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EL IMPACTO DE LA INNOVATIVIDAD ORGANIZATIVA EN LA INNOVATIVIDAD ORIENTADA A LOS PRODUCTOS EN MICRO Y PEQUEÑAS EMPRESAS AGROINDUSTRIALES

OIMPACTO DA INOVATIVIDADE DO TIPO ORGANIZACIONAL NA INOVATIVIDADE ORIENTADA A PRODUTOS EM MICRO E PEQUENAS EMPRESAS AGROINDUSTRIAIS

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Abstract: By means of the Local Innovation Agents (LIA) Program, the Brazilian Micro and Small Business Support Service (SEBRAE) has conveyed innovation to Brazilian micro and small businesses (MSBs). Within this setting, this paper aims to analyze the impact of organizational innovativeness on product-oriented innovativeness in agroindustry small businesses. Regarding methodology, Structural Equation Modelling (SEM) was employed in order to validate constructs and to analyze causal effects. The sample comprises secondary data from 249 agroindustry MSBs that participated in the LIA program between 2012 and 2014. Regarding results, the final models fulfills all constructs validation criteria and structural analysis indicated that both loading factors and path coefficients were statistically significant, besides presenting predictive relevance and explained variance (R^2) of 57,9%. In sum, the results show that organizational innovativeness impacts positively product-oriented innovativeness, corroborating other studies that show the importance of organizational innovations.

Keywords: Innovation, Innovativeness, Brazilian micro and small businesses, SEBRAE, Agroindustry small businesses, Structural Equation Modelling (SEM).

Resumo: Por meio do Programa Agentes Locais de Inovação (ALI), o Serviço Brasileiro de Apoio às Micro e Pequenas Empresas (SEBRAE) tem transmitido a inovação às micro e pequenas empresas brasileiras (MPEs). Neste contexto, este artigo tem como objetivo analisar o impacto da inovatividade do tipo organizacional na inovatividade orientada a produtos de micro e pequenas empresas inovadoras da agroindústria. Quanto à metodologia, foi utilizada a técnica de Modelagem de Equações Estruturais para validação dos constructos e para análise da relação de causa e efeito entre eles. Foram utilizados dados secundários de inovação de 249 MPEs da agroindústria paranaense acompanhadas pelo programa entre 2012 e 2014. Em relação aos resultados, o modelo final satisfez todos os critérios de validação dos constructos e a análise estrutural indicou que os efeitos das cargas dos fatores e do coeficiente de caminho foram estatisticamente significativos, além de apresentar relevância preditiva e um valor de 57,9% de variância explicada (R^2). Em síntese, os resultados indicam que a inovatividade do tipo organizacional impacta positivamente na inovatividade orientada a produtos, corroborando outros estudos que mostram a importância das inovações organizacionais para as empresas.

Palavras-chave: Inovação, Inovatividade, Agroindústria, Pequenas empresas, MPE, SEBRAE.

Palabras clave: Innovación, Innovatividad, Pequeñas empresas, Pequeños emprendimientos, MyPes, SEBRAE

INTRODUCTION

Innovation is micro and small businesses is a topic that has been receiving attention both theoretically and practically (Gonçalves, Cardoso, Carvalho, Carvalho, & Stankowitz, 2017; Teixeira & Feitoza, 2015; Toigo, 2017). Research on companies' innovativeness generally focuses on analyzing the factors that contribute to improve innovation and, consequently, competitive advantage (Porter, 2008). Indeed, innovation is regarded as a critical success factor of small businesses' competitiveness (Resende et al., 2018).

In order to leverage regional competitiveness, many countries develop and implement innovation policies, remarkably for small businesses (Jones & Basso, 2017; Kobs, Reis, & Carvalho, 2008; Radicic, Pugh, Hollanders, Wintjes, & Fairburn, 2016; Romero-Martinez, Ortiz-de-Urbina-Criado, & Soriano, 2010). Within this setting, the Brazilian Micro and Small Business Support Service (SEBRAE) launched the Local Innovation Agents Program (LIA) in 2008, which currently assists more than 55 thousand companies annually. The purpose of the LIA program is to convey innovation to Brazilian MSBs. In this program, small businesses are assisted by an Local Innovation Agent, who performs standardized diagnostics and suggests innovation action plans (SEBRAE, 2017).

With regard to the Brazilian economy, the agribusiness (agriculture and agro-industry) is relevant since it corresponds approximately to one-fifth of the gross domestic product (GDP). Furthermore, the agroindustry comprises about one-third of employment in the manufacturing industries (G. R. Santos, 2014). In the same vein, the State of Parana stands out by its consolidated agro-industry, which is also responsible for much of the states' exports (Braun, Cardoso, Dahmer, & Rinaldi, 2012).

Considering this context, this paper aims to analyze the impact of organizational innovativeness on product-oriented innovativeness in agroindustry small businesses. In order to achieve this aim, Structural Equation Modelling is employed to validate constructs and to analyze causal effects. The sample comprises 249 agroindustry MSBs located in the state of Parana, southern Brazil, which participated in the LIA program during 2012 and 2014.

It is worth noting that there has been a large number of articles related to the Local Innovation Agents Program (Aguiar & Araújo, 2013; Araújo & Araújo, 2015; Carvalho, Silva, Póvoa, & Carvalho, 2015; Denizot, 2014; M. Â. C. d. Oliveira, Mendes, Pinheiro, & Costa, 2015; M. R. G. d. Oliveira, Machado, Burgos Paredes, Alves de Santana, & Nascimento, 2014; Silva Néto & Teixeira, 2011, 2014). For instance, Aguiar and Araújo (2013) found that the innovative environment dimension still needs to be further developed by the bakery industry located in Natal, the capital city of Rio Grande do Norte. In the same state, Araújo and Araújo (2015) found that the process dimension was little developed by restaurants, in which the lack of resources was deemed by managers/ owners as the main reason for this limitation. Denizot (2014) found that Information and Telecommunications small business in Rio de Janeiro have difficulties in developing innovation dimensions related to organizational innovativeness. In the federal district (Brasília), M. Â. C. d. Oliveira et al. (2015) explored the drivers of service small businesses overall innovation level, whereas M. R. G. d. Oliveira et al. (2014) investigated the innovation characteristics of metal-mechanical MSBs from Pernambuco. In the state of Parana, Carvalho et al. (2015) verified significant differences concerning the innovation radar dimensions among different industries.

Notwithstanding a large number of investigations regarding the Local Innovation Agents Program, few of the aforementioned studies analyzed causal relationships, especially employing advanced statistical techniques such as Structural Equation Modelling (SEM). Hence, analyzing the impact of organizational innovativeness on product-oriented innovativeness in the context of the LIA program constitutes a first theoretical contribution of this paper. Furthermore, this research also contributes to the literature on agribusiness innovation in MSBs, which is as a topic that has been receiving increasing attention recently (Coti-Zelati, 2015; A. A. R. Santos, Ferreira, de Araújo, de Oliveira, & Clementino, 2017). Besides, concerning practical implications, the results obtained may not only contribute to business managers improve their agro-industries innovativeness, especially concerning product- oriented innovativeness, but also to policymakers refine further innovation policies.

Literature Review Innovation and Innovativeness

According to the Oslo Manual (OECD/Eurostat, 2005), innovation may be classified into four main types: products (goods and services), process, marketing, and organizational. Still in accordance with the manual, innovation is defined as the introduction of new or significantly improved products, processes, marketing, and organizational methods. Besides, a basic definition of innovative company includes the company that introduced at least one innovation in the last years (OECD/Eurostat, 2005).

Organizations' innovativeness has been understood as companies' innovation capability. For instance, Wang and Ahmed (2004) define innovativeness as the innovation capability a company has to introduce new products and open new markets, combining strategy, innovative behavior, and processes. According to the bibliometric study of Carvalho, Cruz, Carvalho, Duclós, and Stankowitz (2017), recent research has employed different measures concerning innovativeness (i.e., innovation capability). These measures include inputs (related to investments), dynamic capabilities (related to processes), and outputs (related to results) of innovation. Furthermore, these authors propose an innovativeness classification including the three aspects concomitantly (inputs, capabilities, and outputs of innovation).

According to these authors, the literature on innovativeness has two main approaches.

In the former, companies that introduced at least one innovation are regarded as innovative companies, in other words, companies that yielded innovation outputs. For instance, the innovativeness measure applied by Bell (2005) included the introduction of new products/services and the adoption of new technologies. In the literature review of Sundbo, Orfila-Sintes, and Sorensen (2007), innovativeness was generally measured by the introduction (or no introduction) of innovation types and the number of innovations introduced. Kostopoulos, Papalexandris, Papachroni, and Ioannou (2011) also analyzed outputs such as revenues generated by product innovations. It is worth mentioning that Oslo Manual's (OECD/Eurostat, 2005) definition of an innovative company is aligned to some extent with this first approach. Besides, some researchers used innovation inputs such as patents as a proxy for innovation outputs and, consequently, innovativeness (Bellamy, Ghosh, & Hora, 2014; Keil, Maula, Schildt, & Zahra, 2008).

In the latter, innovativeness encompasses the propensity a company has to innovate and generally includes diverse innovation resources and capabilities, such as innovation culture (i.e. propensity to innovate) (Ferraresi, Santos, Frega, & Quandt, 2014; Hurley & Hult, 1998; Quandt & Castilho, 2017; Santos-Vijande & Alvarez- Gonzalez, 2007), creativity, openness, leadership, knowledge capabilities, among others (Quandt, Bezerra, & Ferraresi, 2015; Ruvio, Shoham, Vigoda-Gadot, & Schwabsky, 2014; Saunila & Ukko, 2014; Valladares, Vasconcellos, & Serio, 2014).

For instance, Quandt et al. (2015) identified ten dimensions of innovativeness, namely, leadership, culture, organizational structure, processes, people, relationships, technological infrastructure, measuring, and strategy.

Similarly, Valladares et al. (2014) identified eight dimensions of companies' innovativeness: transforming leadership, intention to innovate strategically, people management, clients and market knowledge, strategic management of technology, organic structure, project management, and innovation performance.

Local Innovation Agent Program

Based on the work of Sawhney, Wolcott, and Arroniz (2006), D. L. Bachmann and Destefani (2008) developed for SEBRAE a questionnaire to measures the innovation level of Brazilian micro and small businesses, namely, the innovation radar. The result of the questionnaire comprises thirteen innovation dimensions in a scale that goes from 1 (low) to 5 (high), namely, offerings, platform, solutions, customers, customer experience, value capture, processes, organization, supply chain, presence, networking, brand, and innovative environment. It is also worth mentioning that Paredes, Santana, and Fell (2014) already identified some common ground between these dimensions and Oslo Manual innovation types (OECD/Eurostat, 2005).

The data collected throughout the Local Innovation Agents Program have already been used to generate much research (Aguiar & Araújo, 2013; Araújo & Araújo, 2015; Carvalho et al., 2015; Denizot, 2014; M. Â. C. d. Oliveira et al., 2015; M. R. G. d. Oliveira et al., 2014; Silva Néto & Teixeira, 2011, 2014). For instance, Aff and de Araújo (2013) showed that an unfavourable organizational climate constrains necessary supply chain innovations. M. Â. C. d.

Oliveira et al. (2015) verified by means of regression analysis that financial management and strategic planning impact significantly and positively the overall innovation level of service small businesses located in Brasilia. M. R. G. d.

Oliveira et al. (2014) investigated the innovation characteristics of the metal- mechanical industry in the state of Pernambuco and found three innovation dimensions as the most developed, namely, platform, brand, and client relationship.

Carvalho et al. (2015) verified significant differences on the thirteen innovation dimensions level among different industries such as agroindustry, furniture, software, tourism, clothing, etc., even though overall these industries innovate more in the same dimensions. Carvalho, do Nascimento, Strauhs, Carvalho, and Cruz (2016) confirmed that companies that possess partnerships innovate significantly more than their counterparts that do not possess partnerships. By means of correlational hierarchical cluster analysis, Carvalho, Silva, Carvalho, Cavalcante, and Cruz (2017) identified the main innovation strategies employed by MSBs in the agroindustry, construction, and retail industries, in which platform dimension played a major role as it was present in all strategies.

Based on a sample over 6,000 MSBs all over Brazil, Carvalho, Carvalho, Cardoso, and Gonçalves (2018) showed that the Local Innovation Agents Program innovation improved more dimensions related to organizational and marketing innovation types than those related to product and process innovation types.

By comparing data from the beginning and the end of a LIA Program cycle in Sergipe, Cavalcanti Filho, de Oliveira, and Cavalcanti (2012) verified that there was not a significant growth on the overall innovation level of MSBs from the telecommunication and information technology (TIC) industry.

Cavalcanti, Moutinho, Cabral, Torres, and Pereira (2014) verified significant differences (at the 5% level) on the innovation level among retail MSBs located in different cities in the Pernambuco region.

Denizot (2014) also analyzed the TIC industry, but in the state of Rio de Janeiro, and found that these companies had difficulties regarding organizational innovations dimensions such as innovative environment and organization.

Based on a sample about 27 thousand MSBs that participated in the LIA program, Gonçalves et al. (2017) portrayed an innovation panorama of Brazilian micro and small businesses, in which the dimensions brand, platform, offerings, and relationships stood out as highest. Silva Néto and Teixeira (2011) analyzed by means of descriptive statistics the innovation level of MSBs from the textile industry in the state of Sergipe. Waltrich and Stassun (2016) verified that leaders with higher levels of entrepreneurship do not necessarily induce higher levels of innovative environment.

It is observed that there are still few studies that analyze causal relationships, especially using advanced statistical techniques such as Structural Equation Modelling (SEM). In addition, there is also little research within the ALI program that addressed the impact of organizational innovativeness, which is the topic presented in the next section.

Impact of Organizational Innovativeness

There are studies in the literature regarding the impact of organizational innovativeness, but this number is still limited (Camisón & Villar-Lopez, 2014). In the context of Spanish industrial companies, Camisón and Villar-Lopez (2014) verified that organizational innovations affected directly process and indirectly product innovation capabilities, besides directly affecting performance. In the same vein, Augusto, Lisboa, and Yasin (2014) confirmed in Portuguese industrial companies that organizational innovations affected positively process innovations and, in turn, these affected product innovations.

Based on the data of the fourth Communication Innovation Survey (CIS) from United Kingdom (UK), which follows Oslo Manual guidelines(OECD/Eurostat, 2005) and is to some extent similar to the Brazilian Innovation Survey (PINTEC), Battisti and Stoneman (2010) showed that there are significant positive correlations among different innovation types (process, product, machinery, marketing, organizational, management, and strategy).

Furthermore, these authors identified by means of exploratory factor analysis (EFA) two main innovation types that complement each other: organizational and technological innovation. In a similar approach and based on CIS data from Italy, Evangelista and Vezzani (2010) identified four main innovation modes: product-oriented, process-oriented, organizational, and complex.

Moreover, these authors suggest that organizational mode seems a complement or even a pre-requisite to improve products and services. In this vein, Capitanio, Coppola, and Pascucci (2010) contend that organizational features have become more and more relevant with regard to product innovations in Italian agro-food companies.

Based on the literature review presented, this paper proposes the following hypothesis:

H1: organizational innovativeness impacts positively product-oriented innovativeness in agro-industrial MSBs.

Methodology Data and Sample

The data analyzed were secondary, which were made available to researchers by SEBRAE- PR. The study population comprises agro-industrial micro and small businesses (MSBs).

The sample comprises 249 MSBs that participated in the Local Innovation Agents (LIA) Program during the 2012-2014 period. In this regard, it is worth mentioning that in the State of Parana, the LIA Program assisted 2,989 (249 from agroindustry) in the 2012-2014 period (D. L. Bachmann & Rodrigues, 2015); 530 MSBs (264 from agroindustry) in the 2005-2008 period (D. L. Bachmann, 2009); and 1,182 MSBs (537 from agroindustry) in the 2010-2012 period (Bachmann & Associados, 2012).

The data include thirteen innovation dimensions in a scale that goes from 1 (low) to 5 (high), namely, offerings, platform, solutions, customers, customer experience, value capture, processes, organization, supply chain, presence, networking, brand, and innovative environment (D. L. Bachmann & Destefani, 2008).

As aforementioned in the literature review section, several researchers (Carvalho et al., 2018; Paredes et al., 2014) have already identified some common ground between these dimensions and Oslo Manual innovation types (OECD/Eurostat, 2005).

Based on the literature review presented, innovativeness is understood in this paper as the innovation capability of a company.

Thus, organizational innovativeness is understood as the innovation capability a company has to implement organizational innovations. Similarly, product-oriented innovativeness is understood as the innovation capability a company has to introduce product innovations. In both cases, innovativeness (i.e. innovation capability) is a construct that reflects the implementation of innovations.

Since this paper aims to analyze the impact of organizational innovativeness on product-oriented innovativeness in agroindustry small businesses, only the innovation dimensions related to these constructs were considered, that is, only five out of thirteen innovation dimensions from the Local Innovation Agents Program were considered.

In sum, the organizational innovativeness construct included the dimensions ‘organization’ and ‘innovative environment’, whereas the product-oriented innovativeness included the dimensions ‘offerings’, ‘platform’, and ‘solutions’.

The organizational dimension encompasses organizational innovations, whereas innovative environment encompasses a company’s internal environment that nurtures innovation. When compared to the innovation types defined by the Oslo Manual (OECD/ Eurostat, 2005), it is possible to contend that these dimensions comprise organizational innovations and, therefore, reflect a company’s organizational innovativeness.

The offerings dimension comprises the creation of new products or services. The platform dimension encompasses the use of common components or building blocks to a diverse set of products/services.

The solution dimension encompasses the creation of integrated and customized solutions, that is, a combination of products and services. (D. L. Bachmann & Destefani, 2008).

When compared to the innovation types defined by the Oslo Manual (OECD/Eurostat, 2005), it is possible to contend that these dimensions comprise product innovations and, therefore, reflect a company’s product-oriented innovativeness.

The remaining innovation dimensions (customers, customer experience, etc.) may also be linked to Oslo Manual process and marketing innovation types, as it was indeed proposed by some researchers (Carvalho et al., 2018; Paredes et al., 2014), but this is beyond the scope of this paper, which aims to analyze the impact of organizational innovativeness on product- oriented innovativeness in agroindustry small businesses.

Analysis methods

Regarding analysis, Partial Least Squares Structural Equation Modelling (PLS-SEM) with SmartPLS V2.0 software was employed to validate constructs as well as to analyze causal effects. Overall, general guidelines concerning PLS-SEM were followed (Hair, Ringle, & Sarstedt, 2011); Hair, Ringle, and Sarstedt (2013); Hair, Sarstedt, Pieper, and Ringle (2012); (Ringle, Silva, & Bido, 2014).

In order to validate the measurement model (i.e. constructs), several criteria were applied:

- Internal consistency reliability: composite reliability higher than 0.7.
- Internal consistency reliability: Cronbach's alpha higher than 0.7.
- Indicator reliability: indicator loadings higher than 0.7.
- Convergent validity: average variance extracted (AVE) higher than 0.5.
- Discriminant validity: Fornell-Larcker criterion, i.e., the square root of any construct's AVE should be higher than any correlation (in module) with other constructs.
- Discriminant validity: cross-loadings criterion, that is, the indicator's loadings should be higher than its cross-loadings (i.e., loadings with other constructs).

In order to analyze the structural model, the following criteria were applied:

- Analyzing R^2 values for endogenous latent variables (i.e. dependent variables).
- Statistical significance: the bootstrapping technique with 5.000 resamples was employed to assess t-values of two-tailed tests. Critical t-values of two-tailed tests are approximately 1.96 (significance level $\alpha = 0.05$), 2.58 ($\alpha = 0.01$), and 3.30 ($\alpha = 0.001$).
- Predictive relevance: the blindfolding technique was employed with d value of 10 and the cross-validated redundancy measure (Q^2) was analyzed since Q^2 higher than 0 (zero) indicates predictive relevance.

Results AND DISCUSSION Initial Model

Initially, all innovation dimensions that compose each construct (organizational innovativeness and product-oriented innovativeness) were added to the first model, as shown in Figure 1. With regard to organizational innovativeness (ORG), the dimensions organization (ORG1-ORG) and innovative environment (ORG2-ENV) were included as indicators. Similarly, with regard to product-oriented innovativeness, the dimensions offerings (PROD1-OF), solutions (PROD2-SOL), and platform (PROD3-PLAT) were included.

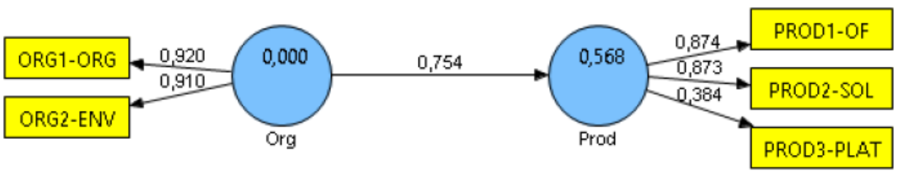

Figure 1
First Model

Table 1 shows indicators' loadings and cross-loadings on the constructs. As one may observe, the loadings values (in bold) are the same as those shown in Figure 1. Still, Table 1 also shows indicators' cross-loadings, that is, the loadings with other constructs. With regard to discriminant analysis, all indicators fulfill this criterion, as the loadings on the corresponding constructs are higher than the cross-loadings with other constructs. However, the platform dimension (PROD3-PLAT) did not fulfill the minimum loading value of 0.7.

Table 1
First model - indicators' loadings and cross-loadings

	ORG	PROD
ORG1-ORG	0.9203	0.7095
ORG2-ENV	0.9099	0.6689
PROD1-OF	0.6706	0.8740
PROD2-SOL	0.6733	0.8728
PROD3-PLAT	0.1942	0.3835

Table 2
first model general evaluation

Construct	AVE	Composite reliability	R^2	α Cronbach	Commun.	Redund.
ORG	0.8374	0.9115	0	0.806	0.8374	0
PROD	0.5576	0.7737	0.568	0.595	0.5576	0.3105

Table 2 shows overall assessment metrics to the first model, such as AVE, composite reliability, R^2, among others. In line with the criteria described in the methodology section, both AVE and composite reliability fulfill the minimum criteria of 0.7.

Notwithstanding, Cronbach's alpha of the product-oriented innovativeness (PROD $\alpha = 0.5945$) was lower than the minimum criteria of 0.7.

Based on these results concerning the validation of the first model, especially the low loading of the platform dimension (PROD3-PLAT loading = 0.384) and the low Cronbach's alpha (PROD $\alpha = 0.5945$), the measurement model needed to be re-specified, which is presented in the next section.

Moreover, it is worth noting that the structural equation model was not analyzed at this point since the constructs (i.e. measurement model) need to be adjusted before analyzing path coefficients and significance.

Final Model

The platform dimension (PROD3-PLAT) was excluded in the final model as it did not fulfill the minimum loading of 0.7 on its construct, namely, product-oriented innovativeness (PROD). Figure 2 shows the re- specified final model and detailed information regarding loadings and the path coefficient between organizational innovativeness (ORG) and product-oriented innovativeness (ORG->PROD = 0.761).

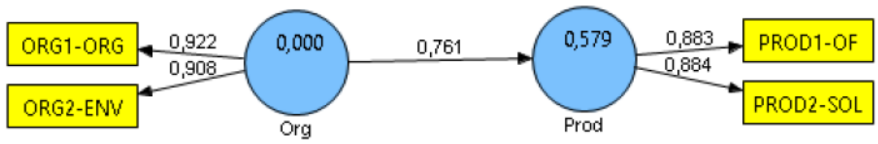

Figure 2
Final Model

Table 3 shows indicators' loadings and cross-loadings in the final model. The removal of the platform dimension (PROD3-PLAT) slightly improved other dimensions loadings on product-oriented innovativeness (PRO1-OF = 0.883; PROD2-SOL = 0.884). Table 3 also shows that all indicators reliability and discriminant analysis criteria were fulfilled. First, all indicators loadings are higher than the 0.7 threshold on their respective constructs. Second, all indicators' loadings are higher than their cross- loadings (i.e., loadings with other constructs). For instance, the organizational dimension (ORG1-ORG) has a loading of 0.922 on organizational innovativeness (ORG) and a cross-loading of 0.722 on product-oriented innovativeness (PROD).

Table 3
Final model - indicators' loadings and cross-loadings

	ORG	PROD
ORG1-ORG	0.9217	0.7216
ORG2-ENV	0.9083	0.669
PROD1-OF	0.6707	0.8830
PROD2-SOL	0.6736	0.8841

Table 4
Final model general evaluation

Construct	AVE	Composite reliability	R²	α Cronbach	Commun.	Redund.
ORG	0.8373	0.9115	0	0.806	0.8373	0
PROD	0.7806	0.8768	0.579	0.719	0.7806	0.4518

Table 4 shows the assessment metrics of the final model, which are better than those from the first model (Table 2), especially concerning the product-oriented innovativeness construct (PROD).

Its AVE increased from 0.56 to 0.78, as well as its composite reliability (from 0.77 to 0.88), and R^2 (from 0.568 to 0.579). It is also worth noting the increase of Cronbach's alpha value from 0.595 to 0.719, which became higher than the minimum threshold of 0.7.

The Fornell-Larcker criterion of discriminant analysis is presented in Table 5, in which the square root of any construct's average variance extracted (AVE) should be higher than any correlation (in module) with other constructs.

The final model fulfills this criterion, as both constructs' AVE (ORG's AVE = 0.915; PROD's AVE = 0.884) are higher than the correlation between them (r = 0.761).

Table 5
Discriminant validity FornellLarcker criterion

Correlation and AVE	ORG	PROD
ORG	0.9150	-
PROD	0.7607	0.8835
Bold values within the main diagonal indicate AVE's square roots.		

The previous results demonstrate that the final model fulfills all validation criteria presented in the methodology section. Thus, once the measurement model was validated, the structural model was then analyzed, in other words, once the constructs were validated, the path coefficients between them were then analyzed.

It is worth mentioning that this analysis included the variance explained (R^2) of the latent/dependent construct, the bootstrapping technique with 5000 resamples to assess significance values, and the Blindfolding technique to assess predictive relevance.

The variance explained (R^2) of the dependent construct, namely, product-oriented innovativeness (PROD) was 0.579, could be considered as moderate according to Hair et al. (2011). It is worth noting that the R^2 value is included in both Table 4 and Figure 2 (within the product-oriented innovativeness construct).

Table 6 shows the t-values and significances (p-values) for outer loadings and the path coefficient. All t-values were higher than the critical t-value of 3.30, which corresponds to a significance value of 0.1%, in other words, the results demonstrate that all outer loadings and the path coefficient were highly statistically significant. Moreover, the positive and significant effect of organizational innovativeness on product-oriented innovativeness (ORG->PROD path coefficient = 0.762; $p < 0.001$) confirms the hypothesis (H1) proposed, namely, organizational innovativeness impacts positively product-oriented innovativeness in agro-industrial micro and small businesses.

Finally, the predictive relevance of the final model was also assessed.

Table 7 shows the cross-validated redundancy (Q^2) of the endogenous construct, namely, product-oriented innovativeness (PROD). The result (Q^2 = 0.451) is higher than the threshold of 0 (zero), confirming that its explanatory construct, organizational innovativeness (ORG), has predictive relevance.

Table 6

significance values obtained by Bootstrapping

Bootstrapping	Outer loadings	Path coefficients	t-value	p-value
ORG1-ORG <- ORG	0.9216		107.3104	p<0.001
ORG2-ENV <- ORG	0.9078		80.4287	p<0.001
PROD1-OF <- PROD	0.8831		52.4658	p<0.001
PROD2-SOL <- PROD	0.8841		61.3841	p<0.001
ORG -> PROD		0.7622	30.3867	p<0.001

Table 7

Final model predictive validity

	Total SSO	SSE	Q^2 = 1-(SSE/SSO)
PROD	498	273.4	0.451

In sum, the results validate the final model and confirm the hypothesis proposed in this paper, that is to say, organizational innovativeness impacts positively product- oriented innovativeness in agro-industrial MSBs. The results corroborate other studies that show the importance of organizational innovativeness on product-oriented innovativeness (Augusto et al., 2014; Battisti & Stoneman, 2010; Camisón & Villar-Lopez, 2014; Capitanio et al., 2010), but in the underexplored context of Brazilian agro- industrial micro and small businesses (MSBs).

For instance, based on the United Kingdom's innovation data, Battisti and Stoneman (2010) found significant positive correlations among different innovation types, including product and organizational. Camisón and Villar-Lopez (2014) verified in Spanish industrial companies that organizational innovations impacted directly process and indirectly product innovation capabilities.

A similar result was found by Augusto et al. (2014) considering Portuguese industrial companies. Capitanio et al. (2010) stress that organizational features have become vital to subsidize Italian agro-food companies product innovations. Hence, companies seeking more product innovations may benefit from innovating organizationally (Evangelista & Vezzani, 2010).

Conclusion

The paper's results support the importance of companies' organizational innovativeness on their product-oriented innovativeness. Basically, companies with a higher capability to implement organizational innovations secure a higher capability to introduce product innovations. It is also worth mentioning that the paper's aim was fulfilled, as the impact of organizational innovativeness on product-oriented innovativeness was indeed analyzed by means of Structural Equation Modelling. Besides, H1 was confirmed since this impact is positive and significant at the 0.001 level (path coefficient = 0,7622; p-value < 0.001).

This research contributes to the literature on micro and small businesses (MSBs) innovation and, particularly, to the literature covering the Local Innovation Agents (LIA) Program in Brazil. To the best of our knowledge, few studies concerning the LIA Program analyze causal relationships, especially employing advanced statistical techniques such as Structural Equation Modelling (SEM). Besides, this research contributes to the literature on the agro-industry sector by analyzing micro and small businesses innovation and by showing the importance of organizational innovativeness on product-oriented innovativeness.

It is also worth remarking that the results obtained should be considered taking into account methodological limitations, namely, the model's scope and the companies' location in the State of Parana, Southern Brazil. Future research could extend this analysis involving other constructs such as process and marketing innovation capabilities (i.e., innovativeness), as well as analyze different industries and regions.

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