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Servitization strategies: shortcomings and opportunities in offering products and services in the agricultural segment

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RESUMO

Objetivo- Analisar estratégias de servitização vigentes e potenciais, sob a perspectiva dos produtores rurais do Oeste do Paraná, em relação aos seus fornecedores de insumos e equipamentos agrícolas.
Metodologia- O estudo conta com uma abordagem qualitativa e exploratória, com base em entrevistas aplicadas à produtores rurais que atuam na produção de grãos e que consomem produtos e serviços relacionados ao fornecimento de insumos para suas lavouras.
Resultados- gerencialmente, observou-se que os produtores não mostraram fidelidade exclusiva à determinada marca de equipamento ou insumo agrícola, mas consideram a oferta de serviços de pós-venda e assistência técnica de qualidade na decisão. Foram identificados novos serviços demandados pelos produtores e, tais serviços, podem favorecer a compra de produtos dos mesmos fornecedores. Há *gaps* que permitem explorar oportunidades quanto à servitização, dado que nem todos os serviços esperados têm sido supridos pelos fornecedores.
Originalidade- Esta pesquisa se destaca pela análise da servitização do ponto de vista de produtores rurais em relação aos fornecedores de máquinas e insumos agrícolas, e identifica novas oportunidades no maior uso de tecnologias, maior transparência e o compartilhamento de conhecimento técnico, melhoramento de assistência técnica e pós-venda com preços mais acessíveis.
Palavras-chave - Serviços; Agronegócio; Cadeias produtivas; produção de grãos; insumos agrícolas.

ABSTRACT

Purpose *– To analyze current and potential servitization strategies, from the perspective of rural producers in the West of the Brazilian state of Parana in relation to its inputs and agricultural equipment.*
Design/methodology/approach *– The study has a qualitative and exploratory approach, based on interviews with rural producers who work in grain production and use products and services related to the supply of inputs for their crops.*
Findings *– Managerially, it was found that producers did not show exclusive loyalty to a certain brand of equipment or agricultural input, but consider the offer of after-sales services and quality technical assistance in the decision. New services demanded by producers were identified and these services may favor purchasing products from the same suppliers. There are gaps that allow exploiting opportunities in terms of servitization, given that not all services that were expected to have been supplied, were supplied by suppliers.*
Originality/value *– This study stands out for its analysis of servitization from the point of view of rural producers in relation to suppliers of agricultural machinery and inputs. It identifies new opportunities in the greater use of technologies, greater transparency and sharing of technical knowledge, improvement of technical assistance and post-sales service at more affordable prices.*
Keywords – *Service**;** Agribusiness; Production chains; grain production; agricultural inputs**.***

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1. INTRODUCTION

Manufacturing companies continually offer new services in their portfolios, as this is an investment considered profitable and part of the strategy (BAINES *et al.*, 2017). The implementation of services provided by such companies has grown rapidly, both in developed and developing countries (VALTAKOSKI, 2017). At this point, the quest to stand out among so many competitors bring the challenge of rethinking services offering, which makes replication difficult by competitors and can increase the competitive advantage of the business (KOWALKOWSKI *et al.*, 2017; RYMASZEWSKA *et al.*, 2017).

Service delivery becomes important and gains strength as market competitiveness grows. Over the years, products have been losing value and becoming less profitable (MARILUNGO *et al.*, 2017; FLIESS; LEXUTT, 2017). Consumers are more demanding with what companies have to offer. As the delivery of quality products is no longer enough to please, they need to look for product and service options that will innovate and make the production process of their customers more flexible (RADDATS *et al.*, 2016).

This action of offering services and solutions added to the products is called servitization (VANDERMERWE; RADA, 1988). The provision of services by the company, in addition to generating profit from the service itself, can be structured in such a way that it can also add value to manufactured goods, so that the company does not need to reduce operating costs to remain competitive, and to replace the selling products, to sell products and services that add value in an integrated way (BAINES *et al.*, 2017). Servitization helps companies to reorganize customer interactions, in addition to offering customized services and solutions (LUSCH; VARGO, 2014).

A sector that has intensified the demand for services is agriculture. Farmers need to deal with climate problems, increase productivity without expanding land, preserve the environment, reduce consumption of water, energy and CO_2 levels (FAO, 2018). Taking this into consideration, farmers need help to make better decisions, acquire new technologies and invest in better inputs, technologies, and mechanization correctly. Faced with these challenges, servitization emerges for the industry to innovate with greater speed and specificity to the needs of these customers (SPRING; ARAÚJO, 2009). Brazil has become an important producer of commodities, largely due to agricultural mechanization, which enabled

an increase in productivity, bringing new opportunities for the services market (SCHLOSSER, 2004; BACHA, 2012).

Studies on creation and management of services aimed at Brazilian farmers and other agribusiness collaborators show that companies are interested in developing services that increase the satisfaction of their customers, understanding what they need to improve in their service offering (PEREIRA, 2020). In addition, in the international scenario it is evident that products and services need to be improved when greater economic development is expected (RAMOS; CARRER, 2020). In the context of studies on strategy, discussions about the design of products associated with services have been initiated (GURTU, 2019) in different sectors of the economy. The present study differs from the others by relating servitization strategies in the sector in Brazilian context.

Therefore, the research question seeks to answer: *is there evidence that suppliers and producers in the agricultural segment have used servitization as a value maximization strategy?*

This study aims to analyze current and potential servitization strategies, from the perspective of rural producers in western Paraná, in relation to their suppliers of agricultural inputs and equipment. As a way of operationalizing the work, the specific objectives are: a) to identify practices related to servitization strategies adopted by suppliers of agricultural inputs and machinery; b) verify the level of servitization and the type of service existing in the supplying companies analyzed; c) diagnose the expectations and needs of rural producers in relation to servitization offered by their suppliers.

2. THEORETICAL FOUNDATION

2.1 Servitization

For a better understanding of the concept of servitization, it is necessary to understand the term service, which deals with the transformation of a good into added value to the customer. This transformation can be from a material to a product, or even from experiences offered to the customer (TEBUOL, 2006). For Vargo and Lusch (2008), service is the application of specialized skills (resources, knowledge, and skills) through activities and processes. Services have become important as they offer strategic alternatives to

manufacturing companies, which have started to reinvent their business models (BAINES *et al.*, 2017).

Servitization provides manufacturing companies with the necessary strategy in defense of competition, leads to financial and marketing benefits, generates increased sales, profits, and customer satisfaction. The definition of servitization is a transformational process in business models, in which companies start to focus on product-service sales and not only on the sale of products (KOWALKOWSKI *et al.*, 2017; MARTINEZ *et al.*, 2017). For customers, it enhances the delivery of quality products and services, customized to the needs of each person or company (FLIESS; LEXUTT, 2017).

According to Tukker (2004), the marketing strategy of the product is related to three types of services, they are: services related to the products (maintenance and repair of equipment, training and consulting) to guarantee the operation and durability; services linked to use, which consists of making the use of the product available to increase its use and life cycle and its ownership is not transferred to the customer; and the third type of service is linked to results in which the company retains ownership of the product and the customer pays for the solution provided.

As a result, companies change their transaction-based business models to models that create a relationship with the customer (KOWALKOWSKI *et al.*, 2017; MARTINEZ *et al.*, 2017). With this change in its business model, uncertainties are created, such as the change in risk patterns and difficulties in managing and controlling strategic, organizational, and operational levels (BAINES *et al.*, 2017). In addition to the risks generated for the business model, due to misalignment with the company's strategy, the servitization process faces many challenges (GOTHBERG *et al.*, 2014).

Among the challenges to implement servitization as a strategy, there are risks related to the absence of profits or not achieving higher returns than its competitors, which impairs financial performance (EGGERT; THIESBRUMMEL; DEUTSCHER, 2015). There are still risks of the company causing reverse servitization, for something that did not turn out as expected (VALTAKOSKI, 2017). To facilitate this transition to servitization, the company can use technological innovations to improve its strategy, with the possibility of better engagement with the customer and the supplier in the provision of services (CUSUMANO *et al.*, 2015).

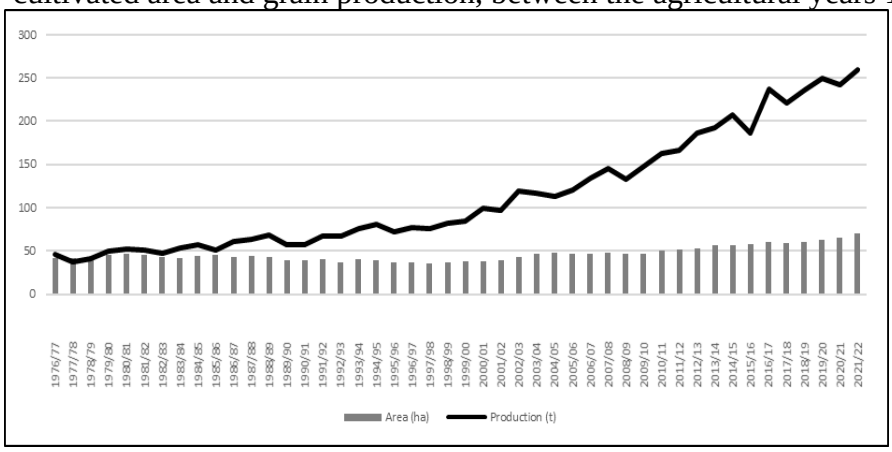
The servitization process is currently compared to a transformation trajectory, whereby the manufacturing process identifies innovative resources and capabilities to create mutual value for customers (BENEDETTINI *et al.,* 2015). Servitization is divided into 3 categories, showing increasing levels of complexity, degree of differentiation and added value, namely: basic services, intermediate services, and advanced services (BAINES *et al.*, 2013). Although servitization is found in different segments, this article focuses on the changes and impacts it produces and can still produce more specifically for grain producers who use agricultural machinery in the agribusiness segment.

2.2 Servitization in agribusiness

Bacha (2012) defines five functions of agriculture in the process of economic development of a country, they are: providing food for the total population (1), providing capital for non-agricultural sector (2), providing labor for the growth and diversification of activities in the economy (3), provide foreign exchange for the purchase of inputs and capital goods necessary for the development of economic activities and (4) constitute a consumer market for products from the non-agricultural sector (5). Furthermore, the author includes a sixth function in the case of the Brazilian context, which is to generate raw material necessary for the industrial development process. When analyzing Brazilian agricultural competitiveness between 2008-2010 and 2018-2020, Christ and Cunico (2022) diagnosed that 52.71% of 432 items of Brazilian agricultural products are in an optimal situation, that is, in addition to the country increasing market share; share in exports (US$) of these items to the world; world consumption (imports) also increased.

More than producing food for the world, Brazil showed a growth in grain production that went from 46.9 million tons in the 1976-1977 agricultural year to 250 million tons in 2021-2022, which means an increase of 462% in 46 years (Figure 1). However, the cultivated area in hectares (ha) expanded by 67% in the same period. That is, both grain production and area have grown since the 1970s, however the growth rate was higher for production than for the area, showing a gain in productivity, justified by the technological advance of agriculture, improvements chemical-mechanical among other factors (TELLES; RIGHETTO, 2019).

Figure 1 - cultivated area and grain production, between the agricultural years 1976/2022



Source: prepared by the authors from the National Supply Company (Conab).

Agricultural production, however, does not depend only on the capacity of rural producers, it is related to several interferences, among them: unfavorable weather conditions, increased productivity without the devastation of new areas for cultivation and the reduction of environmental impacts. With this, the producer demands high managerial competence of the cultures, it requires complete solutions, from agricultural inputs, commercialization, credit, and security to produce. This induces companies to provide means to ensure that all interferences linked to rural production are resolved, ensuring superior returns, and progress in terms of customer satisfaction for the products and services offered (KNAPP, 2015).

The development of agribusiness requires that its products, systems, and services are improved and innovated (RAMOS; CARRER, 2020). Precision agriculture gains space in this scenario, bringing technologies that are able to help the rural producer to identify management strategies to be adopted, making it possible to maximize the profitability of the crops, with products of high profitability and with the reduction of the costs of application of inputs, such as manures, fertilizers and pesticides, in addition to minimizing the environmental impacts of the activity (CARVALHO *et al.*, 2009; OLIVEIRA *et al.*, 2007).

Another new business model for the agricultural sector is technology embedded in machinery. The technology adds value to the machines, the measure removes the total dependence of an operator, and is now controlled by software, which reduces the need for attention in planting and harvesting activities and provides the intelligent use of inputs. Digital tools help in offering services in different ways. Before, companies offered repairs and overhauls of equipment, now they monitor the day-to-day use of the machines to deliver

complete efficiency, provide training and predictive maintenance solutions, which can point out in advance when the machinery will need a replacement of parts (LUIZ, 2021).

Two other service models that are being used by companies that supply agricultural machinery are: the rental of machinery, which eliminates the need for high investments in the acquisition of agricultural machinery and, the second, deals with the outsourcing of the service, a situation in which the producer pays a certain amount for a company to perform the necessary tasks (LUIZ, 2021).

2.3 Servitization as a strategy for maximizing value

One of the biggest challenges for companies is the way in which it transforms its business model focused on products, expanding it to focus on services through servitization, that is, product and service become integrated. The literature has shown that the fundamental concepts of servitization are consequently established, but the practices for this change are still advancing (BAINES *et al.*, 2017).

Among the forms of servitization, the change in focus from the production of consumer goods to the revenue generated through the provision of services, has provided companies with the construction of technological innovation competences, offering advanced services that combine with complex functions (STORY *et al.*, 2016) which interferes with the strategy.

The competitive strategy of a company is understood as a process by which the organization defines a plan to characterize its target market, its customers and products, and the actions to achieve these objectives (AZEVEDO, 2013). For the development of this strategy, the company needs to adopt new activities or perform them in different ways, with the intention of outperforming its market competitors, obtaining a competitive advantage, providing value to the customer, and creating it for itself. Value creation can be obtained using three competitive strategies, namely, cost leadership, differentiation, and focus (PORTER, 1996).

Cost leadership is found when a company invests in state-of-the-art equipment and innovations, which make it possible to reduce the company's costs and overheads, so they can sell their products at more affordable prices, gaining an advantage over their competitors. Differentiation consists of creating services in which the customer will be willing to pay, even

with a high value, a unique service that brings a feeling of trust and importance to the consumer. And the focus strategy consists of the idea of satisfying a particular target market, focusing on the specific needs of those customers, being more effective in the services or products offered (FITZSIMMONS; FITZSIMMONS, 2004).

3. METHODOLOGICAL PROCEDURES

As a focus, this work empirically seeks to carry out an analysis of the influence of servitization strategies on agricultural activities, through an exploratory study. Regarding the approach to the problem, the present research can be classified as qualitative, as it agrees (FLICK, 2007).

Its exploratory character is since it aims to expand the researchers' understanding of the investigated phenomenon as it seeks to identify the main causes of staff turnover (RAUPP; BEUREN, 2003). As an object of research, ten rural producers who work in the field of agriculture and who use products and services aimed at the mechanization of their crops were interviewed. At each interview, the interviewee was asked to indicate another producer who made intensive use of agricultural technology for planting and harvesting. Thus, based on the saturation of the results, the research ended with the tenth interviewee.

The research was developed in the western region of Paraná, between March and May 2022. Each of the ten interviews lasted an average of twenty minutes. Data collection took place online and in person. The instrument for collecting the information consisted of a semi-structured interview script with questions aimed at rural producers, with the intention of identifying which technologies, which services, which equipment are used, and which are still lacking and could improve work in the field, according to Table 1.

Table 1 - Semi-structured Interview Script with producers

RESEARCH ROUTE
01) What is your understanding of servitization (the provision of services by companies related to the agriculture sector)?
02) What services have been offered in recent years that, in your opinion, were important for carrying out work in agribusiness?

03) Do the companies with which you have a business relationship present future innovation that make it possible to improve the quality of production? (Seeds with greater profitability, which are resistant to water scarcity, plant pests, unfavorable weather conditions, etc.)
04) Are you satisfied with the evolution and with the provision of services by companies in the field of agricultural machinery?
05) What could be improved in terms of profitability, maintenance, assistance, and amenities by these companies?
06) What services could rural credit providers improve (facility for credit approval, rate and interest reduction, government subsidies and insurance)?
07) From a general point of view, do you believe that companies are offering the best possible services for the agricultural activity?
08) What could be added to these services?
09) If yes, if there were services, did they have a positive impact on the value creation of your products?

Source: The authors, 2022.

In the second phase of the survey, the supplying companies mentioned by the producers were analyzed by means of documentary research on their websites in order to verify which services they are offering and what their commitments to customers are regarding the offer of services linked to the sale of the respective equipment. This work was carried out by the authors and lasted 12 weeks, with an average document survey time recorded at 3 hours. Table 2 demonstrates the research planning regarding the literature review on the servitization theme, the construction of the interview script and the planning of the script to meet the objectives.

Table 2 – Categories, operationalization, and objectives of the work

Categories	Authors	Questions	Goals purpouses
Servitization strategies	(GURTU, 2019; BAINES *et al.*, 2017) (TEBUOL, 2006)	01) What is your understanding of servitization (the provision of services by companies related to the agriculture sector)?	To analyze current and potential servitization strategies, from the perspective of rural producers in western Paraná, in relation to their suppliers of agricultural inputs and equipment.
Current Services	(MARILUNGO *et al.*, 2017; KOWALKOWSKI *et al.*, 2017)	02) What services have been offered in recent years that, in your opinion, were important for carrying out work in agribusiness?	a) identify practices related to servitization strategies adopted by suppliers of agricultural inputs and

	(MARTINEZ *et al.*, 2017)		machinery;
New services	(TUKKER,2004) (FLIESS; LEXUTT,2017) (CARVALHO *et al.*, 2009; OLIVEIRA *et* al., 2007)	03) Do the companies with which you have a business relationship present future innovation that make it possible to improve the quality of production? (Seeds with greater profitability, which are resistant to water scarcity, plant pests, unfavorable weather conditions, etc.)	b) verify the level of servitization and the type of service existing in the supplying companies analyzed;
Opportunities for servitization in agriculture	(CONNING; UDRY,2005) (CUSUMANO *et al.*, 2015; RAMOS; CARRER, 2020)	04) Are you satisfied with the evolution and with the provision of services by companies in the field of agricultural machinery?	c) diagnose the expectations and needs of rural producers in relation to servitization offered by their suppliers.
	(KNAPP,2015) (PORTER,1996)	05) What could be improved in terms of profitability, maintenance, assistance and amenities by these companies?	
		06) What services could rural credit providers improve (facility for credit approval, rate and interest reduction, government subsidies and insurance)?	
		07) From a general point of view, do you believe that companies are offering the best possible services for the agricultural activity?	
		08) What could be added to these services? 09) If yes, if there were services, did they have a positive impact on the value creation of your products?	

Source: The authors, 2022.

After the collection, the interviews were transcribed and the content analyzed, to establish the necessary relationships between the categories, the questions present in the theoretical framework and the answers (field findings), thus evidencing the relationship between theory and empirical reality, among other factors linked to the objectives initially proposed.

4. RESULTS AND DISCUSSIONS

4.1 Servitization from the viewpoint of the rural producer

The interviews were applied to ten rural producers, with 100% of the respondents being male. It was found that 30% of respondents are over 31 years old, and 70% are between

20 and 30 years old, characterizing a young audience that is prone to accept innovation in the field.

All individuals have a considerable cultivated area, being: 2 of them have over 500 hectares, 2 respondents have between 200 and 400 hectares and 6 producers cultivate an area between 20 and 199 hectares, leading to a total of 2,150 hectares cultivated by the 10 producers rural. All properties are in the municipality of Toledo, western Paraná, chosen for having the highest Gross Agricultural Value (VPB) among all municipalities in Paraná in the last 8 years, consecutively, being considered the agribusiness capital of Paraná.

Regarding the current and potential servitization strategies by the companies, most farmers are satisfied with the services offered, 7 of the producers agree that the companies are concerned with bringing the necessary services, also some more detailed information about new products, which need a greater attention, as well as in the after-sales, some phrases said by the respondents, as reported by interviewee 5 "*companies always give support, not only in sales, but explaining the benefits of using the products they are selling"* and respondent 2 *"companies are concerned about showing their services and the importance of them".*

On the other hand, 3 of the respondents believe that companies could improve, as in better information and technical assistance in relation to innovative and technological products. As producer 8 reports, *"most companies work on the sale of products because it is the fastest way of financial return, leaving aside the possible services that could be provided to win customers."* That is, what respondent 8 answered, correlates with what the authors Eggert, Thiesbrummel and Deutscher (2015) argued in relation to the simultaneous introduction into the market of new products and services and the positive performance of these innovative companies in relation to simple product innovation.

In addition, producer 3 reports *"currently, companies provide a large amount of products, but with little information about their uses".* The interviews confirm that companies that sell agricultural machinery still focus on offering products and, gradually, have given greater attention to the sale of services, which reflects the strategic vision of customizing products and services to customer needs (KOWALKOWSKI *et al.*, 2017).

Thus, companies can rethink their strategies to seek customer satisfaction, since market competitiveness is increasing, consumers are looking for products and services that will facilitate work in the field, but only quality products are not enough to win over customers. It is essential that companies provide information and knowledge about the

products, ensuring the proper functioning and durability of the equipment, as well as lasting business relationships (BAINES *et al.*, 2017).

In the identification of the strategies used by the companies to improve the attendance in services in the accomplishment of the activities of the agribusiness, the ten respondents agree that the services provided in the last years in relation to technical assistance, both in machines and in the care with the production, the agriculture of precision, the information taken to the producer, the new technologies and innovations, were of total importance for the work. As interviewee 8 reports, *"soil collection and assertive chemical analysis allows for soil correction that improves crop development conditions, resulting in possible higher yields".* Interviewee 6 stated that: "*the online platforms made available by the companies came as an aid, the introduction of great technologies bringing productivity increases, property management control, more quality and reduction in costs and waste".* The research confirmed that new strategies in the provision of services are constantly being implemented, corroborating Baines *et al.* (2017) when stating that fundamental concepts of servitization are established, but in practice changes are constant.

In general, producers are satisfied and believe that companies are offering the best services within their capabilities, but they agree that all companies have something to add and improve, as reported by Schlosser (2004) regarding opportunities in services. Respondents suggest more training and qualification of employees who provide support and transfer of knowledge about the new technologies and innovations available. Only 2 respondents are dissatisfied with some companies, reporting that there could be an improvement in after-sales, and in addition, they suggest that companies do not focus only on their products.

It is a fact that servitization allows companies not only to focus on their products, but to use the services that these products can provide as a way of adding value to the business. Innovations and technologies help companies to overcome obstacles related to agricultural production, such as unfavorable weather conditions, increases in productivity without the devastation of new arable areas, reduction of environmental impacts and costs with inputs. Precision agriculture stands out in this scenario, enabling complete solutions to interferences, companies can individually analyze the difficulties faced by each producer, offering products and services customized for the different needs existing in the equipment, cultivation areas and plantations of rural producers (KOWALKOWSKI *et al.*, 2017; MARTINEZ *et al.*, 2017).

In verifying the satisfaction that rural producers have in relation to companies with which there is a commercial relationship of products and services, the ten respondents agree that companies bring new services and new technologies that provide greater profitability. Servitization related to the customization of service needs is a way to innovate and make the production process of producers more flexible (RADDATS *et al.*, 2016).

These companies have expanded their area of operation to provide more agile service to their customers and for knowledge to help them make more assertive decisions. As interviewee 7 reports, *"yes, we clearly notice the companies' concern to evolve in technologies and innovations, increasing productivity without expanding new arable areas, cultivars that provide less use of agricultural inputs".* This report corroborates with Telles and Righetto (2019), where the authors show the evolution of agribusiness productivity in Brazil, when buying grain production with the cultivated area.

In agricultural production, time is a determining factor. Decisions need to be taken quickly and in advance, so that there are no losses and losses. With this, companies can offer services and products focused on accuracy and agility, being a way to differentiate themselves from their competitors, customizing these services to what producers really need, such as maintenance and repairs in machines and the delivery of parts with deadlines. reduced costs, training and consulting that explain the operation and better use of their products, reducing possible damage and future maintenance. The outsourcing of planting and harvesting services is expected to grow, since the acquisition of agricultural machinery and implements involves high investments. Another factor is the high logistical cost to take the machinery to different places where the producers have cultivated areas. These advantages were cited as points of analysis by the interviewees, reflecting the results of previous research (LUIZ, 2021; TUKKER, 2004).

The expectations that producers have in relation to the services offered by the companies were scored in the interviews in the category opportunities for servitization in agriculture. Such desires can be considered by companies to increase satisfaction in the provision of services. In this research, the ten producers agreed that some points should be reviewed by the companies, such as: providing more affordable prices, training more technicians and professionals for field service, providing mechanics capable of offering instructions and knowledge about the machines and offering programs troubleshooting to maximize equipment life. Interviewee 2 reports that *"the functionality of each piece of*

equipment, maximizing the machine's performance with fewer stops for routine maintenance, as well as effective preventive maintenance of the machines, so that there is no need to stop work due to any defect". Opportunities were identified for offering services linked to products, which, according to Fitzsimmons and Fitzsimmons (2004) would be able to increase trust and credibility.

As an additional result, this research also identified the importance of credit for the acquisition of equipment and technological services by rural producers. Companies need to be aware and, additionally, the offer of credit is also a service to be explored. According to the producers, if interest rates were lower and there was more government participation in insurance and subsidies, in addition to the ease and agility in releasing credit, there would be greater incentives for producers, who often do not have the necessary conditions. for the purchase of certain products and services. Interviewee 7 argues *"we perceive an increasing bureaucratization to have access to credits, improvements in agility would help in the development of properties"* complements interviewee 8 *"I believe that a larger credit line with fewer requirements would enable people who want to start an investment to acquire goods, with lower interest rates".* What could be repaired by credit providers is the ease with which these financings reach their customers, providing producers with better business experiences (CONNING; UDRY, 2005).

In the evaluation of what could be added in terms of new services by companies, as a way of adding value for them and for rural producers, the respondents suggested more information and more agility so that there is a decrease in future problems both in agricultural machinery as in cultivars, greater monitoring of farming activities and more efficient inputs and resources.

Checking if the producers believe that the services offered add value to their products, 4 of the respondents agree that the services help in decision-making, facilitate work, enable more agility and income, consequently increasing production and generating greater profits, as reported by the interviewee 8 "in relation to the value of the products there was no change, what increased was the production, better inputs and bigger machines that provide a faster and more assertive operation".

The other 6 interviewees believe that the services offered do not add value to their final products, agreeing that the costs to produce are high and that companies do not value the risks and the work of the producer, as the producer 6 states, "it is remarkable that any service

correctly employed has a positive impact on earnings and profits for companies, now the products produced by us are not being valued as they should be to keep up with investment costs" complements interviewee 10 "when we sell our products, we have to accept the prices that the companies offer, as well as at the time of purchase, where companies set prices, and we are obliged to pay to produce".

For a company to change its competitive strategy, it needs to characterize its target market, so it can carry out new activities or perform them in different ways, adding value to its customers and to itself (PORTER, 1996). In this way, companies that supply agricultural technologies need to listen to producers and realize that when they are concerned with offering personalized services, services at a lower cost for the small producer, subscription club services that guarantee partnerships every harvest year and technologies integrated into the machinery, end up developing new ways to increase their revenue.

4.2 Servitization from the point of agricultural equipment supplier companies

In the second phase of the survey, the five companies with which the producers have the greatest relationship were analyzed, that is, they carry out a greater volume of business regarding the purchase of equipment. Once this selection was made, the step was to verify the positioning and commitment of these companies regarding the dissemination of services offered through their websites and digital media platforms. The following companies took part in the research: John Deere, New Holland, Morgan Seeds, Bayer and Coamo Agroindustrial Cooperative.

The company John Deere® presents on its website *"We innovate on behalf of our customers because our learning is not a by-product of our activities. He is the fuel that fuels what we can do better. Our solutions motivate customers to achieve their goals, work more accurately and productively with the help of advanced technology, and make better decisions based on data."* The company's products and services are focused on precision agriculture, making the increasingly robust machines become intelligent partners for work in the field, which take full advantage of the potential, improving application rates, fuel savings and placement of inputs.

The company New Holland® presents on its website the information "we know exactly what the farmer's challenges are and, through this knowledge, we develop solutions for each client, from planting to harvesting. In all products, through the application of state-

of-the-art technology, we do not give up the permanent evolution of design, robustness, power, low maintenance cost, fuel economy and low emission of pollutants". New Holland offers specialized technical assistance from the moment the product is delivered to the customer, offering the knowledge, technology, and the right tools to guarantee the highest productivity of the equipment. They offer professionals with extensive training to ensure an excellent standard in services, they stand out for their agility and efficiency.

The John Deere® and New Holland® companies have a variety of equipment used by rural producers. Its communication channels and media show interest in servitization as a strategy to attract and keep its customers, given that services linked to what each machine demands are commercialized. Since companies have the knowledge of how to proceed with certain difficulties faced by producers and have the mechanical expertise to make maintenance and technical assistance more agile, whether in relation to planting or harvesting, it is possible that by improving proximity to the communication with the customer, they can find many opportunities for maximizing value from servitization (CONNING; UDRY, 2005).

As for the company Morgan Sementes®, it stands out: *"Morgan is a premium seed brand that reaches its 10 years of age increasingly focused on research, innovation, biotechnology and genetic improvement, delivering what producers are really looking for".* A company specialized in hybrid corn seeds, which serves the market with technology and innovation, offering products of varieties that adapt to climatic and soil conditions. In addition, its differential regarding servitization is in offering technical support to provide productivity gains to each producer.

The Bayer® company stands out by saying *"we provide farmers with the best tools and solutions so that they can produce enough using natural resources more efficiently".* This company stands out for focusing on sustainable agriculture, offering innovations, and promoting various initiatives to preserve the environment. Due to demands and pressures from world society, investing in services aimed at preserving the environment represents a specific niche of services in agribusiness, which has a wide potential to be explored.

And finally, the company Coamo Agroindustrial Cooperative® reports that *"always seeking to improve the productivity and income of the more than 30 thousand members, the cooperative is attentive to the current scenario to offer the social framework the most modern for agricultural production".* The cooperative has strategically located units to be as close as possible to its members. As its main services, it stands out for accompanying production and

planning from before planting to the commercialization of the product, offering lines of financing for the acquisition of machinery and implements, offering investments in soil fertility, as well as providing the exchange service term for the purchase of inputs.

These companies are relevant because they are directly linked to agribusiness productivity, as they are a reference for producers in terms of the supply of seeds, equipment, and other inputs responsible for maximizing production. Furthermore, on them rests the expectation of the producers.

Figure 4 makes a comparative summary between what producers expect from companies regarding the provision of services and, on the other hand, what companies have disclosed on their websites and social media as a concern and effort to offer their customers.

Table 3 – Comparison of current vs potential servitization strategies

Producers have demanded:	**Companies have sought to offer:**
POINTS OF DIVERGENCE	
Greater access to information	
Online platforms for crop management	
Mechanical preventive maintenance services	
	Cultivars that need less inputs
	Innovation and Genetic Improvement of Seeds
	More sustainable solutions
	Harvest monitoring and planning
	Exchange to acquire inputs without working capital
	More robust and intelligent machines
CONVERGENCE POINTS	
✓ Higher volume of technicians (technical assistance)	✓ Personalized technical support for each farmer
✓ Consultancy for soil analysis	✓ Investments to increase soil fertility
✓ More trained technicians	✓ More qualified professionals
✓ Customized services for precision agriculture	✓ Knowledge for precision agriculture
✓ Simplified machine maintenance and repair	✓ Mechanical assistance and agile maintenance
✓ Specialized outsourced services for planting and harvesting	✓ Customized solutions
✓ Services with more affordable prices	✓ Equipment that consumes less fuel and optimizes the use of inputs
✓ Financing lines for the acquisition of equipment with lower interest rates	✓ Own financing for the purchase of machines
✓ More agility in servicing agricultural machinery maintenance	✓ More agile services

Source: The authors, 2022.

In this way, the current servitization strategies regarding the analyzed suppliers are considered and, above all, potential opportunities persist and can be explored. There are also experience-oriented services (TEBUOL, 2006), which are configured as desires that customers do not normally demand, being opportunities for companies to recognize them. As

an analysis, the presence of servitization in agriculture has contributed to technological gains, diffusion of services aimed at sharing knowledge and seeking to achieve higher levels of productivity. Opportunities stand out at points of divergence where new services can be exploited.

5. CONCLUSION

The present research aimed to propose criteria for the selection of green suppliers in the foundry sector and select the best suppliers using AHP method. For this purpose, a literature review was carried out through which eleven criteria that were identified in the implementation of the GSCM. After the analysis of eight specialists, six criteria were selected with five sub-criterion each. Then the criteria and sub-criterion were used to rank top five suppliers using the AHP method in order to recommend a supplier at the end of the selection process.

The analysis of importance order of each criteria showed that in the view of specialists in the foundry area, the environment is considered a factor of great importance presenting a weight of 34.96% followed by health (27.04%) and security (22.98%). The remaining criteria were considered as low importance (below 10%).

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The results obtained of this research are useful for the foundry sector and for the researchers of GSCM as well, because they bring a proposal for adopting new criteria for the selection of green suppliers.

The main objective of this work was to analyze current and potential servitization strategies, from the perspective of rural producers in western Paraná, in relation to their suppliers of agricultural inputs and equipment. According to the producers interviewed, the companies are offering adequate services as they value good customer service, are concerned with offering technologies, knowledge and new information, which have helped in decision-making in the field, in addition to facilitating work. and generate an increase in profitability and agility in production.

Servitization is a transformational process in companies' business models, and this was confirmed by analyzing what companies are communicating on their websites and social media. The five companies highlighted in the study, with which producers have a greater relationship, are interested in offering products-services, many of which are aligned with producers' expectations. Although none of the companies present an advanced level of servitization, it is possible to observe the growth and strengthening of this strategy.

The services that have generated the greatest perception of value for producers in recent years are related to technical assistance in machines and crops, which allowed for better production results and cost minimization, as well as precision agriculture and the information passed on by technicians. directly to producers. Among the expectations of producers that can be seen as servitization opportunities are: greater transparency about new innovations and technologies, preventing future problems due to lack of knowledge in their equipment; soil and crop care; improvement in quality technical assistance and after-sales; more affordable prices; better trained technical professionals; Producers expect companies not only to focus on their profits, but on the needs and difficulties they have, helping in an increasingly better production, providing incentives and adding value to the services performed by the rural man, configuring themselves by win-win strategies. win (win-win).

With this, organizations, previously oriented only to the production of tangible goods, can improve their efforts to provide an integrated offer of products and services, meeting the entire set of demands from producers, creating customized and differentiated solutions for each profile. The need for customization presents in the literature on servitization was ratified in this research. The present research achieved its objectives as it identified the practices related to the servitization strategies adopted by suppliers of agricultural inputs and machinery, verified the level of servitization and the type of service existing in the supplying companies analyzed and diagnosed the expectations and needs of rural producers in regarding servitization offered by its suppliers. As the main managerial contribution, it presented gaps between services demanded by producers and offered by companies. Theoretically, the discussion on servitization as an opportunity to strengthen the relationship with the customer was enriched.

As limitations of the study, the collection of information from companies obtained only through documentary research, provides opportunities for further in-depth interviews. Furthermore, other research can also extend this analysis to a larger set of suppliers in the

production chain. The applicability of servitization generates the possibility of studies covering other areas focused on food production, such as Brazilian agriculture, with indicators that demonstrate the results obtained by companies that have chosen to develop their servitization strategies and expand the services offered.

References

AZEVEDO, C. E. F.; ABDALLA, M. M.; OLIVEIRA, L. G. L. A Estratégia de Triangulação: Objetivos, Possibilidades, Limitações e Proximidades com o Pragmatismo. **Anais...**Brasília: ENEPQ, 17 p. 2013.

BACHA, C. J. C. **Economia e política agrícola no Brasil**. São Paulo: Atlas, 2012. v. 2.

BAINES, T. S. et al. Servitization: revisiting the state-of-the-art and research priorities. **International Journal of Operations & Production Management**, v. 37, n. 2, p. 256– 278, 2017.

BAINES, T. S. et al. **State of the art in product-service systems.** Department of Manufacturing, Cranfield University. Cranfield, UK, 2013.

BENEDETTINI, O.; SWINK, M.; NEELY, A. Examining the influence of service additions on manufacturing firms' bankruptcy likelihood. **Industrial Marketing Management**, v.60, p.112-125, 2017.

CARVALHO, G. R. et al. Comportamento de progênies F4 obtidas por cruzamentos de 'Icatu' com 'Catimor'. **Ciência e Agrotecnologia, Lavras**, v. 33, n. 1, p. 47-52, 2009.

CHRIST, G. D.; CUNICO, E. A competitividade agrícola argentina e brasileira no comércio internacional: uma análise entre 2008-2010 e 2018-2020. XLVI ENCONTRO DA ANPAD - EnANPAD. **Anais**...2022. Disponível em: <http://anpad.com.br/pt_br/event/details/120>. Acesso em: 14 set. 2022.

CONNING, J.; UDRY, C. Rural financial markets in developing countries. In: PINGALI, P., EVENSON, R. E. e SCHULTZ, T. P. (Eds.). **The Handbook of agricultural economics, agricultural development: farmers, farm production and farm markets.** New Haven: Economic growth center – Yale University, 2005.

CUSUMANO, M. A.; KAHL, S. J.; SUAREZ, F. F. Services, industry evolution, and the competitive strategies of product firms**. Strategic Management Journal**, v. 36, p. 559–575, 2015.

EGGERT, A.; THIESBRUMMEL, C.; DEUTSCHER, C. Heading for new shores: Do service and hybrid innovations outperform product innovations in industrial companies**? Industrial Marketing Management**, v. 45, p. 173–183, 2015.

FITZSIMMONS; J. A.; FITZSIMMONS, M. J. **Administração de serviços:** operações, estratégia e tecnologia da informação. São Paulo: Bookman, 2004.

FLICK, U. **Uma introdução à pesquisa qualitativa**. 2. ed. Porto Alegre: Bookman, 2007.

FLIESS, S.; LEXUTT, E. How to be successful with servitization – Guidelines for research and management. **Industrial Marketing Management**, [s. l.], november, 2017.

FOOD AND AGRICULTURE ORGANIZATION (FAO). **The future of food and agriculture – Alternative pathways to 2050**. Rome: Licence: CC BY-NC-SA 3.0 IGO, 2018.

GÖTHBERG, N.; ANASTACIA, S. Customer value perceptions and business models: The case of O&M services in Swedish wind energy industry**. 3rd International Business Servitization Conferece**, p. 83-87, 2014.

GURTU, A. The Strategy of Combining Products and Services: A Literature Review. **Services Marketing Quarterly,** v. 40, n. 1, p. 82-106, 2019.

KNAPP, D. J. **Marketing de relacionamento**: a importância para o crescimento e fidelização dos associados da Cooperativa Tritícola Santa Rosa Ltda – Cotrirosa. Unijuí, 2015.

KOWALKOWSKI, C.; GEBAUER, H.; KAMP, B.; PARRY, G. Servitization and Deservitization: Overview, Concepts, and Definitions**. Industrial Marketing Management**. v. 60, n.1, 2017.

KOWALKOWSKI, C.; GEBAUER, H.; OLIVA, R. Service growth in product firms: Past, present, and future. **Industrial Marketing Management**, [s. l.], v. 60, p. 82–88, 2017.

LUIZ, R. L. Boas de serviço: Depois da digitalização, fabricantes de máquinas agrícolas transformam sua estratégia. **Plant Project,** n 25, ano 21. Disponível em: https://plantproject.com.br/2021/06/boas-de-servico-servitizacao/. Acesso em: 14 set. 2022.

LUSCH, R.; VARGO, S. Service-dominant logic: premises, perspectives, possibilities. **Journal of the Academy of Marketing Science**, v. 2, n. 1, p. 2-33, 2014.

MARILUNGO, E. et al. From PSS to CPS design: A real industrial use case toward industry 4.0. **Procedia CIRP**, v. 64, p. 357–362, 2017.

MARTINEZ, V. et al. Exploring the journey to services. **International Journal of Production Economics**, v. 192, n.12, p. 66–80, 2017.

OLIVEIRA, E. et al. Eliminação de linhas em cafeeiros adensados por meio semimecanizado. **Ciência e Agrotecnologia, Lavras**, v. 31, n. 6, p. 1826-1830, 2007.

PEREIRA, Milena Cristina. **O design de serviços na geração de valor a clientes e empresas:** um estudo de caso orientado ao agronegócio brasileiro. Dissertação (mestrado

profissional MPA) – Fundação Getulio Vargas, Escola de Administração de Empresas de São Paulo, 2020.

PORTER, M. **What is strategy?** Boston: Harvard Business Review, 1996.

RADDATS, C. et al. Motivations for servitization: the impact of product complexity. **International Journal of Operations and Production Management**, v. 36, n. 5, p. 572-591, 2016.

RAMOS, P. H. B.; CARRER, C. C. Decisão multicritério: priorização de ideias inovadoras no contexto do agronegócio – um estudo de caso *Startup in School*. **Revista Da Micro E Pequena Empresa (RMPE),** v. 14, nº 3,2020.

RAUPP, F. M.; BEUREN, I. M. **Metodologia da pesquisa Aplicável às Ciências Sociais**. Teoria e prática. 3ª edição. São Paulo: Atlas, 2003.

RYMASZEWSKA, A.; HELO, P.; GUNASEKARAN, A. IoT powered servitization of manufacturing – an exploratory case study. **International Journal of Production Economics,** 192, 92–105, 2017.

SCHLOSSER, J. F. et al. Índice de mecanização de propriedades orizícolas no Rio Grande do Sul, Brasil. **Ciência Rural**, Santa Maria, v. 43, n. 3, p, 791-794, 2004.

SPRING, M.; ARAUJO, L. Service and products: rethinking operations strategy. **Journal of Operations & Production Management**, v. 29, n.5, p. 444-467, 2009.

STORY, V. et al. Capabilities for advanced services: A multi-actor perspective. **Industrial Marketing Management.** In press, 2016.

TEBOUL, J. **Service is Front Stage**. Palgrave Macmillan, 2006.

TELLES, T. S.; RIGHETTO, A. J. Crescimento da agropecuária e sustentabilidade ambiental. Em: VIEIRA FILHO, J. E. R. (Ed.). **Diagnóstico e desafios da agricultura brasileira**. Rio de Janeiro: IPEA, 2019. p. 89–113.

TUKKER, A. Eight types of product-service system: eight ways to sustainability? Experiences from SusProNet. **Business Strategy and the Environment**, v. 13, n. 4, p. 246–260, 2004.

VALTAKOSKI, A. Explaining servitization failure and deservitization: A knowledge-based perspective. **Industrial Marketing Management**, v. 60, n. 1, p. 138-150, 2017.

VANDERMERWE, S.; RADA, J. Servitization of business: adding value by adding services. **European Management Journal**, v. 6, n. 4, p. 314-24, 1988.

VARGO, S. L.; LUSCH, R. F. Why "service"? **Journal of the Academy of Marketing Science**, n. 36, p. 1-10, 2008.