MASTERS

DATA ANALYTICS FOR BUSINESS

TRABALHO FINAL DE MESTRADO

INTERNSHIP REPORT

REPORTING AND MANAGEMENT CONTROL

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MANAGEMENT CONTROL AND REPORTING MANAGER FILIPA PIRES

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Abstract

The present report arises as a result of a curricular internship carried out in the Operations Department in the Reporting and Management Control Department of the company Grupo Nabeiro – Delta Cafés.

Regarding the intention to introduce the Direction of Operations (DO) in all of the 23 Departments of the group, the main objective of this report was to continue the development and daily analysis of KPI's (Key Performance Indicators) of Reports on the Horeca and Domestic channels linked to the Technical Assistance operational sector, integrating the respective commercial departments under the control of the DO and new creation of Reports and Performance Indicators in view of the needs of other departments of the Operations Department.

This internship gave me the opportunity, in addition to being evaluated and completing the last phase of the master's degree, to apply and practice all the knowledge acquired and taught during the course, regarding the integration of operational management tools, contributing to a better analysis of the functioning of the company's processes and operations.

All my work was done in favor of the company's needs and by order of the supervisor and head of department Filipa Pires.

Keywords: Operations Directorate, KPI's, Horeca, Domestic, Technical Assistance

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Glossary

Introduction

This internship report is the result of a curricular internship, aiming at the conclusion of the master's in data Analytics for Business at Instituto Superior de Economia e Gestão. The internship project, which took place during four months in the Direction of Operations of the Nabeiro Group, was based on two important themes – performance monitoring in terms of technical assistance, through the development and definition of performance indicators, and support for the customer support and Development and Quality Control, aiming for improvements in the performance of these sectors. To achieve the proposed objectives, it was necessary not only to understand the complete flow of the entire sector regarding technical assistance and the objectives expected by the Quality department.

Due to the high competitiveness present in the industry, factors such as meeting deadlines, qualitative and quantitative aspects regarding the product, prices, technical efficiency, among others, are crucial for the success of a company. All companies aspire to have an effective control and monitoring system, which allows them to monitor and report daily any type of occurrence outside the normal operational procedure, to provide adequate and continuous support to the work sectors and deliver everything necessary for the regular functioning of its activities, responding efficiently to the intended requirements.

To achieve these goals, it was necessary to build the correct reports on Power BI assimilating the correct data, extract and clean daily data, as well as analyze the obtained results, which should be available when needed. Currently, one of the department's biggest challenges is to support all other departments and work sectors linked to the Operations Department and ensure that all indicators generated correspond to their expectations. Manage all performance and technical efficiency from the complaint made by the customer to the assistants, to the repair of the equipment, seeking to satisfy the needs of all the company's customers and seeking to prevent future complaints and anomalies.

Internship Report Structure

This report is organized into four chapters, in addition to this introductory one. Chapter 2 presents the theoretical framework that underpins the main concepts and themes on which the work was carried out. In chapter 3, the methodology for developing the proposed work is discussed, as well as the presentation of the host company. Then chapter 4 describes the main activities developed in the context of the internship, also showing the information collected and analyzing the results obtained, establishing comparisons. Finally, chapter 5 presents the final conclusions of this report, elaborates a reflection on the work developed as well as some proposals for the development of future works.

Literature Review

Concept of Big Data

The concept of Big data sets back to the 1960's and 70's when the world of data was just getting started. The concept of the collection of large scale and variety of data was reinforced by Doug Laney in 2000, an instructor on data and analytics strategic topics, with the five characters regarding the topic of Big Data: Volume, which describes the size and amount of big data that companies manage and analyze; Value, that usually comes from insight discovery and pattern recognition that lead to more effective operations, stronger customer relationships and other clear and quantifiable business benefits; Variety, corresponding to the diversity and range of different data types; Velocity, that is the speed at which companies receive, store and manage data; Veracity, which means, the accuracy of data and information assets.

Big Data brought new possibilities to every type of companies, not only regarding cost reductions, but also substantial improvements in the time required to perform a computing task, or new product and service offerings (Thomas H. Davenport and Jill Dyché, 2013). According to PhD Stefan Iovan (2015) “Big Data humanization makes that 'large volumes of data' to become accessible for analysts in the companies, offering the abilities available, most of the time, only for IT (Information Technology) department. In order not to focus strictly on software development and statistical abilities, data obtained

can be humanized by adding right context and by offering simple and direct tools for building analytic applications".

The responsibilities of a data analyst vary dramatically from business to business. Its role is fundamental in data analysis and in the Big Data process. "Companies can register several information by digitizing the conversations held by costumers with call centers and by the images recorded on video, of the movement in the stores. This information is usually unstructured, is available and what the concept of Big Data does is to integrate them in a way that it generates a much more comprehensive volume of information, which allows the company to make decisions based on facts and not just sampling and intuition." (Cezar Taurion, 2013). Big Data allows the creation of new models of business based on the value of the information stored and analyzed. Companies from different sectors now have conditions, through predictive analyses, to avoid the waste of preventive maintenance.

Power BI

"Business intelligence (BI) combines business analytics, data mining, visualization tools, data infrastructure, and best practices to help organizations make smarter, data-driven decisions. In practice, modern business intelligence is recognized when you have a comprehensive view of the organization's data and use it to drive change and eliminate inefficiencies."

According to Co-Founder and Chief Data Scientist Dean Abbott, business intelligence is directly related to predictive analytics. "The output of many business intelligence analyses are reports or dashboards that summarize interesting characteristics of the data, often described as Key Performance Indicators (KPI's). The KPI reports are user-driven, determined by an analyst or decision-maker to represent a key descriptor to be used to the business" (Dean Abbott, 2014).

Microsoft developed Power BI out of several "Power" add-ons for Excel beginning with the 2013 edition (Kline,2014). According to Microsoft, it is a business intelligence (BI) tool that collects and processes large amounts of unstructured data from internal and external systems, more specifically, documents and files. Power BI provides a way to obtain data through the Power Query Editor to find information, mainly through

queries, where it is possible to add measures, columns and clean information and group several databases through the construction of relationships, from the option cardinality that defines the association between tables.

This tool helps prepare data for analysis so you can create reports, dashboards, and data visualizations. The results give employees and managers the power to accelerate and improve decision making, increase operational efficiency, identify market trends, report genuine KPIs and determine new business opportunities.

Company Description

Created in 1961, Grupo Nabeiro - Delta Cafés has 25 companies and operates in different areas organized by strategic business areas, which support the main activity: the commercialization of coffees. From Campo Maior, Delta set out to conquer the world, being present in more than 35 countries, spread over five continents and employing more than about 3500 people.

Delta Cafés, always supported by family roots, originated a national economic group - Grupo Nabeiro/Delta Cafés, chaired by Rui Nabeiro, consisting of several companies ranging from food to agriculture, real estate, automobiles, transport, hotels, among others.

The Group is committed to the satisfaction of its human capital, considering that an integrated and motivated employee contributes to the better functioning and success of the company. To achieve this, the Group promotes opportunities to involve its employees in the production of ideas and projects, following the maxim that everyone's commitment and creativity result in economic and social success. Quality, productivity, competitiveness, and technological innovation are fundamental factors throughout the Group. On the other hand, all the companies in the group are characterized by providing high quality machinery, large offices, and excellent working conditions, fostering a concern for everyone's well-being, health, and safety.

Mission and Values

The mission and values are factors that determine how the organization is run

and what guiding principles they follow in their administration. constitute the mode institutionalized way of thinking and acting that exists in the organization, which distinguishes the company from the others.

Delta Cafés adopts a Human Face management model that is the company's DNA. It comes from reference values, giving rise to a mission very focused on customers and a governance model based on sharing and dialogue.

Mission

Since its foundation, Delta has developed a responsible business model characterized by dialogue and sharing of values with all stakeholders, meeting their needs, and corresponding to the demands of customers and markets, with the mission of seeking total satisfaction. and customer/consumer loyalty.

Values

Delta Cafés bases its activity on solid values. It always seeks to implement the values defended, through the practices, policies and principles applied. The solid values and human principles were reflected in the creation of a Brand with a Human Face, its DNA. Values they believe in: Integrity, Transparency, Total Quality, Loyalty, Responsible Innovation, Truth, Sustainability, Solidarity.

Reporting and Management Control Department

The department in which the internship took place is called Reporting and Management Control. This is responsible for supporting all commercial departments already included in the Operations Department through the study and presentation of data at an operational level.

The department was created with the inauguration of the DO and is currently composed of a team leader Filipa Pires and four employees, responsible for data analysis and controlling, which can be consulted through the chart in Annex B.

Direction of Operations

Inaugurated in 2019, the Direction of Operations wanted to gradually absorb all the commercial departments (Sellers and Operations) linked to the Nabeiro group from

north to south, introducing operational management to standardize all services and provide the same quality to all the Group's customers, with the management of three major sectors as the basis for this implementation: Logistics and Warehouse, Technical Assistance and Contact Center.

Ensuring the entire product distribution chain for customers is one of the focuses of operations, which have teams dedicated to preparing and distributing all Grupo Nabeiro products daily. The proximity and support to customers is a differentiating factor and therefore technical assistance teams for the group's equipment were also integrated into the operations structure. In customer contact, in addition to the commercial team,

Horeca Channel and Domestic Channel

The Horeca channel, which is exclusively linked to Restaurants, Hotels and Cafés, is the latest novelty from the Portuguese brand of coffee in capsules, Delta Q, which has invested in a business area called Delta Q Business. This Report was designed to support the entire technical assistance sector linked to the Horeca channel.

As one of the main channels of the Nabeiro group, it was necessary to create a Report so that it was possible to monitor daily the number of assistance generated and provided to our customers connected to the Horeca channel, the effectiveness corresponding to the fulfillment of the proposed SLAs (Service Legal Agreement) , that is, verifying that the Group complies with the previously established deadlines (repair time, time between technical arrival and end of repair) and the quality of service provided to all customers of the Horeca channel. The flow of the Horeca channel consists of the creation of work orders by the Contact Center assistants, who in turn allocate a technician to each of these orders, according to the type of work requested.

Along with the Horeca channel, the domestic channel is also one of the main channels of the Nabeiro group. Thus, it was necessary to create this Report so that it was possible to daily monitor the number of machines that arrive at the warehouse to be checked and, if necessary, repaired, the effectiveness corresponding to the fulfillment of the proposed SLAs (Service Legal Agreement) and the quality of the provision of services to all domestic channel customers. The flow of the domestic channel consists of creating a case number according to a request for assistance by the customer with an assistant. The

case number makes it possible to monitor the course from the creation of the case to the lifting of the equipment at the customer, from its analysis in the Backoffice and respective intervention in the Repair Center and subsequent scheduling of delivery and dispatch to the customer.

Activities Developed

In this chapter, the various tasks performed during the internship will be presented. During the first weeks, dedicated to the reception and integration in the institution, I tried to understand how the company works, get to know the employees, and find out about the internal rules of operation, with a greater focus on sectors related to technical assistance.

Much of the time spent in the internship was focused on developing and analyzing the Microsoft Power BI tool for Horeca and Domestic Operational Reports, which has a direct impact on the operations of the group's two major technical assistance channels.

Knowing what kind of information was necessary to extract and how the different databases could be interconnected was one of the biggest challenges encountered. It was necessary to clean and transform a large variety of data, so that all the information that remained was highly important and reliable to demonstrate and visualize through Dashboards on the reports.

To create the desired visualizations in Power Bi Desktop, the information extracted and worked on was not enough. It was also necessary to develop numerous measures that helped in the calculation of results through expression formulas (Data Analysis Expressions or DAX).

Finally, the most important thing was to present the information that was discovered through the processing of the data, in order to get understandable insights, including KPIs, metrics and other key points. The most important thing about these views is the clarity of the message they convey, so that it is possible to analyze and report all the information quickly and intuitively and take the correct lessons.

Daily Tasks

All Reports were designed through the daily collection and proper filtering of data from the respective information platforms and the data was updated daily to be analyzed. All extractions come from static Excel sheets (.xlsx) or from text documents with tabs, loaded in folders that include all the history of extracted information to date. In Annex B and C, it is possible to observe the constitution of those data folders of the Operational Horeca and Domestic Operational Reports. Each folder is sorted by the extractions made on each information platform and by information topic. Normally, the name of each database refers to the month in which the extraction is being carried out, although the information is daily updated.

Operational Horeca TA Report

The Report is based on three types of orders, which come from the Tecops support platform:

1. orders created
2. open orders
3. orders carried out

HORECA TECHNICAL ASSISTANCE KPIS

Assumption

- The Horeca Technical Assistance KPIs are based on all repair orders contained in Tecops
- All orders associated with commercial departments that are not under the responsibility of the Operations Department were excluded, as well as orders that are allocated to another technical team of the group (example cold/Vending technicians) and all consumption adjustments

Notes:

- **Zone**

Information taken from the location code field - indicates the geographic area to which the customer corresponds:

01MRLX- Lisboa, 01MRSE- Setúbal; 01MRTV- Torres Vedras; 01MRSA-Santarém; 01MRCO- Coimbra; 01MRLE- Leiria; 01MRPO- Porto; 01MRBR- Braga; 01MRVC- Viana do Castelo; 01MRAV- Aveiro

- **Zone (groups)**

Grouping of zones by technical coordination:

01MRLX- Grande Lisboa, 01MRSE- Grande Lisboa; 01MRTV- Grande Lisboa; 01MRSA- Centro; 01MRCO- Centro; 01MRLE- Centro; 01MRPO- Norte; 01MRBR- Norte; 01MRVC- Norte; 01MRAV- Norte

- **Kind of work**

Indicates the type of work requested/performed by the technician, in which we can have: **Technical assistance (TA)**: corrective or preventive interventions; **Audits (AU):** Technical assessments; **Installation orders (IO):** equipment installation interventions; **Withdrawal orders (WO):** equipment withdrawals; **Offsite Repair (OR):** corrective or preventive interventions carried out at departmental repair centers

Created Orders

- All repair requests created in Tecops, considering the creation date
- These contain orders without technical allocation of the areas in which the commercial departments are under the responsibility of the Operations Department.

KPI's Developed

- Number of repair orders created (year N and year N-1)
- Number of orders created by the commercial area (year N and year N-1)
- Weight created orders that have and have given rise to technical intervention (year N and year N-1)
- First Call Resolution (FCR) - Percentage of end-customer requests that were resolved in their first interaction/call with the assistant (year N)
- Origin of order creation (requesting area) and evolution of the respective FCR
- Orders created that originated work orders by type of anomalies
- Orders created by ad (top Ads with the most TOs)
- Total claims requests and claim rate (evolution)

All information by zone/centre and division

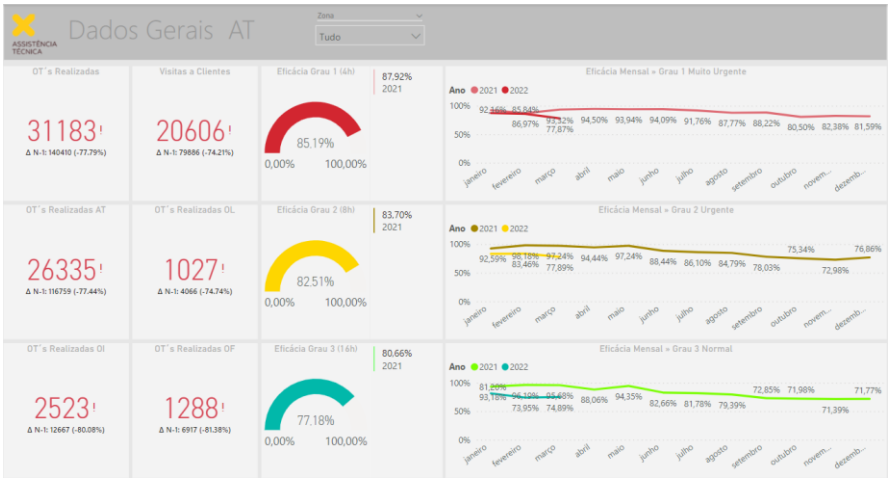


Figure 1 - General Horeca TA Indicators

Finished Orders

All orders carried out in Tecops, considering the end date of the technical intervention and that its status is "Provisional Closing"

KPI's Developed

- No. of repair orders carried out (year N and year N-1)
- Number of visits to Customers (year N and year N-1)
- Average orders placed per visit – this average corresponds to the number of interventions requested by the customer in the same visit
- First Resolution (FR) - Percentage of end customer corrective orders that were resolved in their first technical intervention/technician visit (year N and year N-1)
- Orders made by Priority Degree and respective SLA
- Orders made by division and cost center
- Orders made by type of work (year N and year N-1)
- No. Corrective orders performed (year N and year N-1)
- Number of visits to corrective Customers (year N and year N-1)
- Evolution of recurrences - machine is not well repaired, so new technical intervention is requested (year N and year N-1)
- Detail of customers with corrective repeat orders (top customers)
- Corrective recurrence rate - when the technician performs a work order and performs technical assistance again on the same equipment

```
TOTAL REINCIDÊNCIAS CORRETIVAS A CLIENTE =
CALCULATE (
    'AT | MEDIDAS'[TOTAL VISITAS A CLIENTES],
    'AT | DB » ORDENS REALIZADAS'[TIPO TRABALHO] = "ASSISTÊNCIA TÉCNICA",
    'AT | DB » ORDENS REALIZADAS'[AUX 2 » Considerar corretiva?] = "CONSIDERAR"
)
    - CALCULATE (
        [TOTAL CLIENTES VISITADOS],
        'AT | DB » ORDENS REALIZADAS'[TIPO TRABALHO] = "ASSISTÊNCIA TÉCNICA",
        'AT | DB » ORDENS REALIZADAS'[AUX 2 » Considerar corretiva?] = "CONSIDERAR"
    )
```

Figure 2 – Corrective Recurrence Rate

All information by zone/centre and division

Efficiency

- The calculation of the monthly effectiveness considers the total of orders carried out by the technical team of the DO, of the type of work Technical Assistance that fulfilled the SLA;
- The following degrees of SLA compliance were considered:

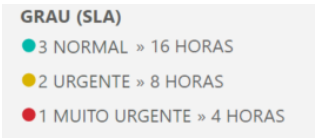


Figure 3 – Degrees of SLA Compliance

- For the purpose of calculating the lead time, the time elapsed, in working hours, from the creation of the order to the arrival of the technician at the intervention site (date creation of the TO until the intervention start date);
- Orders created by the technical team (waiting for part, waiting for equipment and consumption adjustments) and all orders without an associated degree are excluded.

Formula:

```
EFICÁCIA MENSAL (%) =
CALCULATE (
    [TOTAL OTS REALIZADAS],
    'AT | DB » ORDENS REALIZADAS'[TIPO TRABALHO] = "ASSISTÊNCIA TÉCNICA",
    'AT | DB » ORDENS REALIZADAS'[CUMPRIMENTO SLA ÚTIL] = "CUMPRIDO",
    'AT | DB » ORDENS REALIZADAS'[GRAU (SLA)] <>"",
    'AT | DB » ORDENS REALIZADAS'[AUX 1 » Considerar Lead time?] = "CONSIDERAR",
    'AT | DB » ORDENS REALIZADAS'[AUX 2 » Considerar corretiva?]= "CONSIDERAR",
    'AT | DB » ORDENS REALIZADAS'[ÂMBITO] <> "",
    'AT | DB » ORDENS REALIZADAS'[SUBTIPO SERVIÇO] <> "",
    'AT | DB » ORDENS REALIZADAS'[SUBTIPO SERVIÇO] <> "ACERTO DE CONSUMO"
)
    / CALCULATE (
        [TOTAL OTS REALIZADAS],
        'AT | DB » ORDENS REALIZADAS'[TIPO TRABALHO] = "ASSISTÊNCIA TÉCNICA",
       'AT | DB » ORDENS REALIZADAS'[GRAU (SLA)] <>"",
     'AT | DB » ORDENS REALIZADAS'[AUX 1 » Considerar Lead time?] = "CONSIDERAR",
     'AT | DB » ORDENS REALIZADAS'[AUX 2 » Considerar corretiva?]= "CONSIDERAR",
     'AT | DB » ORDENS REALIZADAS'[ÂMBITO] <> "",
     'AT | DB » ORDENS REALIZADAS'[SUBTIPO SERVIÇO] <> "",
     'AT | DB » ORDENS REALIZADAS'[SUBTIPO SERVIÇO] <> "ACERTO DE CONSUMO"
    )
```

Figure 4 – % Monthly Effectiveness Formula

KPI's Developed

- Monthly effectiveness by SLA (year N and year N-1)

Lead Time Response (Business hours)

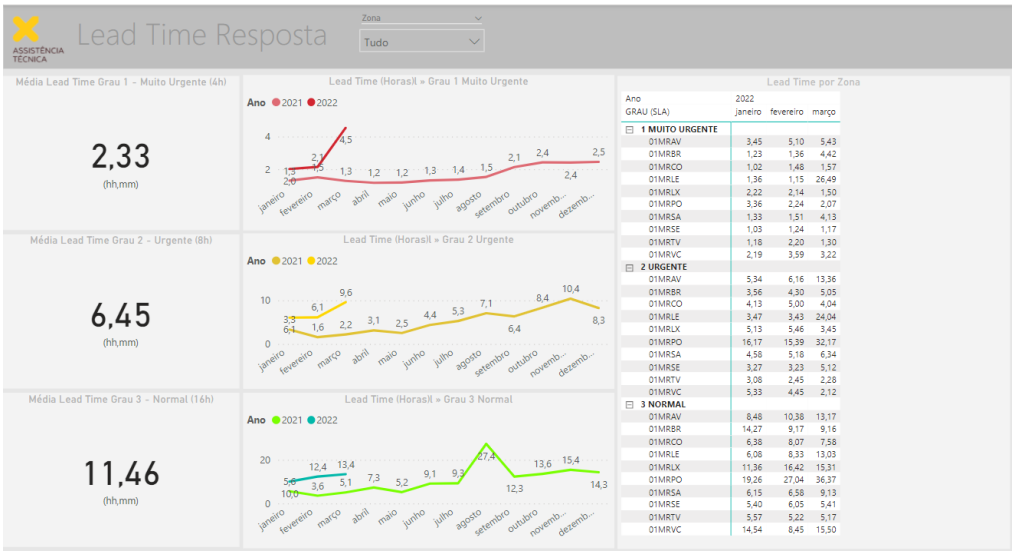


Figure 5 - Lead Time Response (Business hours) Indicator

Lead Time response - based on the average time, in working hours, elapsed between the creation of the OT and the technician's arrival at the Customer.

The calculation is done in decimal hours, for example 0.5 hours is 30 minutes.

Orders made by the technical team (waiting for part, waiting for equipment and consumption adjustment) and all orders without an associated degree are excluded.

> NOTE: If the lead time exceeds 10 hours (daily work hours of the technician), they are divided by 3.

```
AUX » LEAD TIME DECIMAL UTIL =
IF (
    'AT | DB » ORDENS REALIZADAS'[AUX » LEAD TIME DECIMAL] > 10,
    'AT | DB » ORDENS REALIZADAS'[AUX » LEAD TIME DECIMAL] / 3,
    IF (
        'AT | DB » ORDENS REALIZADAS'[AUX » LEAD TIME DECIMAL] < 0,
        0,
        'AT | DB » ORDENS REALIZADAS'[AUX » LEAD TIME DECIMAL]
    )
)
```

Figure 6 – Lead Time Formula (Horeca)

KPI's Developed

- Average monthly lead time per SLA (year N and year N-1)

- Monthly evolution by SLA (year N and year N-1)
- Average monthly lead time per zone

```
MÉDIA LEAD TIME ÚTIL =
VAR FINAL =
    AVERAGE ( 'AT | DB » ORDENS REALIZADAS'[AUX » LEAD TIME DECIMAL UTIL] )
VAR TEMPO =
    ROUNDDOWN ( FINAL, 0 )
        + ( FINAL - ROUNDDOWN ( FINAL, 0 ) ) * 60 / 100
RETURN
    TEMPO
```

Open Orders

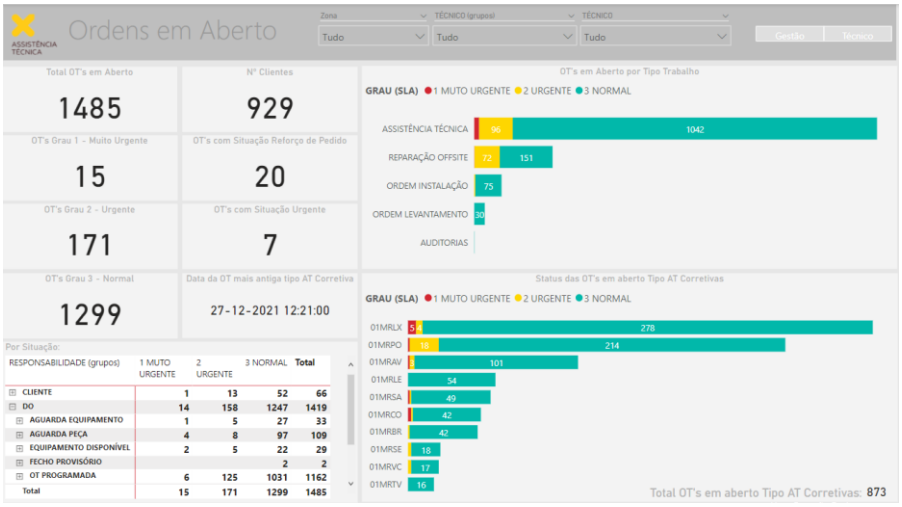


Figure 7 – Open Orders Indicators

All repair orders still open in Tecops, considering all orders that do not contain a work order completion date

KPI's developed

- Number of open orders in the portfolio – number of orders to be executed on the day of extraction

```
TOTAL OTS EM ABERTO = DISTINCTCOUNT('AT | DB » ORDENS ABERTAS'[Nº OT])
```

- Number of Clients with open orders in the portfolio
- Open orders by type of work (AT/OI/OL/RO/AU)
- Open orders by Priority Degree and respective SLA
- Corrective open orders by status in working hours and the respective SLA (OT status)
- Open orders by situation and responsibility (Director of Operations client)
- Data of the oldest corrective order (creation date/time)

- Portfolio orders opened by technicians with detail: SLA, OT status, equipment range, type of work and if it is corrective

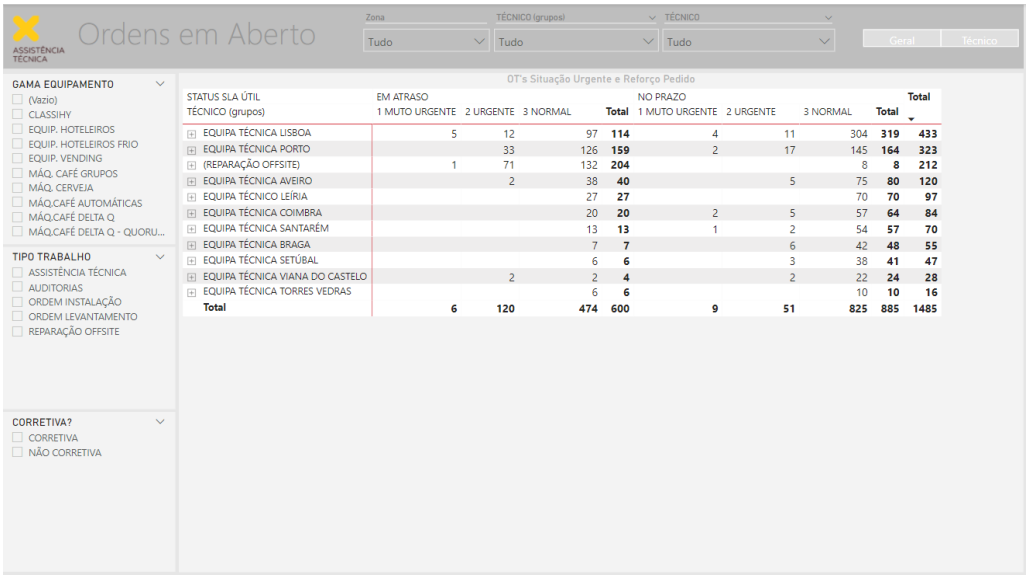


Figure 7.1 – Open Orders Details

Warehouse Parts Management

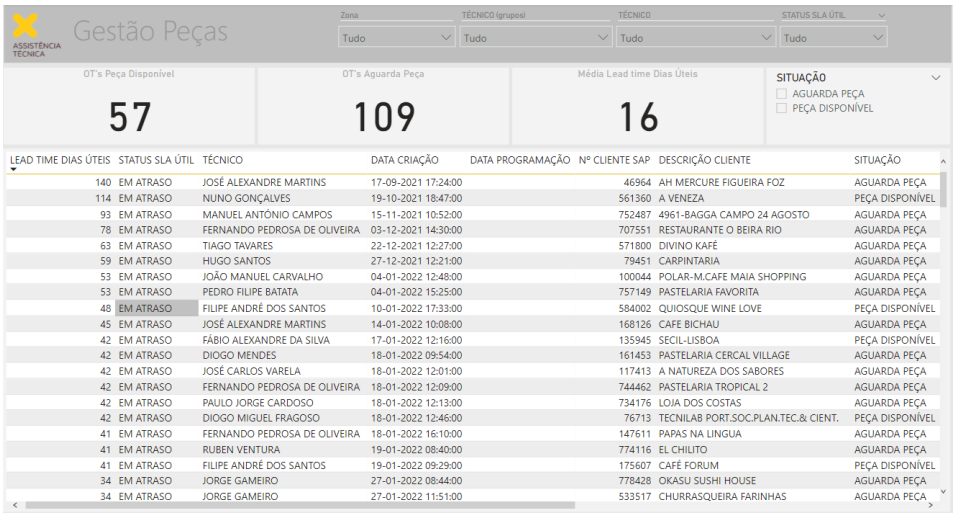
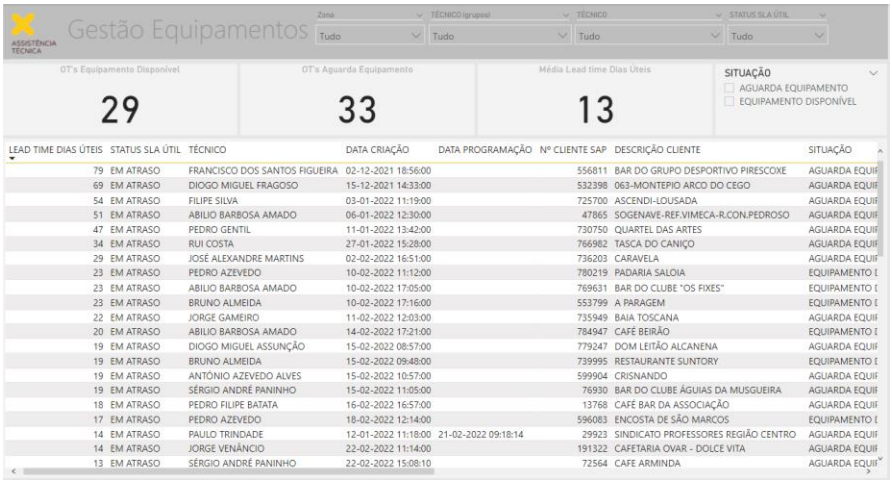


Figure 8 –Warehouse Parts Management Indicators

KPI's developed

- Open orders await part
- Open orders part available
- Detail of open orders with status: waiting for part and part available.
- Average time elapsed (working days) between the creation of the TO until the date of extracting the information.

Warehouse Equipment Management



LEAD TIME DIAS ÚTEIS	STATUS SLA ÚTIL	TÉCNICO	DATA CRIAÇÃO	DATA PROGRAMAÇÃO	Nº CLIENTE SAP	DESCRIÇÃO CLIENTE	SITUAÇÃO
79	EM ATRASO	FRANCISCO DOS SANTOS FIGUEIRA	02-12-2021 18:56:00		556811	BAR DO GRUPO DESPORTIVO PIRESCOXE	AGUARDA EQUIP
69	EM ATRASO	DIOGO MIGUEL FRAGOSO	15-12-2021 14:33:00		532398	063-MONTEPIO ARCO DO CEGO	AGUARDA EQUIP
54	EM ATRASO	FILIPE SILVA	03-01-2022 11:19:00		725700	ASCENDI-LOUSADA	AGUARDA EQUIP
51	EM ATRASO	ABILIO BARBOSA AMADO	06-01-2022 12:30:00		47865	SOGENAVE-REF.VIMECA-R.CON.PEDROSO	AGUARDA EQUIP
47	EM ATRASO	PEDRO GENTIL	11-01-2022 13:42:00		730750	QUARTEL DAS ARTES	AGUARDA EQUIP
34	EM ATRASO	RUI COSTA	27-01-2022 15:28:00		766982	TASCA DO CANIÇO	AGUARDA EQUIP
29	EM ATRASO	JOSÉ ALEXANDRE MARTINS	02-02-2022 16:51:00		736203	CARAVELA	AGUARDA EQUIP
23	EM ATRASO	PEDRO AZEVEDO	10-02-2022 11:12:00		780219	PADARIA SALOIA	EQUIPAMENTO E
23	EM ATRASO	ABILIO BARBOSA AMADO	10-02-2022 17:05:00		769631	BAR DO CLUBE "OS FIXES"	EQUIPAMENTO E
23	EM ATRASO	BRUNO ALMEIDA	10-02-2022 17:16:00		553799	A PARAGEM	EQUIPAMENTO E
22	EM ATRASO	JORGE GAMEIRO	11-02-2022 12:03:00		735949	BAIA TOSCANA	AGUARDA EQUIP
20	EM ATRASO	ABILIO BARBOSA AMADO	14-02-2022 17:21:00		784947	CAFÉ BEIRÃO	EQUIPAMENTO E
19	EM ATRASO	DIOGO MIGUEL ASSUNÇÃO	15-02-2022 08:57:00		779247	DOM LEITÃO ALCANENA	AGUARDA EQUIP
19	EM ATRASO	BRUNO ALMEIDA	15-02-2022 09:48:00		739995	RESTAURANTE SUNTORY	EQUIPAMENTO E
19	EM ATRASO	ANTÓNIO AZEVEDO ALVES	15-02-2022 10:57:00		599904	CRISNANDO	AGUARDA EQUIP
19	EM ATRASO	SÉRGIO ANDRÉ PANINHO	15-02-2022 11:05:00		76930	BAR DO CLUBE ÁGUIAS DA MUSGUEIRA	AGUARDA EQUIP
18	EM ATRASO	PEDRO FILIPE BATATA	16-02-2022 16:57:00		13768	CAFÉ BAR DA ASSOCIAÇÃO	AGUARDA EQUIP
17	EM ATRASO	PEDRO AZEVEDO	18-02-2022 12:14:00		596083	ENCOSTA DE SÃO MARCOS	EQUIPAMENTO E
14	EM ATRASO	PAULO TRINDADE	12-01-2022 11:18:00	21-02-2022 09:18:14	29923	SINDICATO PROFESSORES REGIÃO CENTRO	AGUARDA EQUIP
14	EM ATRASO	JORGE VENÂNCIO	22-02-2022 11:14:00		191322	CAFETARIA OVAR - DOLCE VITA	AGUARDA EQUIP
13	EM ATRASO	SÉRGIO ANDRÉ PANINHO	22-02-2022 15:08:10		72564	CAFE ARMINDA	AGUARDA EQUIP

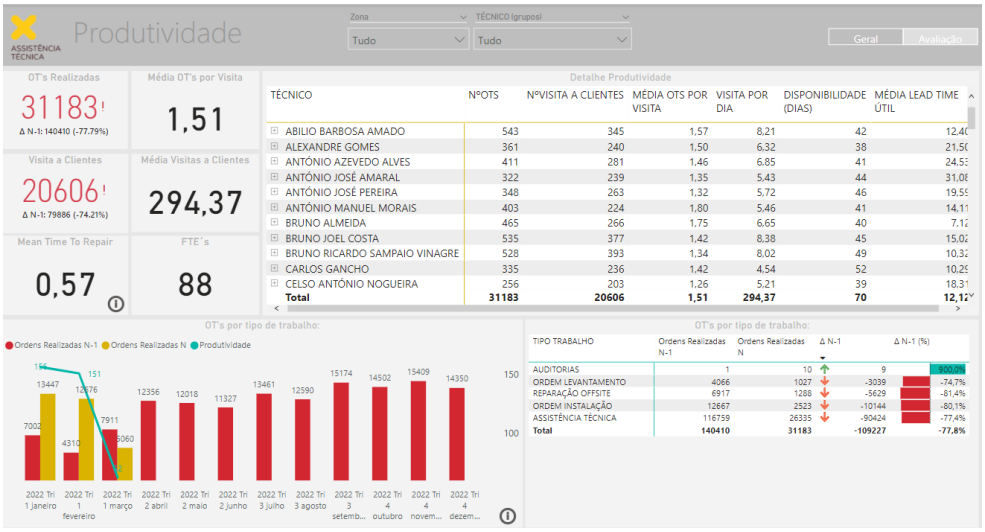
Figure 9 – Warehouse Equipment Management Indicators

KPI's developed

- ✘ Open orders await equipment
- ✘ Open orders equipment available
- ✘ Detail of open orders with status: waiting for equipment and available equipment;
- ✘ Average time elapsed (working days) between the creation of the TO until the date of extracting the information.

All information by zone, technical team (groups), technician and useful SLA status

Technical productivity



TÉCNICO	Nºots	NºVISITA A CLIENTES	MÉDIA OTS POR VISITA	VISITA POR DIA	DISPONIBILIDADE (DIAS)	MÉDIA LEAD TIME ÚTIL
ABILIO BARBOSA AMADO	543	345	1,57	8,21	42	12,4
ALEXANDRE GOMES	361	240	1,50	6,32	38	21,5
ANTÓNIO AZEVEDO ALVES	411	281	1,46	6,85	41	24,5
ANTÓNIO JOSÉ AMARAL	322	239	1,35	5,43	44	31,0
ANTÓNIO JOSÉ PEREIRA	348	263	1,32	5,72	46	19,5
ANTÓNIO MANUEL MORAIS	403	224	1,80	5,46	41	14,1
BRUNO ALMEIDA	465	266	1,75	6,65	40	7,1
BRUNO JOEL COSTA	535	377	1,42	8,38	45	15,0
BRUNO RICARDO SAMPAIO VINAGRE	528	393	1,34	8,02	49	10,3
CARLOS GANCHO	335	236	1,42	4,54	52	10,2
CELSO ANTÓNIO NOGUEIRA	256	203	1,26	5,21	39	18,3
Total	**31183**	**20606**	**1,51**	**294,37**	**70**	**12,1**

TIPO TRABALHO	Ordens Realizadas N-1	Ordens Realizadas N	Δ N-1	Δ N-1 (%)
AUDITORIAS	1	10	9	900,0%
ORDEM LEVANTAMENTO	4066	1027	-3039	-74,7%
REPARAÇÃO OFFSITE	6917	1288	-5629	-81,4%
ORDEM INSTALAÇÃO	12667	2523	-10144	-80,1%
ASSISTÊNCIA TÉCNICA	116759	26335	-90424	-77,4%
Total	**140410**	**31183**	**-109227**	**-77,8%**

Figure 10 – Technical Productivity Indicators (Horeca)

It considers all orders made by the technical team of the Operations Department, with end date and productivity levels of each technician

KPI's developed

- Number of orders made (year N and year N-1)
- Number of visits to Customers
- Mean time to Repair (MTTR) - based on the average time elapsed, in minutes, from the technician's arrival to the closing of the corrective work order

```
WIP » MEAN TIME TO REPAIR (MTTR) =
SUM('AT | DB » ORDENS REALIZADAS'[TEMPO INTERV. CORRETIVAS])/
CALCULATE([TOTAL OTS REALIZADAS],
'AT | DB » ORDENS REALIZADAS'[AUX 2 » Considerar corretiva?] = "CONSIDERAR",
'AT | DB » ORDENS REALIZADAS'[SUBTIPO SERVIÇO] <> "",
'AT | DB » ORDENS REALIZADAS'[TIPO TRABALHO] = "ASSISTÊNCIA TÉCNICA"
)
```

- Nº FTE's – corresponds to the number of resources, in these cases, technicians that are available to provide services
- Average orders placed per visit
- Average Visit to Customers
- Average orders per day – on average how many orders are closed per day
- Technician Availability – Time a technician has had available to perform their job
- Productivity - Total interventions/Number of FTE's
- Orders made by type of work (year N and year N-1)

All the information by zone, technical team (groups) and technician

Operational Domestical TA Report

DOMESTIC TECHNICAL ASSISTANCE KPIS

Assumption

- The Domestic Technical Assistance KPIs are based on all the cases generated to carry out interventions. Unlike the Horeca channel, work orders (TOs) are not created, but case numbers linked to the intervention of each equipment. All information that represents the development of the case is contained in both CRM, SAP, and Outside SAP.
- All orders associated with commercial departments that are not under the responsibility of the Operations Department were excluded.
- All orders are associated with the business unit through the cost center associated with the customer.

- All scores regarding customer zones that were considered for the Horeca channel are the same for the Domestic channel.

General Indicators Domestic TA

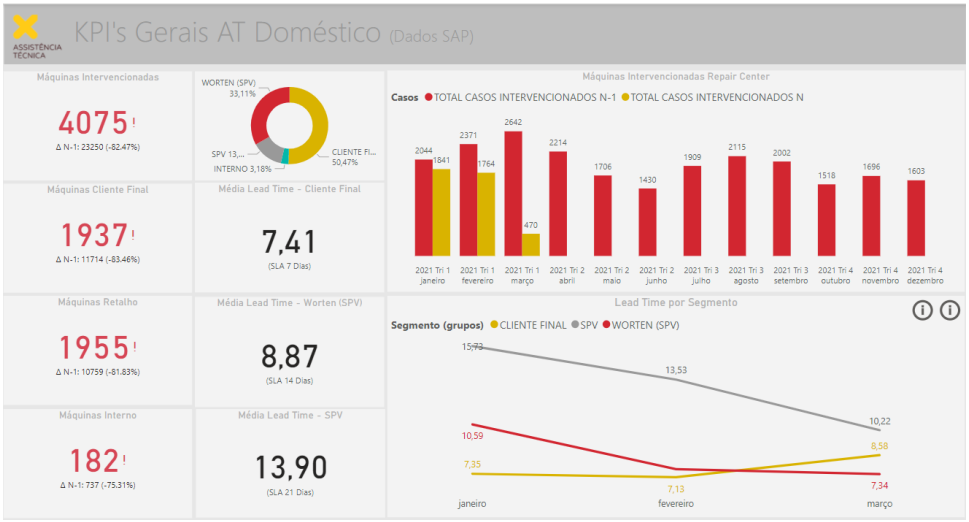


Figure 11 – General Domestic TA Indicators

KPI's developed

- Total number of machines intervened (year N and year N-1)
- Total number of machines operated by segment (End Customer, Retail, Internal)
- Lead time per segment – running time, in working days, from the collection of the equipment from the customer until it is delivered after dispatch from the warehouse

```
LEAD TIME =
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[SEGMENTO (grupos)] = "CLIENTE FINAL",
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA]<>BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA]<>BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA]='DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA],
1,

    CALCULATE (
        SUM ( '0 | DATA (AGENDAMENTOS)'[DIA ÚTIL] ),
        DATESBETWEEN (
            '0 | DATA (AGENDAMENTOS)'[DATA],
            'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA],
            'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA]
        ))-1))),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[SEGMENTO (grupos)] = "INTERNO",
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA]<>BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA]<>BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA]='DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA],
1,

    CALCULATE (
        SUM ( '0 | DATA (AGENDAMENTOS)'[DIA ÚTIL] ),
        DATESBETWEEN (
            '0 | DATA (AGENDAMENTOS)'[DATA],
            'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA],
            'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA]
        ))-1))),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[SEGMENTO (grupos)] = "WORTEN (SPV)",
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA CRIAÇÃO CASO]<>BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA]<>BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA CRIAÇÃO CASO]='DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA],
1,

    CALCULATE (
        COUNT ( '0 | DATA (AGENDAMENTOS)'[DIA ÚTIL] ),
        DATESBETWEEN (
            '0 | DATA (AGENDAMENTOS)'[DATA],
            'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA CRIAÇÃO CASO],
            'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA]
        ))-1))),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[SEGMENTO (grupos)] = "SPV",
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA CRIAÇÃO CASO]<>BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA]<>BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA CRIAÇÃO CASO]='DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA],
1,

    CALCULATE (
        COUNT ( '0 | DATA (AGENDAMENTOS)'[DIA ÚTIL] ),
        DATESBETWEEN (
            '0 | DATA (AGENDAMENTOS)'[DATA],
            'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA CRIAÇÃO CASO],
            'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA]
        ))-1))))))
```

Figure 12 – Lead Time Formula (Domestic)

Technical productivity

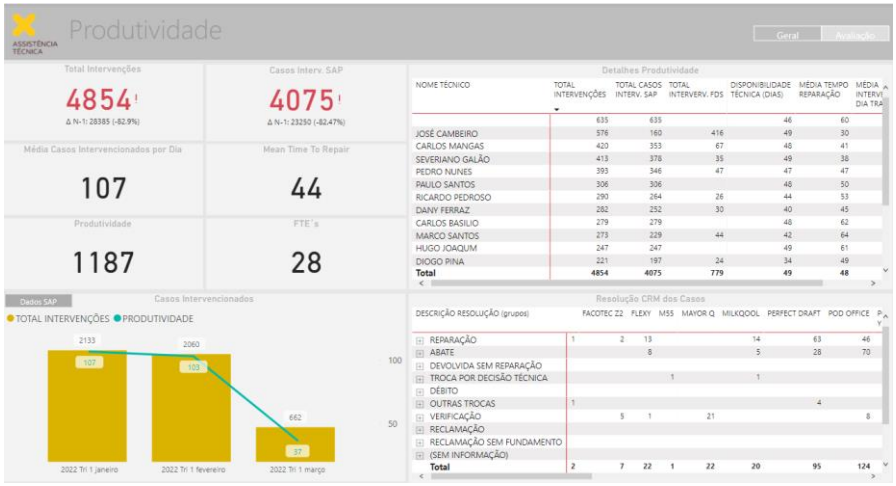


Figure 13 – Technical Productivity Indicators (Domestic)

It considers all cases dealt with by the technical team of the Operations Department.

KPI's developed

- Total number of interventions (year N and year N-1)
- Average number of cases treated per day
- Productivity = Total interventions/Nº FTE's (number of resources, in this case technical)
- Mean time to Repair (MTTR) – based on the average real time elapsed since the technician arrived and the intervention ended in minutes

```
TMR =
IF('AUX » PRODUTIVIDADE 1'[TEMPO REAL]=BLANK(),

(Var hora_decimal_seg = 'AUX » PRODUTIVIDADE 1'[Tempo (hh:mm:ss)]*24*60*60
var segundo = MOD(hora_decimal_seg,60)/100
Var minuto = (hora_decimal_seg - MOD(hora_decimal_seg,60))/60
RETURN
minuto + segundo),

'AUX » PRODUTIVIDADE 1'[TEMPO REAL])
```

- Cases intervened - Total number of interventions and productivity level in monthly terms
- Total interventions, in SAP, Outside SAP, Technical Availability, Average Time to Repair (per technician)
- Case resolution - detail of interventions, by resolution description and equipment model

Shipping Equipment

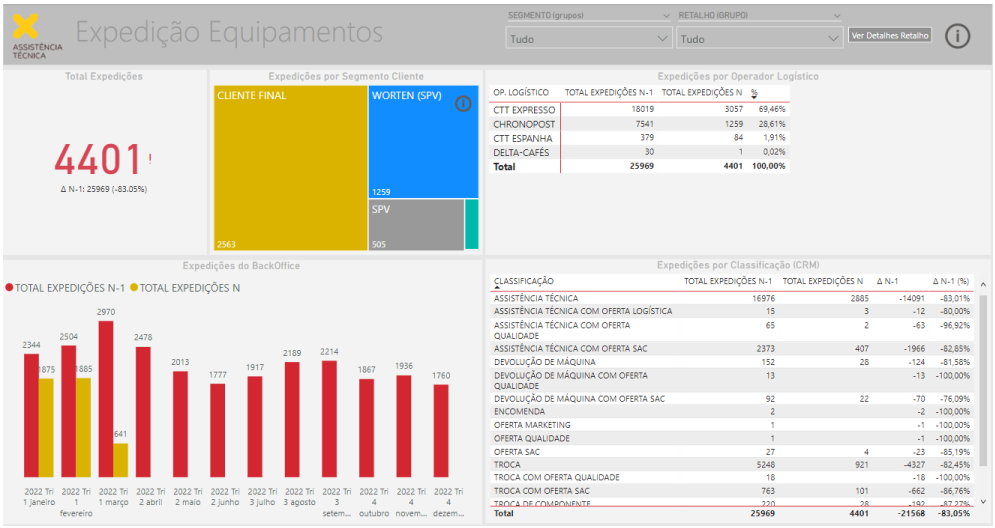


Figure 14 – Shipping Equipment Indicators

KPI's developed

- Total No. of Equipment Shipments with annual scheduling date (year N and year N-1)

```
1 TOTAL RECEPÇÕES =
2 DISTINCTCOUNT ( 'DB » MOVIMENTOS EQUIPAMENTOS (ENTRADA)'[OrdCliente_1] )
```

- Equipment shipments with scheduling by Customer segment
- Total Expeditions by End Logistics Operator (year N and year N-1) and percentage of the total
- Total number of monthly BO Expeditions (year N and year N-1)
- Total No. of Equipment Shipments by Classification (CRM) - year N and year N-1 and percentage variation of total Shipments
- Annual Case Resolution Expeditions

All information by Segment and Retail Group

Complaints Technical Quality

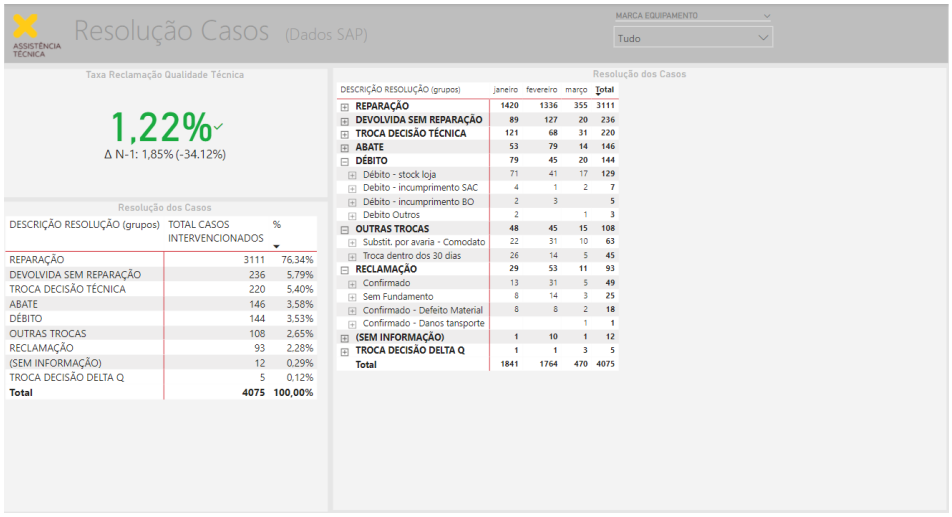


Figure 15 - Complaints Technical Quality

KPI's developed

- The calculation of the No. of quality complaint interventions considers the total number of cases intervened by the technical team of the DO, with assumptions Subject Description = “Repair Quality” and Resolution Description = “Confirmed”;
- The calculation of the quality complaint rate considers the No. of quality complaint interventions / Total No. of cases intervened by the DO technical team, with the assumption Description Resolution = “Repaired”;

  Note: The technical Complaint rate has, as a rule, to be below 2% to meet the objective defined by the company

- Detail of the No. of interventions by the DO team by type of intervention (Description of Resolution) and description of the subject (explanation of the type of work performed by the Repair Center technicians)

Operational Lead Time-End Customer

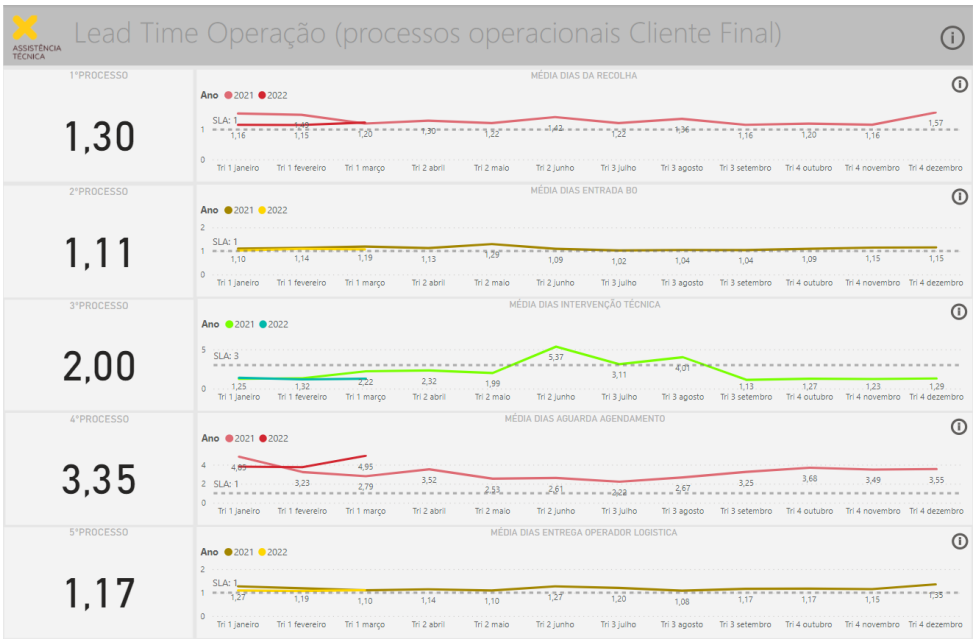


Figure 16 - Operational Lead Time-End Customer

KPI's developed

- Average Collection Days - working days from the equipment collection schedule date to the actual collection from the customer

```
DIAS DA RECOLHA À ENTRADA (1ºPASSO) =

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[SEGMENTO (grupos)] <> "CLIENTE FINAL",BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[LEAD TIME]=BLANK(),BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA] = BLANK (),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA]=BLANK(),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA]<'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA],BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA]='DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA],
1,

CALCULATE(SUM('0 | DATA (AGENDAMENTOS)'[DIA ÚTIL]),DATESBETWEEN('0 | DATA (AGENDAMENTOS)'[DATA],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA RECOLHA],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA]))
-1)))))
```

Figure 16.1 - Average Collection Days

- Average days Entry in BO - working days from the collection of the equipment to the entry of the same in the Backoffice

```
DIAS ENTRADA BO À FILA RC (2ºPASSO) =

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[SEGMENTO (grupos)] <> "CLIENTE FINAL",BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[LEAD TIME]=BLANK(),BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA]=BLANK(),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA FILA RC]=BLANK(),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA FILA RC]<'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA],BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA]='DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA FILA RC],
1,

CALCULATE(SUM('0 | DATA (AGENDAMENTOS)'[DIA ÚTIL]),DATESBETWEEN('0 | DATA (AGENDAMENTOS)'[DATA],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA
FILA RC]))-1)))))
```

Figure 16.2 - Average Days Entry in BO

- Average days Technical Intervention - working days from entering the RC queue to the end of the intervention

```
DIAS ENTRADA FILA RC AO FECHO DA INTERVENÇÃO (3ºPASSO) =

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[SEGMENTO (grupos)] <> "CLIENTE FINAL",BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[LEAD TIME]=BLANK(),BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA FILA RC]=BLANK(),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA FECHO REPARAÇÃO] = BLANK(),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA FECHO REPARAÇÃO]<'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA FILA RC],BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA FILA RC]='DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA FECHO REPARAÇÃO],
1,

CALCULATE(SUM('0 | DATA (AGENDAMENTOS)'[DIA ÚTIL]),DATESBETWEEN('0 | DATA (AGENDAMENTOS)'[DATA],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTRADA FILA RC],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA
FECHO REPARAÇÃO]))-1)))))
```

Figure 16.3 - Average Days Technical Intervention

- Average Shipping days - working days from the arrival of the equipment at the shipping warehouse to the collection by the Logistics Operator for delivery to the customer (Awaiting Scheduling)

```
DIAS AGUARDA AGENDAMENTO ENTREGA (4ºPASSO) =

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[SEGMENTO (grupos)] <> "CLIENTE FINAL",BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[LEAD TIME]=BLANK(),BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA AGUARDA AGENDAMENTO]=BLANK(),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA COMUNICAÇÃO OL] = BLANK(),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA COMUNICAÇÃO OL]<'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA AGUARDA AGENDAMENTO],BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA AGUARDA AGENDAMENTO]='DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA COMUNICAÇÃO OL],
1,

CALCULATE(SUM('0 | DATA (AGENDAMENTOS)'[DIA ÚTIL]),DATESBETWEEN('0 | DATA (AGENDAMENTOS)'[DATA],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA AGUARDA AGENDAMENTO],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA
COMUNICAÇÃO OL]))-1)))))
```

Figure 16.4 - Average Shipping Days

- Average delivery days by the Logistics Operator - working days from the collection of the Logistics Operator to the date of delivery to the customer

```
DIAS ENTREGA EFECTIVA (5ºPASSO) =

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[SEGMENTO (grupos)] <> "CLIENTE FINAL",BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[LEAD TIME]=BLANK(),BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA COMUNICAÇÃO OL]=BLANK(),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA] = BLANK(),BLANK(),
IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA] <'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA COMUNICAÇÃO OL],BLANK(),

IF('DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA COMUNICAÇÃO OL]='DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA],
1,

CALCULATE(SUM('0 | DATA (MESTRE)'[DIA ÚTIL]),DATESBETWEEN('0 | DATA (MESTRE)'[DATA],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA COMUNICAÇÃO OL],'DB » AGENDAMENTOS ENTREGA (LEAD TIME)'[DATA ENTREGA EFETIVA])
)-1)))))
```

Figure 16.5 - Average Delivery Days by The Logistics Operator

- All information by Theme (Repair Request), Resolution Description, Segment (End Customer), Business Area (Delta Q)

Backoffice queue

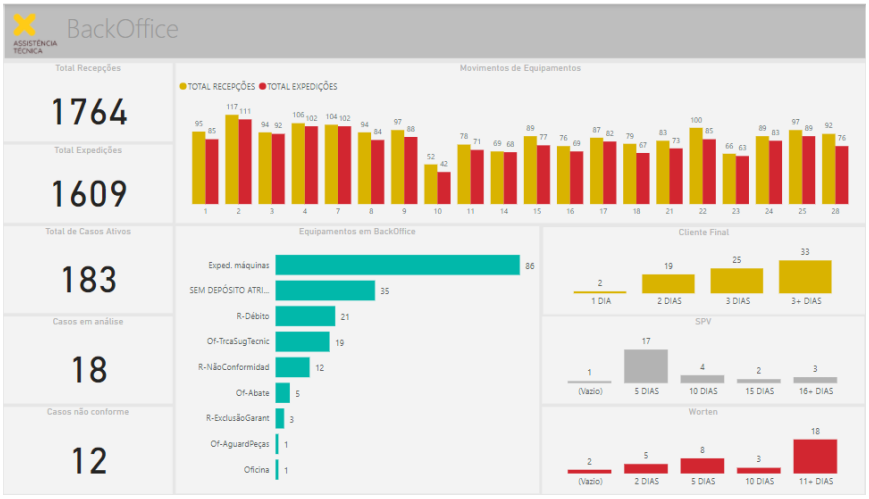


Figure 17 – Backoffice Queue Indicators

KPI's developed

- ✖ Total No. of Equipment Receipts in Backoffice
- ✖ Total No. of Shipments scheduled for delivery to the customer
- ✖ Comparison between Number of Receipts and Number of Shipments (monthly)
- ✖ Total number of repaired active technical cases awaiting customer appointment
- ✖ No. of Equipment in BO per current warehouse
- ✖ Lead time for dispatch – based on the time in calendar days from the entry into the BO to the current date, awaiting dispatch to the customer (filtered by segment)

```
TEMPO EM BO/RC =
IF (
    'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] = TODAY (),
    0,
    IF (
        AND (
            'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] <> BLANK (),
            'DB » CASOS TÉCNICOS (ATIVOS)'[SEGMENTO (grupos)] = "CLIENTE FINAL"
        ),
        CALCULATE (
            SUM ( '0 | DATA (MESTRE)'[DIA ÚTIL] ),
            DATESBETWEEN (
                '0 | DATA (MESTRE)'[DATA],
                'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA],
                TODAY ()
            )
        ) - 1,
        IF (
            AND (
                'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] <> BLANK (),
                'DB » CASOS TÉCNICOS (ATIVOS)'[SEGMENTO (grupos)] = "INTERNO"
            ),
            NOW () - 'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA].[Date],
            IF (
                AND (
                    'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] <> BLANK (),
                    'DB » CASOS TÉCNICOS (ATIVOS)'[SEGMENTO (grupos)] = "SPV"
                ),
                NOW () - 'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA].[Date],
                IF (
                    AND (
                        'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] <> BLANK (),
                        'DB » CASOS TÉCNICOS (ATIVOS)'[SEGMENTO (grupos)] = "WORTEN (SPV)"
                    ),
                    NOW () - 'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA].[Date]
                )
            )
        )
    )
)
```

Figure 17.1 – Lead Time for Dispatch

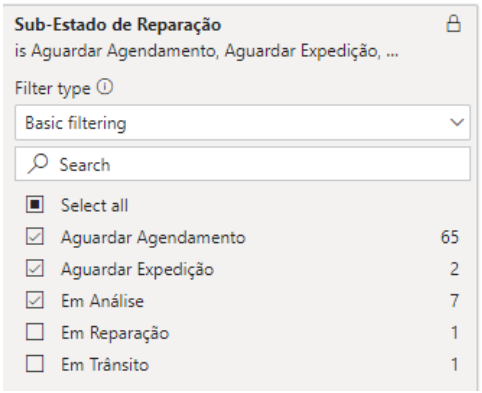


Figure 17.2 – Filter for Lead Time

Equipment Reception

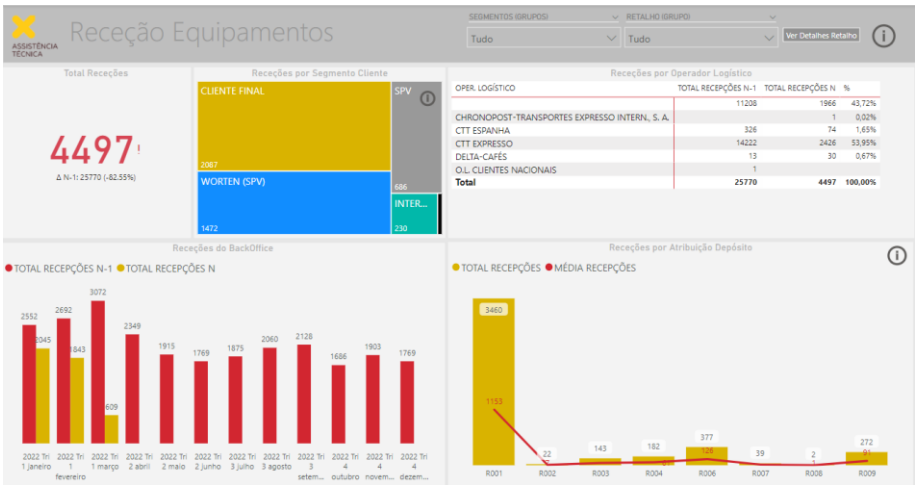


Figure 18 - Equipment Reception

KPI's developed

- Total No. of Equipment Receipts with annual entry date (year N and year N-1)

```
1 TOTAL RECEPÇÕES =
2 DISTINCTCOUNT ( 'DB » MOVIMENTOS EQUIPAMENTOS (ENTRADA)'[OrdCliente_1] )
```

- Equipment receipts with repair order by Customer segment
- Total Receipts by End Logistics Operator (year N and year N-1) and total percentage
- Total number of monthly BO Receipts (year N and year N-1)
- Total No. of Equipment Receipts per input warehouse

All information by Segment and Retail Group

Repair Center Queue

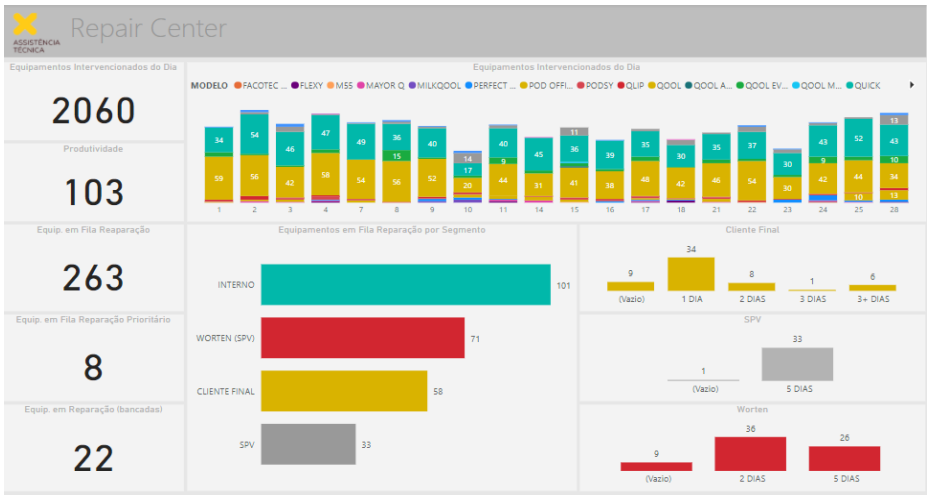


Figure 19 - Repair Center Queue

KPI's developed

- Total No. of Equipment intervened for the day
- Total Equipment in Repair Queue (Priority and on benches)
- Number of equipments operated per day aggregated by equipment model and name of the respective technician
- No. of Equipment in Repair Queue by Segment (Internal, Worten SPV, SPV, End Customer)
- Repair lead time – based on the time in working days from entering the RC queue to closing the intervention (filtered by segment)

```
TEMPO EM BO/RC =
IF (
    'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] = TODAY (),
    0,
    IF (
        AND (
            'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] <> BLANK (),
            'DB » CASOS TÉCNICOS (ATIVOS)'[SEGMENTO (grupos)] = "CLIENTE FINAL"
        ),
        CALCULATE (
            SUM ( '0 | DATA (MESTRE)'[DIA ÚTIL] ),
            DATESBETWEEN (
                '0 | DATA (MESTRE)'[DATA],
                'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA],
                TODAY ()
            )
        ) - 1,
        IF (
            AND (
                'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] <> BLANK (),
                'DB » CASOS TÉCNICOS (ATIVOS)'[SEGMENTO (grupos)] = "INTERNO"
            ),
            NOW () - 'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA].[Date],
            IF (
                AND (
                    'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] <> BLANK (),
                    'DB » CASOS TÉCNICOS (ATIVOS)'[SEGMENTO (grupos)] = "SPV"
                ),
                NOW () - 'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA].[Date],
                IF (
                    AND (
                        'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA] <> BLANK (),
                        'DB » CASOS TÉCNICOS (ATIVOS)'[SEGMENTO (grupos)] = "WORTEN (SPV)"
                    ),
                    NOW () - 'DB » CASOS TÉCNICOS (ATIVOS)'[DATA ENTRADA].[Date]
                )
            )
        )
    )
)

```

Figure 19.1 - Repair Lead Time

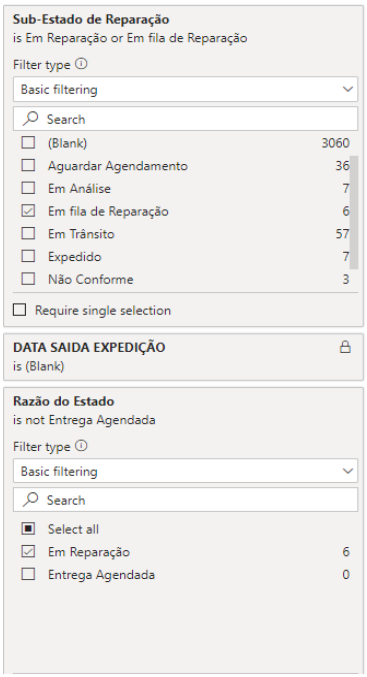


Figure 19.2 - Filter for Lead Time

Final Consumer Report

The final consumer line is the general line of Grupo Nabeiro and is used by anyone who wants information about the products or even the company.

In this line, the most common situations are the exposure of complaints or suggestions, requests for sponsorships or charitable events and commercial information from suppliers and customers.

The “Final Consumer” Report analyzes the number of calls, reflecting its effectiveness and analyzing the situations that are reported by customers through the typification of each CRM case.

Inbound

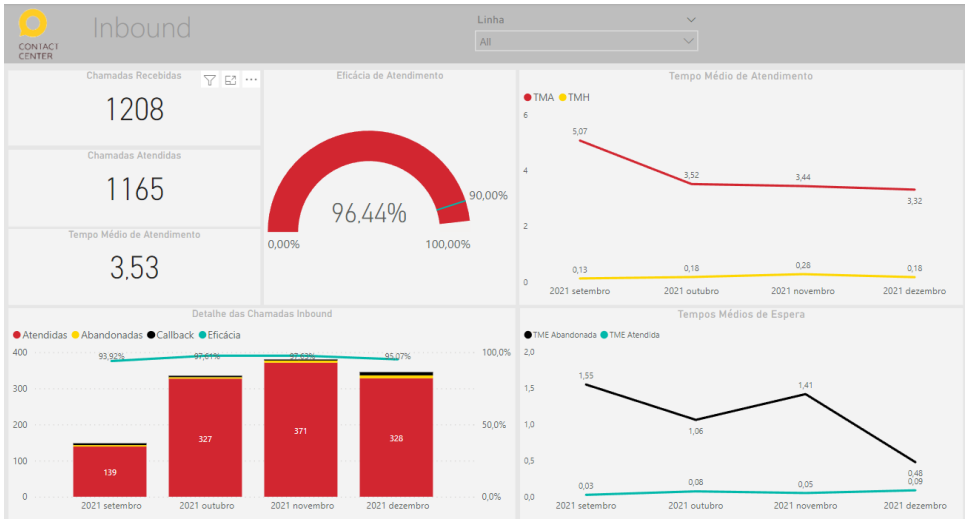


Figure 20 – Inbound

KPI's developed

- Total number of calls received (year N)
- Total number of answered calls (year N)
- Efficiency of service - rate of answered calls in relation to the total number of calls received
- Inbound Calls Detail - Monthly total Number of calls answered, received, callbacks and monthly service effectiveness
- Average Answer Time (ATM) - Time the call lasts from the moment it is answered until it is disconnected

```
> IN MÉDIA ATENDIMENTO (TMA) =
VAR media_s = CALCULATE(AVERAGE('CC INBOUND'[Talk Time (seg)]),'CC INBOUND'[OUTCOME CALL]="CHAMADA ATENDIDA")
var segundo = MOD(media_s,60)/100
Var minuto = (media_s - MOD(media_s,60))/60
RETURN
minuto + segundo
```

Figure 20.1 - Average Answer Time (ATM)

- Average Hold Time (TMH) -Time during a call in which the assistant puts the customer on hold so that they can consult information, type a case, etc.

```
>IN MÉDIA HOLD (TMH) =
VAR media_s = CALCULATE(AVERAGE('CC INBOUND'[HoldTime (seg)]),'CC INBOUND'[OUTCOME CALL]="CHAMADA ATENDIDA")
var segundo = MOD(media_s,60)/100
Var minuto = (media_s - MOD(media_s,60))/60
RETURN
minuto + segundo
```

Figure 20.2 - Average Hold Time (TMH)

- Answered Average Wait Time (TMEA) - Time the customer waits after the IVR has expired until their call is answered by an assistant

```
> IN MÉDIA ESPERA ABANDONADA (TMEA) =
 VAR media_s = CALCULATE(AVERAGE('CC INBOUND'[Queue Time (seg)]),'CC INBOUND'[OUTCOME CALL]="CHAMADA NÃO ATENDIDA")
var segundo = MOD(media_s,60)/100
Var minuto = (media_s - MOD(media_s,60))/60
RETURN
minuto + segundo
```

Figure 20.3 - Answered Average Wait Time (TMEA)

- Average Abandon Waiting Time (TMEAB) - Time that the customer waits but the call is not answered, that is, it reflects the time that the customer is willing to give up before declining the contact

```
> IN MÉDIA ESPERA ATENDIDA (TME) =
VAR media_s = CALCULATE(AVERAGE('CC INBOUND'[Queue Time (seg)]), 'CC INBOUND'[OUTCOME CALL]="CHAMADA ATENDIDA")
var segundo = MOD(media_s,60)/100
Var minuto = (media_s - MOD(media_s,60))/60
RETURN
minuto + segundo
```

Figure 20.4 - Average Abandon Waiting Time (TMEAB)

Cases

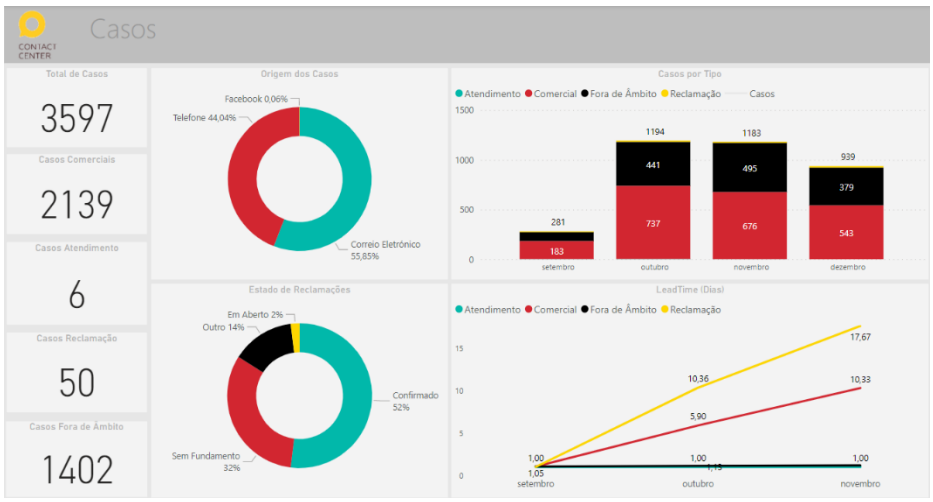


Figure 21 - Cases

KPI's developed

- Total number of cases created by topic typology (Commercial, Service, Complaint)
- Origin of Cases – Electronic Mail, Facebook, Telephone, Web
- Lead Time (Days) – elapsed time in working days from the date of creation of the case to its resolution

```
SLA1 = If('CC CAMPO MAIOR'[Criado Em]='CC CAMPO MAIOR'[Data Resolução],0,IF('CC CAMPO MAIOR'[Criado Em]>'CC CAMPO MAIOR'[Data Resolução],BLANK(),
CALCULATE(SUM('AUX »  DATA'[DIA ÚTIL]),DATESBETWEEN('AUX »  DATA'[DATA], 'CC CAMPO MAIOR'[Criado Em],'CC CAMPO MAIOR'[Data Resolução]))))
```

- Detail Status Complaints – Confirmed (problem with CTT, Transport Damage, Rangel Logistica, resolved with grounds), Open, Resolved without grounds, Other (wait for Customer contact, Under analysis, Resolved online, Resolved by supervisor)

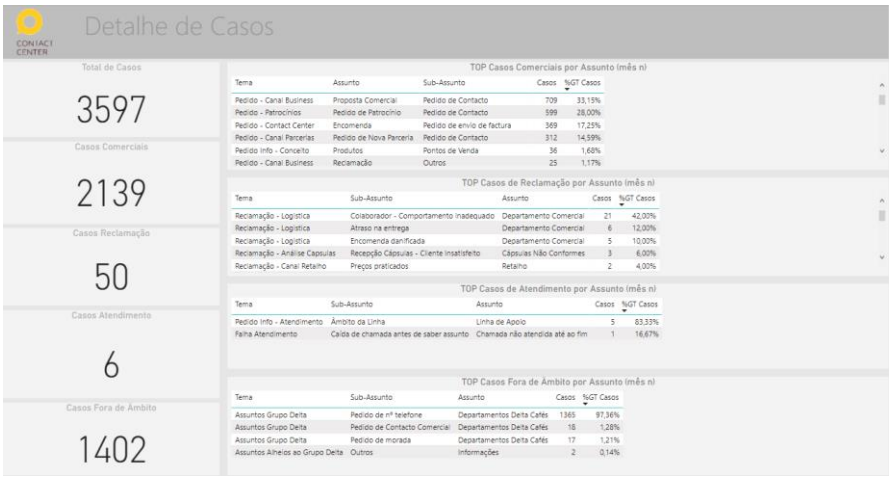


Figure 22 - Detail of cases

- Detail of cases – Description (by subject and sub-topic) of the number of cases and respective rate of importance in relation to the total number of cases

Quality Control Report

The creation of this Report, as requested by the Development and Quality department of the Operations Department, had as its main objective to monitor both the level of efficiency with which our technicians carry out interventions to the various equipment that are returned due to some malfunction, as well as the quality of the respective equipment itself, in order to prevent future breakdowns and anomalies.

With regard to Service Quality Control, indicators were developed focusing on 4 different objectives:

1. Recurrence rate after 30 days

2. Average time between failures (1st and 2nd)
3. Recurrence Rate per Technician
4. Exchange Rate by Technical Decision

Recurrence rate after 30 days

Analyzing this rate, we were able to assess whether after a machine is repaired, that same machine returns to the workshop within a period of less than 30 days, to detect inconsistencies in the repair carried out by the technician.

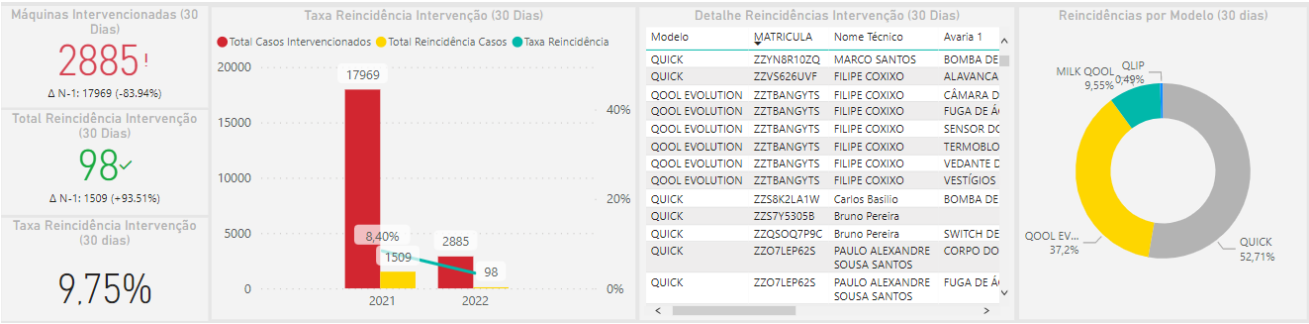


Figure 23 - Recurrence After 30 days

KPI's developed

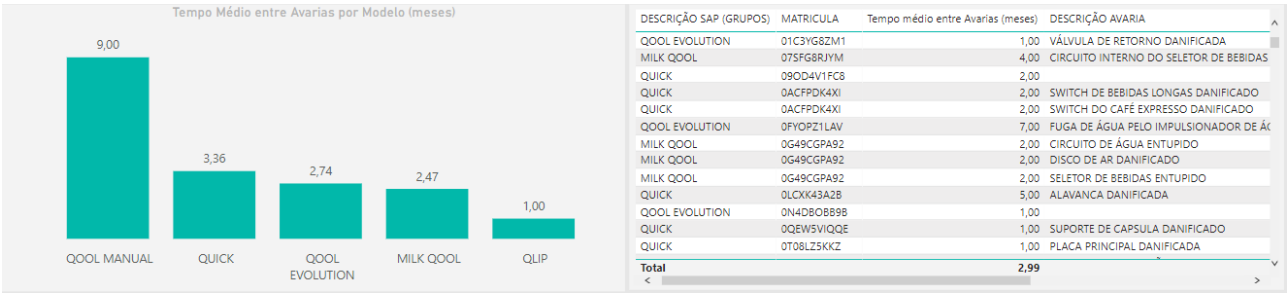
- Total number of machines repaired which returned after 30 days of purchase (year N and year N-1)
- Total number of machines returned after being repaired in the first 30 days

```
TOTAL REINCIDÊNCIA CASOS = [TOTAL CASOS INTERVENCIONADOS]
-
DISTINCTCOUNT('ZANDL03 » CASOS TÉCNICOS (INTERVENÇÕES)'[MATRICULA])
```

- Recurrence rate – percentage of machines in comparison to the total number of interventions, which returned after being repaired in less than 30 days

Average time between failures (1st and 2nd)

Depending on these values, calculated in months, we were given information about the time, on average, that a machine returns to the workshop after being repaired. In this way, we were able to understand whether when the machine arrived at the workshop for repair, a check up was carried out to detect future defects.



DESCRIÇÃO SAP (GRUPOS)	MATRICULA	Tempo médio entre Avarias (meses)	DESCRIÇÃO AVARIA
QOOL EVOLUTION	01C3YG6ZM1	1,00	VÁLVULA DE RETORNO DANIFICADA
MILK QOOL	07SFG8RJYM	4,00	CIRCUITO INTERNO DO SELETOR DE BEBIDAS
QUICK	09OD4V1FC8	2,00	
QUICK	0ACFPDK4XI	2,00	SWITCH DE BEBIDAS LONGAS DANIFICADO
QUICK	0ACFPDK4XI	2,00	SWITCH DO CAFÉ EXPRESSO DANIFICADO
QOOL EVOLUTION	0FYOPZ1LAV	7,00	FUGA DE ÁGUA PELO IMPULSIONADOR DE Á
MILK QOOL	0G49CGPA92	2,00	CIRCUITO DE ÁGUA ENTUPIDO
MILK QOOL	0G49CGPA92	2,00	DISCO DE AR DANIFICADO
MILK QOOL	0G49CGPA92	2,00	SELETOR DE BEBIDAS ENTUPIDO
QUICK	0LCXK43A2B	5,00	ALAVANCA DANIFICADA
QOOL EVOLUTION	0N4DBOBB9B	1,00	
QUICK	0QEW5VIQQE	1,00	SUPORTE DE CAPSULA DANIFICADO
QUICK	0T08LZ5KKZ	1,00	PLACA PRINCIPAL DANIFICADA
Total		2,99	

Figure 24 - Average Time Between Failures

```
INTERVENÇÃO (MÊS) = DATEDIFF('DB » REINCIDÊNCIAS'[DATA CRIAÇÃO],'DB » REINCIDÊNCIAS'[DATA INTERVENÇÃO SEGUINTE],MONTH)
```

Recurrence Rate per Technician

This indicator tests the individual efficiency level of each technician, as it allows us to see which technicians have not been properly repaired and hence the return of the machine to the workshop. In this way it is possible to detect training and improvement opportunities.

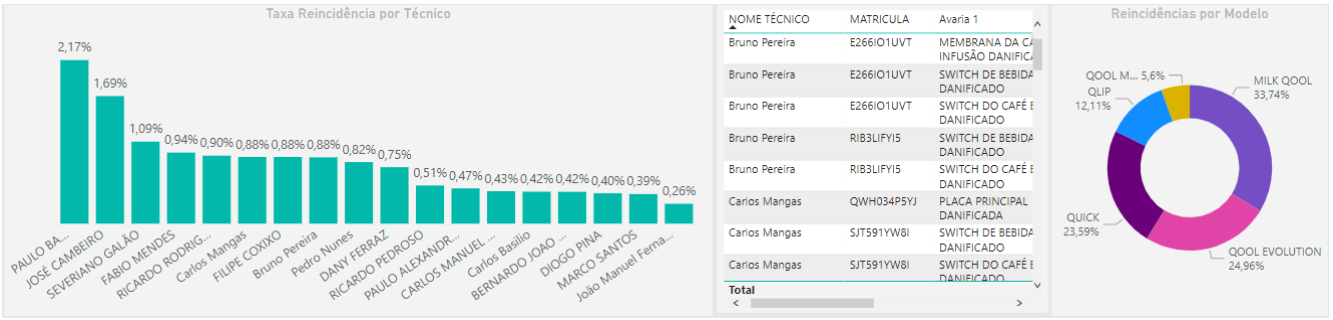


Figure 25 - Recurrence Rate per Technician

KPI's developed

- Recurrence rate – percentage of machines of the total number of interventions, which returned after being repaired in less than 30 days

Exchange rate per technical decision

When a machine comes to the workshop, it is up to the technician to analyze whether it is possible to repair te equipment or not. If this is not possible, the technician may request the replacement of the equipment. The exchange rate by technical decision allows to

controll the number of exchanges per month/model so that it is possible to predict possible defects in series of equipment and prevent stock outs.

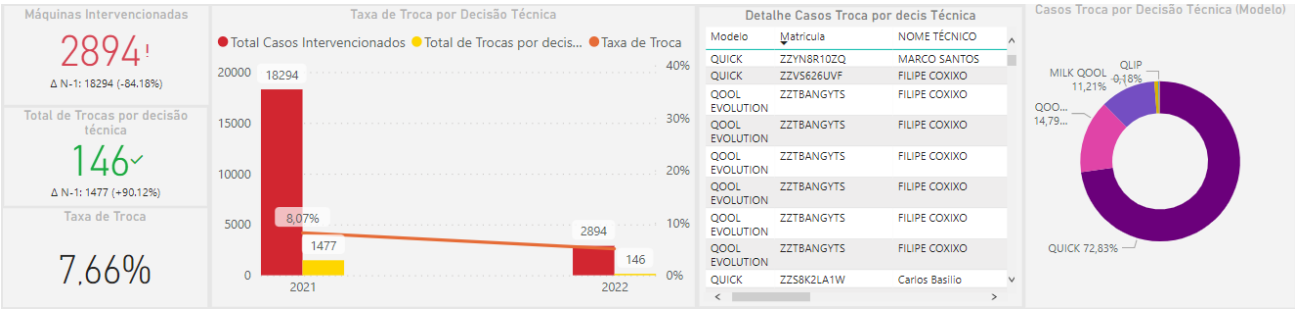


Figure 26 - Exchange Rate per Technical Decision

KPI's developed

- Total number of machines intervened (year N and year N-1)
- Total number of machines that could not be repaired and, by decision of the technician, were replaced

```
CASOS TÉCNICOS Troca por Decisão Técnica =
CALCULATE(DISTINCTCOUNT('DB » CASOS CRIADOS'[Número do Caso]),
'DB » CASOS CRIADOS'[Código Resolução] = "Troca por Decisão Técnica")
```

- Exchange rate - percentage of machines that arrive and that, by decision of the technician, are exchanged, without any type of repair

Regarding Product Quality Control, indicators were also developed focusing on 3 different objectives:

1. Average time until first failure
2. Average time until third failure (slaughter)
3. Rate of machines that returned in the 1st year

<u>Average time to first failure</u>

Indicator that helps to understand the time, after the purchase of the machine, until its first failure by model, by component and by year of purchase.

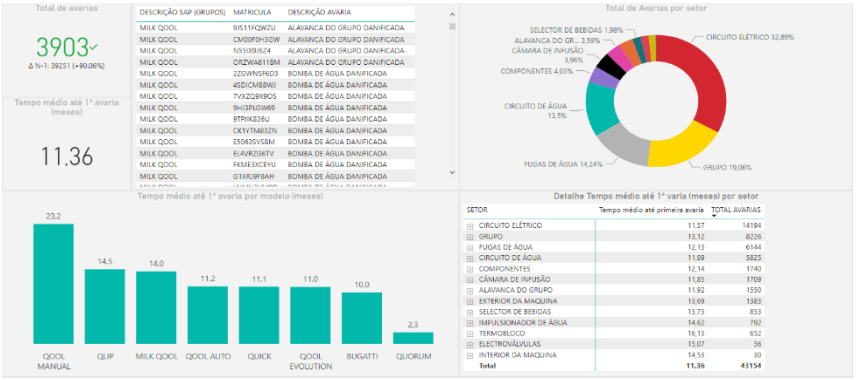


Figure 27 - Average Time to First Failure

Rate of machines returning in the 1st year

Indicator similar to the average time until the first breakdown, in the sense that it helps us to understand what percentage of machines, after their purchase (warranty start date), return in the first year of use, by model.

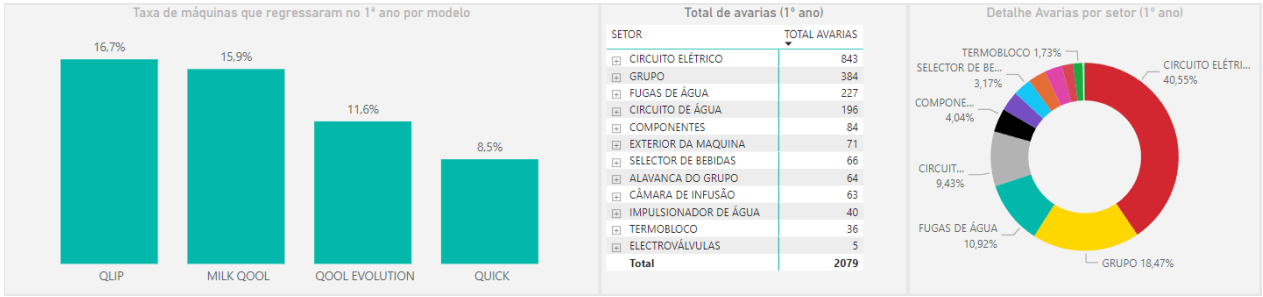


Figure 28 - Rate of Machines Returning in The 1st Year

Average time until third failure

Given this information, we can understand how long the machine has to live, after the second failure, until it is scrapped. The Directorate of Operations assumes the third damage as assumed so that the machine is no longer used and goes to slaughter.

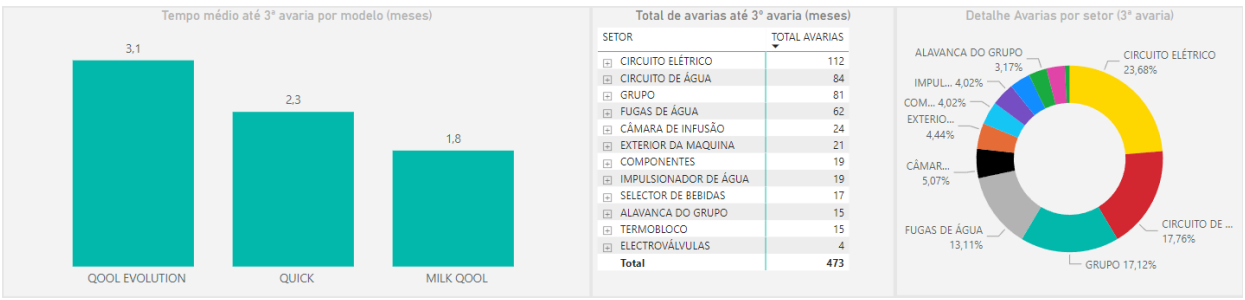


Figure 29 - Average Time Until Third Failure

Conclusion

Reflection on acquired skills

The curricular internship is one of the alternatives for the conclusion of the master's in data Analytics for Business, being simultaneously an opportunity to get in touch with the business reality. Indeed, I was able to learn about the operational reality of a company that is constantly growing and the challenges they face. The internship turns out to be, in a way, a precious complement to the course, since, in addition to having provided direct contact with the business world of a high-status company in Portugal such as the Nabeiro Group, it allowed not only to apply, but also to also to constantly consolidate and deepen the knowledge acquired during academic training.

Relating to the theoretical framework, the internship revealed the growing and high importance that work with Big Data has for the development of companies. Working with a high volume of data not only enables the provision of new services (Thomas H. Davenport and Jill Dyché, 2013), but also improves decision-making through analysis applications (PhD Stefan Iovan, 2015) and obtains a complete knowledge of how the company is operating.

It appears that these data increasingly need practical treatment and common sense to transform them into relevant information (Davis, 1989). The careful analysis of data, both internal and external to an organization, becomes increasingly necessary (Freitas & Lesca, 1992).

With the help of the Microsoft Power BI business intelligence tool, it was possible to easily assimilate and relate all the extracted databases and create a predictive analysis through the creation of reports and Dashboards (Dean Abbott, 2014). In this way, constant critical analyzes can be made regarding the company's operational processes, especially regarding the technical assistance sector, and significant improvements have been observed in terms of meeting the defined deadlines and the intended annual objectives.

As for the internship experience, Grupo Nabeiro and in particular the department leaders show a strong predisposition to share their knowledge and receive feedback and opinions from their subordinates. There is collaboration and a lot of mutual help among the different collaborators of the team, with a special contribution from a dynamic and young spirit, which helped that the objectives, initially predefined, have been achieved and implemented throughout this period. In this way, the internship provided the

development of skills both at a professional and personal level, through observation of the behavior of all employees involved in the Group and the interaction with them.

Limitations / Development Topics for the Future

With the completion of the internship and later the completion of the internship report, some limitations emerged.

Regarding the completion of the internship, the difficulty in assimilating the excessive amount of information about the operation and processes adopted by the company in the first weeks was notorious. The technical assistance sector is a complex field that is entirely linked to the Logistics and Warehouse and Contact Center sectors. In this way, additional learning was necessary, especially outside the internship hours. A second limitation is directed to the difficulty in understanding the support tools used by the Group. Trainees lacking experience using these tools can lead to delays in carrying out the intended tasks and failure to meet related deadlines.

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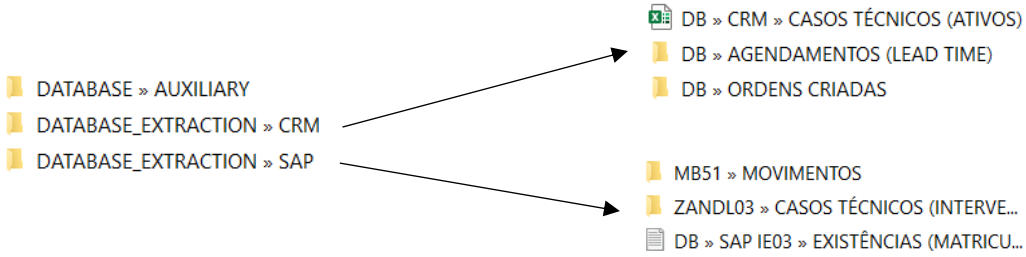
Attachments

Attachment A – Department chart



Attachment B – Database Domestic channel

Attachment C– Database Horeca channel