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After sales service: key settings for improving profitability and customer satisfaction

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Abstract

This paper presents a performed study to develop and improve the process of after sales of a Latvian company specialized in manufacturing fish processing equipment. The project was developed based on an action- research methodology. During the first stage of the study, the current after sales process was analysed to identify the issues and possible improvement opportunities that could be implemented later on. Data were collected through surveys and analysed, resulting in a series of improvement proposals discussed with the board of the company. At a later stage of the study, improvements were implemented such as the introduction of new services, development of new process diagrams and improvements of the spare parts management strategy. To conclude the study, the new services were offered and presented to customers and the trial period for the new after sales methodology was started.

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1. Introduction

Currently, organisations in the manufacturing industry have begun to consider service as a profitable and fundamental factor in business. Up till recently, production, marketing and management of physical goods were considered the most important issues and service was seen as an independent and distinct area [1-5]. However, nowadays, customers are “more demanding than ever” [6], and enterprises need to adapt in order to stay on the leading edge and to keep profitable. In this matter, after sales services plays an important role in the offered product [7,8]. While it is true that satisfied customers will repurchase, the connection between service quality, satisfaction and loyalty is influenced by several aspects,

namely the country, the economic sector, and even the company or customer segment [9]. In fact, according to Kurata and Nam, after sales services has confirmed to be an unquestionable predictor of customer satisfaction and retention [10,11]. In this line of study, Yadav and Joseph [12] argue that the availability of after sales services is one of the necessary evaluation criteria for customer satisfaction.

The novelty of this paper is to give some contributes on how to improve after sales contracts, that can lead to an increase of customers’ satisfaction, to a more balanced production and consequently to more profitability, based on a real case study.

This study was held as customers were very unsatisfied when they needed support after purchasing materials in a multinational Latvian company. There was no clear

methodology on how to act when customers needed spare parts or when a complain arrived. Moreover, there were multiple sources of data storage regarding customers’ information. On top of all, the company was struggling as they could not level production, nor forecast demand.

This paper is structured in 6 sections: Section 1 introduces the subject; Section 2 presents the literature review. Section 3 entails the research methodologies and the paper framework. In Section 4 presents the current status of the company. Section 5 shows the improvements that were carried out, and Section 6 entails some concluding remarks that could be implemented by other entities in similar situation.

2. Literature Review

While for some after sales services are seen as a necessary evil, others defend that it can be a strategic opportunity [13]. As enterprises become more international, they become aware of the importance of after sales in international activities and of the factors that inhibit or facilitate the offering of these services [14].

As customers are increasingly more demanding some studies are being held on after sales services. Lele, M. M. studied the costs customers have when their equipment fails and developed a framework to identify the most cost-effective service strategies for different customer segments. It also determines the manner in which these strategies should affect the design of the equipment. The framework is shown to predict how product and service strategies have to alter, to meet new technological developments and customer needs [13].

Armistead and Clark [15] developed a strategy for formulating an after sales support strategy and related it to a manufacturing strategy model in order to create a broad strategy for customer satisfaction over the lifespan of a manufactured product.

Gaiardelli et al. [16] highlights that after sales is of strategic importance and is a key part of the product service mix offered to the customer, impacting on the physical and organizational configuration of the global logistics network. Van Birgelen et al. [17] even add the impact of culture and technology while evaluating after sales services.

As Fazlzadeh et al. [18] proved, after sales service quality affects customer satisfaction that consequently impacts on behavioural intentions. Thus after sale services has consequences on the overall offering and, in turn, on the quality of the relationship with customers [18].

Services that complement the primary product may be responsible for 75 - 80 % of the company profit [19,20]. A complementary study confirmed this tendency, revealing that although only 25% of revenues across all manufacturing companies were due to after sales services and parts, they were, in fact, responsible for 40% to 50% of profits [21,22].

Nevertheless, other advantages of after sales services over the main products could be pointed out, such as the low impact of financial cycles and economic crises [23]. In fact, after sale services could pay off the often uncertain product business through a longer-lasting relationship with customers throughout the life cycle of the product [24, 25]. Subramoniam et al. [26] point out that this is highlighted in companies which

encounter shrinking profit margins, where after sales services provide an opportunity of minor risk and a high margin of income [27].

3. Research methodology

As products are becoming very similar, the aftermarket business is playing an increasingly more significant role, contributing to a relevant part of revenue and growth of manufacturing companies [28].

Since several areas of the company were targeted, it was vital to establish a course of action to pursue this issue, and to come up with valid and adequate solutions. It was also essential that these findings would be easy to implement and that the possible solutions would be capable of being applied in other companies facing similar situations. Therefore, this project was developed based on an action-research methodology upon which, the researcher increases knowledge by doing, that is, studying by working in the field. Therefore, learning should be seen as “experiential, reflective and reflexive” and an approach of “learning by doing” was followed [29]. This methodology enables the harmony between scientific and company knowledge so as to achieve the target goals [30]. At the end, findings should be listed in a clear way so that they can be used by other entities that find themselves in a similar situation. Therefore, an action research methodology was followed.

4. Company’s analysis

The company under analysis is one of the world leaders in the production and manufacturing of equipment and process lines for pelagic fish industry (small fish such as Sardines, Mackerel, Anchovies, Herring and others).

In the initial status, the after sales service was held as shown in Fig. 1.

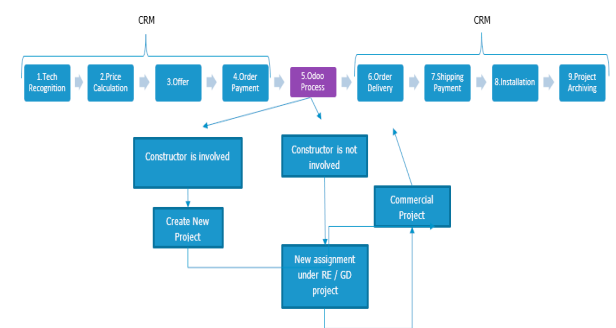


Fig. 1. Initial after sales flow

The first step consisted in making the technical recognition of the issue reported by the client. During this step the after sales manager gathered technical information to diagnose the issue and tried to define a solution for it.

Then the internal price would be calculated, where the manager requested a quotation to suppliers (if the part was purchased) or a quotation to production (if parts were manufactured internally). After the price offer and approval from the client, the pre-payment was mandatory.

When the payment was confirmed a new after-sales project would be created on the ERP system ODOO and assigned to the different departments, to allow the internal order status to follow.

Finally, the parts would arrive the destination and would be installed on the equipment, this task could be done by PERUZA's or client's maintenance technicians. To conclude the process, the project would be finalized and archived on the server and ERP systems.

4.1. Information management

The company had multiple sources of information regarding customer profiles, namely: purchase history, contacts and warranty dates. The company had five available sources of information: MS Excel® file, Pipedrive, Axapta, Odoos, which they had recently been acquired, and the server folder - where it was possible to save the project files, with the technical information and administrative documents of each purchase order.

In the MS Excel® file, the purchase history of the ongoing and completed projects, containing valuable information (like delivery dates, warranty expiration dates, quantities and types of equipment sold, project and serial numbers) were registered.

The Pipedrive software was used to manage and keep track of the sales matters, as well as to store important information about the customer (such as, the historic of emails and calls, as well as failed and successful deals). Moreover, all the possible future customers were registered on this system and, when the profiles were well created, it was possible to have a clear search and easily access the information about contacts and sales.

Axapta was the major ERP system, the brain of all the company's information. It connected the project management, with procurement, with the after sales and stock management. Everything that existed indoors or that went in or out of the company had to be available in the database of this system.

Indeed, the company had a lot of information on the customers. However, this was all dispersed, there was no interaction with each system. In some cases, it was possible to see duplication of information, whereas, in others, there was a lack of data.

From the MS Excel®, it was clear that there were a lot of issues with finding information, as there were no criteria in inserting the data. This process was manual and did not have any restrictions. The name of the customer or the equipment could be written in many ways. Therefore, it was hard to do a bulk research. It was also common to find missing information about some projects, that was valuable to understand the customer profile and equipment owned.

In the Pipedrive software, there was a lack of information regarding the customer contacts and its role in the company. Therefore, when it was necessary to discuss after sales or technical issues with the customer, it was impossible to know who the appropriate person to attend was, which implied a waste of time.

Multiple problems were identified with Axapta. Some because of software limitations others because of misuse. The first problem which was identified was the poor system of labelling and identifying of the equipment and parts. In fact,

not all needed parts had a number able to identify them. Some only had a description. This made it almost impossible to identify the requested and purchased parts. Also, there was no logic way of creating the codes. Every time a new part was inserted in the system, an automatic sequential code was generated and added to this specific part. Due to this fact, it was impossible to identify the family or subfamily of the part only by reading the code, delaying the process of search and identification of the required parts. Axapta contained a lot of double information that was already available in the excel file. However, none of the sources of information were fully complete and updated. Therefore, sometimes it was necessary to search in both tools in order to have accurate and reliable information. Lastly, the process of creating quotations or invoices directly from Axapta was not automatic. It was only used as a data base to consult the price and input the data manually.

4.2. Spare parts management

Since most of the equipment that was manufactured in the company was customized to customer's needs, the process of managing spare parts became a very hard task to perform in an effective way.

The fact that every equipment was similar but, at some stage had some differences in dimensions or specifications, blocked the possibility of creating a spare part package for each model or each equipment. It was not economically viable to keep stocks of all kinds of spare parts, as there was a significant variety and it would have involved high investments in parts that might have been used exclusively by specific customers. Additionally, this would occupy valuable stock space in the storage zone that might never have been needed. As a result, there was no active organized sale of spare parts, but rather, just simply, a response to the customers' complaints and requests. By just attending to customers' complaints, the company increased the risk of failing to respond to customers' essential needs and expectations, putting the relationship and trust in the company at risk. Moreover, the revenues were lower, and demand was not predictable. This caused numerous management problems to the after sales department which was struggling to provide services to each customer on time, essentially because they had to deal with multiple requests and different issues simultaneously.

Moreover, there was no clear methodology on the process of supplying spare parts, making it a confusing and discontinuous service, resulting in higher costs, downtimes, and higher lead-times. Typically, the process started with a complaint/request from the customer. If the information obtained was enough (which was not always the case), the after sales assistant would analyse the request, search for the part in the server, find the design engineer in charge and ask for her/his opinion. Afterwards, they would ask stock managers or procurement to order the part if it was in stock. If this was not the case, then it would be necessary to contact production and request that it be manufactured. Sometimes, the order would be delayed for more than three days merely due to low efficiency. As soon as the part was requested, the after sales assistant would make the offer and send it to the customer. The customer

had to approve it and it had to be paid beforehand. As soon as the part was ready, the shipment offer was made and sent to the customer.

4.3. Customer communication and support

The efficiency and quality of the communication is halfway to securing a more trustful and satisfactory relationship with the customer. A fast and objective reply may also improve the amount of time spent on identifying the issues and, consequently, reduce the lead-times.

It was not clear to customers – nor to employees - who to call or write to in the case of a warranty or maintenance situation.

The services provided to support the customer in after sales issues were not a big asset. The after sales services provided were mainly spare parts supply, diagnostics, and, more rarely, spare parts replacement. Also, the customer who purchased a new equipment had a warranty period where the company covered the costs of the damage to parts that were faulty, due to technical mistakes of manufacturing. Together with the installation of the equipment, a short staff training was provided to explain the functionalities of the machines to the operators and give some advice and tips for working with and for keeping the machine well maintained. However, this training was usually not as useful as it should have been because the customer was too excited about the new equipment to pay attention or was not even interested in the maintenance information about the equipment. Also, verifying the current maintenance issues that occurred due to misuse of the equipment, led to realize that a short training program was probably not enough. Moreover, there were no preventive maintenance services registered at all and the organization of the schedules of assistance was very poor. The process of pricing was very confusing, there being no fixed price chart that indicated the hourly price of each activity, the price of transportation and the profit margin of the spare parts sold. As the prices had not been previously studied or appropriately evaluated, this resulted in customer dissatisfaction. After 1 or 2 years of warranty, the equipment required a minimum of 1 or 2 general preventive maintenance check-ups or interventions, and as that service was not offered, the number of issues and demand of spare parts was so big, that the staff were unable to supply this all on time, which, once again, led to big downtimes that meant big losses and costs for the customer.

4.4. Customer satisfaction

A satisfaction survey was carried out in order to support the proposition of the implementation of the improvements in the after sales process. This research was sent to the Top 100 customers, from which only 64 were contacted due to multiple setbacks, such as missing contacts or unavailability or lack of interest, and from this total, only 50% of the contacted customers submitted a response to the survey, which already indicates that after sales and maintenance is either something unimportant or uninteresting or that the knowledge about it is too low to permit an understanding of its due importance. The responses from 10 different countries contributed to obtaining

a worldwide view of the quality of the after sales services. As one can understand from Fig. 2., most of the answers were from customers located in the Baltic States. This was expected as most of the customers are located in these areas.

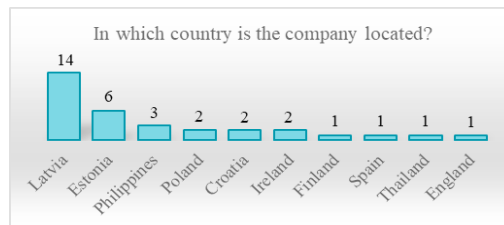


Fig. 2. Countries under analysis

As shown in Fig. 3. the evaluation is, in general, positive, with a global average of 3,5/5; a maximum of 4,3/5 from Philippines and a minimum of 3,0 from Poland, Croatia, Ireland, Spain, Thailand and England. From this graph, it can be concluded that the customers are neither very satisfied nor very dissatisfied with the quality of services, but it is also clear that there is still a big margin for improvement, turning after sales into a big competitive advantage by improving the relationship with the customer and consequently increasing customer satisfaction.

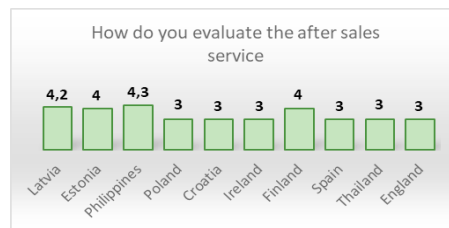


Fig. 3. After sales evaluation per country

Regarding the prices, as shown in Fig. 4., 58% of respondents considered the prices normal when comparing with the expected prices of the after sales services, and 35% considered them expensive. 3.5% of the participants considered the prices very expensive and 3.5 % very cheap. From these data, one can see that the price level might be a bit higher than

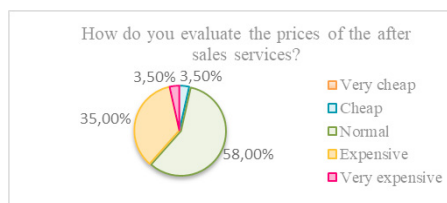


Fig. 4. After sales price evaluation

the expected, which may be a consequence of the problems previously identified regarding the inefficient and unorganized pricing process of the after sales services.

Regarding lead times, Thailand represents a negative assessment evaluation, Spain, England and Poland present a neutral assessment and the Latvia, Estonia and Finland present a positive assessment evaluation.

Following this, it was necessary to understand what the best method to exchange technique information was.

As Fig. 5. shows, almost half of the customers that answered the survey selected the exploded view as the best way to identify and diagnose damaged parts, followed by the 3D model of the equipment. Internally, the 3D model option would be the best option as it does not require any extra work, while the first option requires extra working hours to develop the exploded file. Some companies in underdeveloped countries, prefer the paper version, as not every factory has access to computer or the knowledge to work with 3D files.

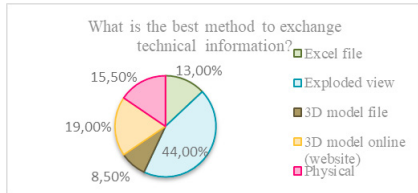


Fig. 5. Methods to exchange technical information

4.5. Revenues and expenses from after sales

In order to understand how the company could improve the after sales revenues, it was necessary to first analyse the current situation.

Table 1. Revenues and expenses from after sales services

Repairs		Warranty	
Year	Revenues	Year	Expenses
16	43340,93	16	16348,47
17	76943,05	17	29470,51
18	14169,66	18	59484,75

Table 1. shows how variable the expenses and the revenues can be, which is explained by the fact that there is no active sale of services, so the demand depends only on customer’s requests and complaints. The warranty expenses were much higher in 2018 because a new market segment was introduced, and multiple new projects were designed and manufactured.

4.6. Competition

Subsequently, a survey on other similar Original Equipment Manufacturers (OEM) companies was carried out. This study led to the conclusion that spare parts, maintenance and diagnostics are the core business of after sales and are in fact the main target of the companies when developing or improving their after sales strategy. Moreover, the most common approach for offering after sales services is through maintenance contracts. Most of the companies include preventive maintenance interventions once or twice a year, assure fast reply and fast delivery and provide 24 hours on site assistance or phone support in their service contracts. Some also apply special discounts on spare parts.

The second most frequent way is active sale of spare parts. This activity is responsible for most of the revenues generated

from after sales and plays a big role in keeping the machine productive and well-functioning. Having a minimum safety stock can improve the down times of the machines.

Moreover, from Fig. 6. is possible to understand that at least half of the participants manage to supply a spare part within 1 day of the arrival of the request to the national market. This means that the supply system for delivery and manufacture is very efficient, otherwise it would be impossible to achieve this ratio.

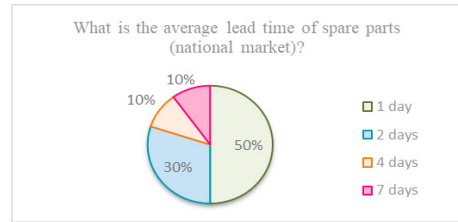


Fig. 6. Graphic of the average lead time of spare parts (national market)

When considering the foreign market, there is a high variety of answers due to many factors such as, distance, type of spare part requested, quantity and strategy. Most of the participants manage to supply spare parts worldwide between 3 to 5 days, numbers that are considered normal and acceptable as transport time might take several days, as shown in Fig. 7.

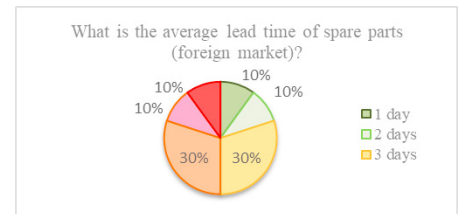


Fig. 7. Graphic of the average lead time of spare parts (foreign market)

The companies that replied 1 and 2 days are companies that have multiple storages, keeping the most wearable parts in stock and can easily distribute to any part of the world on short notice, but not all the companies can afford to have different storage units distributed around the world.

Table 2.: Percentage of revenues/expenses from after sales/warranty services

Company size	After sales revenues	Warranty expenses	Country
100-499	10%	4%	Germany
20-99	15%	2%	Switzerland
20-99	20%	10%	Switzerland
20-99	2%	2%	Portugal
20-99	5%	5%	Portugal
< 19	10%	2%	Portugal

The solution for these companies is to convince the customer to keep the main wearable parts in stock, thus assuring fast response and small downtimes when the machines are damaged or stopped for maintenance interventions. Lastly, regarding the relation between the total revenues and the after sales, revenues, and warranty expenses, as shown in Table 2., it is possible to conclude that competitors have a significant

higher percentage of after sales revenues but also a higher percentage of warranty expenses. From these numbers, one can see that improvements on the after sales revenues can be achieved by developing a better strategy and focusing more on this feature.

4.7. SWOT Analysis

To sum up the current status of the company, a SWOT analysis was carried out as can be seen in Table 3.

Table 3. SWOT Analysis

Strengths	Weaknesses
Great service and spare parts prices	No focus on preventive maintenance and related activities
Qualified staff	High lead times
Good staff training	Incomplete process flow diagram
Fast and efficient communication	Spare parts management issues
Good technical skills	Inefficient resource management
Know-how	Poor data collection and analysis
Opportunities	Threats
Standardization of equipment and spare parts	Worst after sales support when compared with other competitors
Introduction of maintenance contracts	Customer dissatisfaction
Creation of spare parts packages for active sales	High costs for the company
Development of new ERP systems for data collection	Potential risks of damaging the equipment
Reorganization of the process flow diagram	

5. The improvements

After understanding the status of the company and its environment, some improvements were suggested, and some implemented.

5.1. Improvement on the ERP system (customer profile)

In order to avoid several different means of storage of information, it was agreed that only one ERP system would operate and that all the other software would be discontinued. The free ODOO software was selected. This database favours the company by providing initial information about its future customers, improving the relationship established with them. For this operation to be effective, it must be constantly updated so that the sources of contract are not lost. Therefore, to assure the identified valuable information for both after sales and sales activities is collected, some fields are marked as mandatory when creating a customer profile. This can be the invoicing address, shipping address, country, at least one contact, as well as other tools that ensure knowledge about the profile of the customer. Some other fields were added to the profile form to provide more information regarding ongoing projects and historical repairs and/or purchases, as shown Fig. 8. Other non-mandatory fields were also added such as the preferred method of technical information exchange and the preferred communication method.

Also, the system should alert when the service contract is close to finishing, so that the customer is automatically alerted

PR Number	Client Name	Project Name	Project Manager	Designer	Start Date	End Date	Warranty End Date	Planned Hours	Actual spent Hours
19.34	Perusa	Autofeeder Line	Makims	Antonio	10.05.2018	20.12.2018	20.12.2019	09.02.1900	06.02.1900
19.40	Perusa	Autonobbing Line	Makims	Antonio	10.05.2018	20.12.2018	20.12.2019	09.02.1900	06.02.1900
19.58									

Fig. 8. Example of a customer profile

to repurchase or upgrade the contract. One of the suggestions was the possibility of having a field that indicates the number of active repair orders for each customer. This should be connected to the Repair App. Another suggestion was to also have a button that would provide information on the related project with the customer and the respective equipment, as can be seen in Fig. 9.

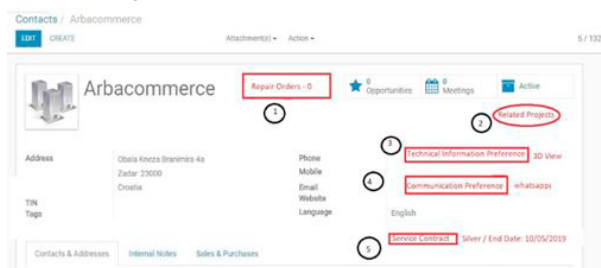


Fig. 9. Example of a repair order status

Moreover, by clicking on a button, it should be possible to see other relevant information such as the list of all the equipment that the project requires and the version of the materials, among others.

The new version is organized, contains the information required to communicate with the customer effectively and saves time. Together with this new update, the website was also improved. The possibility of connecting the website with the ERP system, allowing the customer to communicate and report directly with the after sales assistant and to create a request containing all the required information through a form available on the website, was also suggested.

One of the best features of the ODOO software is that it is easily customizable, allowing the user to tailor the software to meet its needs. The software allows the installation of apps and extensions from various fields and for different purposes, including an after sales and Repair app.

The installation of this Repair App brought many advantages and made the after sales management process a more organized and easily manageable activity. This app includes several features that improve the process of managing after sales requests and customer complaints. This app made it possible to keep track of the ongoing repair orders, allowed the manager to associate the tasks to the respective assistant and to create and send quotations and invoices directly from the app to the customer's email.

Moreover, the data containing prices and suppliers of all the parts that were ordered at least once in the past were imported to the system, allowing the software to generate automatic prices and estimate delivery dates for the selected products from the updated list.

5.2. Data collection

To have updated data, an analysis was made to determine the customers that were still active. Moreover, some activities were performed, such as collecting data from the different sources of information, to obtain all the basic information from the existing customers. Additionally, purchase history was carried out. With this, it was possible to obtain updated, complete and accurate information about all customers.

5.3. After sales service contracts

Having a maintenance contract agreement can help save money over the life of the contract and useful life of the equipment. Most service companies offer discounts to customers who sign a maintenance service agreement, as well as other kind of benefits. After several attempts, and with the customers' feedback, it was decided that the initial offer would be only one single and standardized contract. Additionally, the possibility of adding extra services should be presented as shown in Table 4.

Table 4. Table of after sales service contract

1. Main features	
Preventive maintenance	
Equipment calibration	
Fundamental training program	
2. Additional features	Quantity
Spare part discount	15%
On-site diagnostics & repair discount	15%
On-site response time	48 hours

While deciding the final structure of the maintenance service contracts, it was necessary to develop a pricing strategy that could be beneficial to both supplier and customer. Therefore, a formula was developed to suggest a price that would encourage customers to purchase the service contracts and assure some extra income to the company.

In order to obtain the final price, the manager must introduce 3 bits of major information, enabling the tool to automatically generate the maintenance contract selling price for that specific customer. The first is the customer's name. The second is the customer's equipment. As the system did not supply data on the number and type of purchased equipment, a study was conducted to collect the precise number and type of equipment. Thirdly other variables were considered. From these the distance, the number of preventive maintenance interventions and trainings that are desired by the customer are mandatory. However, other features may need to be taken into consideration as customers have the possibility to add extra features. Therefore, the remaining information that may be requested is the number of free diagnostics, spare part replacement services, and emergency on site assistance.

5.4. Timings

A list with all the important equipment and the average preventive maintenance time depended on intervention was estimated. The most complex equipment usually takes a day

(8h). All the other lines required an average of half a day (4h) and the simplest equipment between 1 or 2 working hours.

The same analysis was made for the diagnostic times for each equipment, which led to an average of 1 to 2 hours per diagnosis.

5.5. Pricing

Bearing all this in mind, it was possible to standardize prices and profit margins for any kind of service or spare part. This allowed the new ERP system to automatically create quotation or invoices for after sales activities, making the process faster and more transparent, avoiding mistrust and conflicts with the customer. Therefore, by inserting the previous variables in the formula the calculations are automatically generated and are expressed in the form of a table, as shown in Table 5. By placing the quantity needed in column "Quantity", the "Final Price is automatically computed.

Table 5. Price calculator

Service	Calculator		
	Quantity	Unit Price	Final Price
Distance diagnostics	0	0,90 €	0,00 €
Distance preventive maintenance	0	0,90 €	0,00 €
Distance spare part replacement	0	0,90 €	0,00 €
Diagnostics	0	140,00 €	0,00 €
Priority	0	0,00 €	0,00 €
Preventive maintenance	0	1 120,00 €	0,00 €
On-site response time (48h)	0	500,00 €	0,00 €
On-site spare part replacement service	0	280,00 €	0,00 €

5.6. Spare parts: a new strategy

The first step to start implementing the new strategy of spare parts management was to analyse what the critical spare parts for each equipment were. Two different analyses were carried out. One was held together with the construction engineers focusing on weak points. The other one was done using the purchase history, to find out the most requested spare parts per type of equipment, focusing on standardized equipment. Thus, it was possible to define the critical spare parts list. From the customers' feedback, the prices are acceptable when compared with the market price for the same products. However, it was decided that, to encourage the customer to buy the spare parts package, the prices had to be reduced. Thus, the pricing structure was improved. For any contract holder, all the spare parts have a discount of 15% on the original selling price that is 100% on the buying price. In the case of purchasing the suggested spare parts package, the customer has access to a higher discount of 30%. The main idea of increasing the discount is to motivate the customer to purchase the package, as it can bring many benefits for both parties, such as reduced downtimes, faster response, stable income for supplier and reduced prices for the buyer. For the non-contract holders, the packages also have a discount of 15% although every spare part that is ordered occasionally, without any pack associated, is sold at the normal price that is the buying price plus 100% profit margin. The biggest improvement in this matter was the introduction of a new concept of selling spare parts: the active

sale. Until then, only the requested parts, or parts that were damaged and had to be replaced were sold. This new concept consists in actively suggesting that the customer purchase spare parts as a package, showing the benefits of acquiring it, assuring constant income for the supplier and protects customer's equipment and production.

6. Conclusions

The initial after sales business model was to merely answer customers' complaints and requests. This was very hard for the team. As demand was not predictable, there were several difficulties in managing, planning, and producing. It was also very hard to deliver products on time, leading to very low profit margins. This situation boosted the risk of losing customer's loyalty, as in this stage customers tended to already be upset. Moreover, there was no clear process on supplying spare parts. Furthermore, neither customers nor the team knew who to address in case of warranties or maintenance cases. In another perspective, there were multiple storage locations of customer's information, which lead to a lack of information that was relevant to support/contact customers. The study that was carried out led to the conclusion that most of the similar companies included preventive maintenance interventions once or twice a year, assured fast reply and delivery and provided 24 hours on site assistance or phone support in their service contracts. Furthermore, some even applied special discounts on spare parts. The second most frequent way is active sale of spare parts. The study allowed the improvement of the after sales service and to achieve some conclusions that may be useful to other companies that are interested in improving their after sales services. Sales contracts and preventive maintenance can provide several advantages such as levelling and increasing demand, as well as maintaining customers. The after sales process should also be very clear. Customers should know who to contact and the after sales team should be able to trigger a rapid and standard procedure to satisfy customers. Thus, it is necessary to gather all need information in a database. So, data should be collected and stored in a complete and automatic way in only one platform. Also, there should be a clear methodology for determining prices as well as estimated timings, and both customers and the team should be able to obtain a budget for a certain service. All this has led to a clearer after sales process flow and has boosted competitiveness. Regarding limitations, it was not possible to implement the new strategy for companies placed in other continents. This would bring new challenges as in terms of resources and logistics as the reality is different and needs to be analyzed. Lastly, data analytics could be used to dynamically identify the main problems in customers' needs and to forecast their occurrence.

CRedit author statement

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