



Organizational learning and global value chains: evidence from small and medium-sized enterprises

Aprendizagem organizacional e cadeias globais de valor: evidências em pequenas e médias empresas

Aprendizaje organizacional y cadenas de valor globales: evidencia en las pequeñas y medianas empresas

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Palavras-chave

Cadeias de valor globais. Aprendizagem organizacional. Capacidade de absorção. Pequenas e médias empresas; Agronegócio.

Keywords

Global value chains. Organizational learning. Absorptive capacity. Small and medium-sized enterprises. Agribusiness.

Abstract

The growing presence of multinational companies (MNCs) in developing countries increases the dissemination of knowledge in global value chains (GVCs). In agribusiness, this can promote organizational learning in small and medium-sized enterprises (SMEs), although the effects vary according to the quality of interactions and prior absorption capacities. This study analyzes whether local SMEs that supply MNEs have higher levels of organizational learning compared to those that do not. A quantitative, non-experimental, cross-sectional study was conducted with 115 SMEs in the agro-industrial chain. Results reveal that supplier SMEs show significantly higher organizational learning (mean 57.0 vs. 45.8), confirmed by the *t*-test ($t=2.682$; $p=0.008$). Interactions in GVCs act as vectors for knowledge transfer and technological capacity development, reinforcing the importance of collaborative and institutionally structured learning environments.

Resumo

A inserção crescente de Empresas Multinacionais (EMN) em países em desenvolvimento amplia a difusão de conhecimento nas Cadeias Globais de Valor (CGV). No agronegócio, isso pode favorecer a aprendizagem organizacional de pequenas e médias empresas (PMEs), embora os efeitos variem conforme a qualidade das interações e as capacidades prévias de absorção. O objetivo deste estudo é analisar se PMEs locais fornecedoras de EMN apresentam níveis superiores de aprendizagem organizacional em comparação com aquelas que não mantêm esse vínculo. Realizou-se uma pesquisa quantitativa, não experimental e transversal, com 115 PMEs da cadeia agroindustrial. Os resultados mostram que PMEs fornecedoras de EMN apresentam aprendizagem organizacional significativamente mais elevada (média 57,0 vs. 45,8), confirmada pelo teste *t* ($t=2,682$; $p=0,008$). As interações nas CGV atuam como vetores de transferência de conhecimento e desenvolvimento de capacidades tecnológicas, reforçando a importância de ambientes colaborativos e institucionalmente estruturados.



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1. INTRODUCTION

External knowledge flows have been widely recognized as catalysts for companies' innovation capabilities and as important drivers of their competitive advantages (Aghion & Jaravel, 2015; Escribano et al., 2009).

This recognition has given rise to different perspectives on the ways in which organizations access, assimilate, and use new knowledge to accelerate internal innovation processes and expand their operations in existing or emerging markets (Chesbrough, 2003).

In recent decades, a relative consensus has emerged in the specialized literature that knowledge is the central resource of the contemporary economy, and learning is its main structuring process (Montgomery, 2007). Similarly, it has become evident that both learning and innovation depend on continuous mechanisms for the conversion and circulation of knowledge, which enable its transformation into new products, services, practices, and organizational routines (Nonaka & Takeuchi, 1995).

From the perspective of Innovation Systems, such processes of conversion, diffusion, and use of knowledge occur in localized organizational environments that are deeply connected to their institutional and productive surroundings. Thus, organizational learning is not restricted to the firm's internal resources, nor can innovative performance be understood in isolation from the relationships that companies establish with other economic, scientific, and political actors (Freeman, 1987, 1997; Lundvall, 1985, 2007).

An innovation system is composed of multiple elements that interact in the production, circulation, and application of knowledge. Among its main components are heterogeneous and interrelated actors, including local and multinational companies, universities, research centers, and government agencies, highlighting the interactive and distributed nature of the innovation process (Ciceri, 2015; Edquist, 1997; Lundvall, 1988; Nelson, 1993).

At the regional level, Regional Innovation Systems (RIS) constitute a meso-level specification of the productive and institutional configuration in which companies and other organizations in the territory operate (Cooke, 2001). These systems are often understood as comprising two complementary subsystems: knowledge exploitation—which includes universities, research institutes, technology transfer agencies, and business organizations—and knowledge exploitation, composed mainly of companies, often organized in clusters (Cooke & Memedovic, 2003).

In addition to the systemic attributes of the SRI, the policies, internal practices, and forms of governance adopted by companies and collective actors, whether formal or emerging, which structure rules, routines, and interactions at the micro level, are also relevant. Such mechanisms function as important vectors for the activation of social capital and the strengthening of regional innovative capacity (Cooke et al., 1997).

In Brazil, the insertion in Global Value Chains (GVC) led by Multinational Companies (MNCs) has played a relevant role in the dissemination of knowledge, especially in sectors such as automotive, aerospace, electronics, and capital goods. The presence of these companies has intensified foreign direct investment and introduced more advanced technological, organizational, and management standards. Evidence indicates that the learning

of Brazilian companies integrated into GVCs depends less on the mere presence of MNEs and more on the quality of the interactions established with them, as well as on the prior knowledge absorption capacities of local firms (Figueiredo, 2001).

In this scenario, agribusiness deserves special mention, understood as a complex and knowledge-intensive socioeconomic system that plays a strategic role in the Brazilian economy through its contribution to GDP, exports, and job creation (EMBRAPA, 2022; OECD, 2023). Studies on innovation in agribusiness emphasize that its competitiveness is increasingly linked to the ability to incorporate and generate technological, managerial, and organizational knowledge, especially through integration into Global Value Chains (GVCs) and collaborative networks (Spielman 2023; Vorley, 2012).

The insertion of Brazilian agribusiness into GVCs—observed in segments such as grains, meat, and dairy—has intensified the circulation of knowledge associated with digitization, traceability, sustainability, and international quality standards, promoting technological leaps that go beyond the strictly productive level (Gereffi et al., 2005; Ponte & Ewert, 2009). However, evidence from regional and sectoral studies indicates that the benefits of learning and innovation in agribusiness are not distributed evenly across the country: they vary according to the density of productive and institutional capacities, the presence of local productive arrangements, and the quality of interactions between producers, companies, and scientific institutions (Amin & Thrift, 1994; Boschma, 2005; Giuliani, 2007). This pattern is directly influenced by the absorption capacities of firms—that is, their ability to recognize, assimilate, and exploit external knowledge—a crucial determinant of innovation in both industrial and agricultural contexts (Cohen & Levinthal, 1990; Zahra & George, 2002). In agro-industrial segments, intense competitive pressures, strict health requirements, and the rapid evolution of digital and sustainable technologies make organizational learning a central element of survival and growth strategies, requiring local companies not only to have access to knowledge, but also to have the capacity to internalize it and transform it into a competitive advantage (Hoffmann, 2018; Kristensen & Birch-Thomsen, 2013). In many cases, domestic suppliers gain access to sophisticated production and technological routines, gradually developing new skills. However, the appropriation of this knowledge is uneven across Brazil, being more intense in regions with greater industrial density and scientific infrastructure, such as the Southeast and South (Fernandes & Mesquita, 2024). In this context, public policies that stimulate RD&I, technological cooperation, and the formation of clusters—such as the programs of the Brazilian Industrial Research and Innovation Company (EMBRAPII) and the incentives provided for in the Lei do Bem (Good Law)—act as complementary mechanisms for strengthening national innovation capacity (Alencar & Ferreira, 2025). Thus, in Brazil, learning gains in GVCs stem from a combination of qualified interactions with MNEs and consistent internal innovation efforts in local companies, which reinforces the strategic role of absorption capacities and institutional coordination for industrial competitiveness.

2. THEORETICAL FRAMEWORK

2.1 Agribusiness and its relationship with global value chains

From a classical conceptual perspective, Davis and Goldberg (1957) describe agribusiness as an intersectoral set that encompasses the production, processing, and

distribution of agricultural products and their derivatives. This concept covers the entire production chain, from the supply of inputs to the arrival of the final product at the consumer. Already in the 1950s, the notion of agribusiness was therefore intrinsically associated with the idea of a value chain, since agricultural production came to be understood as an articulated system. In this sense, Davis (1956, pp. 107-108) argues that technological changes “have increasingly brought agricultural production and marketing closer together, making them interdependent” and, therefore, it was necessary to look at “the entire system, not just production on the farm”.

With the advance of the globalized economy, the concept of the value chain underwent a process of theoretical and analytical evolution. A widely accepted definition describes the value chain as the complete set of activities necessary to take a product from conception, through the different stages of production and distribution, to final consumption and eventual disposal (Kaplinsky & Morris, 2002). From this perspective, primary production represents only one link in a broader system of value addition.

Later authors reinforce the relational and interdependent dimension of these chains. Bellú (2013) understands global value chains as a set of interconnected economic activities carried out by different agents throughout complementary stages, while Webber and Labaste (2010) emphasize that the value generated must be observed both in the vertical flow—which connects inputs, production, processing, distribution, and consumption—and in the horizontal connections with other chains that provide intermediate goods and services. In addition, the analysis of global value chains allows for the exploration of dimensions such as power, governance, and coordination, as emphasized by Gereffi et al. (2001), highlighting that productive links are not organized in a neutral manner, but according to arrangements that shape how value is created, distributed, and appropriated.

In this context, this approach becomes particularly relevant given that productive links are fragmented and distributed territorially on an international scale. In agribusiness, insertion into GVCs intensifies the flows of technical, managerial, and technological knowledge, while exposing producers and agribusinesses to the demands of standardization, traceability, sustainability, and operational efficiency. Donovan et al. (2015) highlight that this transformation of agri-food chains redefines roles, competencies, and coordination mechanisms among actors, increasing the importance of organizational learning and the capacity for continuous adaptation.

This discussion becomes even more relevant in view of the scenario projected for the coming decades. The world population is expected to reach approximately 9.7 billion people in 2050, while the Brazilian population is expected to peak at around 231 million inhabitants in the same period. To meet the growing demand for food, it is estimated that an increase of close to 35% in global production will be necessary (United Nations, 2022). This challenge is compounded by geopolitical and economic uncertainties that impact international trade, access to inputs, and the stability of supply chains, intensifying the need for more resilient, innovative, and sustainable value chains.

In this context, global value chains play a central role in modern agriculture. As Gereffi (2018) observes, the coordination and specialization of different production links can enhance efficiency and competitiveness gains. On the other hand, this same interdependence increases the sector's sensitivity to external shocks, such as logistical disruptions, price fluctuations,

institutional crises, and regulatory changes (OECD, 2023). Thus, understanding agribusiness through the lens of GVCs allows us to analyze not only how value is created and distributed across the production chain, but also how companies learn and innovate in an increasingly complex and dynamic global environment.

2.2 Organizational learning and innovation

Organizational learning is one of the main determinants of innovative processes, as it involves the creation, retention, and transfer of knowledge within and between organizations (Argote & Miron-Spektor, 2022). The Organization for Economic Cooperation and Development (OECD, 2018) emphasizes that learning depends on routines, interactions, and systematic practices capable of mobilizing both explicit and tacit knowledge, articulating internal and external sources of knowledge. Thus, knowledge management presupposes the adoption of mechanisms that enable the acquisition of external knowledge, interorganizational collaboration, and structured knowledge sharing internally.

This process is cumulative and interactive in nature, occurring in organizational and institutional environments in which companies, universities, research centers, and collective organizations build formal and informal cooperative relationships (Klaus et al., 1996). From this perspective, innovation can be understood as the result of continuous learning processes in action, approaching what the literature calls *mathetics*: learning through deliberate practice, reflection on action, testing hypotheses, and the progressive internalization of new routines and skills.

The literature also shows that the quality of interactions between multinational companies (MNCs) and small and medium-sized enterprises (SMEs) conditions local technological learning. According to Altenburg (2000), the use of these interactions depends mainly on three factors: (1) public policies that encourage investment and knowledge transfer; (2) MNC strategies aimed at developing local suppliers; and (3) the internal capacities of SMEs to meet the required technical and managerial standards in a relatively short time.

Among the mechanisms of technological diffusion, the following stand out: demonstration and imitation of productive practices, mobility of skilled workers, competitive pressures, learning via export, supply links with quality and management standards, structured training, and direct technology transfer (Dutrénit & Fuentes, 2009; Görg & Greenaway, 2001). These mechanisms contribute to structuring incremental and cumulative learning trajectories—the core of *mathetic* logic.

Innovation, therefore, can be understood as the result of internal and external organizational learning processes, supported by networks, interaction, and information management capabilities (OECD, 2018; Rothwell, 1994). Recent research reinforces that innovation occurs in complex systems, involving multiple actors and collaborative relationships, which requires continuous absorption and adaptation capacities (Crossan et al., 2008).

In the Innovation Systems approach, technological learning and innovation constitute an interactive network in which the institutional and territorial context plays a central role. In developing countries, such processes tend to focus on process innovations, with gradual

advances influenced by cultural, organizational, and geographical proximity between actors (Giuliani et al., 2005). Evidence also shows that the integration of local companies into Global Value Chains (GVCs) remains limited by productive and technological constraints; however, when SMEs establish stable supply relationships with MNEs, their absorption capacities tend to increase, especially when there is a structured transfer of practices, routines, and technology (Olea-Miranda et al., 2016).

In summary, learning and innovating are inseparable processes. Sustainable and continuous innovation depends on organizational and institutional structures that favor mathematics learning—understood, in line with Comenius (1985), as the art of learning through guided experience, observation, and reflective practice. From this perspective, learning is not limited to the transmission of information, but involves the active construction of knowledge in action, which reinforces that there is no consistent innovation without robust, experiential, and interactive organizational learning.

3. METHODOLOGY

A non-experimental, cross-sectional, correlational study was designed to identify statistically significant associations between variables; the study population was defined based on companies that met the following criteria:

1. Companies that develop processes, products, or services within the agro-industrial chain—such as food processing, input production, industrialization of derivatives, storage, and technology applied to agribusiness—and which, according to previous research, are more likely to maintain supply and cooperation relationships with large anchor companies in the sector.
2. Companies that meet the size classification criteria adopted in Brazil for micro, small, and medium-sized enterprises (MSMEs), according to IBGE and SEBRAE parameters (SEBRAE, 2013).
3. They are located in municipalities with high population density and economic activity in the state of São Paulo, according to data from the Brazilian Institute of Geography and Statistics (IBGE, 2022), in order to favor the presence of large anchor companies and structured production chains.

The sample size was determined from the universe of 672 SMEs that met the established characteristics and selection criteria. It was determined that the proportion “ p ” for the purpose of estimating a variable across the entire company does not differ by more than seven percent accuracy. Once the precision was set, a confidence level of 95 percent was selected; an ideal sample size of 115 companies was estimated, and a distribution proportional to size by representativeness, economic activity, and geographic location was established.

For the collection of information in the field, a questionnaire based on the instrument “Technological learning and innovation in technology-based SMEs: the role of global networks in knowledge transfer” was used, adapted to the Brazilian context and the agro-industrial sector. The questionnaire consists of 95 questions organized into ten sections. The questionnaire was designed to ensure that each item was aligned with the theoretical

constructs to be measured. To this end, the capabilities matrix proposed by Lall (1992), which analyzes the nature and determining factors of technological development at the microorganizational level, was adopted as a central reference. In addition, the analytical framework of Morrison et al. (2008) was used as a basis, which integrates the technological capabilities approach with the dynamics of Global Value Chains. This perspective allows us to understand how interactions with different actors—local and international—influence learning processes, the formation of absorption capacities, and the innovative performance of small and medium-sized enterprises.

The hypothesis of this research is as follows:

H₀: There is no statistically significant difference in organizational learning between SMEs that are suppliers to MNEs and those that are not ($\mu_1 = \mu_2$).

The operationalization of theoretical concepts through measurement scales is an essential step in empirical research, as it allows for the observation of relationships between hypothetical variables. According to Hair et al. (2010), when these variables are represented by a set of related questions, they form complex constructs, whose measured properties support the formulated hypotheses.

A composite indicator, in turn, synthesizes a multidimensional concept into a single index, based on an underlying conceptual model. Its construction depends on the dimensions analyzed and the items that compose them, and may result from weighted averages or the simple sum of the responses. When the number of items varies between dimensions, the standardization of scores is necessary to enable their comparable aggregation (Schuschny & Soto, 2009).

In this study, the organizational learning indicator was developed to measure both internal and external learning. The internal dimension encompasses the mechanisms used for knowledge acquisition and problem solving; the external dimension refers to the forms of linkage with different agents of the Regional Innovation System, such as universities, research centers, government institutions, and associations.

3.1 Development of the intra-organizational learning capacity measurement scale

To quantitatively operationalize the concept of intra-organizational learning, the learning mechanisms present in SMEs were identified and analyzed, as recommended by the OECD (2005). These mechanisms include, among others, training programs, quality circles, multidisciplinary problem-solving teams, certifications and accreditations, as well as initiatives associated with lean manufacturing and Six Sigma.

The internal learning dimension consisted of six observable items:

- **Tools for knowledge acquisition and sharing:** measures the degree of sophistication in the use of instruments and systems for disseminating knowledge within the company.

- **Internal learning activities:** assesses the relevance attributed to activities aimed at improving employee knowledge, as well as the use and mastery of these practices in everyday organizational life.
- **Formal training plan:** verifies the existence of a structured training program, indicating whether skills updating is part of the company's strategy.
- **Sources of information for learning:** identifies and measures the sources used for updating in relation to the market, processes, products, and services, including the possible adoption of technology watch practices.
- **External certifications:** measures the achievement of certifications recognized by external entities (e.g., ISO 9000, Six Sigma, project management).
- **Innovation incentive programs:** assesses the importance attributed to innovation, recognition, and incentives offered to employees, indirectly reflecting the company's openness to risk and change.

3.2 Development of the interorganizational learning capabilities measurement scale

The interorganizational learning capabilities scale measures the company's ability to establish and manage relationships with external organizations through formal mechanisms, programs, and projects associated with innovation processes (Altenburg, 2000).

This dimension is composed of three factors that correspond to the main actors in the Regional Innovation System (RIS): higher education institutions (HEIs), research centers, and government entities.

3.3 Development of the HEI measurement scale

The HEI scale records the type and intensity of links established with universities and technological institutes located in the region where the company operates, covering technological cooperation and learning interactions (Giuliani et al., 2005).

This dimension consists of three items:

- **Link with HEIs:** identifies the existence or absence of formal relationships between the company and higher education institutions.
- **Innovation with HEIs:** measures the degree of joint development of innovative products and/or services in partnership with HEIs.
- **Activities linking to HEIs:** specifies and evaluates the types of interaction established with the educational sector (e.g., R&D projects, technical advice, internships, training, among others).

3.4 Development of the measurement scale for Research Centers

Research centers include specialized laboratories and certifying entities responsible for technical processes and scientific-technological development (Giuliani et al., 2005). This dimension consists of one item:

- **Technological development:** measures the degree of the company's involvement in technological development activities, including product and process design and

modification, testing and use of new materials, as well as intellectual property acquisition, among other initiatives.

3.5 Development of the measurement scale for government entities

This scale records the type and intensity of links established with public institutions and support organizations that promote innovation in the industrial sphere, such as government agencies, sectoral chambers, and associations that offer technical, financial, and training support (Giuliani et al., 2005). The dimension consists of three observable items:

- **Government programs:** identifies and describes the public programs to promote innovation used by the company.
- **Business chambers:** measures the company's participation in formal agreements with civil and sectoral organizations, understood as channels for knowledge transfer.
- **Government support:** verifies whether the company received government support for the development of new products and/or services, as well as the type of support granted.

3.6 Hypothesis testing: comparison of means between two independent groups

When you want to contrast whether the values of a quantifiable variable differ significantly between two or more groups, the appropriate method is to compare the means of two random samples drawn from these populations.

There are several statistical tests designed to contrast the means of two populations. The decision on which one to choose depends on the characteristics of the variable to be contrasted; the assumptions of independence between observations, normality in the distribution of the variable, and homoscedasticity (equality of variances) determine the procedure to be used (Christensen, 2012; Montgomery & Runger, 2015).

To answer the working hypothesis of this research, the assumptions of the variable (organizational learning) are verified and compared between the two analysis groups (SMEs that are suppliers and non-suppliers of MNEs). The mathematical expression of the hypothesis testing model is:

$$H_0: \mu_1 = \mu_2$$

$$H_1: \mu_1 \neq \mu_2$$

4. ANALYSIS AND DISCUSSION OF RESULTS

As an initial step in the analysis of organizational learning of local SMEs integrated into the CGV, we consider that, of the total number of SMEs, 33.62% are linked to the CGV and the remaining 66.38% have no supply relationships.

Organizational learning was constructed based on two dimensions (Figure 1); on a scale of 0 to 100, Table 1 shows the proportion of supplier and non-supplier SMEs that are below or above the average of the total collaborative learning indicator, as well as the average by supply condition with MNEs.

In the same Table 1, we can see that, for supplier SMEs, the average indicator (57.0) is higher than for non-suppliers (45.8). In addition, the distribution of the proportion of SMEs that are above or below the overall average differs in terms of their supplier status. Among non-supplier SMEs, the indicator is similar (around 50%), but in terms of supply conditions, there is a significant difference, since 61.54% of them have an indicator above the average.

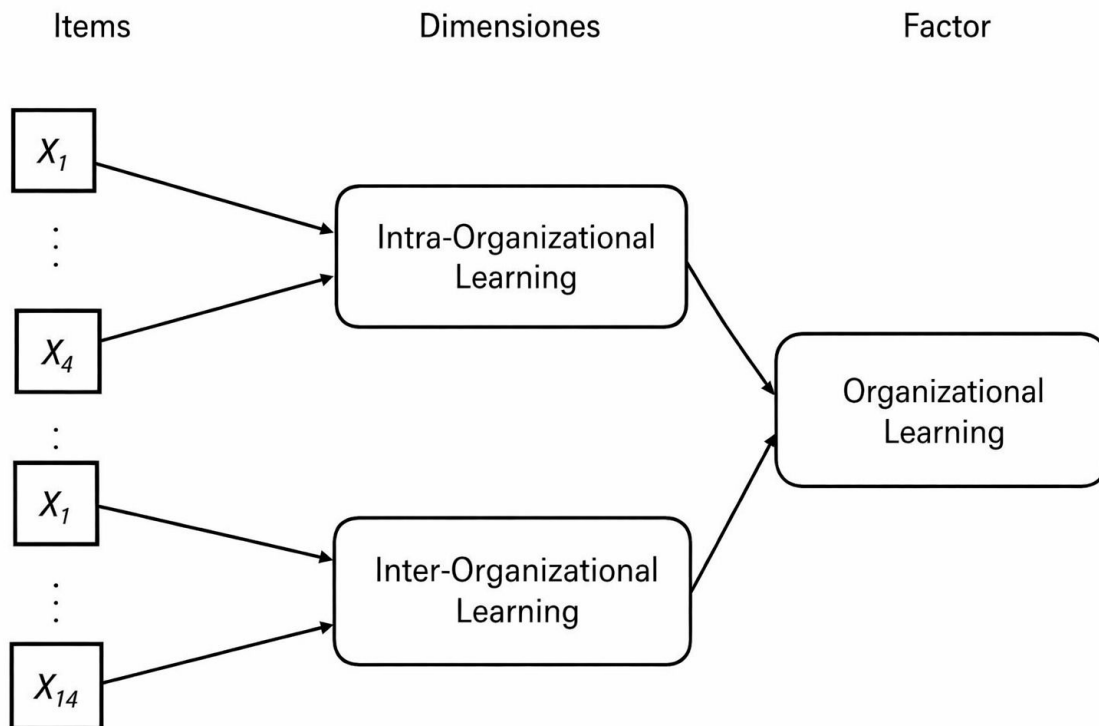


Figure 1. Organizational Learning measurement structure
Source: own elaboration.

Table 1
Organizational learning dimension and EMN provider

Organizational Learning	Non-MNE Supplier (%)	MNE Supplier (%)	Total (%)
Below Average	49.35	38.46	45.69
Above Average	50.65	61.54	54.31
Overall Average	45.80	57.00	49.50

Source: Own elaboration.

The contrast between the average organizational learning of SMEs that are suppliers and those that are not suppliers of MNEs was performed using the t-test procedure for independent samples; for the assumption of normality, the Kolmogorov-Smirnov test was used, which presented significances of 0.200 and 0.176, proving the normality of the variable in both population groups. The means of the organizational learning variable of SMEs were

estimated at ($\mu_p = 0,570$) for MNE suppliers and ($\mu_{np} = 0,458$) for non-MNE providers; and their standard deviations at 0.214 and 0.211, respectively.

To contrast the hypotheses that collaborative learning among SMEs differs depending on whether or not they are suppliers to an MNE, Levene's test is used to determine the homoscedasticity of the variances; this statistic reports an estimate of $F=0.019$ with a significance level of $p = 0,89$, which suggests that the variances of both populations are equal ($H_0 : \sigma^2 = \sigma^2$). The *t-student* test statistic was estimated at 2.682, with an associated significance of 0.008 (significant at 1%), leading to the conclusion that SMEs supplying EMN show, on average, greater collaborative learning compared to those that do not.

The previous statement can be confirmed with the reported confidence interval. $(0,029 \parallel \mu_p - \mu_{np} \parallel 0,194) = 95\%$, given that both are positive (not including zero), this implies that the first reference population (SMEs supplying MNEs) has a higher average organizational learning indicator than non-suppliers (Table 2).

Based on the statistics presented, it can be said that SMEs develop various techniques and skills through collaborative learning; however, these are greater when they are suppliers to MNEs.

Table 2

Organizational learning of SMEs that are suppliers and non-suppliers to MNEs

Organizational Learning	Levene's Test for Equality of Variances		t-test for Equality of Means			95% Confidence Interval of the Difference			
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	0.029	0.89	2.68	114	0.008	0.112	0.042	0.029	0.194
Equal variances not assumed			2.66	75.4	0.009	0.112	0.042	0.020	0.195

Source: Own elaboration.

This statement is consistent with other studies, which conclude that when MNEs set up in a region, they need to establish relationships with local companies, and when these relationships are supply-based, they usually require quality certifications or the adoption of new ways of operating their processes. In order for SMEs to meet these requirements, MNEs disseminate knowledge in the region, and the companies that significantly increase this knowledge are those that have a direct supply relationship with them (Olea-Miranda et al., 2016).

The transformations associated with globalization and the consolidation of Global Value Chains have redefined the ways in which SMEs participate in developing economies. Although these companies often face barriers related to quality standards, costs, and deadlines, a growing number of them have become suppliers to MNEs, which opens up new possibilities for learning and technological development.

Based on previous evidence suggesting that SME suppliers tend to develop greater absorption and innovation capacities, this study empirically analyzed the relationship between supply links with MNEs and organizational learning. The results confirm the hypothesis: SMEs that supply MNEs have, on average, higher levels of organizational learning than those that do not have this type of relationship.

Statistical analysis, using the t-test for independent samples, showed a significant difference between the groups, indicating that suppliers develop practices and routines associated with internal and interorganizational learning with greater intensity. Such evidence suggests that interaction with MNEs stimulates processes of qualification, standardization, problem solving, certification, and knowledge sharing, contributing to the consolidation of incremental learning trajectories, which is the core of what is understood here as mathetic learning.

These results, however, do not eliminate the existence of power and knowledge asymmetries in the relationships between MNEs and SMEs. Integration into GVCs remains a gradual, selective, and often demanding process for local firms. Nevertheless, the findings of this study indicate that when such relationships materialize into stable supply links, they can generate positive effects on organizational learning and, potentially, on innovative capacity. It should also be acknowledged that the sample of 115 firms, while statistically justified within the defined parameters, represents a limited share of the 672 eligible SMEs in the population. This raises questions about representativeness, particularly given the heterogeneity of the Brazilian agribusiness context across regions and firm types. Caution is therefore warranted when generalizing these findings beyond the specific context examined.

From a theoretical point of view, the study reinforces the relevance of articulating the frameworks of Innovation Systems, GVCs, and organizational learning, highlighting that the diffusion of knowledge depends simultaneously on external interactions and internal structures that allow for the absorption, transformation, and application of acquired knowledge.

In terms of practical implications, the results suggest that public policies and business strategies aimed at strengthening connections between SMEs and MNEs, through training programs, certification support, encouragement of technological cooperation, and institutional strengthening, can amplify the positive effects of insertion into GVCs. For SMEs, investing in

systematic organizational learning practices is not only a survival mechanism but also a strategic asset for competing in increasingly demanding markets.

Finally, it is recommended that future research explore different sectors and regions, as well as longitudinal approaches that allow for the observation of the evolution of learning capacities over time, deepening the understanding of the mechanisms by which interactions with MNEs translate, or not, into local technological development.

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