575	MSA ≥ 0.843
	Q15e Productive Processes	0.639	ve = 63.3%,
	Q15f Product	0.557	α = 0.880
Entrepreneurial orientation (EO)	Q19a Release of new agricultural products	0.814	KMO = 0.867
	Q19b Change in agricultural production method	0.699	Bartlett = 756.98
	Q19c Anticipate competitors' actions	0.876	p ≤ 0.001
	Q19d Competitive posture	0.889	MSA ≥ 0.816
	Q19e High risk projects with high benefits	0.841	ve = 68.5%,
	Q19f Courageous and aggressive posture	0.833	α = 0.907
Market orientation (MO)	Q20a Market information	0.654	KMO = 0.851
	Q20b Information about competitors' strategies	0.541	Bartlett = 836.84
	Q20c Information about buyers' satisfaction	0.707	p ≤ 0.001
	Q20d Information about structure and tendencies of the rural market	0.718	MSA ≥ 0.762
	Q20e Internal discussion about tendencies of the rural market	0.594	ve = 64.3%,
	Q20f Complaints and suggestions from buyers	0.612	α = 0.906
	Q20g Analysis of anticipating changes in the environment	0.671	
Business performance (BP)	Q21a Revenue/profit	0.662	KMO = 0.859
	Q21b Production growth	0.748	Bartlett = 662.25
	Q21c Growth in sales' revenue	0.673	p ≤ 0.001
	Q21e Buyers' satisfaction	0.697	MSA ≥ 0.823
	Q21f Company's image and reputation	0.652	ve = 66.10%,
	Q21g Success of new products	0.533	α = 0.894

KMO, Kaiser-Meyer-Olkin test; Bartlett, Bartlett sphericity test; MSA, Measure of Sampling Adequacy; ve, variance explained; α, Cronbach's alpha measure of reliability.

results of R^2 and Q^2, it is evident that these variables are important to fit the model.

Verification of hypotheses

After analyzing the data for the latent variables and the consistency of the model, the latter was submitted for verification of the hypotheses. The results of the hypotheses are presented in Table 5.

The values of t-statistics indicated in Table 5 support that the organizational capacities consisting of the MO and EO positively influence the BP, as indicated in the academic work of Lumpkin and Dess (1996) and González-Benito et al. (2009). In hypotheses H1a and H1b, the mediation for II between the latent variables MO→II→BP and EO→II→BP respectively, the statistics for the Sobel test were z = 1.63 for the mediation of MO and z = 1.60 for EO. These values are less than 1.96,

rejecting the hypothesis that II is a mediator of MO and EO to BP. Hypothesis H2 is rejected (t = 1.551 and p> 0.05) indicating that the II in rural business does not influence BP. It is assumed that this is due to the structure of the production chain in agribusiness, where oligopsony and seasonality of production set the price of the product, which implies a low attention to marketing, such as sales force and distribution channel (Neves and Castro, 2011), and the strategy when related to many competitors and products (such as commodities), focusing more on the management of the production process and the product itself (Batalha, 2009).

Hypotheses H3 and H5 are rejected based on t-statistic not being significant at p < 0.05. These indicators allow us to infer that NE does not influence BP. Whatever may be the type of collaboration between the university and rural business (Univ), this does not stimulate better BP. The explanation may be that these rural enterprises are closer to their raw materials and equipment suppliers and

Table 4. Discriminant validity between latent variables and the quality of the theoretical model fit.

Latent variable	Discriminant validity				Quality of the model					
	BP	II	EO	MO	AVE	CR	R^2	Q^2	α	Communality
BP	**0.804**				0.647	0.917	0.372	0.240	0.890	0.647
II	0.473	**0.788**			0.621	0.907	0.426	0.262	0.877	0.621
EO	0.535	0.587	**0.811**		0.657	0.920			0.895	0.657
MO	0.547	0.589	0.625	**0.793**	0.629	0.922			0.901	0.629

The values diagonal in bold correspond to the square root of the average variance extracted (AVE).

Table 5. Hypotheses of the proposed model, results, and significance levels.

Path	Hypothesis	Path coefficient	Standard deviation	t-statistic	Hypothesis support
MO→BP		0.291	0.122	2.41**	
EO→BP		0.306	0.101	3.00***	
MO→II		0.367	0.069	5.32***	
EO→II		0.361	0.066	5.47***	
II→BP	H2	0.138	0.086	1.55	Rejected
NE→BP	H3	-0.090	0.314	0.32	Rejected
NE x MO→BP	H4a	-0.398	0.384	1.01	Rejected
NE x EO→BP	H4b	0.546	0.286	1.91*	Rejected
Univ→BP	H5	-0.114	0.234	0.44	Rejected
Univ x MO→BP	H6a	0.568	0.305	1.81*	Rejected
Univ x EO→BP	H6b	-0.390	0.194	1.99**	Accepted

Legend: Two-tailed significance levels: * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

closer to buying markets than the universities; and that the pressure from the inputs segment at the beginning of the production chain with its technological packages and guidelines for production drives BP improvement (Batalha, 2009).

The effect of moderation of NE versus MO, and NE versus EO in terms of the outcome of BP, is not significant, t = 1.01 and t = 1.91, respectively, to the level of p <0.05; rejecting hypotheses H4a and H4b. The number of college graduates in rural enterprises does not moderate its organizational capabilities. The results indicate that the rural enterprise does not perceive that university graduates can collaborate in the efficient implementation of management and technology, participants of the innovation process (Reis, 2008), adding knowledge that may reflect on BP. It is possible to propose an understanding of this result based on the natural feature of rural business, whose demand for knowledge and innovation is associated with each production target; and that knowledge and learning can be obtained from external agents such as suppliers and buyers (Batalha, 2009). The desired organizational capacity can be acquired with the diffusion of external knowledge integrated into economic activity through the acquisition of a new machine or a new product (Zuin and Queiroz, 2006).

The moderating effect of Univ versus MO is not significant at the p < 0.05 level, rejecting hypothesis H6a. The forms of collaboration between the university and rural business do not moderate MO positively to BP. However, hypothesis H6b is supported, indicating that Univ moderates EO in achieving better results for BP. Among the moderations of Univ versus EO items, it stands out that when the rural business by using the collaboration of university tries to anticipate its competitors in introducing new products and processes, adopting a more competitive and courageous position, and exploring possible market opportunities.

Conclusion

The set of results indicate that rural businesses use their organizational capabilities to achieve higher business performance. However, with respect to incremental innovation, management and technology, these do not appear as strategies to support better business outcomes. The rural business does not recognize the importance of personnel with a university degree among their staff. The collaboration between the university and rural business is perceived to be important only for the improvement of entrepreneurial strategies when needed

to achieve proactivity, innovation, and take calculable risks. The rural business does not resort to the university when it needs to improve its processes and products; instead, it is assumed that its resorts to external agents, such as suppliers and buyers.

Final considerations

The findings and conclusions of this study have important implications for rural entrepreneurs and universities. The limited collaboration between the studied parties indicates that there is a gap of knowledge and interest that must be identified. On one hand, the rural business can use their relationship with the university to expand their knowledge and their competitive advantage. On the other hand, the university can go beyond in providing staff with university education, expanding their cooperative research and interacting with the real market. It can be noted from the causal relationships of the model proposed in this research, that there is a strong link in business performance improvement when organizational capabilities are expanded. This is related to the possibility of understanding the internal and external environment of the rural business, and can be strengthened by the collaboration of the university in the areas of teaching, research and extension.

It should be recognized that this empirical research has its limitations and restrictions. The sample of units analyzed was obtained in a region with a market and technology typical of agriculture and livestock, which can give rise to different findings in other business groups in the agribusiness sector. The expansion and diversification of the sample may extend the research with new arguments on organizational capabilities, incremental innovation and collaboration with universities. The expansion of this research is recognized by the authors as necessary to capture the degree of homogeneity or diversification of how the relationships between rural businesses and universities are perceived in order to improve competitiveness and productivity. It is hoped that this research awakens new issues and interests that will help in the understanding of the agricultural sector.

Conflict of Interest

The authors declare they have no conflict of interest.

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