Development of a KPI Tracking-Tool for Monitoring Operational Performance

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Dissertação de Mestrado

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Mestrado Integrado em Engenharia e Gestão Industrial

2018-01-22

We say what we do, we do what we say!

The team result is bigger than the sum of its parts!

Successful teams see the opportunity in every difficulty, rather than the difficulty in every opportunity.

The customer's perception is our reality.

We make the Excellent, more Excellent, day by day.

SGPT's Guiding Principles

Resumo

A medição de desempenho representa um papel importante na gestão das organizações, servindo de base na tomada de decisões. É usada para melhorar a produtividade, o planeamento estratégico, a garantia de qualidade e benchmarking, entre muitas outras dimensões de toda a organização.

Este projeto de dissertação foca o desenvolvimento de um sistema de medição de desempenho no contexto do centro de serviços partilhados do grupo SEG Automotive (SGPT), o qual presta serviços em escala global ao resto do grupo, em áreas como: Controlo de Gestão, Finanças e Contabilidade, Coordenação Comercial de Vendas, Compras, Recursos Humanos e Sistemas de Informação.

Nesta tese, é incluída a descrição do problema bem como uma visão geral dos indicadores de desempenho monitorizados até ao início do projeto. São assim identificados e construídos novos indicadores que devem ser acompanhados com a implementação de um novo sistema de reporte, usando o Microsoft Excel.

Foi desenvolvido e implementado um novo sistema de medição de desempenho, abrangendo todos os departamentos da organização. Este sistema inclui um mapa de Indicadores Chave de Desempenho (KPIs), que sumariza as medidas de desempenho e permite uma comparação mensal entre os resultados obtidos e os objetivos estabelecidos anteriormente. Foi também especificado um sistema de semáforos de forma a destacar os desvios face ao planeado, permitindo a implementação de medidas internas se necessárias.

Foram também desenvolvidos dashboards para cada um dos departamentos, de modo a compartilhar os resultados mais detalhados de uma forma útil e intuitiva. Nestes é também fornecida uma comparação mensal com períodos anteriores, de modo a facilitar a identificação de efeitos sazonais e tendências nos resultados de desempenho.

Este sistema de medição de desempenho visa ser utilizado pelos chefes de cada departamento como ferramenta de controlo interno. A visualização dos resultados e possíveis desvios face ao planeado são também importantes, pois têm como finalidade a discussão nas reuniões mensais entre o General Manager e os chefes de cada departamento (reuniões da “Equipa de Liderança”).

Com o desenvolvimento desta KPI Tracking-Tool e sua utilização sistemática em reuniões mensais, os chefes de departamento podem assim saber mais acerca do desempenho operacional das suas equipas, além de se consciencializarem mais facilmente dos resultados de desempenho obtidos nos outros departamentos e, de um modo geral, da empresa.

A monitorização e o controlo de desempenho nunca é um trabalho finalizado. As métricas devem evoluir constantemente para se adaptarem às metas e objetivos do negócio. Os objetivos devem também tornarem-se mais exigente ao longo do tempo, para permitir uma melhoria contínua do grupo SEG.

Development of a KPI Tracking-Tool for Monitoring Operational Performance

Abstract

Performance measurement performs a major role in organizations management as the basis for decision-making. It is used for productivity improvement, strategic planning, quality assurance and benchmarking, among many other dimensions across all the organization.

This dissertation project focuses on the development of a performance measurement system in the context of the SEG Automotive group Shared Service Center (SGPT), which provides services at a global scale to the rest of the group, in areas such as: Management Control, Finance and Accounting, Sales Commercial Coordination, Purchasing, Human Resources and Information Systems.

In this thesis, it is included the problem description, an overview of the performance indicators monitored before the beginning of this project, the identification of new indicators that should be monitored, the construction of new performance indicators and the design of a new reporting system using Microsoft Excel.

A new performance measurment system was developed and implemented, covering all departments of the organization. This includes a Key Performance Indicator (KPI) map, that sumarises the performance measures and allows a montly comparison between the results obtained and the targets previous established. A system of traffic lights was also specified, to highlight the deviations from the targets, truggering the implementation of internal actions whenever needed.

Dashboards were also developed for each of the company's departments, to share more detailed results in a useful and intuitive way. In these dashboards, it is also provided a monthly comparison with previous periods, in order to facilitate the identification of seasonality efects and trends in the performance results.

This performance measurement systems aims to be used for the department leaders, as an internal control tool. The visualization of results and possible deviations from targets are also critical to assist the monthly meetings between the General Manager and the department leaders ("Leadership Team" meetings).

With the development of this KPI Tracking-Tool and its systematic utilization in monthly meetings, department leaders can became more aware of the operational performance of their teams, as well as become easily aware of the performance results obtained in other departments and in company, at an overall level.

The monitoring and controlling of the performance is never a finished job. The metrics should constantly evolve and adapt to the business goals and targets. The targets should also become more demanding over time, to allow the continuous improvement of the SEG's group.

Acknowledgments

A journey is never made alone and I was lucky to always have someone by my side supporting me.

It is a pleasure to acknowledge all those who contributed for making this dissertation possible.

A company's quality depends on its persons and SGPT is the biggest example of that. Words can't describe how thankful I am for all the support I had during this project from everyone in the company. Not only for the project itself but especially for the conditions in which it was developed, having SGPT granted me the smoothest of the integrations and equipped me with all the necessary conditions to guarantee the success of the project.

A special note of gratitude goes to the most requested personal in the whole company, the General Manager and my supervisor, Albano Magalhães. His thinking ahead, long-term vision and pedagogic stance were determinant for the development and conclusion of this project. I would also like to express my gratitude to Roberto Pedro for never letting a question go unanswered, even if it meant stopping his work.

A special mention to my supervisor at FEUP, Professora Ana Camanho, for all the valuable guidance and valuable input through this project. Her orientation was of the utmost importance for me.

Also I would like to give my gratitude to all my teachers at FEUP that have given me the knowledge and the ability to become a better student, a skilled professional and, more important, grow as a human being.

This dissertation would have never existed without everyone that made these years at university the best of my life. Thank you for all the values you passed and the support you gave me. To all my colleagues and friends that walked this path with me, there are no words powerful enough to express how grateful I am. You have grown with me, you have helped me become who I am and you made every cliff in the way seem like just a small leap. I can truly say that I would not be where I am today if it was not for you.

Last but not least, I would like to express my appreciation to my parents. This is only possible due to their endless support, continuous care and encouragement. It was their love and understanding, which allowed me to move forward at every stumble. The values passed along, was well as the opportunities granted, will be something carried throughout all my life. For them, words will never be enough.

Table of Contents

Acronyms

BA – Business Analytics

BI – Business Intelligence

BSC – Balanced Scorecard

CRI – Chine Renaissance Capital Investment

DAX – Data Analysis Expression

ERP – Enterprise Resource Planning

JIT – Just in Time

KPI – Key Performance Indicator

OLAP – Online Analytical Processing

PMS – Performance Management System

SG – Robert Bosch Starter Motors and Generators

SGPT – SEG Automotive Portugal

SSC – Shared Service Center

ZMJ – Zhengzhou Coal Mining Machinery Group

GM – General Manager

ISY – Information Systems

HR – Human Resources

PUI – Indirect Purchasing

CFA – Controlling

FIN – Finance

MTD – Month-to-Date

YTD – Year-to-Date

EBIT – Earnings Before Interest & Taxes

List of Figures

List of Tables

1 Introduction

The present dissertation arises from a compelling need to measure, control and optimize performance in SEG Automotive Portugal (SGPT). This project was based in the definition of Key Performance Indicators (KPIs) and design of control procedures to measure the evolution of performance over time, according to the requirements of the leadership team and departments of SGPT.

Performance assessment is the process of collecting, analyzing and reporting information regarding organizations' progress and alignment with strategical and operational goals. One of the most important aspects to retain is that performance measures provide useful information about products, processes and services in a business.

Performance measurement can help the achievement of both strategical and operational goals. The operational issues are more focused on the results obtained in the processes and team operations. These issues typically have a quantitative foundation and a short-term scope, and should be monitored in a regular way by the management team, in order to promote improvements of the results.

On the other hand, the strategical goals are more complex and have a medium/long-term reach. They should be analyzed in a sustained way, to understand if the organization is moving in the planned path. By focusing on the organization, they evaluate the current status of the company as a system, prioritizing the development of the strategical areas.

Performance measurement is a continuous process that involves checking the performance against the standards that have been fixed. This in turn helps managers to understand the extent to which actual performance is deviated from what is expected. This way, determining whether performance matches standards entails evaluating the differences and take necessary actions to improve performance.

In summary, performance assessment is a good way to align the activities with the plans established. The implementation of a robust performance measurement framework is a great way to understand, manage and improve the overall functioning of a business organization. If it is done effectively and efficiently, it drives success in business.

As mentioned before, this dissertation project was done in SEG Automotive Portugal (SGPT), which is a recently created company that has recently experienced important changes in its ownership structure. The next sections explain in a more detail the history and current context of the company.

1.1 Origin of SEG Automotive

The SEG Automotive Group resulted from the acquisition of Robert Bosch Starter Motors and Generators.

The company Robert Bosch Starter Motors and Generators was a division of the Bosch Group. The Bosch Group is organized into four business sectors: Mobility Solutions, Industrial Technology, Consumer Goods and Energy and Building Technology. Robert Bosch Starter Motors and Generators was part of the Mobility Solutions. This company was a world-wide leader in the field of automotive energy supply.

The product portfolio included high efficiency power generators and long-life starter motors for petrol and diesel engines, as well as environmental-friendly solutions for fuel-saving and thus CO_2-reducing Start/Stop systems. In addition, they developed and manufacture electrical motors for hybrid solutions.

The generators guaranteed a reliable supply of energy to the vehicle's electrical systems, as their efficiency contributed to a noticeable reduction in fuel consumption.

As a global partner of vehicle and engine manufacturers, the products were developed for passenger cars and commercial vehicles by international teams, and manufactured in a worldwide manufacturing network.

All over the world, the company played a leading role in the field of energy supply, by developing products that met the highest standards demanded by customers. For this, they made full use of the comprehensive drivetrain know-how acquired at Bosch for customer-oriented, innovative products and services.

Robert Bosch Starter Motors and Generators (SG) was a fast growing division, with total net sales of more than 1.1 billion Euros and employed more than 7500 associates (data from 2016), with 15 manufacturing and multiple sales locations worldwide. Their highest footprint was in Europe, with more than 50% of their business and then more than 25% in Asia.

Two years ago, in June 2015, Bosch Group launched the news that it planned to seek a partner for a joint venture or a buyer for the Starter Motors and Generators division. The company stated they were convinced that this could improve the division's growth prospects in a market characterized by tough competition and cost pressure.

Securing long-term viability, Bosch expected that the new partner or buyer would give an additional boost and further expand the division's international presence. This might enable to tap into additional growth opportunities in those regions in which it didn't not yet have a broad presence.

Apart from the growth prospect for the division, one of the main reasons for Bosch to look for an alliance, was to allow the German company devote more attention to other strategic areas (e.g., Internet of Things, Industry 4.0)

The legal separation of the united was planned for the second part of 2016 and Bosch's Starter and Generators unit started to caught the eye of several private equity groups and competitors.

Bosch has invested a lot in making these happen. The carve-out was the most complex one in the company's history.

In May 2017, Zhengzhou Coal Mining Machinery Group (ZMJ), a Chinese industrial group that produces auto components and coal mining machinery, and CRCI, a Hong Kong private equity firm, announced that they had entered into a binding agreement to acquire Bosch's Starter Motors and Generators Division.

The combination of ZMJ's longstanding manufacturing experience and local know-how paired with CRCI's financial expertise would enable SG to significantly accelerate its technology development business expansion in North America and China, the world's largest automotive market as well as maintain SG's leading market position in Europe.

Bosch, ZMJ and CRI signed a corresponding purchase contract and silence was agreed on the amount of the purchase price.

The headquarter of the company remained in Stuttgart and the date of the acquisition and ownership change was 1st January 2018. As result of the acquisition, the company Robert Bosch Starter Motors and Generators (SG) was renamed as SEG Automotive.

1.1.1 SEG Automotive Portugal

SEG Automotive Portugal (SGPT), former Robert Bosch Starter Motors and Generators Serviços Portugal, is a shared service center. This entity provides services at a global scale to the rest of the SEG Automotive group, in areas such as Management Control, Finance and Accounting, Sales Commercial Coordination, Purchasing, Human Resources and Information Systems

At the time of the division's carve-out from the Bosch Group, this Shared Service Center emerged in the process of optimizing Bosch's strategic portfolio and to support the short-term planned sale of the unit.

Before the carve-out, there were many services that Robert Bosch Starter Motors and Generators (SG) received from a variety of Bosch employees in central departments, based in many different locations (like order and payments monitoring, invoicing and performance reporting). Now SGPT bundles all these services at a central location that is dedicated to SEG – which allows full process knowledge and increases both reaction speed and efficiency.

This entity in Vila do Conde started in September 2016 and within a year had already grown to more than 60 associates, servicing all the SEG different type of entities all around Europe, North America and Asia. People from 15 nationalities work at the offices in Vila do Conde and they can provide the operational service in 14 different languages.

As SGPT Core Business elements, they highlight the Process Transfer and Indirect Areas Services. For this purpose, all teams are expertise in change management, process documentation, process transfer and continuous improvement. SGPT is currently divided in 4 operational services departments – SCC, FIN, CFA and PUI – which efficiently provides these type of services to all SEG entities across the globe.

These operational services departments are:

- **Controlling (CFA):** Direct Support to SEG Management;
- **Finance (FIN):** AP/AR and Liquidity Report for SEG;
- **Sales Commercial and Coordination (SCC):** Assure Customer Demands and support SG Europe;
- **Indirect Purchasing (PUI):** Order Management for Europe;

In SGPT, there are two more departments, although these ones acted locally and their focus is to give support to the SGPT entity and take care of internal situations occurred there. These departments were Human Resources (HR) and Information Systems (ISY).

1.2 Project Motivation

Nowadays, it is well-known that the current business environment in which companies are inserted is strongly influenced by fierce competition, an incessant search for cost reduction and productivity improvement, all with focus on results.

This has lead companies to modify their organizational structures and processes, in order to remain competitive in the market and meet the needs of customers, which are increasingly more demanding and diversified.

In this context, it is fundamental for companies to be able to develop sustainable strategies. If well executed, these will create competitive advantages for the organization, generating added value and clients' satisfaction. The strategic plan should define a path to be followed by the organization, in order to optimize the results taking into account the environment faced by the organization. From small process improvements to the implementation of innovative people management methods, all these actions will help achieving the corporate goals.

However, there is no advantage in implementing these actions, without being sure if they are really contributing to the achievement of the corporate goals. Therefore, all these actions need to be followed regularly by performance and productivity indicators.

In this context, it is essential to use Key Performance Indicators (KPIs) to guide the whole process, ensuring operational efficiency and, indirectly, helping in the transmission of the organizational culture through the company.

Although SGPT clients are its own group entities, nevertheless it is important to provide an excellent customer experience. Mainly in the automobile sector, deliver dates are important to accomplish since customers served by SEG entities need parts to supply their production lines on a Just-in-Time (JIT) standard. Stopping a production line due to a delay or even a failure in a delivery can generate an impact of millions of euros concerning the car company and the own SEG.

In these terms, the aim of the SGPT, as previous defined, is to provide services associated to processes in the areas of customer management, controlling and accounting to SEG Automotive Group. Despite their focus on internal customers, the provision of an excellent customer support is primordial for the success of the company.

With the growth of the automobile sector and the respective increase of orders, the number of contacts for SGPT services in supplying SEG entities has continuously increased. It is necessary to use the available data to optimize the channels in the process of customer support and development of services in synergetic areas of business. This is essential to align the customer's needs with the resources available. Effective communication between SGPT and SEG entities is essential to enable instant decisions and diminish lead times for customers.

It is now vital to guarantee a full control of all SGPT departments actions though the definition of Key Performance Indicators, in order to be able to monitors all players involved in these Shared Service Center. Therefore, it is important to have an overview of the company's business model when defining Key Performance Indicators maps for each area, as well as generating reporting methods.

The goal of this project is to create an effective internal reporting framework to monitor performance. This framework should allow all process interveners to know their performance in a given time period, and generate proactive alerts when KPIs are at risk of not being achieved.

This problem was proposed by the General Manager and his Leadership Team, in order to have an overview of the key aspect of each department, track if the targets defined are being accomplished and take measures if needed.

1.3 Project Goals

When the project started, the Key Performance Indicators of each department were not reported to the General Manager. Therefore, the Management Team could not obtain an overview of the current situation of each department. Taking actions that are not based on objective information of KPIs is not advisable and might be risky. Although some departments had their own performance indicators, they were not sufficient for a correct performance assessment. More accurate ways of reporting, with new types of Key Performance Indicators were needed in order to align the company actions with the results of the performance evaluation.

One of the main goals of this dissertation is to identify and develop the most appropriate and effective metrics to assess the services of each department. Thus, it is vital to create new metrics, ensuring their relevance and alignment with the core business of the company, in order use them systematically to support decision-making. Additionally, it is necessary to provide feedback to all company members, taking advantage of the available data and maximizing the quality of the information provided.

To take advantage by the KPIs implementation, it is necessary to display them to the teams involved in an intuitive and effortless way. The presentation method should guarantee that the KPI results are explicit and effectively communicated to all stakeholders involved, and the core conclusions easily reached.

In this context, this project intends to create and develop a management tool, based on these Performance Indicators, to go through the needs of the SGPT Leadership Team, which is composed for the team leaders of each department, as well as the General Manager.

With the implementation of this tool, a tracking can be done through the definition of objectives and milestones, with a constant monitoring of the measures to support their implementation. Therefore, the expected result is that with the use of this instrument, it should be possible to monitor the whole process and to ensure that it is in compliance with the initial requirements. The goal is to control the performance and ensure that the targets are achieved, showing continuous improvement.

After this project, with the definition of the Key Performance Indicators as well as the construction of new reporting methods, all SGPT department leaders and the General Manager should be able to know more accurately their performance. This requires the creation of proactive alerts, based on dashboards that can inform managers and users.

With the establishment of these reporting methods, it should be possible to better understand where services processes fail and define policies for their continuous improvement.

1.4 Methodology

In order to reach the previously stated points, and therefore to meet the goals of this dissertation, it is necessary to follow a stable methodology. According to the requirements of the business model, it was defined the following methodology to incrementally solve the issues identified:

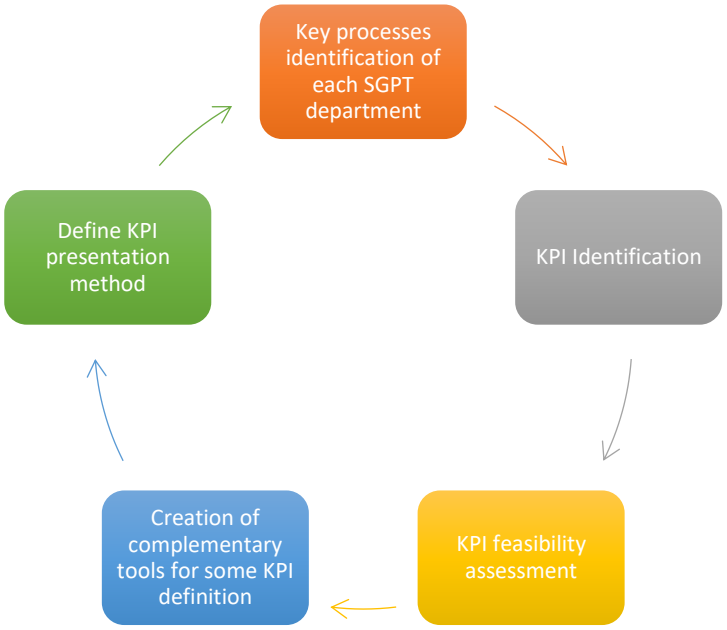


Figure 1 - Methodology

By following this methodology, there was a continuous opportunity to identify problems that were not being evaluated. It was vital to start by getting a close view of each department, in order to get inside of the processes that were part of them and create a base for the workflow. This required acquiring transversal knowledge on all areas of the company, on an operational, tactical and strategical level.

After understanding the processes, it was necessary to create new KPIs that complemented the problematic areas in each one of the department's processes. After that, it was fundamental to evaluate how KPI would be calculated, as if they were measurable, if there was a source of data (if not, how it could be created) and how much value would they bring to the business.

A continuous interaction with the players involved in each department was necessary in order to establish the most appropriate Key Performance Indicators according to the information actually available in the databases. When there were no databases and if the performance metrics were defined as value added to the company, these databases were created and implemented. The requirements and suggestions of each department were always taken into account through the project.

After the implementation, a follow-up process was made in order to understand possible improvements to the reports created. An intense dialogue with all future users was necessary to add and modify particular points of the reporting.

The final step had to do with the choice of presentation method that best fitted the new KPIs established for each area. The reports were designed to disseminate accurately managerial information. Through the implementation of these reports, it should be possible to quickly and effortlessly present the new Key Performance Indicators that allow assessing the needs of the players involved in SGPT, to provide a department's overview to the General Manager and his Leadership Team, and promote a culture of continuous improvement.

1.5 Report Structure

As stated before, the main objective of the thesis is to provide SGPT's General Manager and Leadership Team a complete "in depth" look to the company departments, with focus on

understanding the processes, analyzing all the data and providing solutions to improve reporting methods. So, the content of this dissertation is structured as follows:

Chapter 2 presents the state of the art of the main themes addressed – Performance Measurement Systems, Performance Measurement, Reporting Methods and Business Intelligence as Reporting Methods. They all play a major role alongside this dissertation project.

Chapter 3 shows an overview of all the SGPT departments analyzed and the former reporting methods that were practically nonexistent, which have motivated the execution of this project.

Chapter 4 presents the new solutions and strategies developed along this project, to solve the analyzed problems and the relevance of both. It will address the main issues found on the definition of the new Key Performance Indicators and the new types of reporting methods proposed, including their main functionalities and characteristics.

Chapter 5 concludes the dissertation and presents ideas for future work to the continuity of this project in the company.

2 State of the Art

2.1 Performance Measurement Systems

Nowadays, there is an increasing interest in performance measurement. With the premise that key objectives and goals are set by managers at every level, Ferreira and Otley (2009) state that sometimes they are not necessarily the ones that serve best the organization as a whole.

This is consistent with Abernethy and Chua (1996), who follow the view that objectives are set by the "dominant organizational coalition", in that it is managers who are entrusted the responsibility of setting organizational objectives, taking into consideration the expectations of the relevant stakeholders.

Measures are difficult to choose and imply some strategic orientation, that is why performance measurement systems have been created (Eccles 1995).

One of the big concerns that lead organizations to establish information systems is data overload, as most of them generate some redundant reports (Neely 1999). Another one is the incompleteness and inconsistencies in performance measurement and metrics, due to the large number of metrics established (Arzu Akyuz and Erman Erkan 2010).

According to Ferreira and Otley (2009), Performance Measurement Systems (PMSs) have been developed to encourage a more balanced view of organizations. This can be achieved through analysis, planning, measurement, control and rewarding, with the purpose of broadly managing performance.

A well-designed performance management system incorporates many processes, such as measure identification, target definition, planning, communication, monitoring, reporting and feedback (Cai et al. 2009).

In a more structured approach, some of the purposes of these management systems are: identifying success, identifying if customers' needs are met, better understanding of processes, enabling and tracking progress, providing factual decisions and identifying problems and improvement opportunities (Gunasekaran and Kobu 2007).

The development of these performance tools can be divided into three phases (Bourne et al. 2000):

1. Design of the performance measures and identification of key objectives;
2. Implementation of the performance measures (includes initial collection, collation, sorting/analyze and distribution);
3. Use of the performance measures to assess the implementation of the strategy and to challenge strategic assumptions;

For Bourne et al. (2000) implementation is the phase in which systems and procedures are put in place to collect and process data that enable the measurements to be made regularly. This may involve computer programming to trap data already being used in the system and present them in a more meaningful form. Some new procedures may be initiated so, the information currently not recorded, is captured and completely new initiatives may occur.

We next discuss some performance management frameworks. These ones were chosen to be presented because they played a major role in the development of the extended framework of the report:

2.1.1 The Performance Prism - The Scorecard for Measuring and Managing Business Success

Nowadays, the best way for organizations to prosper is to think about the needs of all the stakeholder and customers, as well as endeavor to deliver appropriate value to each one of them.

Companies must assume a broader role than simply delivering value to their shareholders. By trying to be successful over time, even for and on behalf of shareholders, businesses must address multiple stakeholders. If companies do not give each of their stakeholders the right level of focus, both their corporate reputation and their market capitalization are like to suffer.

The Performance Prism is a thinking aid, which seeks to integrate related perspectives and provide a structure that allows executives to think through the answers to five fundamental questions (Neely, Adams, and Kennerley 2002):

1. **Stakeholder Satisfaction**: Who are our stakeholders and what do they want and need?
2. **Stakeholder Contribution**: What do we want and need from our stakeholders?
3. **Strategies**: What strategies do we need to put in place to satisfy these sets of wants and needs?
4. **Processes**: What processes do we need to put in place to satisfy these sets of wants and needs?
5. **Capabilities**: What capabilities – bundles of people, practices, technology and infrastructure – do we need to put in place to allow us to operate our processes more effectively and efficiently?

Together, these five viewpoints provide a comprehensive and integrated framework for managing organizational performance and, by answering the related questions, organizations can build a structured business performance model.

2.1.2 Balanced Scorecard (BSC)

The Balanced Scorecard is a framework used by companies to check the way strategies and financial controls, previously defined, are influencing their performance. Strategic leaders are responsible for balancing strategic and financial controls and to assure that those controls support effectively the company's corporate-level strategy.

In line with Kaplan and Norton (1992), performance measures are linked across four perspectives: financial, customer, internal business process and innovation and learning. These topics are studied by answering the following questions:

1. How do we look to shareholder?
2. How do customers see us?
3. What must we excel at?
4. Can we continue improving and creating value?

In terms of building a balanced scorecard, we have to begin by evaluating the performance through these four perspectives, defining cause-effect relationships. For each perspective, define 3 or 4 strategic goals, and for each goal define the action plan to achieve it.

With these perspective aligned to corporate goals, KPIs can be organized into scorecards, directly achieving individual goals or fulfilling shared objectives (McNeeney 2005).

Concerning metrics linked with individual perspective goals, they need to be mapped from the lower-level operational measure to higher-level strategic measures.

The Balanced Scorecard should be implemented in a top-down approach, from functional area to each person, communicating and integrating the strategy across the company. It is essential to analyze the performance of the strategic map regularly and correct actions when needed.

These frameworks are therefore multi-dimensional, focusing more on non-financial information in attempt to redress the balance. They are designed to provide a balance by including measure of external success as well as internal performance, and measures which are designed to give an early indication of future business performance as well as a record of what has been achieved in the past.

Although these performance measures frameworks may have answered the question “What types of measures should a company use?”, they did not provide a specific advice to a company implementing a performance measurement system.

2.2 Performance Measurement

Business processes are the way an organization delivers value to its customers and stakeholders. On that basis, we get our answers about performance measurement, with a simple reflection: Are we delivering value to our customers in a way that impresses them, but at that same time, sustainable for us? In agreement with Ittner and Larcker (1999), the choice of performance measures is one of the most critical challenges facing organizations.

Managers are requested to provide measures, which can be about their company’s market share or profitability. In fact, management could hardly exist without measurement.

Measuring means transforming a complex reality into a sequence of limited symbols that can be communicated and reproduced under similar circumstances. But, what about performance? Performance, especially linked to measurement, is not so much about achievements, but about the future and the capability of the unit being evaluated (Lebas 1995).

Aligning these two topics, we can define, as a fundamental principal of management, performance measurement as the process of quantifying actions (Neely, Gregory, and Platts 1995) and its importance in identifying gaps between current and desired achievements (Weber and Thomas 2006).

Performance measurement is fundamental in forming diagnosis to control and measure actual results, and then formulate strategies and communicate them across the organization (Wouters 2009).

According to Lebas (1995), to measure the performance in their businesses, managers and performance evaluators must answer two main questions. The answers should be given regarding the different users and the different purposes:

1. **What do we measure?**
   Measures result from a choice and are carried out with some purpose in mind. The purpose of them is not enough to define what is to be measured. The very concept of performance must be operationalized before it can be measured.

2. **Why do we want to measure?**
   There are, at least, five additional questions that can help understanding why we want to measure:
   - Where have we been? (About the past, to understand how did we get to where we are at the moment);
   - Where are we now? (What is the status of the processes that define the organization and what is their potential for achievements in the future);
   - Where do we want to go? (We want the measures to provide support to the definition of objectives and targets, and support to the design of action plans);
   - How are we going to get there? (The measures must support the budgeting and planning activities, and support continuous improvement);
   - How will we know we got there? (Measures cannot be separated from the feedback loop about whether or not objectives or targets have been achieved.)

In a global company, the increase in the risk and uncertainty associated with the globalization, adds another level of complexity to the already challenging management of the performance measurement (Blome, Schoenherr, and Eckstein 2014).

Regardless of the type of measure, it is possible to assess the basic characteristics and requirements that the new performance measurement metrics should comprise. They should capture the essence of the organizational culture, being based on the company strategy and goals, and relate to strategic, tactical and operations level of decision-making (Gunasekaran, Patel, and McGaughey 2004).

Due to the increase of the organizational complexity, according to Gunasekaran and Kobu (2007) metrics should also vary between organizational locations, be simple, easy to use and actionable, adopting a proactive approach and enabling fast feedback and continuous improvement.

In addition, they should allow for reviewing, revising and refining, contributing for organizational learning (Wouters 2009).

Key Performance Indicators (KPIs) are established metrics that evaluate the performance of an organization, in terms of the achievement of the objectives that have been proposed. By measuring business health of the enterprise, they ensure that all individuals at all levels are "marching in step" to the same goals and strategies.

The selection of the wrong KPIs can result in counter-productive behavior and sub optimized results (Bauer 2004).

The building of the most appropriate set of KPIs should focus on the result, having in mind what the company wants as an outcome from the work processes. This might be difficult to accomplish since we do not work as a set of isolated departments, so a single group does not control all the key steps. It should be done in stages, assessing first the already defined measures, their adequacy, level of interest, effectiveness and alignment with business goals.

However, different departments collect different silos of information that produce metrics, originating different opinions of company performance and limiting a common understanding of new behaviors needed (McNeeney 2005).

According to Cai et al. (2009), regarding continuous improvement, it is essential to ensure that these metrics are evaluated and updated constantly, in order to guarantee that organizations are ready to respond faster to new opportunities or threats of the market.

It is a challenge to understand how to collect the data needed for the KPIs in a systematic and routine based manner. Automation of KPIs provides reliability, and diminishes the time elapsed collecting the data, offering more time for applying the metrics and therefore achieving the benefits from them: "Without a central location to collect, store and report KPI data, it can be extremely difficult to manage metrics unified around a strategy map." (McNeeney 2005)

The use of performance measurement allows the organization to assess the implementation of its strategy (Weber and Thomas 2006). By being designed and implemented carefully, the KPIs allow to precisely know where to take action to improve performance.

In 1995, Peter Drucker proposed an acronym (SMART) to guide goal setting. According to him, to reach the objectives proposed, it is important to set specific rules in designing goals.

Setting SMART goals means clarifying ideas, focusing the efforts, using time and resources productively, increasing changes of achieving what was previously defined.

It is important to make sure that the performance measures follow these rules and the targets really work for what is really wanted. To make sure the performance measures are clear and reachable, each one should be:

1. **Specific** – simple, sensible, significant. They should be clear and unambiguous;
2. **Measurable** – meaningful and motivating. It's important to guarantee that they can track progress and put a number on success;
3. **Achievable** – agreed and attainable. They should stretch but they should never be out of reach;
4. **Realistic** – reasonable, relevant, resourced and results-based. To measure them, there must exist resources and skills to get them done;
5. **Time bound** – time-based, time limited, timely and time-sensitive. There should be a deadline to get them done;

SMART is a well-established tool that can be used to plan and achieve goals. When it is used, it is possible to create clear, attainable and meaningful goals by developing motivation and action plans, to support the needs to achieve them.

Selecting the right measures is vital for effectiveness. Even more important, the metrics must be built into a performance measurement system that allows individuals and groups to understand how their behaviors and activities are fulfilling the overall corporate goals (Neely 1999).

2.3 Reporting Methods

Regarding the effectiveness of a company, KPIs are not only represented by the way they are defined, but also how they are presented through it, in particular to the teams and stakeholders involved. According to Yin, Lijun and Wei (2009), the reporting method chosen is essential to provide an easier interpretation of the data and quickness of action to the ones involved in the processes. Real-time data allows real-time action plans.

The reporting framework must accommodate the requirements of different levels in the organization and the frequency it is presented (Parmenter 2015). Regarding the audience and the regularity of the information needed, several methods can be adopted (Cox, Issa, and Ahrens 2003).

2.3.1 Tables

The main performance measures are reported monthly, weekly or even daily. The most appropriate way to report these metrics is using a previous established table (Parmenter 2015). However, using these table reports when dealing with individual measures, may fail to identify trends, detect unusual events or provide a prediction statement.

2.3.2 Charts

An alternative to table reports are charts presentations. It is similar to summarize the data in a table, but they have the advantage of leading to theories about the past, like comparisons on month-on-month or year-on-year performance (Lam and Bengo 2003).

This type of chart in not intuitive as it is difficult to read, being propitious to wrong interpretations and inconsistent conclusions. “Report charts need to lead to activities that are beneficial to the organization. Traditional tabular and chart reporting leads to stories about the past without any formal system that describes what might be expected in the future.” (Breyfogle 2008)

2.3.3 Dashboards

The excessive amount of data available leading to decision-making has become a big issue for corporate managers. That is why has emerged the need of an information technology that makes possible to organize all data collected.

For Pawels et al. (2009), the challenge is to consolidate all data together and in a proper way to achieve an information-based strategy

In a simple way, dashboards are another reporting method used by companies to communicate and visualize KPIs. They are a tool used to respond to senior management needs. “A dashboard is a visual and interactive performance management tool that displays on a single screen the most important information needed to achieve one or several individual or organizational goals, allowing user to identify, explore and communicate problem areas that need corrective action.” (Yigitbasioglu and Velcu 2012)

According to LaPointe (2005), this type of reporting methods fills some gaps, such as:

1. Poor organization of the pieces of potentially decision-relevant data;
2. Managerial biases in information processing and decision-making;
3. Increasing demands for marketing accountability;
4. Needs for cross-departmental integration in performance reporting practices and for resource allocation;

Dashboards offer a solution for the information overload by the overwhelming reports created by the companies’ multiple systems, such as ERP and BI software. A dashboard is expected to collect, summarize and present information from multiple sources so that user can have a quick view how KPIs are performing (Yigitbasioglu and Velcu 2012).

The integration of multiple sources in one of the most important characteristic of dashboards in three ways (Pauwels et al. 2009):

1. **Data**: integrates diverse sources of different time periods data at different levels of aggregation;
2. **Processes**: helps management relating inputs to management performance indicators and even to financial controls;
3. **Viewpoints**: allows different executives, from different locations or departments, to share the same equally measured input, so that the entire company see its market situation according to the same principles;

After a quick review, managers should be able to assess the performance of the organization and make decisions related to that performance (DeBusk, Brown, and Killough 2003).

By enforcing consistency measurement procedures across departments and business units, the standardization of metrics across them is facilitated, fulfilling their needs presented above (Verbert et al. 2014).

Furthermore, dashboards facilitate the communication to important stakeholders, not only about what the performance is, but also what are the organization values by the choice of metrics to be presented on dashboards (Pauwels et al. 2009).

Dashboards have become one of the most important Decision Support Systems. In order to achieve its full potential, some guidelines should be considered by designers when building them, in terms of contents, features and visualization.

Due to the evolution from a monitoring performance to a more advanced analytical one, new features have been incorporated, such as (Pauwels et al. 2009; Ying, Lijun, and Wei 2009; Yigitbasioglu and Velcu 2012):

1. **Real time notifications and alerts:** necessary so that corrective and proactive actions can be triggered as soon as the measures deviate from predefined targets;
2. **Scenario analysis:** key feature when the purpose of the dashboard is to serve as a planning tool;
3. **Drill down features:** allow users to slice and dice data for more detailed analysis without switching to a different reporting tool;
4. **Presentation flexibility:** ability to view data in different ways;

Regarding content, dashboards should only report a few critical metrics. By reducing dashboard complexity, decisions can be made quickly. Excessive information can lead to decision inaccuracy and even disregard information.

There is as inverted-U relationship between the accuracy of decision making and the quantity of information supplied, indicating that only at an optimal point the information supplied translates into accurate decisions (Velcu-Laitinen and Yigitbasioglu 2012).

Visual features are key aspects when designing a dashboard. They refer to the visualization of data and how efficiently and effectively it is presented to managers, helping those making decisions. Dashboards also help to identify trends, patterns and anomalies, which makes the visual issue very important (Velcu-Laitinen and Yigitbasioglu 2012).

The use of colors, positions, shapes, texts and symbols to improve the process of visualization should be used carefully, since its excessive use can distract the user and therefore have an adverse effect on decision-making. A good balance between visual complexity and information utility is required.

A visual feature can achieve one of the functional features referred above, the "real time notifications and alerts". This alert can be generated by a change in the color of the KPI, capturing special attention to it.

Another important aspect when designing a dashboard is related to its size. Even though the drill down feature is mandatory to a successful dashboard, it is commonly recommended that the data presented on a dashboard can fit and be arranged on a single screen (Few 2006).

For Velcu-Laitinen and Yigitbasioglu (2012), in order to achieve the drill down capability, dashboards should allow a point and click interactivity that allow users to consult more information. Alongside, it should also be possible to "zoom out" from individual departments dashboards and get a complete view on the corporate dashboard.

In conclusion, dashboards should be clean, simple, concise and, most important, intuitive to use. Aligning all these characteristics will allow better decisions, providing managers to focus on the most relevant and urgent data, turning dashboards into a fitted solution to enhance decision making and ultimately company performance.

2.4 Business Intelligence as Reporting Method

Most companies collect huge amounts of data from its business operations. Keeping track of that information requires a wide range of software programs and different database applications for various departments (e.g. sales, finance, customer support) throughout the organization to access and use the data.

Using multiple software programs makes it difficult to retrieve information in a timely manner and to perform analysis of the data. A business intelligence solution replaces the multiple tools traditionally used to collect and analyze the data.

Business intelligence software is designed to analyze all the business data, through automated processes, to provide a better understand of an organization's strengths and weakness. It is the organization's business software that allows management to better see the relationship between different data for better decision-making and deployment of resources. Business Intelligence software plays a key role in the strategic planning process of the corporation.

The type of tools that make up a business intelligence software application solution generally include tools for spreadsheets, operational dashboards, data mining, reporting, search (query), analytics processing (OLAP), content viewer, and other components of enterprise resource planning (ERP) systems.

There are a lot of business intelligence software and in a previous analysis, the aspects that where more concerning where the financial ones and the visualization, which is the main goal to use for this project:

2.4.1 Power Bi

Microsoft Power Bi is a suite of business analytics tools designed and created to help businesses systematically scrutinize data and share insights.

Microsoft Power Bi converts company's data into very attractive and comprehensible visuals, making it easy companies gather information, organize and devise business strategies. The system is created to stay in the know, to identify trends as they occur, and to steer business towards success. The platform also helps users track their business and derive answers fast via robust and comprehensive dashboards that are available on every device.

Microsoft Power Bi offers two enterprise pricing plans to choose from, one of which can be acquired for free (1 GB data capacity limit) and a pro version with more features for $9,99/user/month.

2.4.2 Tableau

Tableau is a business intelligence system that helps companies visualize and understand their data.

Giving a revolutionary new approach when it comes to business intelligence, the solution allows business to quickly connect, visualize, as well as share data with an efficient seamless experience all the way. It is possible to create and publish dashboards, then sharing them with partners, colleagues, or customers – but without the need for programming skills. If already it is used a Tableau Service (Tableau Online or Tableau Server), there will be no obstacles to let data flow seamlessly from one platform to the other.

Tableau Desktop is a self-service analytics solution that allows to look at data and answer questions rapidly. Tableau Server enables to publish dashboards from Tableau Desktop on any web browser or mobile-based device.

Tableau offers flexible SMB and enterprise pricing both on premise and on cloud-hosted editions paid on annual basis. For Tableau Desktop we have a Personal Edition by $35/user/month and a Professional Edition by $70/user/month. Tableau Server can be on premise or public cloud with a $35/user/month annually fee. For Tableau Online, a fully hosted serve, it is priced as $42/user/month.

In the research done comparing PowerBi and Tableau, it was concluded that Tableau has a steep learning curve for executives. The product is expensive for smaller businesses looking for analytics and visualization tools. In terms of Power Bi, it is said that it does not have the ability to publish reports with all associated data. This means some information can be left out of visualizations. Because Power Bi is still in development, some customers have said necessary features critical to BI initiatives are insufficient and the sharing function is subpar.

No product is perfect. Both Power Bi and Tableau have differing strengths and weakness that are common when comparing BI solutions.

This dissertation project is going to evaluate if the Key Performance Indicators have the complexity that justifies the investment to have access to one of these Business Intelligence softwares. In an initial stage, Excel Spreadsheets with tables and charts will be used, in an attempt to provide a good visualization of the data.

3 Initial Company Situation

With the increase in the number of services provided by SGPT, the complexity of the company's support services has continuously grown. Adding to this, the rapid growth of SEG and the respective increase of orders naturally represents more contacts with the Shared Service Center in Portugal – SGPT.

Due to the company nature, it is fundamental to keep the service quality at an excellent level. More efficient and adequate methods for measuring and controlling the company internal situation and service level become imperative. It is necessary to optimize the channels in order to align the requirements with the available resources.

3.1 SGPT Departments Organization

The company started in September 2016 with 2 employees. Two years later, in December 2017, it has more than 80 employees organized in 6 departments. The departments are Controlling (CFA), Finance (FIN), Sales Commercial and Coordination (SCC), Indirect Purchasing (PUI), Information Systems (ISY), Human Resources (HR), all supervised by the General Manager (GM).

Each department has a leader, although the Sales Commercial and Coordination Department has three leaders, each of them responsible for a specific group of customers, to allow a more customized and efficient answer. The organizational chart of the company is shown in figure 2:

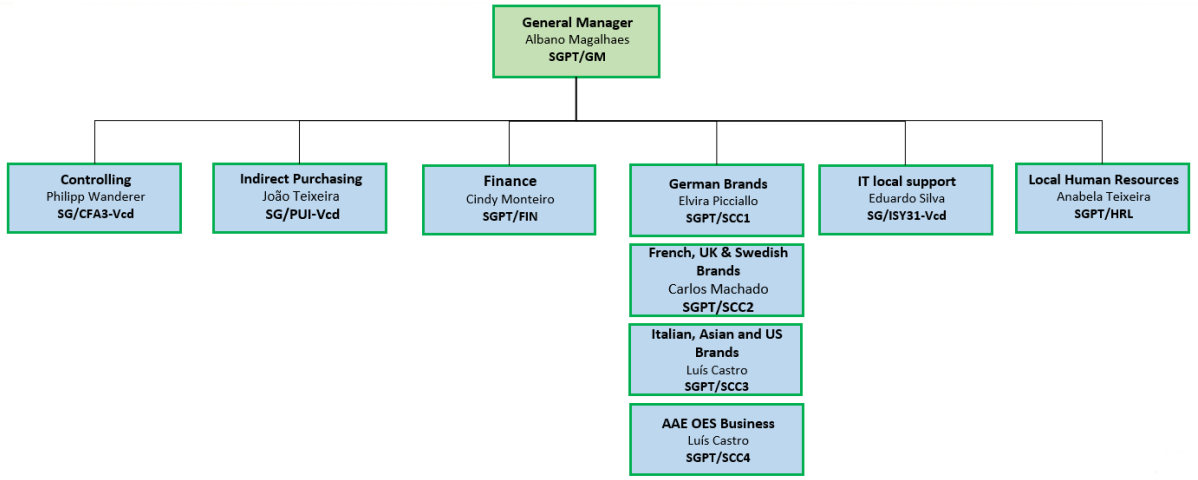


Figure 2 - SGPT Organizational Chart

3.1.1 Information Systems (ISY)

The SGPT Information Systems department (ISY) plans, operates and supports the organization's information systems infrastructure, enabling business users to carry out their roles efficiently, productively and securely. The ISY professionals perform a number of duties to ensure that employees have full access to the computer systems. The department meets multiple business and technical requirements, providing a secure technological infrastructure.

To enable employees to make the most effective use of ISY resources, the department provides various forms of users support. After installing new software or network facilities, the department provides training so that employees can quickly make productive use of the new

resources. The ISY department also provides ongoing support to users by telephone, skype or onsite help at the users' workplace to fix the problems.

As stated before, the ISY department focus on solving user's problems, such as network and hardware issues. If the problem has a larger scale and cannot be solved in the company, it is passed to the Ticketing System. In this system, a ticket is opened in the user's name with the description of the problem and it is assigned a priority, so that it can be solved by the central ISY support services, located in Germany.

3.1.2 Human Resources (HR)

The Human Resources department handles the matters pertaining to the employees of the company, such as recruitment process, compensation and employee's relations. The department also works with the management board to help developing long-term strategies for the growth of the company. It also acts like a middleman between employees and management and is where employees go for basic company information.

The recruitment process is one of the major roles that the HR department plays in the company. They advertise job postings, screen applicants, conduct preliminary interviews and coordinate hiring efforts with department leaders for making the final selection of candidates. The stages of the recruitment process in SGPT are presented in figure 3:

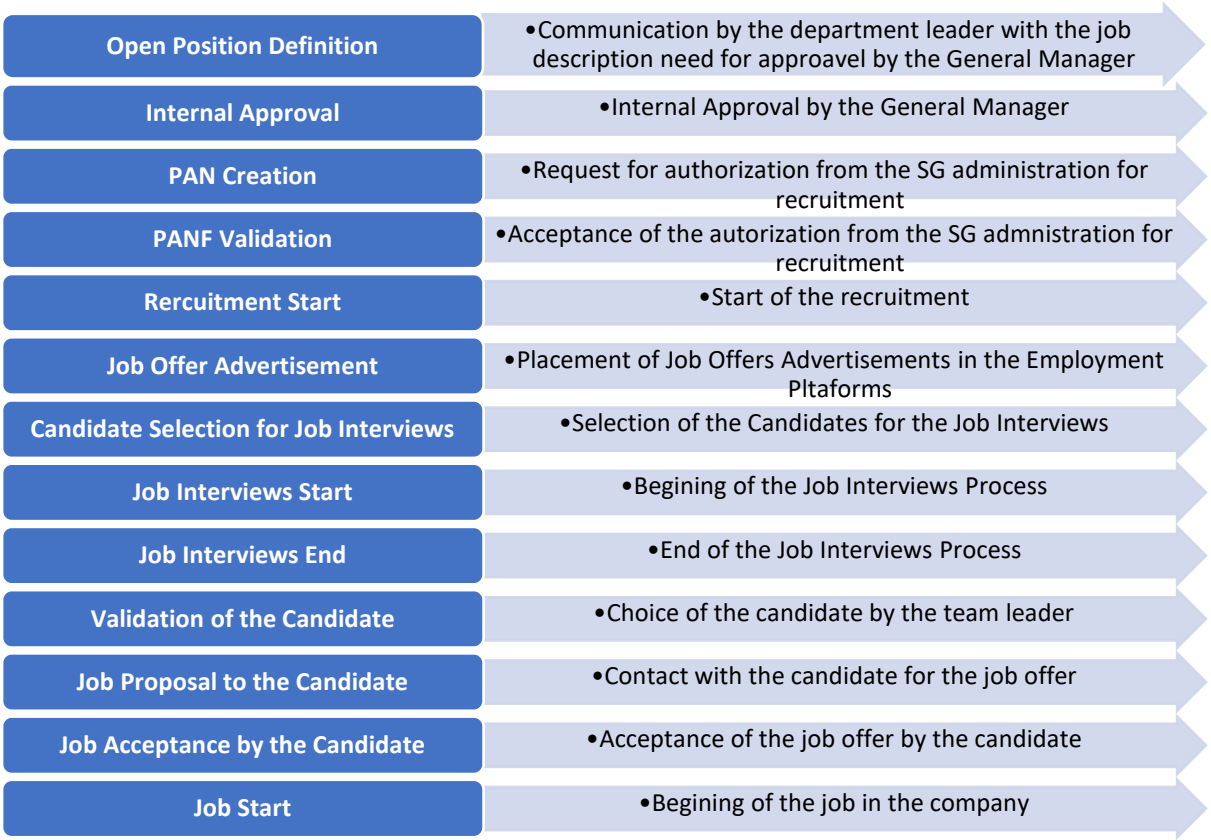


Figure 3 - Stages of the SGPT Recruitment Process

Although payroll can be a component of the compensation and benefits section of HR, the company outsources this function. However, the department takes on some payroll duties, such as tracking vacations, maintaining a holiday schedule and creating policies on flexible work hours.

In addition to the initial integration training in company policies, the HR department coordinates training and mentoring programs to further develop employee skills. The department plays a role in employee performance reviews, handles employee complaints and helps resolve disputes.

3.1.3 Indirect Purchasing (PUI)

The Indirect Purchasing department (PUI) deals with the source of all goods and services for the business, in order to enable its activity. Those goods and services are related with the Operating Resource Management (ORM), used commonly to describe many ordinary office products and services that organizations purchase day-to-day, such as office products and travel services. This service can also deal with Maintenance, Repair and Operating (MRO), which are supplies consumed in the production process but which do not either become part of the end product or are not central to the firm's outputs.

The Indirect Purchasing categories include: information technology (hardware, software), utilities (telecommunications, cleaning, catering, cable), travel management, office products, employee benefits (health insurances), HR related services (recruitment agencies) and professional services (consultants, advisers). They deal with everything that is not raw materials to incorporate the production of starters motors and generators.

The indirect purchasing is unambiguously different from the direct purchasing, which involves materials purchased for use in the manufacturing or distribution supply chain that are directly related to the production or finished goods. The indirect purchasing has smaller average supplier spends, more suppliers and a more complex stakeholder environment than directs. It requires a different balance of disciplined processes and technology, engagement with stakeholders and diverse expertise across a range of suppliers.

In SGPT, the Indirect Purchasing Ordering Center focus in providing this type of services for the SEG entities located in Mexico, Germany, Hungary, having teams with focus on each one of this SEG entities served. This indirect purchasing Ordering Center has a limit value of 12 500 € per order.

However, at internal purchases level, for the shared service center (SGPT), the department manages the entire purchasing process even above the limit of 12 500€. Though, since there is still no management system for internal registration of the purchase requisitions received, they arrive into the department through e-mails to start the purchase process, turning more difficult the follow-up process as it is done for the other entities served.

3.1.4 Sales Commercial and Coordination (SCC)

The Sales and Commercial Coordination department (SCC) is responsible for the Order-to-Cash (O2C) process. It is the department that makes the interface between SEG production and the customers (from car manufacturers to engine manufacturers and tiers) located in Europe.

The SCC Department is divided between Order Management (OM) and Accounts Receivable (AR) tasks.

The Order Management staff works closely together with each customer, SEG customer teams, production plants, regional distribution centers and SEG central departments. Their function is to coordinate orders and deliveries between plants and final customers. However, if a problem arises, it is necessary to act quickly in order to solve the issue. So, every day, the order management staff has to check which orders are not being processed correctly (from customers

ERP to SEG's), identify the errors that motivated the problems and implement procedures to correct the errors. In summary, their tasks are:

- Monitoring of operational logistics;
- Stock balance and deliveries coordination;
- Support the sales team on the set up/update of customer logistic flows, on the ramp up of new part numbers and packaging coordination;

The Accounts Receivable tasks ensure that the customers make their payments in full and on time (at due date), monitoring through reports the accuracy of customers' accounts and investigates, when required, problems related to missing deliveries, quality issues, price differences and others. Their tasks are:

- Price Maintenance (for serial parts);
- Customers payments and overdues controlling;
- Management and processing of customers claims;
- Creation of accounting documents, manual invoices, credit and debit notes;

Both operational areas of the SCC department work in a holistic way to ensure that the external customers receive the requested component under the agreed conditions, contributing sustainably to provide a service of excellence. The purpose of the department is to communicate closely with the customer, to establish a relationship of trust, keeping the customer satisfied.

The SCC Department is divided into teams by customers:

- **SCC1:** responsible for German brands;
- **SCC2:** responsible for French, UK and Swedish Brands;
- **SCC3:** responsible for Italian, Asian and US Brands;
- **SCC4:** responsible for the After-Market Business;

There are three European Sales Organizations (Germany, France and Italy) and three team leaders responsible for each one of the work with the Sales Organization mentioned. The team leader from German customers has a team that only deals with Germany (SCC1), having clients such as Daimler Group and VW Group. It is responsible for the German Sales organization (SEGDE). The team leader from France, UK and Swedish customers has a team who deals with customers such as PSA, Renault and Nissan Group and Volvo Cars. It is responsible for the France Sales Organization (SEGFR). The team leader from Italian, Asian and US Brands has a team who deals with customers such as FCA, Toyota, Suzuki and Ford. It is responsible for the Italian Sales Organization (SEGIT). The SCC4, although the team leader responsible is the same from SEGIT, it deals with quality ensure and complaints after the parts produced by SEG have incorporated the cars and are already on the market, no matter the clients' nationality.

3.1.5 Controlling (CFA)

The role of the Controlling department (CFA) is to plan and track the sales and cost evolution, as well as the headcount development and other financial KPI's for several SEG entities. The target is to report the company's performance to the headquarters in Germany. Thus, this department has a major role in the annual planning, taking part in the development of estimations for the total sales and costs for the next year (Business Plan). Throughout the year the Business Plan is revised in the Current Forecast processes (usually 3 times a year) where

several updates to the Business Plan are made, according to the most accurate information available.

On a monthly basis, the department checks the cost center balances, followed by their evaluation and results analysis. The goal is to analyze the performance versus the initial plan and the latest current forecast. Usually this monthly reporting process is followed by an estimation of opportunities and risks implicit in the figures. The department is also involved in the consolidation process, balancing the internal relationships between the plants and the headquarter.

In terms of profit evaluation, this department has the responsibility to assess whether the production plants are achieving the established profit margin. One of the critical areas that this department controls, which represents a big portion of the annual budget, is the R&D area (products in constant development). So, the CFA department is also committed to control these costs and report them to the headquarter in Germany.

In terms of internal control, the CFA department is also responsible for the planning and monthly reporting of the shared services activities in Portugal (sales, staff costs, external services and supplies, headcount, etc.). This entity (SGPT) provides shared services (controlling, finance, purchasing, etc.) to other SEG entities. The SGPT costs are then charged to the SEG entities (SGPT customers) which receive the services provided (e.g. someone from SCC who work in the France team, for one France customer, is charged to the SEG France entity), based on the allocated capacities to each entity and a defined transfer pricing model. The remaining costs (overhead costs) are charged to the headquarter in Germany.

3.1.6 Finance (FIN)

The Finance Department (FIN) is responsible for executing and coordinating all processes and activities in the financial and accounting areas, both for the SGPT itself and for the other SEG entities to which it provides financial and accounting services: France (SEGFR), Italy (SEGIT), Germany (SEGDE) and Spain (RBET).

In terms of accounting, the two main areas are:

- **Accounts Receivable (AR):** processing incoming invoices from SEG's customers;
- **Accounts Payable (AP):** making payments and keeping the bills paid to the SEG's vendors;

However, as AR is one of the Sales Commercial and Coordination (SCC) Department functions, in this topic the two departments work close, as the Finance Department only receives the customer's payments and informs the SCC responsible for the client.

Regarding the Accounts Payable, it is this department's responsibility to maintain great relationships with vendors, making sure they are paid on time and the correct amount, to ensure that the orders are delivered.

The department assists in the planning and control of treasury management through the management of fixed assets and of the bank account, with reconciliations at the end of the month, between the bank and the accounting balances.

About Tax and Compliance, as running a business involves paying tax, and paying tax means doing a lot of calculation and filling many forms, it is important to make sure all governments' forms and fillings are sent complete and on time. Thus, another departments' function is to ensure the compliance of the tax obligations of the Portuguese entity SGPT (e.g. IVA and IRS),

as well as to assist in the submission of these by the SEG entities to which it provides services. Therefore, it is necessary to ensure the compliance with the reporting dates.

3.2 Former Reporting Methods

Before this project, there were only a few internal metrics of performance in some departments collected on a regular basis. However, the level of detail and automatization in the preparation of the performance indicators did not match the requirements of the organization managers.

For the management meetings, attended by the General Manager and the department leaders, the results from each department were extracted by them from their own systems. Then, team numbers were compared to the global numbers in order to have an idea of the relative importance of each team in term of the results achieved. This analysis was presented on a board and discussed.

These meetings were the only moment that the General Manager and department leaders used to explore the performance of company departments. However, some metrics were not quantified and did not have the level of detail required for a robust analysis.

There was the need for a tool that allowed gathering of information in a single framework and the visualization of data at different levels of detail. The objective of this dissertation was the definition of monthly performance indicators, proposing new measures for some departments, and subsequently collect the information necessary for their calculation. After that, it would be important to organize new forms of visualization that facilitate the monthly analysis undertaken in the management meetings. The development of a new tool, named KPI Tracking-Tool, will also allow to take actions based on alerts that are triggered when results fall below the expectations. This tool should contribute to increase productivity and reduce reaction time to deviations between actual achievements and expected goals.

Figure 4 illustrates the relationship between this project and the reporting methods initially available at the company. The blue rectangles in the lower part of the flowchart correspond to the reporting methods that are currently used on a daily basis for internal monitoring within each department. These methods do not involve sophisticated treatment of data and cannot provide detailed information to monitor performance. The KPI Tracking-Tool developed in this project intends to provide KPI Maps and Dashboards that will allow obtaining a global vision of the operational activity of each department. This framework was designed for a monthly analysis of the key processes of the company's departments.

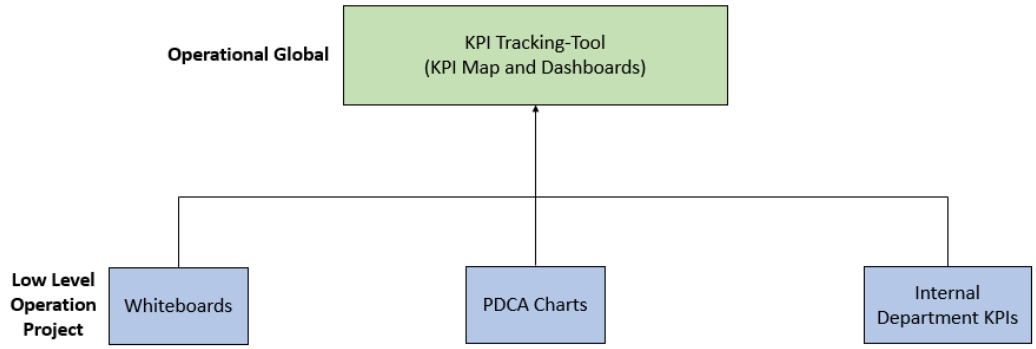


Figure 4 - Relationship between the new reporting tool and the performance measures originally available

3.2.1 Whiteboards

Whiteboards are used in teams' daily meetings in every department. Each team has its own Whiteboard template. The main objective is to find out about the status of team tasks and identify potential problems with their fulfillment. This is an opportunity that team members and their leaders can use to become aware of the progress of the work in the department and share efforts to successfully achieve the objectives.

In this meeting, each team member makes an estimation of the time that will be spent on each task that he/she should work during that day, and makes a point of the situation with everyone. If someone is overloaded, this should be mentioned in this meeting in order to obtain the support from a colleague. In this meeting, the list of team's open tasks (OPL – open point list) is also reviewed. These are the tasks that have not yet been carried out. The reasons for the delay in their execution should be explained, and subsequently the tasks are classified according to their impact.

According to the General Manager and Team Leaders vision, the Whiteboards are tools intended to provide a greater involvement of the team leaders in the teams daily tasks. They also allow enhancing the teams work capacities, the exchange of different opinions (problems and solutions) among team members, and a more regular tracking of the OPL's. This helps to promote synergies among team members.

Although this advantages are understood by the employees, in some departments this reporting method is considered, in some occasions, to be too demanding in terms of time required to prepare the Whiteboard template. On the other hand, these meetings, which are expected to last 10-15 minutes, sometimes tend to take longer due to some trouble-shooting and discussion.

Figure 5 represents an example of a Whiteboard used by the SCC department during the week of 27/11 to 01/12.

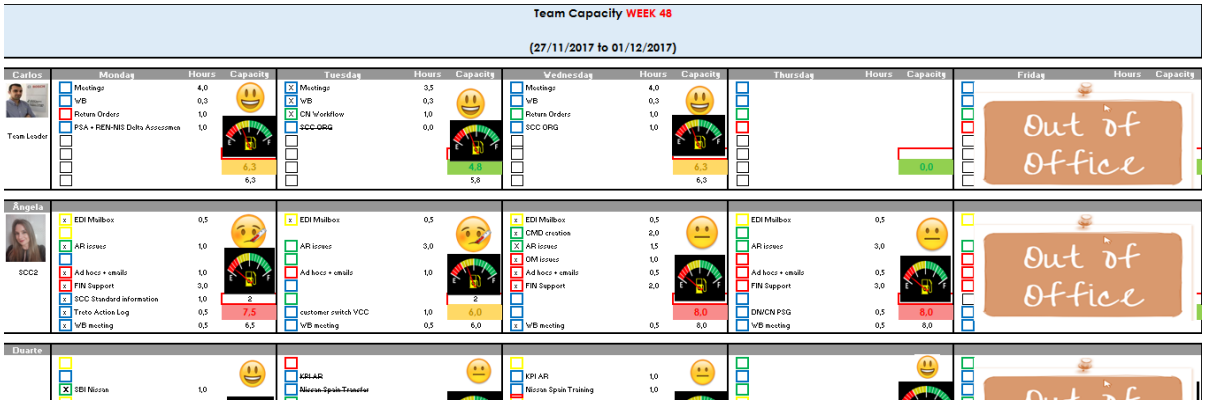


Figure 5 - Example of a Whiteboard

3.2.2 PDCA Charts

Plan, Do, Check, Act Charts (PDCA Charts) are used to compare the actual results versus the targets previously established and define measures for their achievement.

In the company, these type of reporting method is used by the Finance Department to view in a more comprehensive way the key aspects of the department's activity. It is currently focused on the analysis of the weekly incoming invoices. These charts are prepared every week, and require a manually collection of data to prepare the PDCA chart, allowing a comparative analysis of the results obtained versus the targets.

One of the major drawbacks associated with this type of charts is that they do not have an automatic update of the monthly information. Each month, the data are collected from the information systems, analyzed and only after this treatment the summary information is placed in the chart. Thus, whenever a graphical analysis of the evolution of a process over time is required, the global values of each month have to be filled manually in the chart to allow drawing conclusions based on comparisons of progress over time.

In theory, the PDCA Cycle is an iterative four-step management method used in business for control and continuous improvement. The planning phase involves assessing a current process and figuring out how it can be improved. The do phase allows the plan from the previous step to be enacted. The data is gathered to see how effective the change is. During the check phase, the data and results from the do phase are evaluated. Data is compared to the expected outcomes to see any similarities and differences. In the act phase, adjustments are made and corrective actions are taken if the check phase showed something different than expected.

Although this chart approach has all the features of the Plan, Do, Check, Act cycle, in the Finance Department it is only used in a perspective of filling the values and the targets to perform a timely graphically analysis, not taking advantage of the measures definition and tracking main advantages of this continuous improvement tool of the PDCA Cycle.

Figure 6 illustrates a PDCA Chart used in the Finance Department for the weekly incoming invoices. In the chart, in the horizontal axis there are the weeks (CW) and in each column we have the number of invoices which are in backlog (waiting to enter in the processing phase), the number of invoices that are in process (to be posted) and the ones that have already been posted. The label number above each one of the columns represents the total number of incoming invoices of the week, which is the sum of the ones that are in Backlog, in Process and Posted. The line represents the internally defined targets for the number of invoices that remain in process and in backlog in the end of the week. The targets are internally defined depending of the volume of incoming invoices. As stated before, as can be checked in the figure 6, the department in not taking advantage as all the features of the PDCA chart once there are no measures and responsible definitions, neither tracking of the efficiency of the measures after the chart analysis.

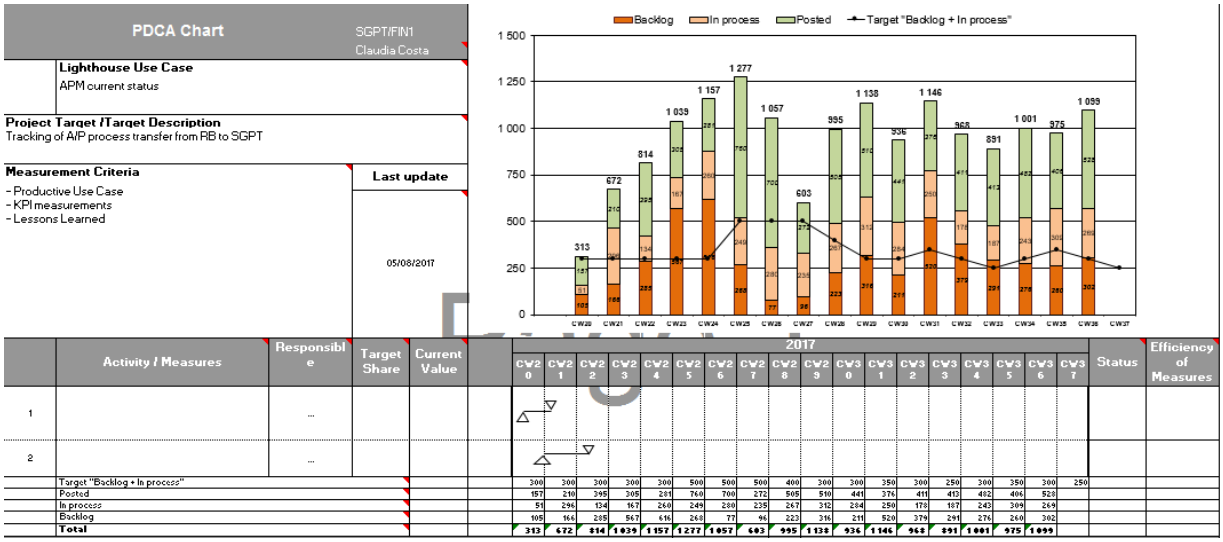


Figure 6 - PDCA Chart used for Weekly Incoming Invoices Analysis in the Finance Department

3.2.3 Internal Departments KPIs

When the performance indicators originally available at each department of the company were studied, it was found that the Human Resources Department (HR), the Information Systems (ISY) and the Controlling (CFA) did not have any internal performance indicators.

The SCC department only had one performance indicator. This performance indicator was related to the ratio between the amount of the customers' overdue payments and the total debt volume. This indicator was used by all department teams. It involved a simple analysis, since the total values were not detailed by type, such as invoice or credit note, neither by the arrears after net due date, or by client. The data was only extracted from the system and inserted into a table to create a chart. This control was done on a weekly basis and each team presented this performance indicator in a chart with a table of the top 10 clients which have the most impact on the overdue values.

Regarding the Finance Department (FIN), the only performance indicator used was the monitoring of the current state of incoming invoices, in order to do the quantification in terms of how many have already been posted, how many are in process to be posted and how many are waiting to enter in the posting process (the ones which are in Backlog).

The Indirect Purchasing Department (PUI) is the only one in the company that performs a daily and weekly monitoring of the internal performance indicators. Due to the importance of this department in the negotiations with suppliers and in the source of all goods and services for the business, in order to enable its activity, the team leader periodically monitors the following performance indicators:

1. Service Level;
2. Discount Calls;
3. Productivity;

One of the focus of the project was also the report of the company's operational results to the General Manager, such as Sales, Costs and Margins (EBIT). Before the implementation of this dissertation project, these results were reported monthly to the General Manager in accounting balance sheets, with the actual values and their position in relation to the forecasts for the various departments of the company. However, the presentation was based only on a set of values presented in tables, not easily understandable by non-financial specialists and not allowing a graphically comparison between previous periods.

3.3 Conclusion

After analyzing all the available metrics, it was concluded that these were not enough to address the current needs. They did not allow a correct evaluation of the company performance as the General Manager and the departments leaders did not have access to an effective visual tool that could reflect the performance of the company accurately. Moreover, data refinements, such as results for each department, were not available. It was not possible to assess department's performance systematically, and the KPI's measured were not comprehensive enough for the type of analysis required for the monthly meetings.

After the analysis of the KPI used by some departments, it was hard to understand what actually was considered critical in the performance assessment. Therefore, there was the clear need to improve the performance evaluation, both in terms of the specification of the KPIs and their presentation. After that, it should be possible to improve the performance of the company at all levels, particularly in terms of Operational Efficiency, Service Level and Customer Satisfaction.

4 Implemented Solution

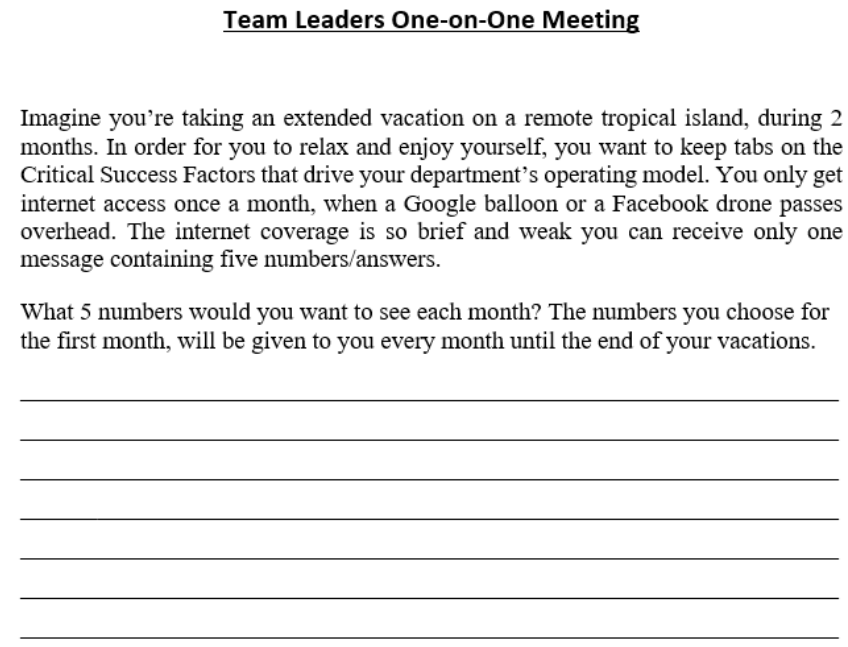
4.1 KPI Tracking-Tool

The scope of this new project is to create Key Performance Indicators (KPI's) maps. It started with a detailed analysis of the processes and needs of each company's departments in terms of performance monitoring and control. Every month, the KPI Tracking Tool to be developed, should provide the General Manager and its Leadership Team a framework that allows checking if the values obtained for the indicators are aligned with the targets defined. In order to smooth these values interpretation and to provide a monthly comparison, it was designed for each department a Dashboard with charts that allow the visualization of the performance indicators selected.

4.2 KPI Construction

In order to have a comprehensive view of all the company's departments and understand their processes, meetings with the department leaders were scheduled during the first two weeks of the project in the company.

In a first stage of these meetings, the functions of the department, as well as its main processes, were presented by the department leaders. After that, it was presented to them the scope of the project that was starting, as well as the characteristics of a good performance indicator. This helped the identification of the most important KPIs to be used in the assessment of operational performance. To make the selection of the Key Performance Indicators more intuitive, it was given to the department leaders the challenge illustrated in Figure 7:



Team Leaders One-on-One Meeting

Imagine you're taking an extended vacation on a remote tropical island, during 2 months. In order for you to relax and enjoy yourself, you want to keep tabs on the Critical Success Factors that drive your department's operating model. You only get internet access once a month, when a Google balloon or a Facebook drone passes overhead. The internet coverage is so brief and weak you can receive only one message containing five numbers/answers.

What 5 numbers would you want to see each month? The numbers you choose for the first month, will be given to you every month until the end of your vacations.

Figure 7 - Challenge used with Department Leaders for helping KPI Identification

After identifying which Performance Indicators were most important for each department leader, it was essential to focus on that indicator's measurability and quantification, i.e., the data source and the calculation method. When there was no data available, and if the KPI was consider to be of high importance, it was proposed the creation of a platform for data collection.

The next sections will describe in detail, for each department of the company, the following topics:

1. Critical aspects to be monitored by Team Leaders;
2. KPIs definition;
3. KPIs data collection;
4. KPIs visualization;

4.3 Development of the KPI Tracking-Tool

4.3.1 Information Systems (ISY)

Critical aspects to be monitored by the Team Leaders:

After the meeting with the Team Leader of the ISY department, the following issues related to operational performance were pointed out as important to track:

1. Number of Information Systems incidents;
2. Average time each one of this incidents takes to be solved;
3. Number of complaints from the user assisted regarding the readiness and quality of the services;

All these indicators were pointed out as measurable and with a high relevance to the department. However, access to these records was impossible since there were no records kept about the user's information systems incidents and their resolution. Whenever a problem occurs, the ISY department is contacted by users using the following channels: (i) a phone call, (ii) a skype call, (iii) going to the ISY department workplace. Then, if required, someone of the department goes to the user's workplace to provide assistance. No record was kept at any stage of this process. Therefore, there was the need to start collecting records of the processes undertaken by the ISY department, such that the performance indicators can be assessed.

KPI's definition:

To carry out an analysis of any aspect of the ISY department's activities, it was necessary to create a platform for registration of information systems' incidents.

This platform enables a count of the incidents number, which was not available, to assess whether the staff of ISY department is sufficient to respond to the company's needs.

To calculate the resolution time of each computer incident, the date and time when the problem is first stated is registered, as well as the date and time at which it is solved. This time is calculated in working hours.

About the performance indicator according the topic of the users complains, regarding the service provided, it emerged the idea to penalize the resolution time whenever a problem is not closed in the first approach. For this, it was clarified the named as "Re-Opening" every time a problem is not solved in the first approach and appears again.

The classification of the "Re-Openings" and the assignment of a penalization to the resolution time is done according to the rules presented in Table 1.

Table 1- Classification of ISY Incidents and Re-Openings

Classification	Description	Penalization in the Resolution Time
Incident	When a problem is solved in the first approach and does not appear again	No Penalization
Re-Opening #1	When a problem is not solved in the first approach and appears again	5%
Re-Opening #2	When a problem is not solved in the first two approaches and appears again	10%
Re-Opening #3	When a problem is not solved in the first three approaches and appears again	20%
Re-Opening #4	When a problem is not solved in the first four approaches and appears again	40%
Re-Opening #5	When a problem is not solved in the first five approaches and appears again	80%

After the allocation of the penalizations in the resolution time, we have a new time called "Adjusted Resolution Time", calculated using the following formula:

$$Adjusted\ Resolution\ Time = Resolution\ Time + Penalization(\%) * Resolution\ Time$$

Based on these calculation methods, we reached a new performance indicator that reflects the percentage of the Re-Openings Resolution Time (using the "Adjusted Resolution Time") in the total Incidents Resolution Time.

By creating a platform for recording the above elements, it was possible to respond to the topics addressed at the initial meeting with the ISY department leader.

Following the previous considerations, the performance indicators presented in the KPI Tracking-Tool, in order to go through the department needs are organized in the following way:

1. Number of ISY Incidents;
2. Average Resolution Time of ISY Incidents;
3. % of Re-Openings Resolution Time in total ISY Incidents Resolution Time;
4. % of Re-Openings Number in Total ISY Incidents Number;

For each of the indicators previously defined, the General Manager and the ISY department leader specified a monthly target. In this pilot version of performance measurement framework developed in this these thesis, the monthly targets were all set with the same value, with no variation over the year.

The deviation between the value observed in a given month and the target previously defined is calculated using the following formula: $\frac{Value\ observed - Target}{Target}$

Traffic lights were adopted for the KPI Map in order to illustrate the deviations and were specified according to the following values:

- **Green Light**: deviation lower than -5 %;
- **Yellow Light**: deviation between -5 % and 5%;
- **Red Light**: deviation higher than 5%;

Concerning the monthly targets for the ISY Performance Indicators, the values defined were the following (for confidentiality reasons, real target values are hidden):

Table 2 - ISY Target Definition

KPI	Target Defined
Number of ISY Incidents	[redacted]
Average Resolution Time of ISY Incidents	[redacted] minutes
% of Re-Openings Resolution Time in total ISY Incidents Resolution Time	[redacted]%
% of Re-Openings Number in Total ISY Incidents Number	[redacted]%

Other classifications regarding the type of the incident, the priority given and the treatment were included in the platform.

Although this analysis was not assessed in the KPIs map, this is represented in the monthly dashboards, to provide the department a close view about the type of the information systems incidents they are facing every month, their priorities and how they are dealing with it.

KPI data collection:

In the platform created for registration of information systems' incidents, it is registered the problems reported by the users that are solved by the ISY department. It is also necessary to record the start time of the problem resolution, as well as the end time, in order to quantify the response time. If the problem is passed to the Ticketing System, the resolution time corresponds to the time taken to reach the conclusion that the problem cannot be solved by the SGPT's ISY department.

Together with the ISY department, it was concluded that this platform could be developed in *Microsoft Excel*. The members of the ISY department are responsible for registering the computer incident any time they give support for an employee information system problem.

In addition to record the number of incidents occurred, the database also includes other fields related to the incident, enabling a detailed analysis of the department's workload. The registration of the incidents allow to characterize it according to the type (User, Network, Hardware, VOIP Communications, SAP, Email, Skype, Portal Tickets, Microsoft Office, SAGE, Millenium, VPN and Software), treatment given (solved, unsolved, passed to Ticketing System) and priority (low, medium, high).

The platform, presented in Appendix A, was created as database to support the KPI's calculation. To insert registrations in the fields regarding the users, the incidents type, the priority, the treatment given and the IT responsible, it is used a pull down menu. For the resolution time calculation it was developed a *Macro*, which calculates, in working hours, the time between the start time of the problem resolution and the end time.

In a secondary sheet, for every field which has a drop down list, there is a list about the inputs to be update every time the department needs. This was done in order to avoid registration errors, which could have implications in the performance indicators analysis.

For confidentiality reasons, some values in databases presented in Appendix A are hidden.

KPI's visualization:

Figure 8 illustrates the KPI map for the ISY department. This map shows a summary of the KPIs' values for the month selected, the targets and the deviation between the values observed and the targets (for confidentiality reasons, the values and the targets are hidden). The traffic light system allows a quick identification of the critical issues that need to be addressed.

By changing the month in the Reporting Time field, the values are update regarding the month pretended to be analyzed.

Reporting Time (Month-Year)	nov/17

SEG AUTOMOTIVE

KPI	Value	Target	Deviation
Number of ISY Incidents	[redacted]	[redacted]	26,67%
Average Resolution Time of ISY Incidents	[redacted]	[redacted]	-11,91%
% of Re-Openings Resolution Time in Total ISY Incidents Resolution Time	[redacted]%	[redacted]%	-89,41%
% of Re-Openings Number in Total ISY Incidents Number	[redacted]%	[redacted]%	-73,68%

Figure 8 - ISY KPI Map from November 2017

For a more intuitive visualization as well to as provide a monthly comparison perspective, it was created a dashboard to present a set of graphs. This dashboard of the ISY department from November 2017 is exhibited in figure 9. For confidentiality reasons, since the values hiding on dashboards would hinder its analysis and comprehension, values were adapted in order to present unreal ones.

By changing the month in the KPI Map, the dashboard presentation is updated to the month pretended to analyze.

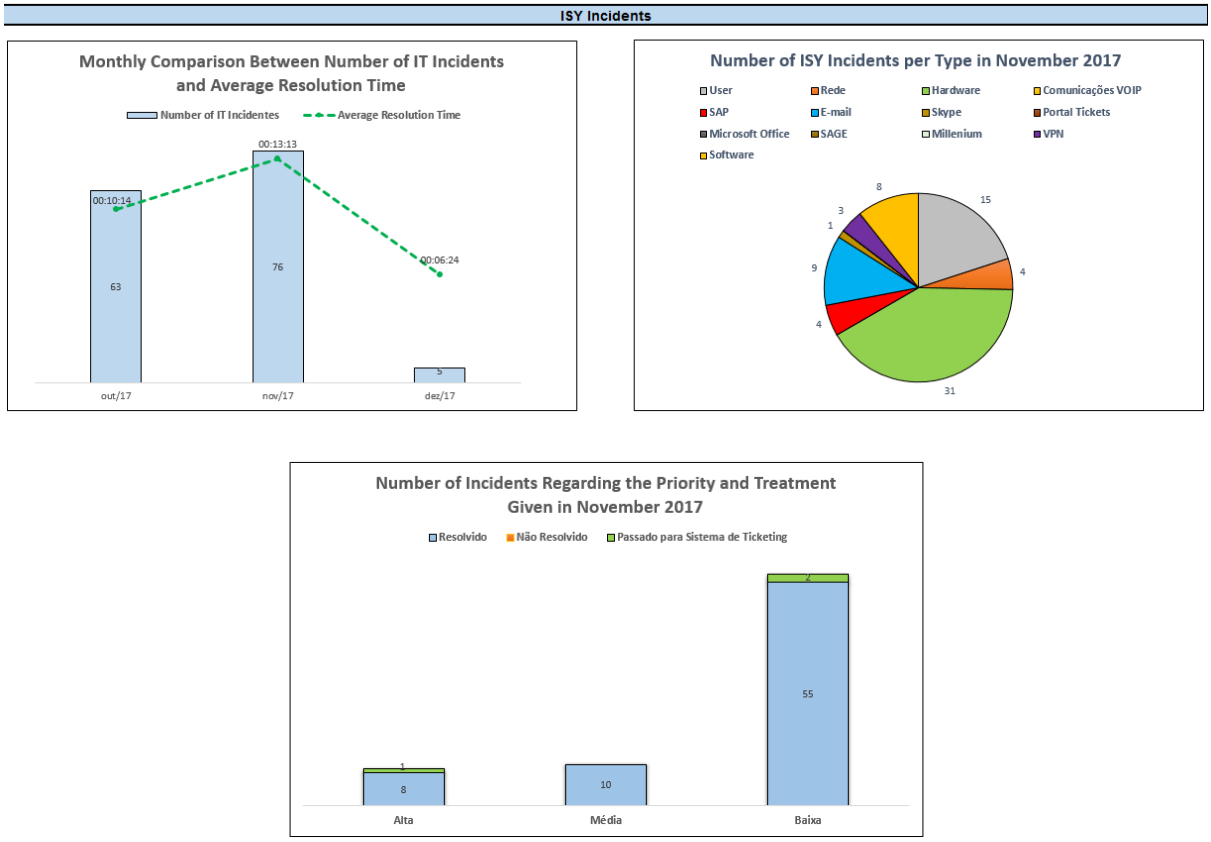


Figure 9 - ISY Dashboard from November 2017

4.3.2 Human Resources (HR)

Critical aspects to be monitored by the Team Leaders:

After the meeting with the HR department's Team Leader, the following issues were pointed out as important to track in order to assess the department's operational performance:

1. Average time of the Recruitment Process;
2. Absenteeism Rate in Training Sessions;
3. Labor Absenteeism Rate;
4. Flexible Time Balance;

All these indicators were considered measurable on a monthly basis and with a high relevance to the department. However, the access data for the KPIs calculation could be difficult.

About the Recruitment Process there was no place where all the data was kept. This data needed to be collected from e-mail messages exchanged between the people involved in each recruitment process. Thus, there was the need to keep all these records in accessible format, in a single database.

About the Absenteeism Rate in Training Sessions it is important to clarify that there are two types of training sessions in the company: Integration Sessions and Language Classes. Integration Sessions occurs during the two first weeks that a new employee works at the company. These present some key aspects of the company to the new employees. Although the attendance in all Training Sessions is always registered in paper sheets, in the case of Language Classes, the attendance was not registered later in a computer.

For the Integration Sessions, the attendance registration was done in a computer but not with the necessary information to calculate the absenteeism rate, since it was only registered the date when the new employee attended the session. If he missesed it, the session was re-scheduled and the failure was not registered. Once again, to assess this performance indicator topic it was needed to clarify the registrations and standardize them for the two types of training sessions.

In terms of Labor Absenteeism and Flexible Time, in the company it is used an assiduity management software called Millenium. Using this software, it is possible to extract the data about the Labor Absenteeism and the Flexible Time.

The flexible time is the number of hours employees accumulate for working over, or less, than the normal 8 hours a day. It translates the accumulation of hours that an employee registers at the end of the month in relation to the expected value of the normal 8 hours a day. The maximum number of hours that are saved in flexible time are 2 hours per day. At the end of the month, only 30 hours of flexible time accumulated transit for the following month, since all above 30 hours are lost. On the other hand, in terms of values lower than the expected, this can only be a maximum of 20 hours, and after the negative balance exceeds 20 hours, this begins to be reduced in the wage.

Therefore, the first stage was to understand better the processes about the department's activities so then could be created databases when needed. These databases will allow access to records which will lead to the calculation of the previous performance indicators.

KPI's definition:

Starting by the Recruitment Process, the goal is to assess the average time of this process (in days). After reviewing the recruitment stages, it was decided to specify several sub-indicators, corresponding to different phases of the recruitment process, and provide a summary performance measure for the overall recruitment topic. The indicators were specified as follows:

1. **Average Time to Choose Candidates for Job Interviews:** This indicator evaluates the time that elapses between the Job Offer Advertisement until the moment when the Job Interviews begin. This indicator evaluates how the job offers are received by the target public, as well as if the channel used to advertise the job offer is effective;
2. **Average Validation Time of the Chosen Candidate by the Team Leader:** from Job Interviews End until Validation of the Candidate. After being identified, by the person in charge of the recruitment, as one of the longest stages during the process, it is necessary to quantify this time taken by the team leader until, after the interviews ended, communicate which candidate is the chosen one;
3. **Average Internal Recruitment Time:** from Recruitment Start until Job Acceptance by the Candidate. This indicator relates to the stages in which the HR department has influence, hence it corresponds to the general indicator of the recruitment process for the department;
4. **Average Overall Recruitment Time:** from Internal Approval until Job Start. This performance indicator is added as it is pretended to see how long it is taking the whole process until the new employee start functions in the company. However, this indicator will account for, external processes that are not dependent on the HR department, such as the validation of the PANF's and number of days a hired employee has to remain in his former company. Although, if this average time proves to be much higher than the appointed in the point 3, measures must be taken to accelerate the external processes;

Since the company is in a growth phase, with monthly arrivals of new employees, it was defined that the analysis of these recruitment indicators only account the processes closed in the month of report, i.e., considering for analysis only the recruitment processes whose employees started functions in the month of report.

Regarding the integration sessions when a new employee starts a function, there is a process of integration and welcome sessions. The attendance at all these integration sessions is mandatory and the non-attendance implies re-scheduling. It is intended to track the total absenteeism rate, per month, of the company in the integration sessions. This is calculated using the following formula:

$$\frac{Total\ Number\ of\ Misses\ in\ Integration\ Sessions}{Total\ Number\ of\ Misses\ in\ Integration\ Sessions + Total\ Number\ of\ Participations\ in\ Integration\ Sessions} * 100$$

The company provides to its employees the possibility of attending language classes, due to the relation with the other SEG entities spread around the world. The frequency of classes is proposed by the department leader, which may be during working hours or after work, depending of the language class attended.

It is pretended an analysis of the company's monthly total absenteeism in language classes. This is calculated by the following formula:

$$\frac{Total\ Number\ of\ Misses\ in\ Language\ Classes}{Total\ Number\ of\ Misses\ in\ Language\ Classes + Total\ Number\ of\ Participations\ in\ Language\ Classes} * 100$$

In terms of Labor Absenteeism when an employee misses a day, he must insert into the assiduity management software, from a set previously established, the justification of the reason for his absence. Therefore, after tracking which justifications were considered "Absenteeism" the summation of the time used with these justifications represents the *Total*

Absence Time. The *Total Expected Work Time* represents the time employees are expected to work during the month. This value is different every month, but it is possible to have access to it in the assiduity management software. The following formula is used to calculate the labor absenteeism rate:

$$\textbf{Labor Absenteeism Rate (\%)} = \frac{Total\ Absence\ Time}{Total\ Expected\ Work\ Time} * 100$$

After getting access to these values, it is possible to obtain the company's monthly labor absenteeism rate.

Regarding the flexible time, this concept translates the working hours' accumulation that an employee registers at the end of the month in relation to the expected value of the 8 working daily hours. The purpose is to compensate some efforts, as well as to give an employee the freedom to be able to manage his daily working hours.

Thus, it is important to monthly control the company's total average flexible time, to check if the month was overworked which lead the employees to work more than the normal.

Following the previous considerations, the performance indicators presented in the KPI Tracking-Tool, in order to go through the department needs are organized in the following way:

1. Average time to choose candidates for job interviews;
2. Average validation time of the chosen candidates by the team leader;
3. Average internal recruitment time;
4. Average overall recruitment time;
5. Absenteeism rate in SGPT integration sessions;
6. Absenteeism rate in language classes;
7. Labor absenteeism rate;
8. Average flexible time;

Concerning the monthly targets, for the HR Performance Indicators, the values defined were the following:

Table 3 - HR Target Definition

KPI	Target Defined
Average time to choose candidates for job interviews	[redacted] days
Average validation time to choose candidates by the team leader	[redacted]days
Average Internal Recruitment Time	[redacted]days
Average Overall Recruitment Time	[redacted]days
Absenteeism Rate in SGPT Integration Sessions	[redacted]%
Absenteeism Rate in Language Classes	[redacted]%
Labor Absenteeism Rate	[redacted]%
Average Flexible Time	[redacted]hours

Although the KPI Maps only provide the company's overall values, in the dashboards it is possible to have access to a more detailed information regarding each one of the KPIs. Besides this, the dashboards also provide a monthly comparison of the overall value presented in the KPI Map. This facilitates some seasonality evaluation and trends assessment.

Regarding the recruitment process, in addition to the total value of the recruitment indicators about the processes closed in the month of report, it is also important to carry out a comparison over several months, in order to verify the evolution of these indicators in relation to the closed processes over the months.

These recruitments indicators can also present their values by department, concerning the job offers for the different ones. However, since the recruitment per department does not have a

significant volume for an analysis of the processes closed in the month of report, it is done on a cumulative basis.

In the dashboard, concerning the company's absenteeism rate in integration sessions, for a more detailed analysis, it is important to have access to the absenteeism rate per integration session. A monthly comparison is also analyzed to compare the variation of the total value of the company's absenteeism rate in integration sessions over the months.

On the same basis as in the integration sessions, regarding the language classes, for further details it is important to access the rate of absenteeism per language class. From a monthly comparative perspective, it is only relevant to compare the total absenteeism rate in language classes.

In the analysis of the labor absenteeism rate, the track of the weight that each of the justifications represent in the total absence time as well as the weight of each one of the departments' teams, is represented in the HR Dashboard. The comparison between the company's labor absenteeism rate with previous months can also be visualized.

Finally, regarding the flexible time, besides the company average value, it is important to check the average within each team per department. With this analysis, it is possible to check which teams were overworked and those that were not with so much workload. In terms of comparative monthly perspective, it is important to follow the evolution of the company's average flexible time over the months.

KPI data collection:

About the Recruitment Process there was no place where all the data was kept. To assess the previous performance indicators related to the topic, there was the need to keep all these records in accessible format, in a single database. Thus, it was created a database for the registration of the closed date of each one of the recruitment process stages (Appendix A).

In this database, it is also recorded the open position name and the corresponding department which the recruitment is for.

Regarding the Integration Sessions, there was the need to change the concept about the no registration when an employee missed a session.

In order to obtain the necessary data to calculate the absenteeism rate in integration sessions, but also to meet the needs of this internal control for the department, a new place for this registration was created. Now, after each session, the following fields have to be complete : integration session name, employee name, organizational area, entry date, integration session date, participation status (P-Presence or F-Fault) and reason for absence. A part of this database for Integration Sessions attendance registration can be consulted in Appendix A.

For the language classes, as previous mentioned, the recording of attendance in these classes was only done on paper. On the same basis of the attendance registration in the integration sessions and in order to standardize processes, a similar platform was created for the language classes. Now, both for performance indicator assessment and for department internal control, the following fields are completed: language class, employee name, organizational area, class data, participation status and schedule (labor or post-labor). A part of this database for Language Classes attendance registration can be consulted in Appendix A.

In terms of Labor Absenteeism the data for this analysis is exported from the assiduity management software (Millenium). When an employee misses a day, he must insert into the system, from a set previously established, the justification of the reason for his absence. In a

first stage, it was necessary to establish which justifications will start to be considered "Absenteeism".

In the end of the month, it is necessary to extract all the justifications codes inserted by the employees (both the considered absenteeism and the ones which are not), as well as the number of hours justified. After considering only the ones regarding the absenteeism, we have the total absence time for the month under analysis. We can also have access to the total expected work time in the assiduity management software.

In Appendix A it is presented an example of an extraction from the assiduity management software to Microsoft *Excel* to be incorporated in the tool and allow the evaluation of the performance indicator related to the company's absenteeism rate.

Regarding the flexible time, at the end of the month, recurring to the assiduity management software, an extraction is done with the following information: employee name, organizational area, extraction date and flexible time in the moment of extraction.

Once again, this extraction is made to a *Microsoft Excel* spreadsheet and it is presented in Appendix A.

KPIs visualization:

Every month, one KPI Map as the one in the figure 10 about the HR department operational performance is now presented to the General Manager and to the department leader in order to assess the results about the performance indicators established.

Reporting Time (Month-Year)	nov/17

SEG AUTOMOTIVE

KPI	Value	Target	Deviation
Average Time to choose candidates for job interviews	[redacted] days	[redacted] days	-20%
Average Validation Time of the choosen candidate by the team leader	[redacted] days	[redacted] days	100%
Average Internal Recruitment Time	[redacted] days	[redacted] days	2%
Average Overall Recruitment Time	[redacted] days	[redacted] days	33%
Absenteeism Rate in SGPT Integration Sessions	[redacted]%	[redacted]%	n.a.
Absenteeism Rate in Language Classes	[redacted]%	[redacted]%	180%
Labor Absenteeism Rate	[redacted]%	[redacted]%	50%
Total Average Flexible Time	[redacted] hours	[redacted] hours	18%

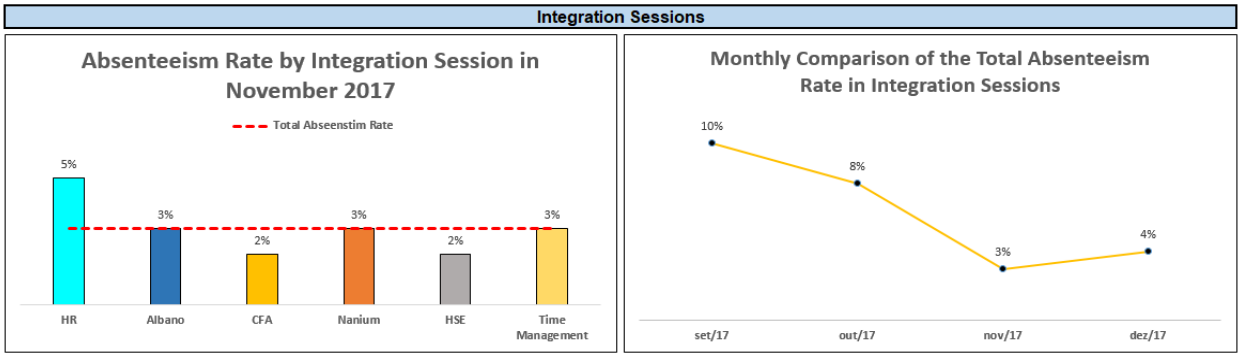
Figure 10 - HR KPI Map from November 2017

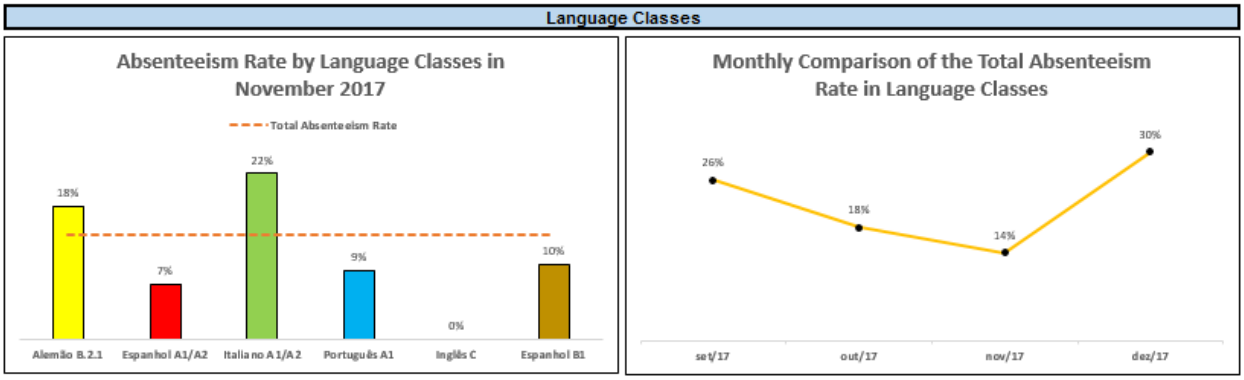
For a more detailed visualization, it was created a dashboard to present a set of charts. In figure 11, it is presented the dashboard for the HR Department from November 2017.

While the KPI Map shows the overall value of the performance indicator, in the dashboard we can have access to a more detailed perspective, for example by language class concerning the language class absenteeism rate or by department regarding the labor absenteeism rate.

Another dashboard purpose in the HR department is to presented a monthly comparison, in order to facilitate seasonality perception. For example, it is possible to check in which months the absenteeism rate is higher and drawing some conclusions. This is not possible if only the KPI Map is consulted.

Concerning the monthly comparisons, for the performance indicators in which the databases were created for the data collection, the registrations only began in September or October, since it was then this project started. For the performance indicators in which the databases used in the assessment are extracted from the assiduity management software, since it started to be used in the company since August, we have data from that time.





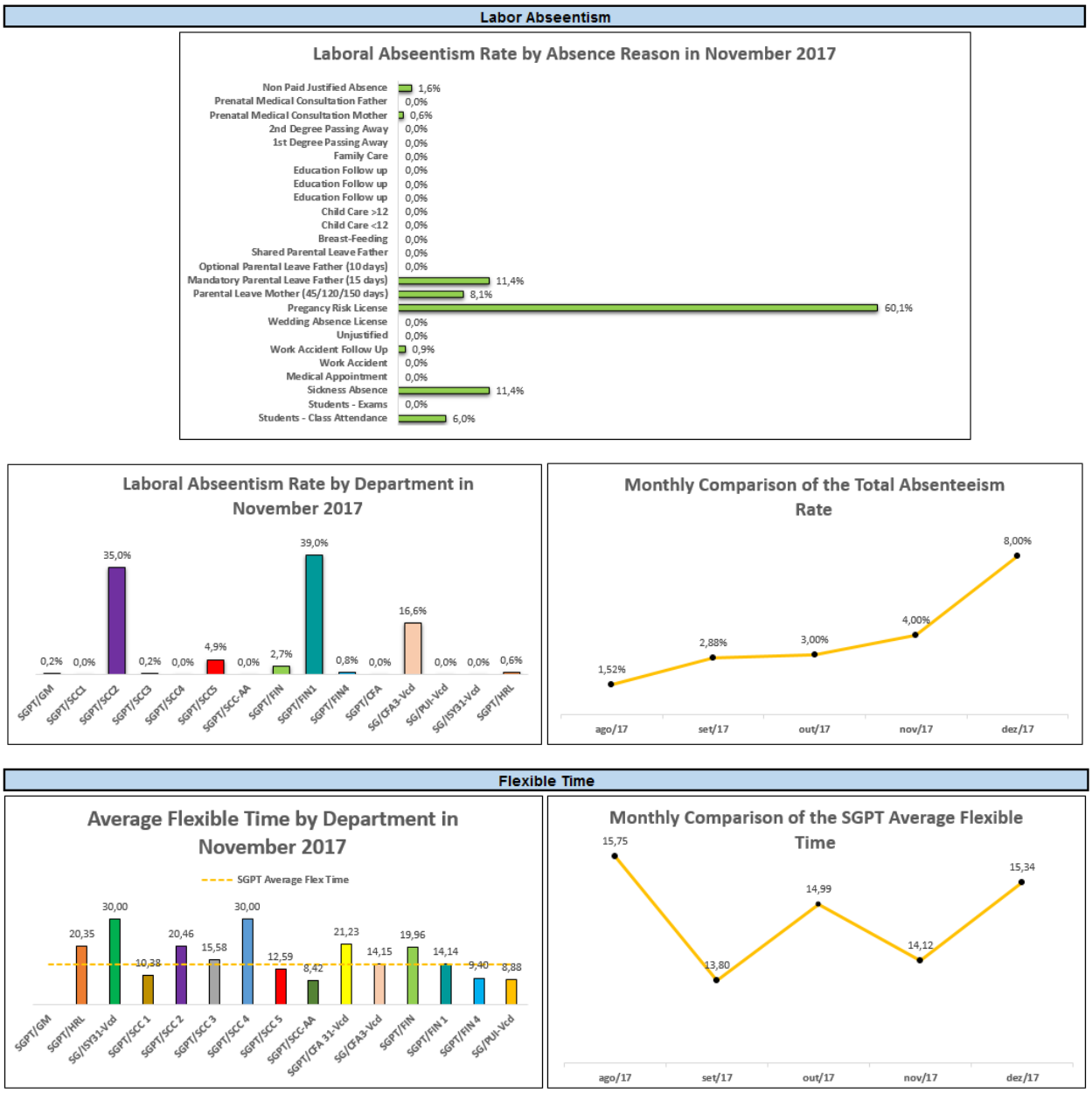


Figure 11 - HR Dashboard from November 2017

4.3.3 Indirect Purchasing (PUI)

Critical aspects to be monitored by the Team Leaders:

The PUI department was the only department in the company that performed an update and monitoring of the performance indicators. This monitoring proves to be essential, since the supply of goods and services to enable the business activity of the SEG Entities in Mexico, Germany and Hungary depends on this department. Due to the high volume of purchasing requisitions (PR) and purchasing orders (POs), this control has to be carried out carefully in order to guarantee a high efficiency in the service level provided.

Therefore, the process of collecting and defining performance indicators with this department proved to be simpler, since they were previously established. The performance indicators

monitored by the department on a daily basis and with weekly analysis are the same to incorporate the KPI Tracking-Tool. These indicators are the following:

1. Service Level (SL);
2. Discount Calls (DC);
3. Productivity (P);
4. Quality Grading (QG);

As stated before, these indicators were already being monitored by the department leader. At the end of the week, there were constructed charts in order to have a visual perception of the monitored performance indicators over the week. Then, there was a historical perspective of the last 6 weeks. It was necessary to group the information for building a KPI Map, followed by a Dashboard, similar to what was being done for the other departments.

One of the aspects focused by the Team Leader was the importance of making a graphic presentation that was easier to understand. The construction of this tool was also important as it provides a monthly comparison, which allows understanding annual seasonality.

KPIs definition:

In a first stage, and since the performance indicators for the PUI department were already defined, it was necessary to understand them, in order to estimate which data was needed to be requested. This data was incorporated into the tool, in order to organize the monthly report.

In terms of the KPI Map, the total value presented is the one from the ordering center, since it is compound by the services provided to the SEG of Germany, Hungary and Mexico. In the Dashboard, it is necessary to have the contribution of the service provided to each one of these entities in the achievement of the total values of the ordering center.

Regarding by the Service Level (SL), this performance indicator is used to measure whether the purchase requisitions (PRs) are processed in the agreed time frame, starting from the approval day and considering their clearing and processing phases, depending on their type.

The clearing phase consists in analyzing the PR received and defining the next process steps. It has a deadline of 1 working day. The PRs processing phase presents different deadlines depending on their type:

1. **Regular Processing (Normal PR's):** 2 working days (total of 3 working days with the Clearing phase inclusion);
2. **If clarification is needed or if it is eligible for negotiation:** 4 working days (total of 5 working days with the Clearing phase inclusion);
3. **Specific purchasing group (Urgent PR's):** 1 working day (total of 1 working day with the Clearing phase inclusion);

The service level performed for each of the entities served by the SGPT ordering center is calculated at the beginning of the day, by checking if in the open PRs there is any out of the deadlines.

The service level provided by the ordering center corresponds to the average of the service level provided by the department's teams, which are in charge of managing the indirect purchases of the business units in Mexico, Germany and Hungary. In the KPI Map, at the end of the month, it is presented the service level average value provided by the SGPT ordering center.

Concerning the Discount Calls (DC), this performance indicator deals with the negotiated discount in % realized by the ordering center for the PRs received. For each of the PRs received, it is calculated the total savings and the % of discount ($\frac{Saving}{Initial\ value}$). At the end of the month, it is possible to calculate the discount average obtained for each of the SEG entities, by using the following formula:

$$\textbf{Discount Calls (\%)} = \frac{\textbf{Value of all savings achieved in € in the month}}{\textbf{Value of total PRs negotiated in the month}} \times \mathbf{100}$$

At the end of the month, in the KPI Map, it is presented the discount call average of the ordering center.

This is the only performance indicator that includes the indirect purchases performed for the own SGPT, since the data of the negotiations is registered into an Excel file. In the other ones it is impossible to follow up the processes because there are no purchasing orders and no purchasing requisitions recorded in the system.

On the subject of the productivity, this performance indicator deals with the average number of purchasing orders (POs) processed per hour in the ordering center.

This value is calculated by assessing the number of employees allocated to provide services for each one of the SEG entities served and the number of POs processed during the month, considering a shift of 8 working hours in a day. The following formula is used:

$$\textbf{Productivity (POs/hour)} = \frac{\textbf{Number of POs processed}}{\textbf{Number of working hours}}$$

The value of the productivity of the ordering center, and which is presented in the KPI Map, is not restricted to an entity served. It is the overall value of the total number of POs processed and the total number of working hours of the ordering center.

The quality grading is dedicated to the control by sampling of the processed purchase orders compared to all relevant directives and process description. This control is based on agreed criteria (e.g. correct connection to the offer, payments terms, and message output) to "grade" checked order in a pre-defined category:

1. **Perfect:** order without errors – grading score > 94;
2. **Not Perfect:** maximum of 2 errors considered not relevant (e.g. correct head mistake) – grading score ≥ 80 and ≤ 94;
3. **Not Sufficient:** more than 2 errors considered not relevant or at least 1 relevant (e.g. delivery date) – grading score <80;

This quality grading is done monthly through a random sample of 4 % of the total number of POs processed by each department's team. After calculating the total number of orders to be analyzed, they are chosen randomly in the system and their process is followed, classifying the steps and obtaining a final grading score between 0 and 100.

Without defining the most important assets to track in the Quality Grading, this indicator could turn a little ambiguous. Therefore, the department has defined two essential sub-indicators, for the ordering center overall value, to track on a monthly basis. These ones are the presented in the KPI Map:

1. % of POs with Rating "Not Sufficient";
2. Average Grading Score;

Following the previous considerations, the performance indicators presented in the KPI Tracking-Tool, in order to go through the department needs are organized in the following way:

1. Discounts Average of the Ordering Center;
2. Service Level Average of the Ordering Center;
3. Productivity (POs/hour);
4. % of POs with rating "Not Sufficient";
5. Average Grading Score;

Since these performance indicators were already monitored by the department, the targets were already defined and they are presented in table 4:

Table 4 - PUI Targets Already Defined

KPI	Target Defined
Discounts Average of the Ordering Center	[redacted]%
Service Level of the Ordering Center	[redacted]%
Productivity	[redacted]
% of POs with rating "Not Sufficient"	[redacted]%
Average Grading Score	[redacted]

The KPI Map only provides the ordering center overall value. In the dashboard, it is possible to have access to a more detailed information regarding each one of the departments' teams in charge of each one of the SEG entities indirect purchasing. Besides this, the dashboards also allow a monthly comparison. This facilitates some seasonality evaluation and trends assessment.

Concerning the Service Level, in the dashboards it is important to track the service level provided for each of the entities managed, to understand their contribution in the value obtained for the ordering center. Beyond these perspectives in the month of report, it is also important to track it in a monthly comparison perspective.

Regarding the Discount Calls, it is relevant to check the total number of discounts achieved, the total savings amount (in €) and the average discount (%), either in the month of report or on a monthly comparative basis. This analysis is individualized by service provided to each entity, once again to analyze its contribution to the ordering center total value.

For the Productivity, whether in the month under analysis or in a comparative perspective, it is important to visualize the productivity as well as the number of POs processed, once again by service provided for each of the entities managed.

Finally, for the Quality Grading, whether in the month under analysis and in a monthly comparative perspective, it is important to get access to the total number of analyzed POs (grouped by classification) and the average grading score (by entity).

KPIs data collection:

In terms of PRs Discount Calls (DC), the department has a database where it registers together all the PRs Discount Calls (DC) information. For each one of the PRs negotiated, the department keeps: the SG Entity which sent the PR, the date of the negotiated discount, the initial value, the value paid after negotiation, the savings and the discount obtained (in %).

This database, presented in Appendix A, is used in the calculation of the "Discounts Average of the Ordering Center".

For the performance indicators assessment, regarding the Service Level and the Productivity, the department registers together the daily Service Level, as well as the number of POs

processed. It is also registered the number of employees assigned to every team, in order to calculate the total number of working hours.

This registration is divided by each one of the teams responsible for one business unit and in the last column it is possible to check the total values for the ordering center. This values imply the average of the 3 entities in terms of Service Level and the summation regarding the total number of the daily POs processed.

The database, presented in Appendix A, is used in the assessment of the Service Level Average for the Ordering Center and the Productivity (POs/hour).

Regarding the Quality Grading performance indicators calculation it is necessary to have access, by entity, to the following topics: total number of orders analyzed, grading score and final rating obtained.

In Appendix A, it is presented the Quality Grading Registration already used by the department and which is used in the calculation of the % of the POs with rating "Not Sufficient" and the Average Grading Score.

KPIs visualization:

Every month, one KPI Map as the one in figure 12 about the PUI department operational performance is now presented to the General Manager and to the department leader in order to assess the results about the performance indicators.

Reporting Time (Month-Year)	now/17

SEG AUTOMOTIVE

KPI	Value	Target	Deviation
Discounts Average of the Ordering Center	[redacted]%	[redacted]%	19,71%
Service Level Average of the Ordering Center	[redacted]%	[redacted]%	40,59%
Productivity (POs/hour)	[redacted]	[redacted]	15,22%
% of POs with Rating "Not Sufficient"	[redacted]%	[redacted]%	-53,49%
Average Grading Score	[redacted]	[redacted]	1,47%

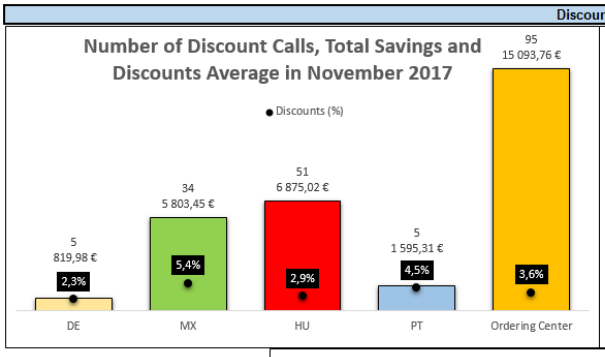
Figure 12 - PUI KPI Map from November 2017

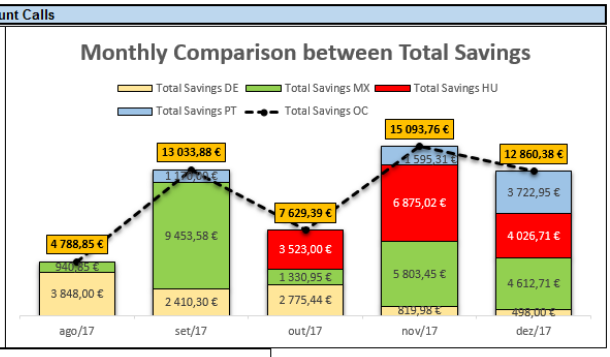
For a more intuitive and detailed visualization it was created a dashboard to present a set of charts. In figure 13, it is presented the dashboard for the PUI Department from November 2017.

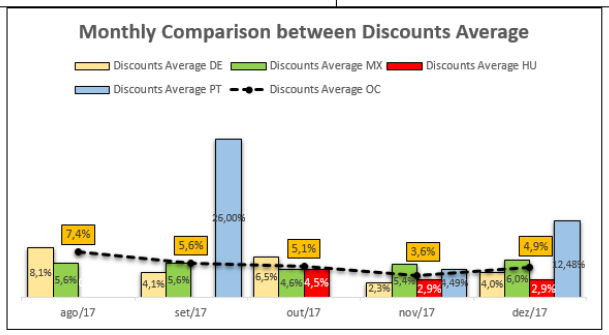
While in the KPI Map it is possible to check only the total value of the ordering center, at the dashboard level it is possible to verify, the contribution of the service provided to each one of the SEG entities to reach the value presented in the KPI Map.

It is also possible to check a monthly comparison, which allows trends identification and seasonality assessment.

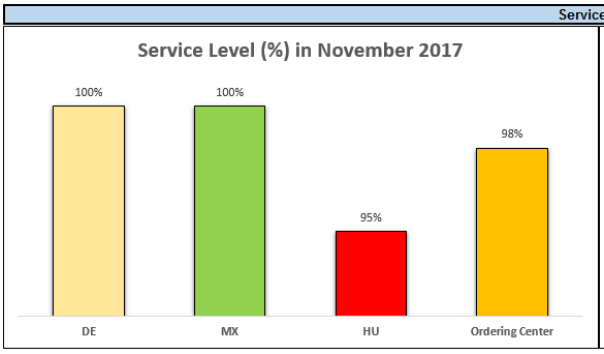
Discount Calls

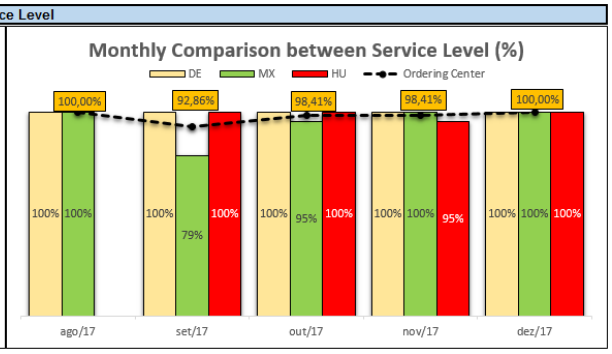




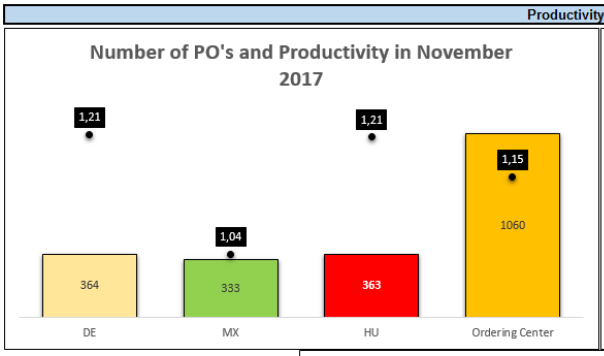


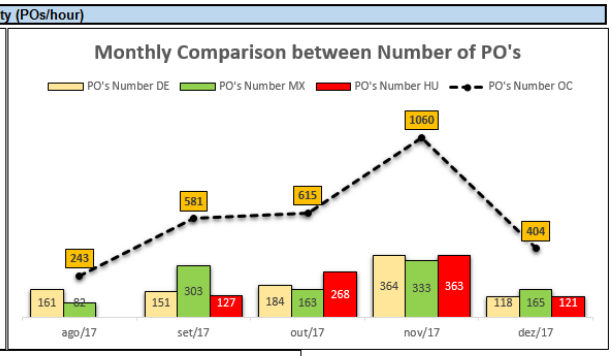
Service Level

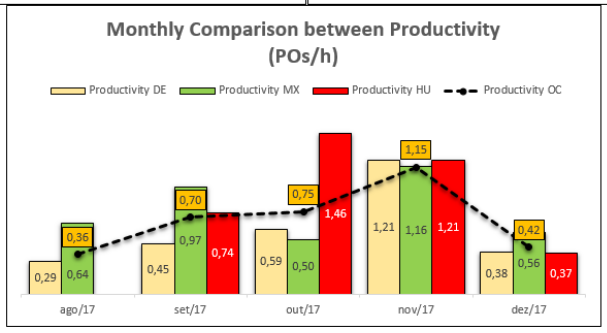




Productivity (POs/hour)







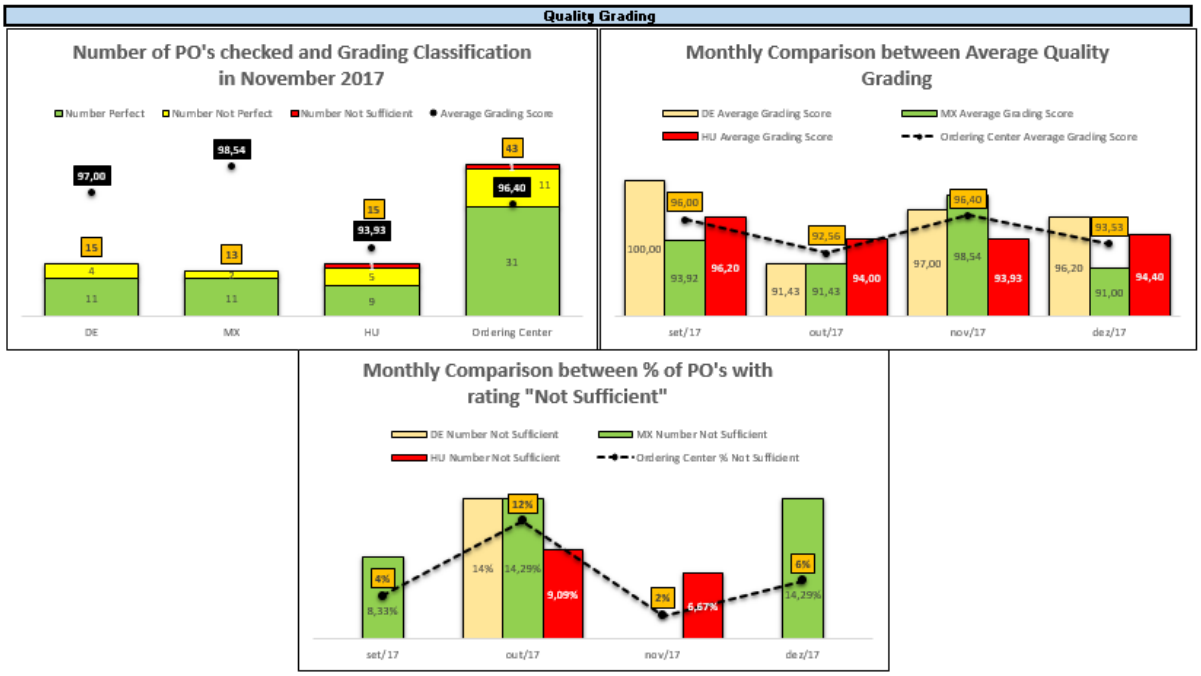


Figure 13 - PUI Dashboard from November 2017

4.3.4 Sales Commercial and Coordination (SCC)

Critical aspects to be monitored by the Team Leaders:

After the meeting with the SCC department Team Leaders, the following indicators ideas were pointed out as important to track, in order to be able to check the departments team's operational performance, each one related to one Sales Organization, in terms of Accounts Receivables (AR):

1. Overdue Assignments (in terms of number and amount);
2. Credit Notes (in terms of number and amount);
3. Pending items in dispute with customers;

As stated before, the SCC department already performed a weekly performance indicator in the Accounts Receivable area. Therefore, a new analysis was expected to take a different approach, not just another comparative perspective between the billing volume and the total debt, as this was already done.

The performance evaluation pointed out by the team leaders only focused in the Accounts Receivables area. In their point of view, in terms of order management, the performance evaluation is monitored between the customers and the plants, in terms of deliveries quality evaluation (on time, defects). The SCC department has no intervention in the problem rising, acting only as a contact point between customers and plants, when a problem arises. Thus, the department only ensures that the evaluations and complains by the customers regarding the service provided by the plants are in accordance with what really succeeded, transmitting it to the plants.

KPIs definition:

Regarding the overdue assignment, it is possible to access this values by checking what has not been paid yet on the customers current account and has already expired the net due date. For

each one of the sales organizations (SGFR, SGIT and SGDE), it is possible to check all the assignments that have not been settled yet and are already in overdue.

This analysis needs to be done by number of overdue assignments, but by their amount as well. The overall value of the overdue assignments provides access to everything that has not been paid yet, whether in favor of the customer (e.g. Credit Note) or SEG (e.g. Invoice). The overall amount value gives the idea if SEG has more to receive (total value positive) or to give back to the customer (total value negative).

In the KPI Map, it is presented the total number and the amount (payments) of the assignments that are already in overdue at the last day of the month under analysis.

The credit notes are documents created in order to reduce the amount payable by the customer in relation to the original value. For each one of the sales organizations, it is possible to check the number and the amount of credit notes created during the month.

Therefore, on the KPI Map it is presented the total number and the amount of the credit notes created during the month under analysis.

In terms of pending invoices in dispute with customers, the Open Items is a file implemented from November onwards, which is dedicated to the process of monitoring an overdue assignment. Each employee of the SCC department dedicated to AR and responsible for a particular customer, whenever as assignment goes into overdue, he alerts the customer and initiates the situation register in the file. If the process is not solved in the month of opening, it transits to the next one until be solved.

In these Open Items file, is registered, as most important, the customer with whom the problem emerged, the number of the respective assignment, the value in dispute, the cause and the time since this dispute is already happening and the respective sales organization. As the number of monthly registration in this file is very high, the team leaders wanted to have an indicator about this disputes and how they are evolving.

Thus, at the end of the month, it is important for them to know, both in number and amount, the assignments in overdue that are still in dispute (Open Items) and the ones that have already been settled (Closed Items). These values are the ones presented in the KPI Map.

Following the previous considerations, the performance indicators presented in the KPI Tracking-Tool, in order to go through the department needs, are organized in the following way:

1. Overdue Number;
2. Overdue Payments;
3. Number of Credit Notes;
4. Amount of Credit Notes;
5. Number of Open Items;
6. Amount of Open Items;
7. Number of Closed Items;
8. Amount of Closed Items;

For each of the previous defined indicators, together with the General Manager and the SCC department leader, monthly targets have been defined and they are presented in table 5:

Table 5 - SCC Target Definition

KPI	Target Defined
Overdue Number	[redacted]
Overdue Payments	[redacted] €
Number of Credit Notes Created	[redacted]
Amount of Credit Notes Created	[redacted] €
Number of Open Items	[redacted]
Amount of Open Items	[redacted] €
Number of Closed Items	[redacted]
Amount of Closed Items	[redacted] €

The KPI Map only provides the total value of the SCC Department. In the dashboard it is possible to have access to a more detailed information regarding each one of the teams dedicated to each one of the sales organizations (SGDE, SGIT, SGFR). Besides, the dashboard also allows a monthly comparison. This facilitates some seasonality evaluation and trends assessment.

Regarding the overdue number and payments, since the main goal is to add value to the previous analysis by the department of the total debt amount, it is significant to divide it by assignment type. Since the total value provides access to everything that has not been paid yet, whether in favor of the customer of SEG, it is important, apart from presenting the total value, divide it by assignment type: Invoice, Payment Difference in SEG's favor, Credit Note, Payment Difference in customer favor.

Another important analyze is to picture the overdue number and payments according to the Arrears After Net Due Date. The following ranges were created in order to group the overdue assignment, according to their expiration time: <30, [30,90[, [90,180[, ≥180.

The dashboard also incorporates a monthly comparison perspective, separately for overdue numbers and payments.

In terms of Credit Notes, it is possible to distinguish it by Credit Note Type, depending on the reason that took to its creation, as the following: Bonus and Quick Savings, Logistic Issues, Price Differences, Quantity Differences, Complete correction of the original invoice, Quality Issues.

It is also important to present a top three customers with the largest volume of credit notes issued in the month under analysis.

In terms of monthly comparative perspective, this is presented according to the number and amount of the credit notes created over the months.

Regarding the open items, there are some reasons that lead to an assignment ultra-passed the net due date without have been settled, originating these disputes. These reasons are grouped in reason groups. Therefore, it is important to present in the dashboard the number of closed and still open items by reason group, at the end of the month.

There is a relation between the closed and still open and the time since they are already in dispute. This time is organized in the file as follows: 0-30 days, 31-89 days, 90-269 days and 270-450 days.

In a comparative monthly perspective, it is analyzed the evolution of the number and respective amount of the closed items and still open ones at the end of each month.

KPI data collection:

The information regarding the Overdue Assignments performance indicators is accessed by using the ERP, SAP module SD, transaction code FBL5N. This transactions gives us everything that is currently open (without have been paid) in the client's account.

Through this transaction and by choosing, filtering, the company code of sales organization (SGFR, SGIT and SGDE), it is possible to check all the assignments that have not been settled yet. Thus, at the end of month, as extraction from SAP to an Excel Spreadsheet has to be carried out, in which it is possible to obtain, in a first stage, which sales organization refers to each one of the assignments information.

Furthermore, it is important to know which customer refers to each one of the assignment, so the extraction has to carry out the client's account, since each one of the accounts corresponds to a single customer.

As in the dashboard it is performed an assignment type (Posting Key) analysis, it is important to extract it as well.

One of the most important aspects to extract from the customer's account is a field to check if the net due date of the assignment has been already exceeded. In SAP, there is an option to incorporate in the extraction, designed Arrears after net due date. In this field, if the value is positive it means that at that extraction date, the assignment has not yet been paid and the net due date has already been expired.

With this extraction, it is possible to know the number of overdue assignment, but also the total amount in overdue, as well as a more detailed information. The key fields to incorporate in the every month extraction are the following: Assignment Number, Company Code, Customer Account, Posting Key, Arrears after net due date and Amount in Document Currency.

In other to avoid issues on the extractions, it was created a SAP extraction manual (Job Aid), to document the procedures about this extraction process. This extraction manual is presented in Appendix B.

Every month, it is performed a SAP extraction to an Excel Spreadsheet. This one is used to calculate the performance indicators regarding the overdue assignments analysis. In Appendix A there is an example of one of these extractions.

The information about the credit notes is also extracted from SAP. Each credit note is identified by the Billing Document.

In a first stage, it is necessary to incorporate in the extraction the sales organization which created it. This is used, not in the overall value assessment, but in the further detailed analysis in the dashboard.

On the extraction, it is also important to access the client's identification (Payer) as well as the Credit Notes type (Billing Type). To perform an analysis of the credit notes amounts, it is essential to extract the amount associated to each credit note (Net Value).

By extracting these data from SAP to a Spreadsheet Excel at the end of each month, it is possible to analyze, both the number and the amount of the credit notes issued during that period.

The key fields to incorporate in this monthly extraction are the following: Billing Document, Billing Date, Sales Organization, Billing Type, Payer and Net Value.

In Appendix A it is presented the databased resulted from the SAP extraction and which is used in the calculation of the performance indicators regarding the credit notes analysis. This extraction process was documented too and it was created a Job Aid to support this process.

In Appendix A is also presented the Open Items file adopted by the SCC Department for monitoring an overdue assignment and which is used in the assessment of the performance indicators related to this topic.

KPIs visualization:

Every month, one KPI Map, as the one in figure 14 about the SCC department team's operational performance, is presented to the General Manager and to the department leaders, in order to assess the results about the performance indicators.

Reporting Time (Month-Year)	nov/17

SEG AUTOMOTIVE

KPI	Value	Target	Deviation
Overdue Number	[redacted]	[redacted]	20,68%
Overdue Payments	[redacted] €	[redacted] €	-8,72%
Number of Credit Notes Created	[redacted]	[redacted]	-66,00%
Amount of Credit Notes Created	[redacted] €	[redacted] €	27,44%
Number of Open Items	[redacted]	[redacted]	-12,00%
Amount of Open Items	[redacted] €	[redacted] €	-29,87%
Number of Closed Items	[redacted]	[redacted]	40,00%
Amount of Closed Items	[redacted] €	[redacted] €	32,99%

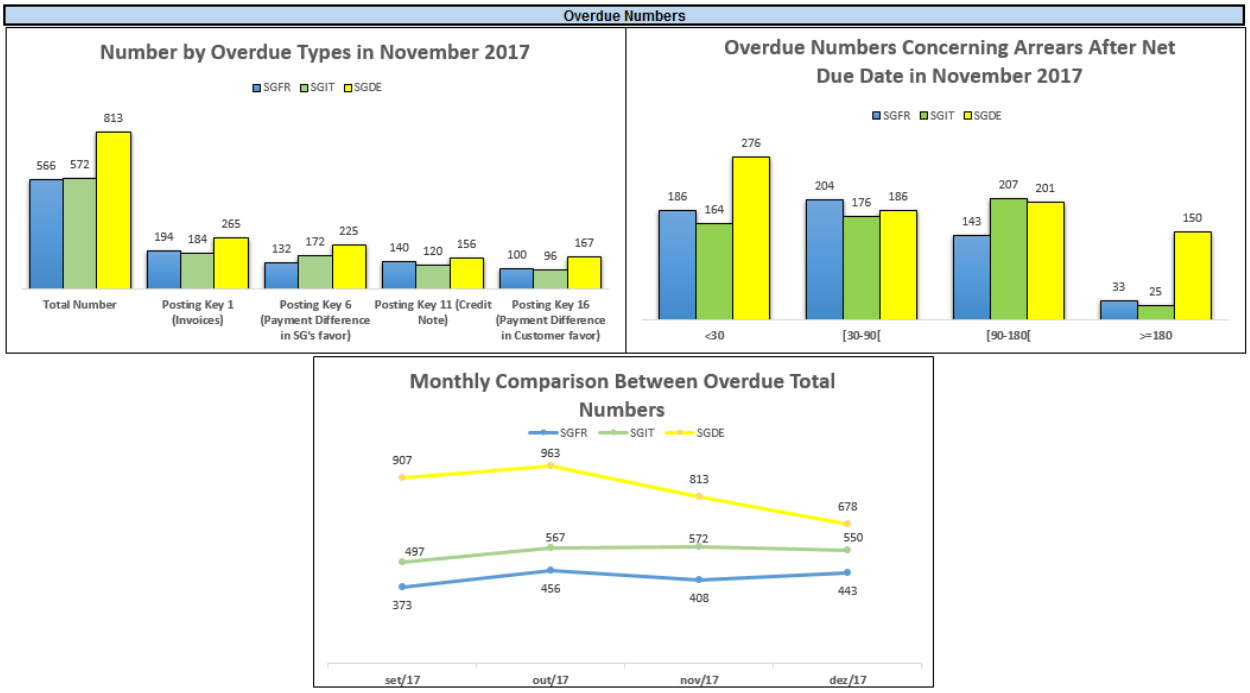
Figure 14 - SCC KPI Map from November 2017

For a more intuitive visualization of the most important monthly assets, it was created a dashboard to present a set of charts. In figure 15, it is presented the dashboard for the SCC Department from November 2017.

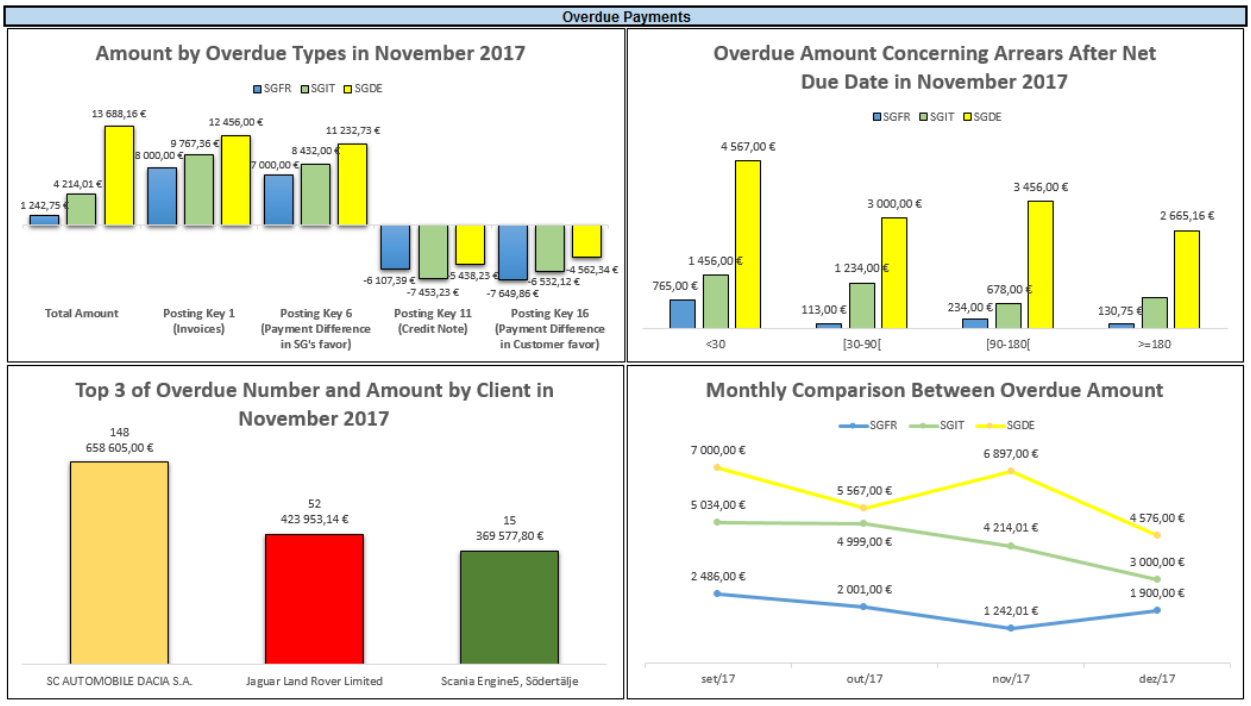
In the KPI Map it is only possible to check the overall value of the department, which is the summation of all the teams dedicated to each one of the sales organizations (SGDE, SGFR, SGIT).

At the dashboard level, it is possible to verify, for every performance indicator, the contribution of each one of the sales organizations to reach the value presented in the KPI Map. There are provided more detailed analysis as well. It is also possible to check a monthly comparison

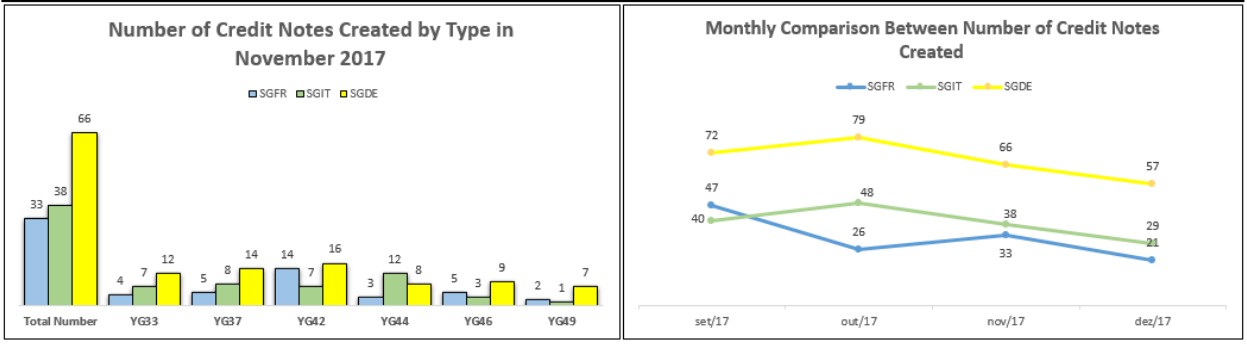
Overdue Numbers



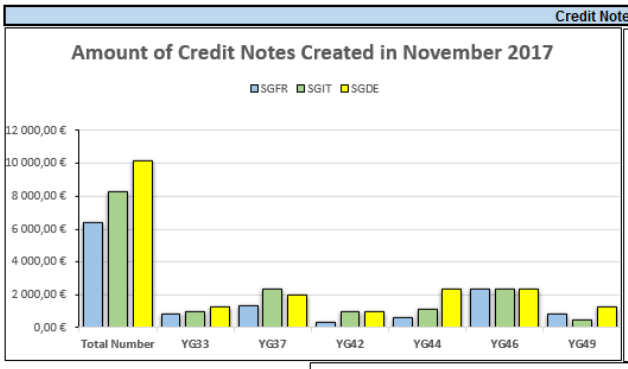
Overdue Payments

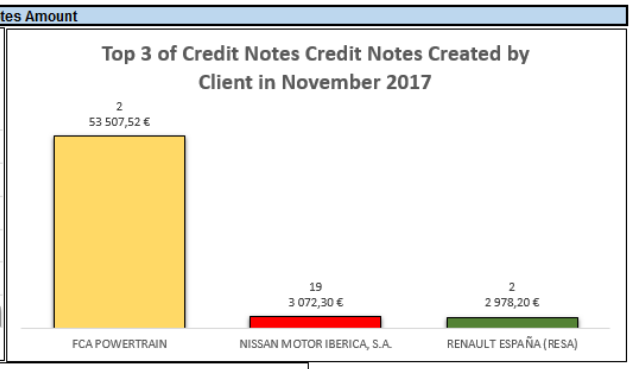


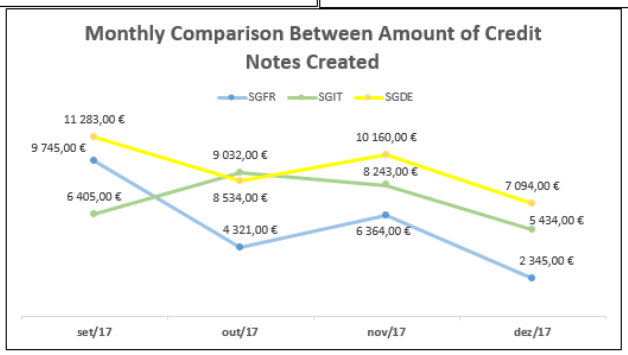
Credit Notes Numbers



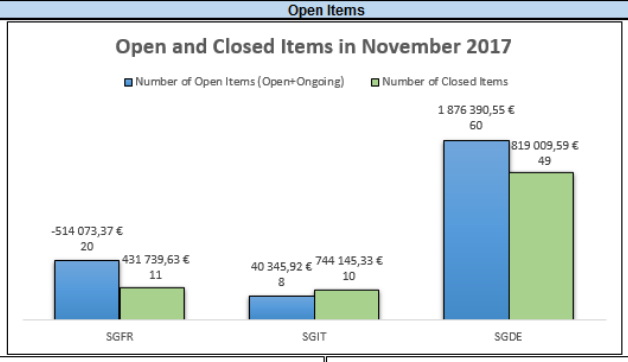
Credit Notes Amount

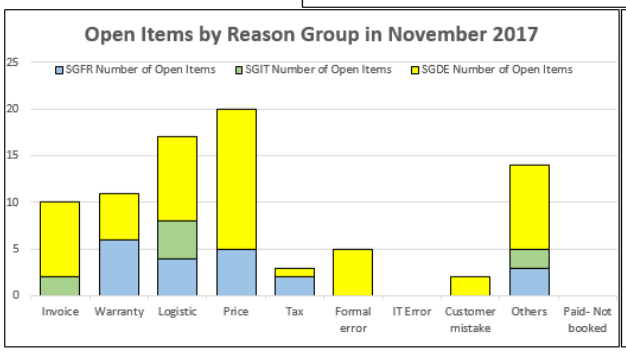


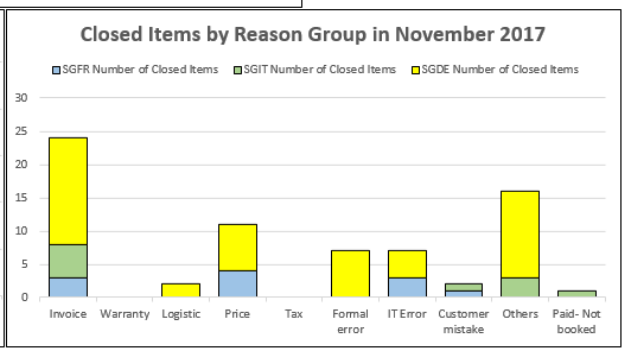




Open Items







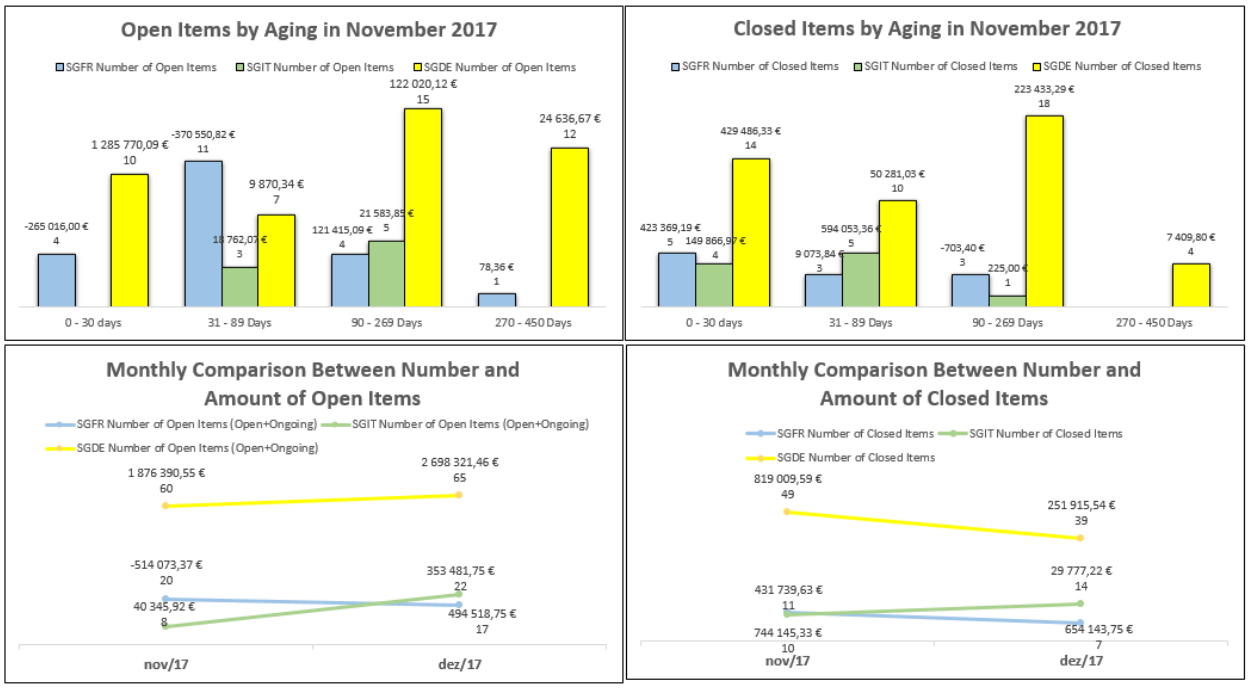


Figure 15 - SCC Dashboard from November 2017

4.3.5 Controlling (CFA)

Critical aspects to be monitored by the Team Leaders:

Since the CFA department already reports directly to Germany, in the process of addressing performance indicators, it makes sense that they focus more on the SGPT's internal control. Therefore, and in a joint perspective between the CFA department and the General Manager, it was expected that the approach to this department focus on improving the way internal global operational results were presented and then, adding new ones.

Thus, together with the CFA Team Leader and the General Manager, the following internal performance indicators were pointed out as to include in the KPI Tracking-Tool:

- **Sales –** on a month-to-date (MTD) and on a year-to-date (YTD) perspective;
- **Costs –** on a MTD and on a YTD perspective;
- **Margins –** on a MTD and on a YTD perspective;
- **Headcount;**
- **Costs by Headcount;**

As stated before in Chapter 3, the company's operational results related to sales, costs and margins, were presented by the CFA department to the General Manager in the form of a balance sheet. In these presentations, the Headcount was also introduced. The aim was to develop the new internal indicator "Costs by Headcount", which was not evaluated until then. It was also pretended to give a new form of visualization to all operational results.

It was intended to, every month, obtain a KPI Map with the monthly results in comparison with the Current Forecast (CF) and thus obtain the percentage deviation against the planned. All these indicators, since they reflect the operational result of the company, were pointed out as of the highest relevance.

Since the CFA department has a database with all the information of the SEG entities, including the SGPT, the access to all the necessary information was simplified. It was only needed to be created the databases to join all these information.

KPIs definition:

The first operational performance indicator focus on the sales.

Although SGPT, as a shared service center, provides services to several SEG entities, these services are only charged to the ones located in France, Spain, Germany, Italy and India. If the services are provided to one entity which was not one of the previous ones, the charge is made directly to Germany.

The monthly value to be displayed on the KPI map corresponds to the total sales, i.e., the amount charged to the SEG entities. Besides this value, it is presented, for the same performance indicator, a year-to-date perspective (YTD), to check the accumulated values over the months.

Regarding the costs, although in the KPI Map it is presented the overall value of the SGPT total costs by month, these costs are be grouped in 3 categories: Staff Costs, External Services and Supplies (FSE) and Depreciation and others.

As for the Sales, besides this value, it is presented, a year-to-date perspective (YTD), to check the accumulated values of the costs over the months.

In terms of margins (EBIT), in the KPI Map it is important to present this indicator, both in percentage of sales and in absolute value. The margins correspond to the difference between the sales and the costs. Again, an YTD perspective is constructed according to the same ideology.

The Headcount refers to the number of the company employees, not counting with internships or temporaries. The goal to present this performance indicator in the KPI Map is to check in which level we are regarding the expected. At the same time to this headcount, in absolute value (state), it is also important to include a headcount average, so it can serve as basis for the annual costs. This headcount average depends on the number of workers over the months.

Regarding the Costs by Headcount, it is important to separate in 2 analyses. As the company receives trainees, which also entail costs, it is important to carry out an analysis in which they are accounted.

We can obtain the average cost for the company of each worker by dividing the average costs accumulated by the average headcount. This analysis only makes sense in YTD perspective, because if it is MTD and the headcount does not increase, the values are the same every month

As stated before, the same analysis has to be carried out taking into account the internships in the company.

Following the previous considerations, the performance indicators presented in the KPI Tracking-Tool, in order to go through the department needs are organized in the following way:

1. Sales (Month-to-Date);
2. Sales (Year-to-Date);
3. Costs (Month-to-Date);
4. Costs (Year-to-Date);
5. EBIT € (Month-to-Date);
6. EBIT % (Month-to-Date);
7. EBIT € (Year-to-Date);

8. EBIT % (Year-to-Date);
9. Headcount (State);
10. Headcount (Average);
11. Costs by Headcount;
12. Costs by Headcount + Interns;

For each of the previous defined indicators, for this department, it was not necessary a target definition since there is a current forecast (CF) to act as one. Therefore, each month, the monthly values are compared to the forecast, to check the deviation and apply the traffic light ideology.

The KPI Map only provides the total value. In the dashboard, it is possible to have access to a more detailed information for each one of the performance indicators analyzed. Besides, the dashboards also allow a monthly comparison.

Regarding the Sales, although the monthly value to be displayed on the KPI map is the same, it was decided to separate it in the dashboard between sales by entity (clients) and sales by cost center.

As a result, it is important to display the monthly division of the value that each entity represents in the final billing volume. The current forecast (the last update was in August, hence the designation CF08) is also presented in the chart, in order to compare the total monthly billing volume with what was planned. It is also important to incorporate in the chart a line corresponding to the business plan 2018 (BP18) to compare the values obtained in the current year, with what the company intends to achieve in the next year. As stated before, parallel to this chart and on the same basis, it is built a similar with accumulated values over the months (YTD).

On the other hand, besides the values are the same, it was identified the need to create a graphical perspective in order to illustrate the charges of the services provided by SGPT by cost centers. The cost centers are the following: Admin, SCC, CFA3, FIN, PUI, ISY, HRL, OTE and General.

At the moment, the Admin cost center is compound by the General Manager (GM) department and the HR and ISY departments. In the future, with the growth of these 2 last one and since they already have cost center, they will be re-allocated to their own cost center. All the other cost centers correspond to one department, except the OTE and the General cost centers. The OTE cost center includes all costs arising from the Bosch carve-out (e.g. in a given month, the company had 2 CFA group leaders: one who would occupy the position of the other who would exit the company to continue in the Bosch Group – this generated a double structure cost which would not exist if the company wasn't carved-out). The General cost center exists to allocate all the general costs that are not of any department in specific and that are distributed according to the Headcount.

In terms of comparative perspective with the current forecast and the business plan, the ideology to adopt is the same as in the sales per entity. As before, in this case is constructed an YTD perspective too.

Regarding the costs, although in the KPI Map it is only presented the overall value of the SGPT total costs, in the Dashboard construction, these are presented divided, regarding the

classification previous stated. Once again, it is important to compare the total monthly value of these costs with the current forecast and the business plan. Besides this version (MTD), this chart also has an YTD version.

Concerning the EBIT (margins), in the dashboard presentation, the 2 perspectives (absolute value and %) coexist. Since there is a target of 5% of monthly margins, it is important to incorporate in the chart a line regarding this goal. For the month of report, the expected margin values are presented according to the Current Forecast and the Business Plan for sales and costs. Again, an YTD perspective is also constructed according to the same ideology.

On the subject of the Headcount (state), a monthly comparative analysis is necessary. In the dashboard, the headcount is presented by area. For this topic, as the forecast is done by area, we are able to check in which areas we are above or below what was planned (current forecast). It is also important to incorporate the value corresponding to the Business plan to check, for the same month under analysis but in the next year, the number of workers the company intends to own.

The chart regarding the Headcount (average) has the same ideology as the state one, but depending on the number of workers over the months

Finally, regarding the Cost by Headcount, the costs with the employees are divided into 2 categories: staff costs and other costs. In the dashboard, as the Costs by Headcount are presented by area, we can obtain the average cost for the company of each worker by dividing the average costs accumulated by the average headcount of each area.

After this analysis by area, the actual average cost per employee of the company has to be presented and compared to the obtained using the current forecast and the business plan values. As stated before, the same analysis is carried out taking into account the internships in the company.

KPIs data collection:

In Appendix A it is possible to consult the databases created to gather all the information for the CFA department performance indicators calculation.

In these databases, besides the values divided by the detailed information previous stated, it is possible to check the Current Forecast Values (CF08) and the Business Plan 2018 (BP18).

KPIs visualization:

Every month, one KPI map as the one in figure 16 about the CFA department regarding the internal SGPT's operational results is now presented to the General Manager and to the department leader.

Reporting Date (Month-Year)	nov/17

SEG AUTOMOTIVE

KPI	Value	Target	Deviation
Sales (Month-to-Date)	[redacted] €	[redacted] €	0,00%
Sales (Year-to-Date)	[redacted] €	[redacted] €	-2,35%
Costs (Month-to-Date)	[redacted] €	[redacted] €	-16,51%
Costs (Year-to-Date)	[redacted] €	[redacted] €	-3,77%
EBIT € (Month-to-Date)	[redacted] €	[redacted] €	311,98%
EBIT % (Year-to-Date)	[redacted] %	[redacted] %	312,64%
EBIT € (Year-to-Date)	[redacted] €	[redacted] €	33,64%
EBIT % (Year-to-Date)	[redacted] %	[redacted] %	36,85%
Headcount (State)	[redacted]	[redacted]	-8,00%
Headcount (Average)	[redacted]	[redacted]	-3,19%
Costs by Headcount	[redacted] €	[redacted] €	-12,11%
Costs by Headcount + Interns	[redacted] €	[redacted] €	-11,49%

Figure 16 - CFA KPI Map from November 2017

For a more intuitive visualization of the most important monthly assets, it was created a dashboard to present a set of charts. In figure 17, it is presented the dashboard for the CFA Department from November 2017.

As this dashboard is more complex, as it involves comparisons between the current values, the current forecast and the business plan, some explanations are required. In the future, with this project implementation and the access to a historical perspective, it is intended that the dashboards for the other departments will have the same complexity as this one.

In this dashboard, the performance indicators identification is always presented in the blue label above each chart.

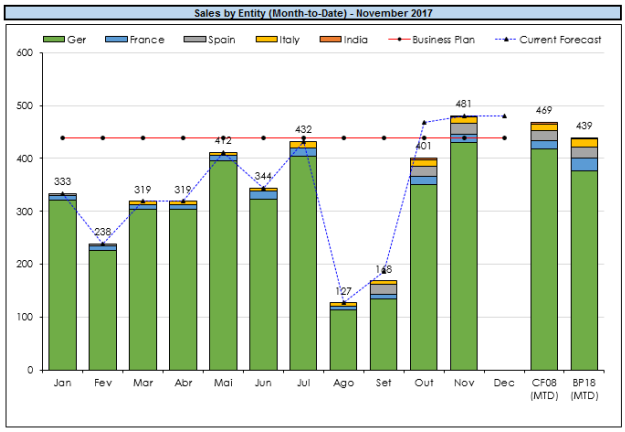
For the Sales by Entity, in the horizontal axis, it is possible to verify a division by the months of the year. For each month, the total value is divided by customers (entities), and the value above each column represents the total value of the monthly sales. The blue dashed line represents the forecast, as the goal is to compare the total value obtained with what was planned. Note that when the forecast was last update in August, all the values before August have been matched to the actual value. The red line represents the next year's Business Plan. Since this is done for an annual overall amount, the monthly amounts are constant. The last two columns represent the division by customer for the month under analysis that was expected to be obtained regarding the current forecast (CF08) and the business plan (BP18). The YTD chart presents the same perspective, but using accumulated values.

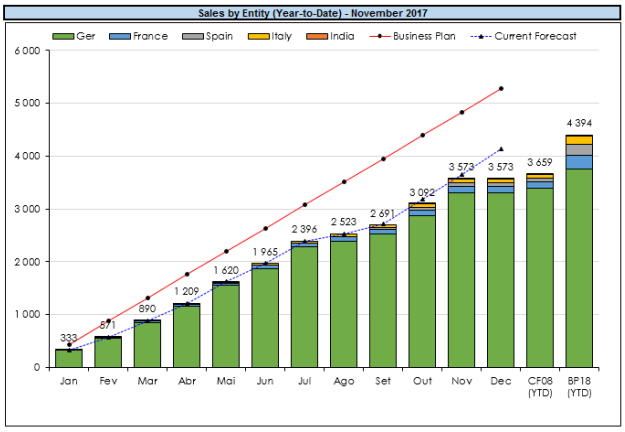
The "Sales by Cost Center" and the "Costs" analysis present the same methodology discussed in the last paragraph.

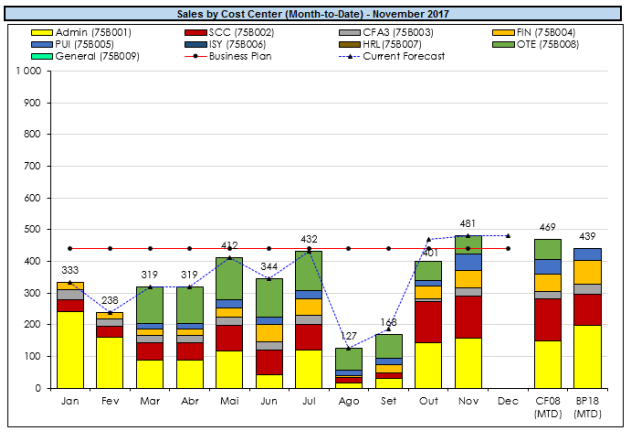
In terms of margins (EBIT), in a MTD perspective, each column represents the absolute value of the margins obtained for each month. The last two columns present, for the month under analysis, the margins that were expected to be obtained in terms of the Current Forecast and the Business Plan sales and costs. The blue line represents the evolution in percentage of the margins over the months, with the values in white labels corresponding to the EBIT % for each month. The YTD chart presents the same perspective but in an accumulated values view.

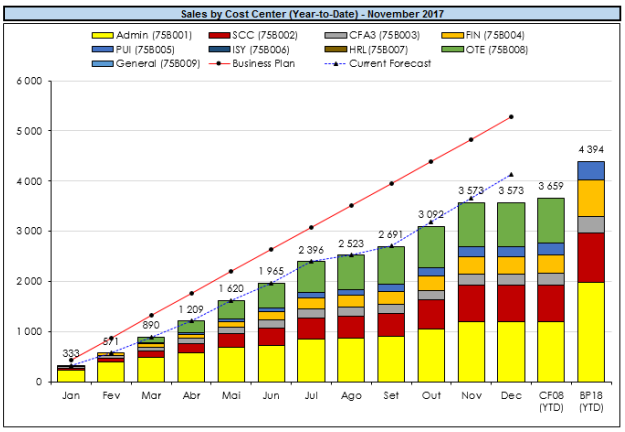
On the subject of the Headcount, the yellow columns represent the monthly headcount until the month under analysis. The small columns in green correspond to the differences per area between the actual and the current forecast for the month under analysis (with the total value on the blue column). The orange column refers to the Business Plan headcount in the month under analysis for the next year.

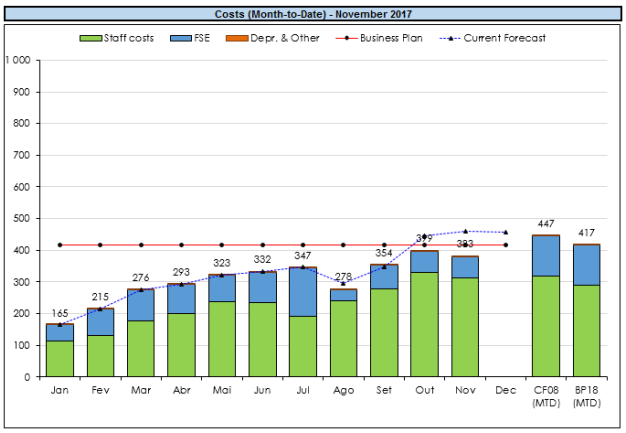
Regarding the Costs by Headcount, the first 7 columns relate to the average division in terms of costs per area (note that ISY2 and HRS-PT are two new departments which will only start activity in 2018). At the top of each column is the total average cost value per employee from a cumulative perspective. The SGPT column refers to the total value of the company, compared to the estimated value in the columns on the right, both for the Current Forecast and for the Business Plan.











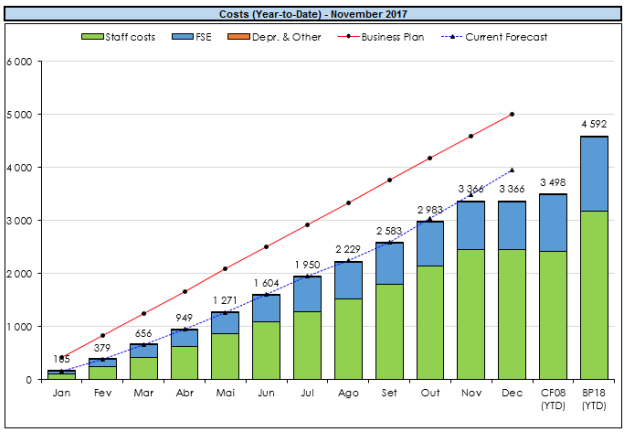


Figure 17 - CFA Dashboard from November 2017

4.3.6 Finance (FIN)

Critical aspects to be monitored by the Team Leaders:

After the meeting with the Finance (FIN) Department leader, the following indicators ideas were pointed out as important to track, in order to be able to check the department's operational performance:

1. Incoming Invoices (posted and in backlog);
2. Vendors Invoices paid in Overdue (both in number and in amount);
3. Average Vendors Payment Time;
4. Detective Controls;

5. Number of Tax Obligations Submitted;
6. Number of Tax Obligations Submitted with delay;

All these indicators were pointed out as measurable and with high relevance to the department, on a monthly basis. However, as warned by the department leader, the real struggle in this performance assessment was the data collection. As SGPT provides services to different SEG entities, there are different people dedicated to different countries, which implies different files format (and sometimes they do not even exist). Therefore, it was important a standardization of the registration files, not only for the performance assessment, but most important for the company's organization.

KPIs definition:

Regarding the incoming invoices, as it was stated before, only its current state was monitored, in order to quantify how many have already been posted, how many were in process to be posted and how many were waiting to enter in the posting process (the ones which were in backlog).

However, the Bosch carve-out led to the loss of the access to the system in which this analysis was done. So it was necessary a new one, which caused a different format of classification.

Now the department registers the number of incoming invoices, the number of the posted ones and the ones still in Backlog (waiting to enter in the posting process), dividing the Backlog causes.

At the KPI Map, it is important to present the total number of incoming invoices, the quantity posted during the month and the total number of those which remain in Backlog. It is also important to check the % of the month Backlog in the total number of incoming invoices.

As at the moment, the department only receives invoices from the German and the Spanish entities, the overall value corresponds to the service provided in terms of incoming invoices posting for these 2 entities.

On the subject of the vendors invoices, for the department leader it is important to obtain the number and amount of the ones paid in overdue, i.e., with delay.

Another performance indicator related to this topic is the average payment time to vendors, regardless of whether it was done in overdue or not. The average payment time results from the time between the Document Date (when it was issued by the vendors) and its payment.

Due to the billing volume, there is a set of internal control metrics (detective controls) in order to verify if the invoices are being processed in accordance with the established standards.

After being verified, if there are errors (findings) these ones are corrected. However, none of this was reported. Thus, in the KPI Map, it is presented the total number of findings, which correspond to the number of findings in the invoices released from the entities of France, Italy, Germany and Spain.

As mentioned previously in the department contextualization, one of the departments functions is to ensure the compliance of the SGPT Tax obligations (e.g. Iva and IRS), as well as to assist in the submission of those Tax obligations of the SEG entities to which it provides services.

For the department leader, it is important to have access, both for the SGPT submissions and for the ones prepared for the other entities submit, to the number of tax obligations submitted and the ones with delay.

Therefore, the total number of tax obligation submitted and prepared by the department, and the ones submitted with delay is presented in the KPI Map.

Following the previous considerations, the performance indicators presented in the KPI Tracking-Tool, in order to go through the department needs are organized in the following way:

1. Number of Invoices Posted;
2. Number of Invoices in Backlog;
3. % of the Backlog in the Total Incoming Invoices;
4. Number of Vendors Invoices Paid in Overdue;
5. Amount of Vendors Invoices Paid in Overdue;
6. Average Vendors Payment Time;
7. Number of Findings in Detective Controls;
8. Number of Tax Obligations Submitted;
9. Number of Tax Obligations Submitted with delay;

Concerning the monthly targets, for the FIN Performance Indicators, the values defined were the following:

Table 6 - FIN Target Definition

KPI	Target Defined
Number of Invoices Posted	[redacted]
Number of Invoices in Backlog	[redacted]
% of the Backlog in the Total Incoming Invoices	[redacted]%
Number of Invoices Paid in Overdue	[redacted]
Amount of Invoices Paid in Overdue	[redacted]€
Average Vendors Payment Time	[redacted]
Number of Findings in Detective Controls	[redacted]
Number of Tax Obligations Submitted	[redacted]
Number of Tax Obligations Submitted with delay	[redacted]

The KPI Map only provides the overall value. In the dashboard it is possible to have access to a more detailed information regarding the service provided to each one of the SEG entities. Besides this, the dashboard also allows a monthly comparison.

In the dashboard, regarding the treatment to the incoming invoices, both for the ones from the Germany (SGDE) and for the Spain (RBET) entities, it is possible to compare the monthly evolution. This comparative perspective is able in the assessment of the % of the Backlog in the total incoming invoices.

Concerning the vendors invoices paid in overdue, both in number and in amount, in the dashboard presentations, this is individualized by SEG entity and is performed a monthly comparison. For the Average Vendors Payment Time, both in the month under analysis and from a monthly comparison perspective, this is divided by entity to which SGPT provides payment services to suppliers.

On the subject of the Detective Controls, in the dashboard, for each entity it is presented the total number of findings found, the total number of Detective Controls performed and the number of those with findings. In terms of monthly comparative perspective, it is presented the total number of findings divided by entity.

In terms of Tax Obligations, the results are divided by entity. In terms of monthly comparison, it was chosen to have access to the global value, not divided by entity.

KPIs data collection:

As the incoming invoices classifications is done in the system, it was created a database to group the information regarding the number of incoming invoices and the number of incoming invoices posted during the month. In this file, it is also recorded the number of invoices in Backlog that have been accumulated in the month (by its classification), as well as the % that it represents in the total number of incoming invoices.

On the subject of the vendors invoices paid in overdue, the database for this calculation is extracted from SAP. As the performance indicator stated by the team leader focus in the monthly invoices (with *Posting Date* of this month under analysis), the SAP Extraction has to carry out these field.

Therefore, at the end of each month, to perform this analysis, it is extracted the date on which a given invoice should have been paid (Payment Date), the date when it was actually paid (Clearing Date) and the invoice amount.

However, with this extraction, we obtain all the vendors invoices, whether they have already been paid or not.

Only after an initial screening to considerer only what has already been paid (the ones which exist a Clearing Date) we can check if there was delay or not. The delay is obtained through the difference between the Clearing Date and the Payment Date. If it is positive, there is a delay.

Regarding the Average Vendors Payment Time, through the previous extraction, it is possible to obtain the date on which the invoice was issued by the vendor (Document Date) and the date in which it was posted in the system (Posting Date). The average payment date results from the time between the Document Date and its payment (Clearing Date).

Every month, it has to be carried out a SAP Extraction to an Excel Spreadsheet, with the fields presented before, in order to calculate the performance indicators related to the vendors invoices. As for SCC, it was created a Job Aid with the steps to perform this extraction in the system. In Appendix A, it is possible to find an example of this extraction.

The databased presented in Appendix A, is used for the collection and registration of the results of the various Detective Controls performed, regarding the different SEG group entities invoices. Since Detective Controls are performed by different employees, there were different files, so it was created this database for, at the end of the month, all the results can be accessed in one place.

Regarding the topic related to Tax and Compliance, since the submissions were prepared by different people, it was necessary to find a way to group all the data into a single file.

It was necessary to record the tax obligations, either the ones submitted by the SGPT, either the ones prepared by the SGPT and sent to the other SEG group entities. The objective is to record the deadline for submission and the actual date in which the submission was done, in order to access how many have been done every month, and how many of them were done with delay

This database, called fiscal calendar, is presented in Appendix A.

KPIs visualization:

Every month, one KPI Map, as the one in figure 18 about the department operational performance is presented to the General Manager and to the department leader in order to assess the results about the performance indicators established.

Reporting Date (Month-Year)	nov/17

SEG AUTOMOTIVE

KPI	Value	Target	Status
Number of Invoices Posted	[redacted]	[redacted]	-19%
Number of Invoices in Backlog	[redacted]	[redacted]	27%
% of the Backlog in the Total Incoming Invoices	[redacted]%	[redacted]%	-2%
Number of Vendors Invoices Paid in Overdue	[redacted]	[redacted]	28%
Amount of Vendors Invoices Paid in Overdue	[redacted] €	[redacted] €	11%
Average Vendors Payment Time (in days)	[redacted]	[redacted]	53%
Number of Findings in Detective Controls	[redacted]	[redacted]	47%
Number of Tax Obligations Submitted	[redacted]	[redacted]	-20%
Number of Tax Obligations Submitted with Delay	[redacted]	[redacted]	n.a.

Figure 18 - FIN KPI Map from November 2017

For a more intuitive visualization of the most important monthly assets, it was created a dashboard to present a set of charts. In figure 19, it is presented the dashboard for the FIN Department from November 2017.

For this department, the dashboard comes to support the KPI Map as it allows to present the overall value divided by entity, as well as it provides a monthly comparison.

Figure 19 - FIN Dashboard from November 2017

5 Conclusions and Future Projects

With the markets becoming everyday more competitive, measuring and controlling company's performance level is a critical requirement for managers.

There are several generic frameworks that can be adopted to manage performance in different perspectives which are composed by a group of performance measures and the respective relationships among them.

Performance measurement and management can be an arduous task if the process to collect data, calculate performance measures and communicate results is not well defined and is not supported by the appropriate tools.

SEG Entities have continuously increasing their requirements in terms of the services provided by SGPT, so a first-rate service at all levels is primordial for the global success of the company.

Although operating as a shared service center, providing services to the own SEG entities, the internal customers still expect the best service possible. They are not afraid of expressing his displease since SGPT acts as a fundamental partner in the company business.

For all these reasons, the development of new Key Performance Indicators, the building of Proactive Reports and the creation of the Departments Operations Dashboards were of high importance to improve internally and therefore, serve the customer at the highest level.

5.1 Main Results

All of the new Key Performance Indicators developed in this project and the tools implemented for the data collection are being used at the company to control performance. Even though it was a radical change in some departments daily routines, such as the IT which had to start registering all the information systems incidents occurred, all staff was guided through the process and trained to understand the meaning and the purpose of all the KPIs.

The biggest challenge was in the departments which did not keep records about their processes and for the ones that required a standardization of the information collected by different teams. For the ones that required the construction of new databases to support the performance assessment, the main implication was in the construction of an historical comparison and in the target definition, since there was no previous record for comparison.

With the development of the KPIs, all department leaders became more aware of their departments operational performance, as well as of the other departments results. The team leaders receive monthly e-mails with the reports and monthly meeting are scheduled to discuss the results, exchanging knowledge and trying to understand what changes can be made.

This project allowed the creation of the proactive reports and the development of detailed measures visible on the dashboard. The main advantage of these new measures and report structure is that it enables SGPT to compare, every month, the actual results with the targets established, taking internal measures if needed, and consequently improve the customer experience and satisfaction.

The implementation of the dashboard facilitated the transition into all the new metrics created. The departments leaders find the visual information easy to read, and the KPI Map capacity has allowed a quick comparison between actual results and targets, besides providing a value of the deviation (in %) to the targets. Another dashboard feature that really pleased the staff was to provide a monthly comparison between previous periods in order to facilitate seasonality perception and trends assessment.

The work performed during this project focused on modeling and identifying an information system solution, which included requirements specifications, and departments interface, as they are responsible for the data they provide for the reports.

Along with this project, it was developed documentation of the structure and processes to support its utilization as the fundamental management tool.

5.2 Further Developments

The monitoring and controlling of the service performance is never a finished job. The metrics should constantly evolve and adapt to the business goals and targets. It is vital to keep building the metrics according to business decisions in order to create a unique flow for the company, where everyone works with the same goal in mind.

The dashboard should itself not be seen as a static tool. It should constantly adapt to teams' needs, allowing the most efficient control. The targets should also be lowering, in order to become more demanding and to make the experience continuously better for customers.

As a future project, as the company is in constant change and growth, it will start providing external services in other areas. In the case of the Information Systems (IT) department, it will begin to solve information systems incidents, not only the ones that occur internally. Like in Germany, it will have a Ticketing system to provide its services to the other SEG entities. For this, the team will grow and they will have more resources. The Human Resources (HR) will also start acting as a center in supporting administrative situations related to employees of other SEG entities. Therefore, for these two departments, it will be necessary to redefine the performance indicators.

For the SCC Department, although the Order Management tasks haven't been addressed in the performance indicator definition, this could be assessed, not only for an internal control, but to provide feedback to the sales organizations. Now that the metrics for the other departments are stable and understood, the Order Management should be the next step. The first idea would be the creation of a Customer Oriented Score. This score would be the combination of metrics most related to Delivering Performance, such as Deliveries on Time and Full (OTIF), No Customer Stoppage and Reaction to Extra Demand, each one with a different weight. This Customer Oriented Score would allow the creation of ranking within customers and respective sales organizations.

In addition to the Customer Oriented Score, another valuable metric would be the Customer Satisfaction Score. Currently almost all the metrics are still focused on the SEG Level, and not on Customer Experience (Feedback). The Customer Satisfaction Score should reflect the overall experience of the customer so far with SEG, like for example creating an annual customer survey that will reflect the SEG performance by the customer perception. This metric would allow to identify if the bad experiences are randomly occurring to different customers of if some customers are being more hurt than others. An action plan could be developed in order to deal with the most penalized customers, based on rewards or other type of incentives. This could improve their repurchase rate and diminish the bad experience, avoiding bad reviews. The customer survey result can lead to customer oriented score target reviews.

For the Indirect Purchasing (PUI) department, one performance indicator that would be important to measure would be the suppliers' evaluation. In this evaluation, different criteria with different weights would be defined, such are deliveries on the agreed time and quantities, discounts, as well as the compliments of other situations defined in the contracts. This would allow the construction of a ranking to support decision-making in suppliers' choices.

Since SGPT is a growing business, the diversity and number of services offered is certainly not static. With the development of new services, the KPIs should be re-considered, in order to avoid the delivery of services below the SGPT targeted level. The lack of monitoring should be avoided at all times, since it is the only way to keep improving and to keep growing as a healthy and appreciate business.

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APPENDIX A: Databases for KPI Collection

Database Created for ISY Incidents Registration

User	Tipo de Incidente	Descrição do Incidente	Prioridade	Data de Registo	Hora de Registo	Tratamento	Data de Resolução	Hora de Resolução	Tempo de Resolução	Tempo de Resolução Ticketing	Método de Resolução	Responsável IT
[redacted]	Hardware	Não consegue imprimir	Baixa	19/10/2017	15:19:00	Resolvido	19/10/2017	15:22	0:03:00	------	VPN estava ligada	[redacted]
	Hardware	Não consegue imprimir	Baixa	19/10/2017	16:45:00	Resolvido	19/10/2017	16:49:00	0:04:00	------	Selecionei a impressora correcta	
	Hardware	Não consegue imprimir	Baixa	20/10/2017	09:00:00	Resolvido	20/10/2017	09:05:00	0:05:00	------	Selecionei a impressora correcta	
	Hardware	Não tem os monitores	Baixa	20/10/2017	09:05:00	Resolvido	20/10/2017	09:07:00	0:02:00	------	Configurei os monitores	
	Skype	Não consegue marcar	Baixa	20/10/2017	09:28:00	Resolvido	20/10/2017	09:33:00	0:05:00	------	Activei o add ins do skype meeting	
	Hardware	O teclado não funciona	Baixa	20/10/2017	09:42:00	Resolvido	20/10/2017	09:44:00	0:02:00	------	Troquei o teclado	
	Hardware	Trocar de posto	Baixa	20/10/2017	10:20:00	Resolvido	20/10/2017	10:28:00	0:08:00	------	Troquei o telefone, coloquei um novo monitor, configurei o speaker	
	User	Queria desligar a VPN de ligar se automaticamente no arranque do	Baixa	20/10/2017	10:40:00	Não Resolvido	20/10/2017	11:12:00	0:32:00	------	Removi a aplicação do system management, ao remover não consegue abrir mais a aplicação, voltei a colocar como estava	

Database Created for the Recruitment Process Stages Dates' Registration

Open Position	Department	Open Position Definition	Internal Approval	PANF Creation	PANF Validation	Recruitment Start	Job Offer Advertisement	Candidate Selection For Job Interviews	Job Interviews Start	Job Interviews End	Validation of the Candidate	Job Proposal to the Candidate	Job Acceptance by the Candidate	Job Start
Customer Controller French Speaker	SCC	18/07/2017	18/07/2017	18/07/2017	20/07/2017	20/07/2017	22/07/2017	03/08/2017	04/09/2017	28/09/2017	01/10/2017	04/10/2017	06/10/2017	16/10/2017
Customer Controller Italian Speaker	SCC	18/07/2017	18/07/2017	18/07/2017	22/07/2017	23/07/2017	29/07/2017	03/08/2017	16/08/2017	26/08/2017	01/09/2017	03/09/2017	05/09/2017	18/10/2017
Internship Finance	FIN	15/09/2017	27/09/2017	28/09/2017	01/10/2017	09/10/2017	10/10/2017	19/10/2017	23/10/2017	25/10/2017	30/10/2017	30/10/2017	31/10/2017	13/11/2017
Internship Finance	FIN	15/09/2017	27/09/2017	28/09/2017	29/09/2017	27/09/2017	28/09/2017	19/10/2017	23/10/2017	25/10/2017	30/10/2017	30/10/2017	30/10/2017	13/11/2017
Accountant	FIN	01/01/2017	03/11/2017	03/11/2017	05/11/2017	05/09/2017	05/09/2017	08/09/2017	16/09/2017	27/09/2017	29/09/2017	30/09/2017	03/11/2017	13/11/2017

Database Created for Integration Sessions Attendance Registration

Integration Session	Associate Name	Organizational Area	Entry Date	Integration Session Date	Participation Status	Reason for Absence
HR	[redacted]	SCC	02/09/2017	04/09/2017	P	----------
Albano		SCC	02/09/2017	04/09/2017	P	----------
CFA		SCC	02/09/2017	12/09/2017	P	----------
Nanium		SCC	02/09/2017	12/09/2017	P	----------
HSE		SCC	02/09/2017	12/09/2017	P	----------
Time Management		SCC	02/09/2017	12/09/2017	P	----------
HR		CFA	02/09/2017	04/09/2017	P	----------
Albano		CFA	02/09/2017	04/09/2017	P	----------
CFA		CFA	02/09/2017	12/09/2017	F	Sickness

Database Created for Language Classes Attendance Registration

Language Class	Associate Name	Organizational Area	Class Date	Presence Hours	Schedule
Alemão A.1.2	[redacted]	FIN	06/09/2017	P	Laboral
Alemão A.1.2		FIN	06/09/2017	P	Laboral
Alemão A.1.2		FIN	06/09/2017	P	Laboral
Alemão A.1.2		FIN	13/09/2017	F	Laboral
Alemão A.1.2		FIN	13/09/2017	P	Laboral
Alemão A.1.2		FIN	13/09/2017	P	Laboral
Alemão A.1.2		FIN	20/09/2017	F	Laboral
Alemão A.1.2		FIN	20/09/2017	P	Laboral

Extraction from the Assiduity Management Software which is used for the Labor Absenteeism Rate Calculation

Area	Employee Nr.	Employee Name	Absence Code	Absence Description	Date	Time Used
SGPT/FIN1	32087232	[redacted]	F30	Prenatal Medical Consultation Mother	16/08/2017	03:30:00
SGPT/SCC3	31967872		F13	Sickness absence	17/08/2017	08:00:00
SGPT/SCC4	31758063		F20	Optional Parental leave Father (10days)	18/08/2017	08:00:00
SGPT/SCC3	31967872		F13	Sickness absence	18/08/2017	08:00:00
SGPT/SCC2	32029803		F30	Prenatal Medical Consultation Mother	18/08/2017	05:05:00
SGPT/SCC4	31758063		F20	Optional Parental leave Father (10days)	21/08/2017	08:00:00
SGPT/SCC2	32029803		F17	Pregancy risk License	21/08/2017	08:00:00

Extraction from the Assiduity Management Software which is used for the Average Flexible Time Calculation

Associate	Department	Date	Flex Time
[redacted]	SGPT/FIN 4	30/10/2017	28:46
	SGPT/GM	30/10/2017	00:00
	SGPT/SCC 1	30/10/2017	26:16
	SGPT/HRL	30/10/2017	28:15
	SGPT/SCC 3	30/10/2017	43:34
	SGPT/SCC 2	30/10/2017	18:15
	SGPT/CFA 31-Vcd	30/10/2017	05:39
	SGPT/SCC 1	30/10/2017	15:37
	SGPT/SCC-AA	30/10/2017	02:14
	SGPT/FIN 1	30/10/2017	10:20
	SGPT/HRL	30/10/2017	31:08

Database used for Discount Calls Registration

Date	Material Group	Supplier Code	Buyer	PR	Supplier's Name	Contact Person	Initial value	Negotiated value	Savings	Discount %	Entity
03/08/2017	U1130	133694	[redacted]	62943658 / 62943659	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	DE
14/08/2017	U1130	97167773		62956299							DE
17/08/2017	W6490	97167773		62974159 / 62974740 / 62974743 / 62974741							DE
30/08/2017	X5200	97378373		1004352145							MX
30/08/2017	U5140	97218283		1004373527							MX
22/09/2017		97141658									MX
13/10/2017	S29ZZ	97295253		63096914, 63096917							HU
16/10/2017	S29ZZ	97295253		63096915, 63096916							HU

Database used for Service Level and POs Registration

	Germany				Mexico				Hungary				Ordering Centre							
Date	Service Level	Nº People	Hours	Total Hours	Service Level	Nº People	Hours	Total Hours	Service Level	Nº People	Hours	Total Hours	Service Level	Nº People	Hours	Total Hours	PO Germany	PO Mexico	PO Hungary	PO Ordering Center
23/ago/17	100%	2	8	16	100%	2	8	16	100%	1	8	8	100%	4	16	32	14	6	0	20
24/ago/17	100%	2	8	16	100%	2	8	16	100%	1	8	8	100%	4	16	32	4	18	0	22
25/ago/17	100%	2	8	16	100%	2	8	16	100%	1	8	8	100%	4	16	32	9	19	0	28
28/ago/17	100%	2	8	16	100%	2	8	16	100%	1	8	8	100%	4	16	32	9	9	0	18
29/ago/17	100%	2	8	16	100%	2	8	16	100%	1	8	8	100%	4	16	32	5	16	0	21

Database used for Quality Grading Steps Registration

PR	PO	Date	ICR and DC file	PR information	Order value limit	Correct PG	Buying channel	Terms of payment	Terms of delivery	Correct connection to offer, Price Agreemnt incl. PO Language,	CP tolerance level followed	Correct Material filed	Correct Head text (if applicable)	Short text (if applicable)	Correct Supplier	Correct requester (if applicable)	Delivery date	Right Price and Currency	GR or IR Check/Un check	Archiving of documents	Correct Message Output	Check PO transmission Status	Result Points	Result Grade
			8	8	8	8	8	8	8	25	8	8	8	8	8	8	25	25	8	8	25	25	Points	Grade
63031288	47929048	12/09/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	perfect
63048643	47930900	12/09/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	perfect
62958982	47926529	12/09/2017	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	perfect

Extraction from SAP which is used for Overdue Assignments Performance Indicators Calculation

Account	Company Code	Assignment	Posting Key	Reason code	Document Date	Net due date	Amount in doc. curr.	Arrears after net due date	Extraction Month-Year
1000004494	[redacted]	201700482193	06	060	27/07/2017	27/07/2017	[redacted] €	65	set/17
1000004494		2700008223	06	060	21/04/2017	21/04/2017	€	162	set/17
1000004494		2700008246	06	060	21/04/2017	21/04/2017	€	162	set/17
1000004494		2700008249	06	060	21/04/2017	21/04/2017	€	162	set/17
1000004494		2700008273	06	060	21/04/2017	21/04/2017	€	162	set/17
1000004494		7056621604	06	080	13/09/2017	09/06/2017	€	113	set/17
1000004494		7056621704	06	080	13/09/2017	11/06/2017	€	111	set/17
1000004494		7056621765	06	080	13/09/2017	17/06/2017	€	105	set/17
1000004494		7056621766	06	080	13/09/2017	17/06/2017	€	105	set/17
1000004494		7056621808	06	080	13/09/2017	18/06/2017	€	104	set/17
1000004494		7056621823	06	080	13/09/2017	19/06/2017	€	103	set/17
1000004494		7056621825	06	080	13/09/2017	19/06/2017	€	103	set/17
1000004494		7056621826	06	080	13/09/2017	19/06/2017	€	103	set/17
1000004494		7056624033	11		13/09/2017	13/09/2017	€	17	set/17
1000004494		7056624033	11		13/09/2017	13/09/2017	€	17	set/17

Extraction from SAP which is used for Credit Notes Performance Indicators Calculation

Billing Document	Item	Sales Organization	Payer	Name	Billing Date	Billing Type	Net value	Extraction Month-Year
7056266138	1	[redacted]	1000903542	[redacted]	21/09/2017	YG46	[redacted]	9-2017
7056266635	1		1000901355		23/10/2017	YG42		10-2017
7056266670	1		1000906108		24/10/2017	YG49		10-2017
7056266759	1		1000901607		26/10/2017	YG49		10-2017
7056266760	1		1000901607		27/10/2017	YG49		10-2017
7056390035	1		1000900261		07/09/2017	YG46		9-2017
7056450251	1		1000902660		30/10/2017	YG46		10-2017
7056450260	1		1000902660		08/11/2017	YG46		11-2017
7056450261	1		1000902660		10/11/2017	YG46		11-2017
7056625318	1		1000004494		24/11/2017	YG42		11-2017
7056625318	2		1000004494		24/11/2017	YG42		11-2017
7056625318	3		1000004494		24/11/2017	YG42		11-2017
7056625318	4		1000004494		24/11/2017	YG42		11-2017
7056625318	5		1000004494		24/11/2017	YG42		11-2017
7056625318	6		1000004494		24/11/2017	YG42		11-2017
7056625323	1		1000904578		24/11/2017	YG42		11-2017
7056625323	2		1000904578		24/11/2017	YG42		11-2017
7056625323	3		1000904578		24/11/2017	YG42		11-2017
7056625324	1		1000904578		24/11/2017	YG42		11-2017
7056625324	2		1000904578		24/11/2017	YG42		11-2017

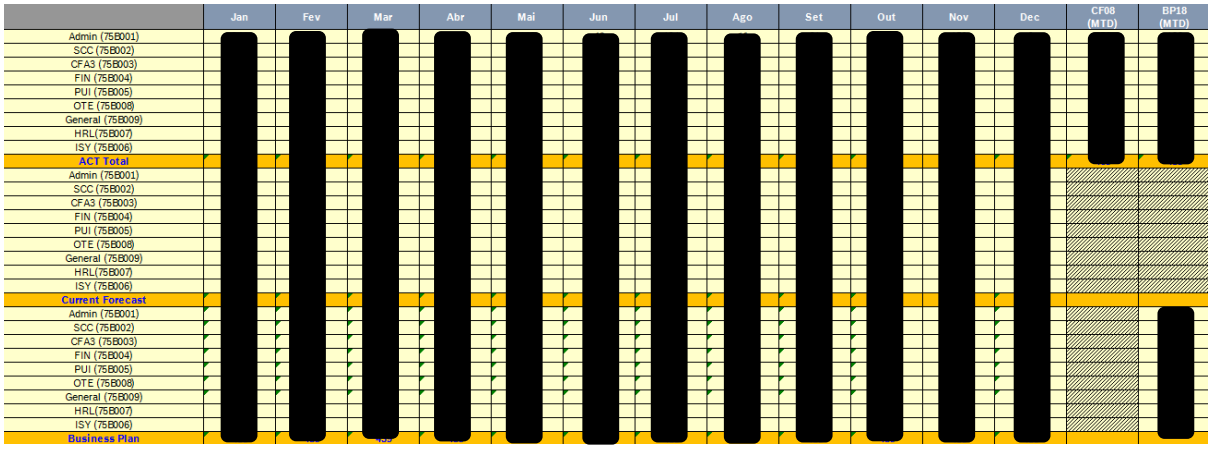
Open Items File used for “Open Items” Performance Indicators Calculation

Nr.	Status	Customer	Customer Nr.	Payment terms	Payment Runs	Document Nr.	Doc. Date	Customer Type	Reason Group	Amount in Dispute	Open Amount in EUR	Aging	Root Cause Analyses	Interim Corrective Action (IC)	Responsible SEG/SCC	Date	Month-Year	Entity
1	Closed - RO	[redacted]	1000028486	Inv. of 1st-28th Due on 30th of Subsequent Month	once a month	84201291	23/10/2017	Paper Invoice	Invoice		[redacted]	0 - 30 days	Late payment Paid on 06.12.2017 together with the future invoice		[redacted]	13/12/2017	12-2017	SGDE
2	Open		1000902424	according to agreement	every Tuesday	0791845023	09/04/2017 - 01/09/2017	Aut. SBI	Invoice			> 451 Days	The PAYER account 1000902424 is already closed. Last feedback received regarding drilldown September 2017 is also applicable for next reports:	VAT correction on customer´s side, clarification of the invoice for sample - reminders sent to the customer		16/11/2017	11-2017	SGDE
3	Open		1000902424	according to agreement	every Tuesday	1120445037	9/04/2013 and 15/10/2013	Aut. SBI	Others			> 451 Days	'Open invoices in clarification 1) tax diff - 20.853,90 EUR; - 1436,40 USD - corrections requested from the customer 2) Open invoice 80207918 is for			16/11/2017	11-2017	SGDE

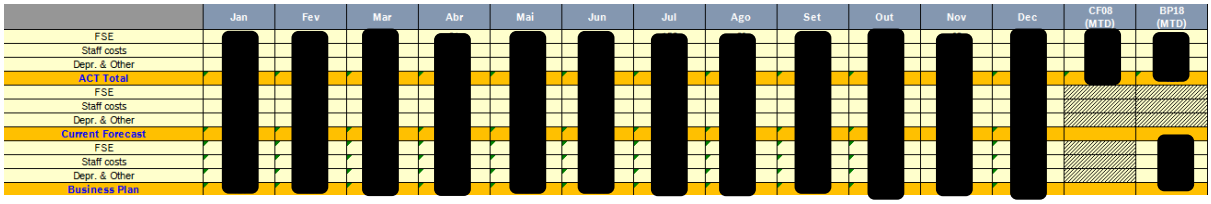
Database created for “Sales by Entity” registration

	Jan	Fev	Mar	Abr	Mai	Jun	Jul	Ago	Set	Out	Nov	Dec	CF08 (MTD)	BP18 (MTD)
France	[redacted]													
Italy														
Spain														
India														
Ger														
ACT Total														
France														
Italy														
Spain														
India														
Ger														
Current Forecast														
France														
Italy														
Spain														
India														
Ger														
Business Plan														

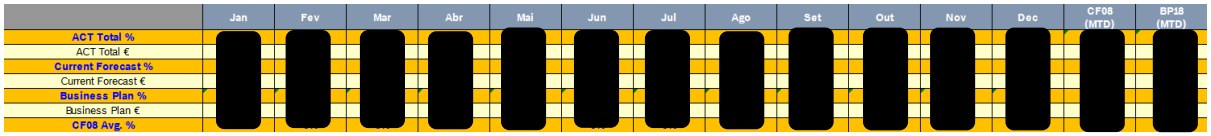
Database created for “Sales by Cost Center” registration



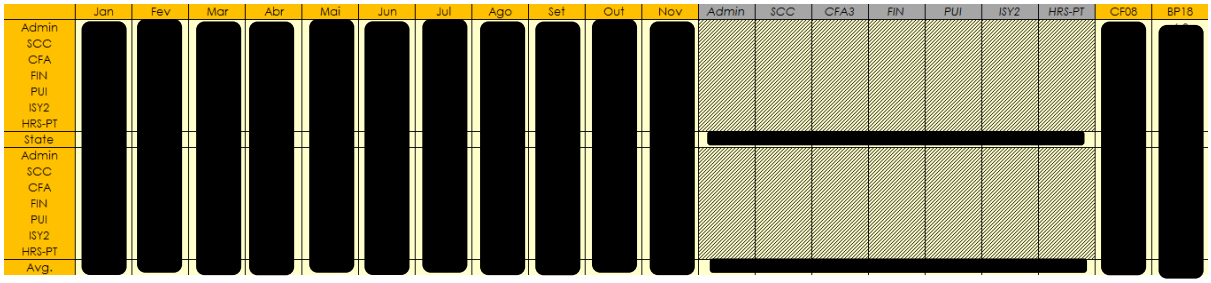
Database created for “Costs” registration



Database created for “EBIT” registration

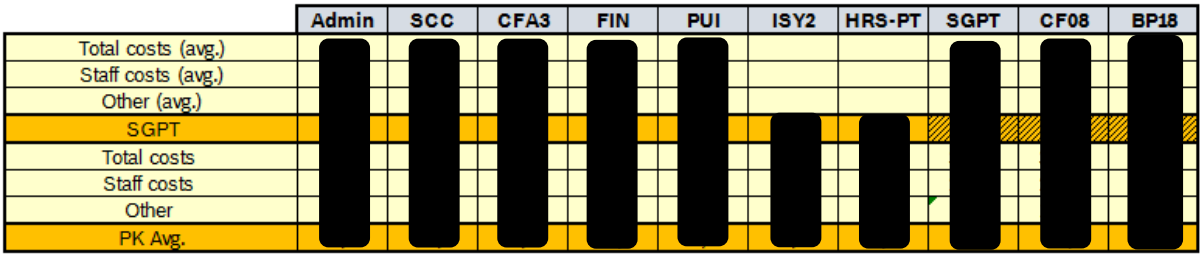


Database created for “Headcount” registration

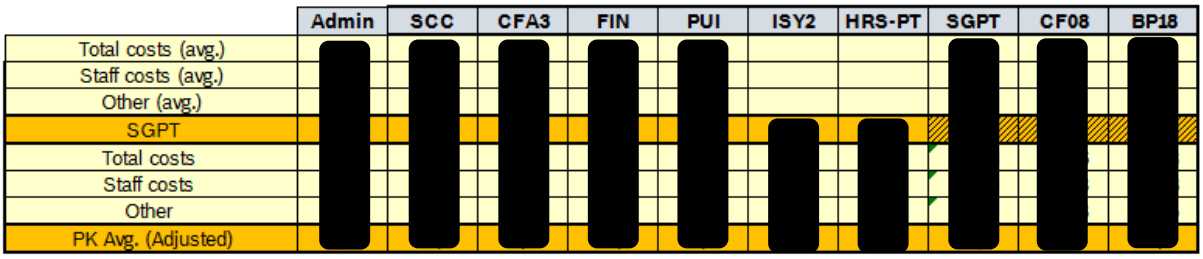


Database created for “Cost by Headcount” and “Cost by Headcount with interns” registration

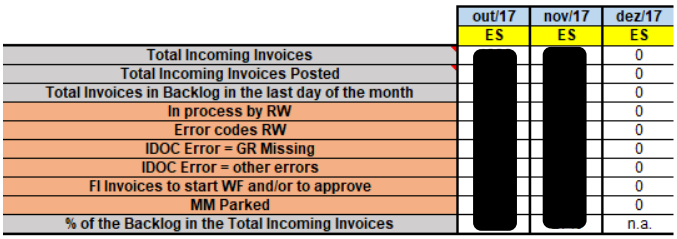
Personal Capacity



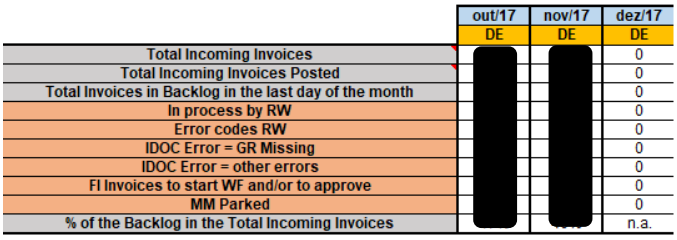
Personal Capacity Adjusted



Database created for “Incoming Invoices” registration



	out/17	nov/17	dez/17
	ES	ES	ES
Total Incoming Invoices			0
Total Incoming Invoices Posted			0
Total Invoices in Backlog in the last day of the month			0
In process by RW			0
Error codes RW			0
IDOC Error = GR Missing			0
IDOC Error = other errors			0
FI Invoices to start WF and/or to approve			0
MM Parked			0
% of the Backlog in the Total Incoming Invoices			n.a.



	out/17	nov/17	dez/17
	DE	DE	DE
Total Incoming Invoices			0
Total Incoming Invoices Posted			0
Total Invoices in Backlog in the last day of the month			0
In process by RW			0
Error codes RW			0
IDOC Error = GR Missing			0
IDOC Error = other errors			0
FI Invoices to start WF and/or to approve			0
MM Parked			0
% of the Backlog in the Total Incoming Invoices			n.a.

Extraction from SAP used for Vendors Invoices Performance Indicators Calculation

Reference	Document Number	Clearing date	Clearing Document	Document Date	Posting Date	Amount in local currency	Local Currency	Payment date	Vendor	Company Code
7055710863	11005987	26/11/2017	12050104	04/09/2017	04/09/2017	[redacted]	EUR	15/11/2017	97361137	[redacted]
7061094344	11005988	26/11/2017	12050104	04/09/2017	04/09/2017		EUR	15/11/2017	97361137	
7055710864	11005989	26/11/2017	12050104	04/09/2017	04/09/2017		EUR	15/11/2017	97361137	
7055710865	11005990	26/11/2017	12050104	04/09/2017	04/09/2017		EUR	15/11/2017	97361137	
7055710866	11005991	26/11/2017	12050104	04/09/2017	04/09/2017		EUR	15/11/2017	97361137	
7055710867	11005992	26/11/2017	12050104	04/09/2017	04/09/2017		EUR	15/11/2017	97361137	
7061094360	11005993	26/11/2017	12050104	05/09/2017	05/09/2017		EUR	15/11/2017	97361137	
7054679341	11005994	21/09/2017	12050083	08/06/2017	05/09/2017		EUR	15/07/2017	97361137	
7058163183	11005995	28/10/2017	12050095	18/08/2017	05/09/2017		EUR	15/10/2017	97361137	
7058164037	11005996	28/10/2017	12050095	30/08/2017	05/09/2017		EUR	15/10/2017	97361137	
7058164035	11005997	28/10/2017	12050095	30/08/2017	05/09/2017		EUR	15/10/2017	97361137	
7055770256	11005998	26/11/2017	12050104	05/09/2017	05/09/2017		EUR	15/11/2017	97361137	
7055770257	11005999	26/11/2017	12050104	05/09/2017	05/09/2017		EUR	15/11/2017	97361137	
7055710868	11006000	26/11/2017	12050104	05/09/2017	05/09/2017		EUR	15/11/2017	97361137	
7055710869	11006001	26/11/2017	12050104	05/09/2017	05/09/2017		EUR	15/11/2017	97361137	
7061094394	11006002	26/11/2017	12050104	05/09/2017	05/09/2017		EUR	15/11/2017	97361137	
7055710870	11006003	26/11/2017	12050104	05/09/2017	05/09/2017		EUR	15/11/2017	97361137	
7055710871	11006004	26/11/2017	12050104	05/09/2017	05/09/2017		EUR	15/11/2017	97361137	
7055710872	11006005	26/11/2017	12050104	05/09/2017	05/09/2017		EUR	15/11/2017	97361137	
7061094411	11006006	26/11/2017	12050104	06/09/2017	06/09/2017		EUR	15/11/2017	97361137	

Database created to group the *Detective Controls* monthly results

	SGPT			RBET			SGIT			SGFR			SGDE		
	Total Number of DC Performed	Different DC with Findings	Total Number of Findings	Total Number of DC Performed	Different DC with Findings	Total Number of Findings	Total Number of DC Performed	Different DC with Findings	Total Number of Findings	Total Number of DC Performed	Different DC with Findings	Total Number of Findings	Total Number of DC Performed	Different DC with Findings	Total Number of Findings
jan/17	[redacted]														
fev/17															
mar/17															
abr/17															
mai/17															
jun/17															
jul/17															
ago/17															
set/17															
out/17															
nov/17															
dez/17															

Tax Calendar created to group the Tax Obligations monthly Submissions

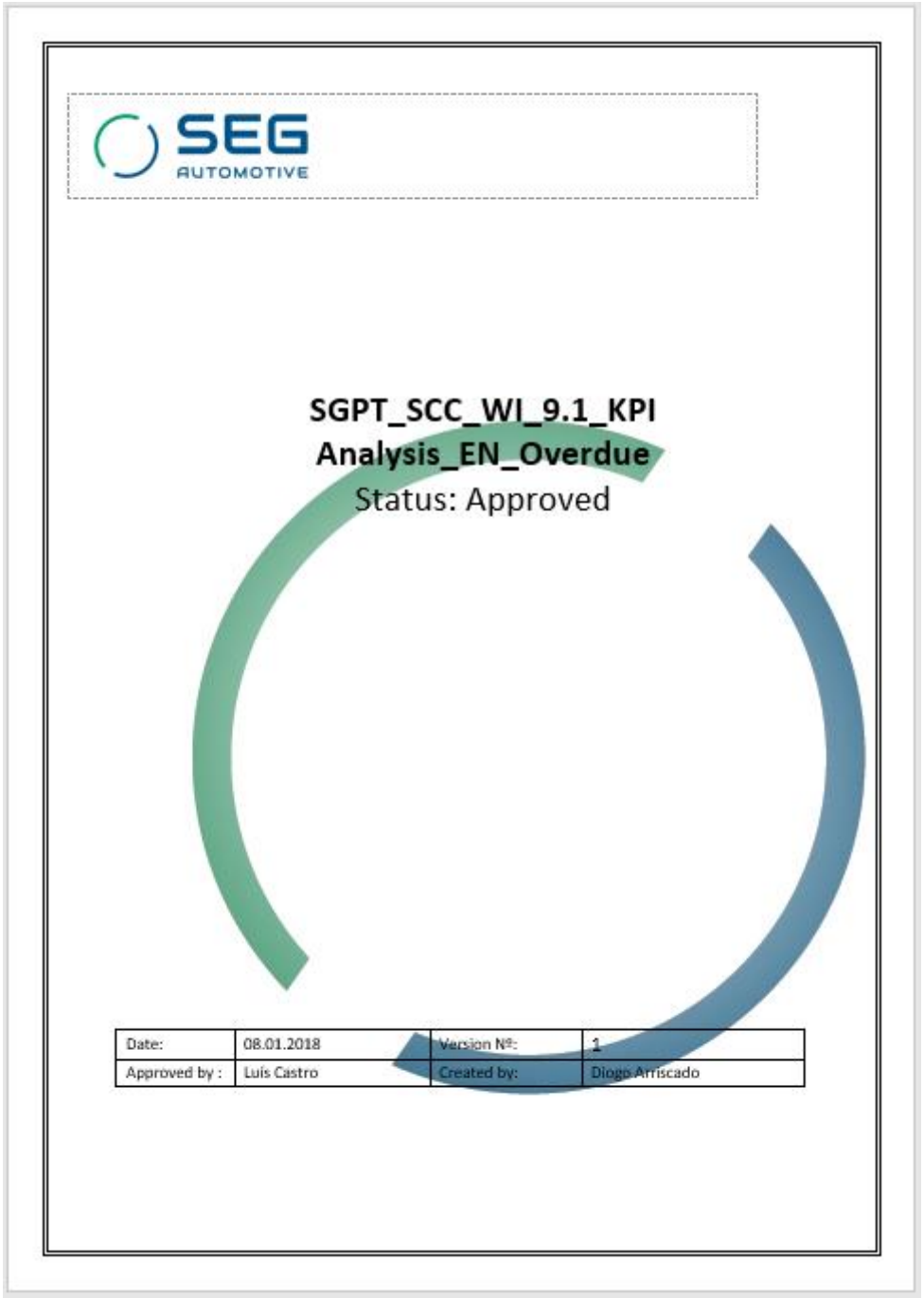
SEG AUTOMOTIVE

Calendário Fiscal 2017

Entidade	Obrigação	Descrição	Categorização	Janeiro			Fevereiro			Março		
				Data Limite	Data Submissão	Atraso	Data Limite	Data Submissão	Atraso	Data Limite	Data Submissão	Atraso
SGPT	Banco Portugal (Dia Útil)	Comunicação Operações/Posições com o Exterior	Outras comunicações/submissões	[redacted]								
SGPT	IVA Periódico	Envio da declaração periódica, e anexos, para os contribuintes no regime mensal	IVA									
SGPT	IES/ Declaração Anual	Envio da IES/Declaração Anual referente a 2016 e anexos aplicáveis	Declarações Fiscais									
SGPT	Dossier Fiscal	Constituição / entrega do processo de documentação fiscal referente a 2016	Declarações Fiscais									
SGPT	Preços de Transferência	Organização da documentação relativa política de preços de transf. referente a 2016	Documentação Preços Transferência									
SGPT	IVA SAF-T	Comunicação dos elementos das faturas (SAF-T)	IVA									
SGIT	VAT Calculation & Booking		IVA									
SGIT	Italian VAT Payment		IVA									
SGIT	WHT Payment		IRS + IRC									

APPENDIX B: SAP Extraction Manual

Job-Aid KPI Analysis – Overdue



Rights

Table of Contents

1. Process Overview

1.1 Process Describe

The KPI Tracking-Tool is a management tool that incorporates the main performance indicators of each one of the SEG Departments.

This document describes how to perform the SAP extraction about the Overdue Status, in order to be used as Database in the SCC KPI Tracking-Tool.

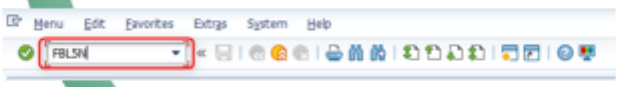
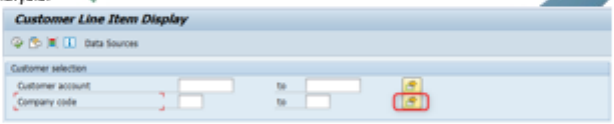
At the end of every month, this extraction should be performed in order to check the Overdue Numbers and Payments.

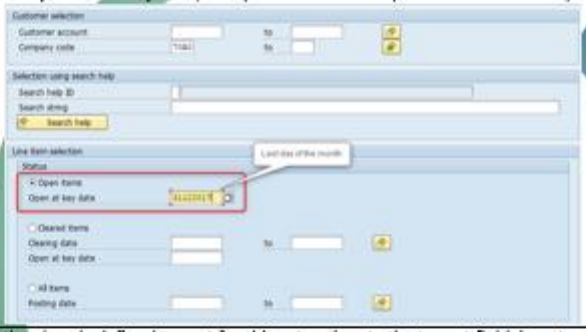
Besides the month of report analysis, it will be incorporated in this tool a monthly comparative analysis as well.

In this document, it's also presented how to add the extraction to the SCC Tracking-Tool.

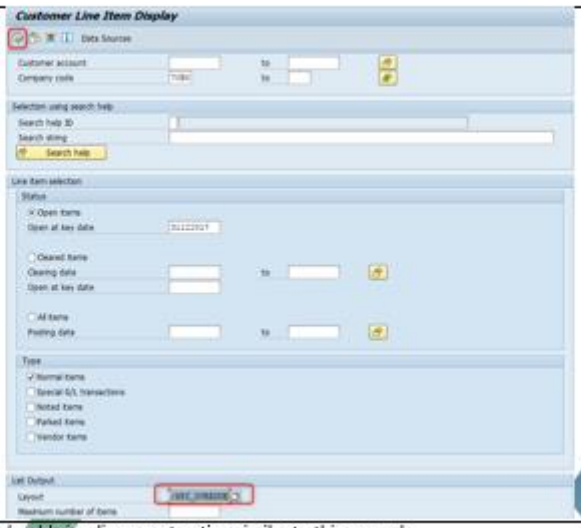
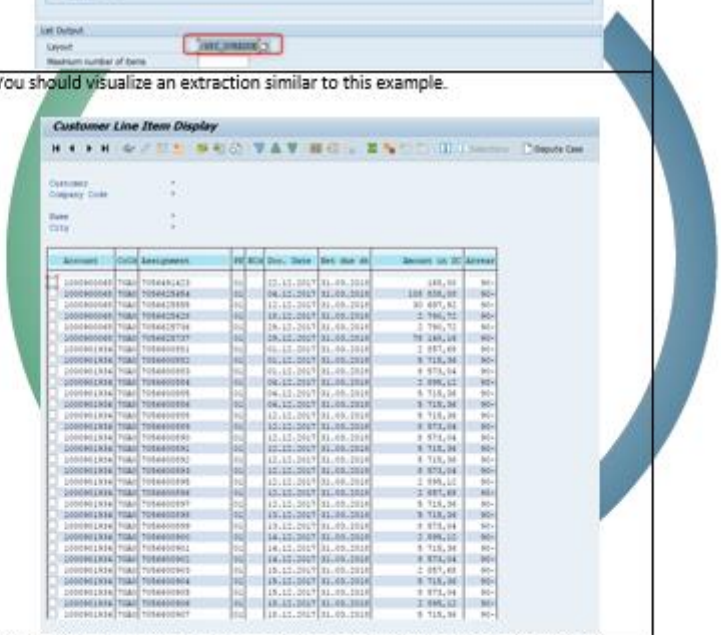
Because of the specifications in this extraction, it was important to document every step of the process.

1.2 Process by Step

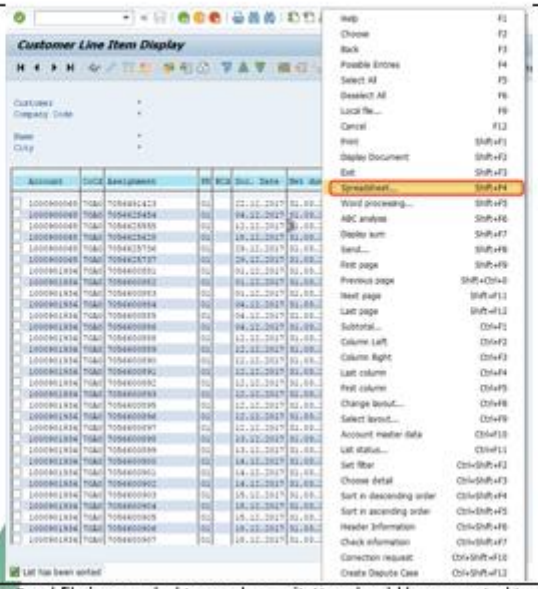
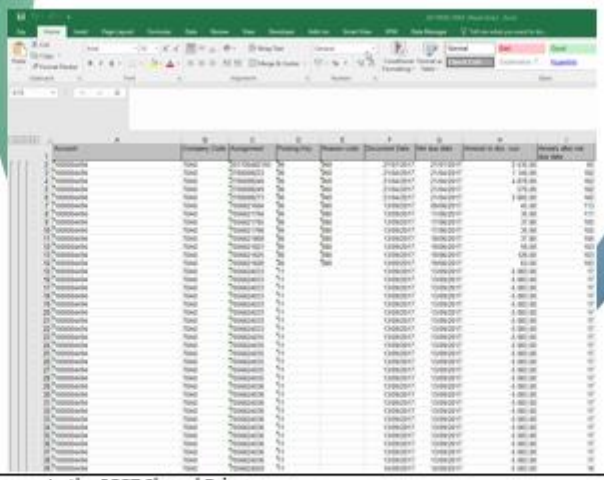
Step	Description
1	In SAP, enter the transaction code FBL5N. 
2	Select the Multiple Selection Company Code to enter the sales organizations in Analysis. 
3	Enter the Sales Organizations in analysis: [1] *7040* – France

	70B0 – Italy *71F0* - Germany Press Process [2] or use the shortcut F8. 
4	On the **Open Items Key Data**, always write the last day of the month in analysis. 
5	Use the already defined Layout for this extraction. In the Layout field, insert */KPI_OVERDUE*. Then press Process, or F8 for shortcut.

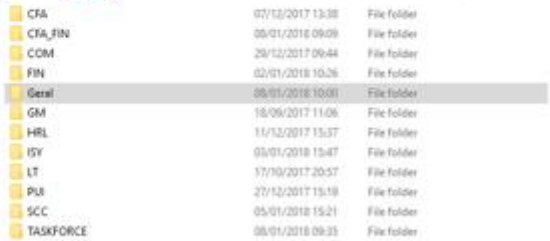
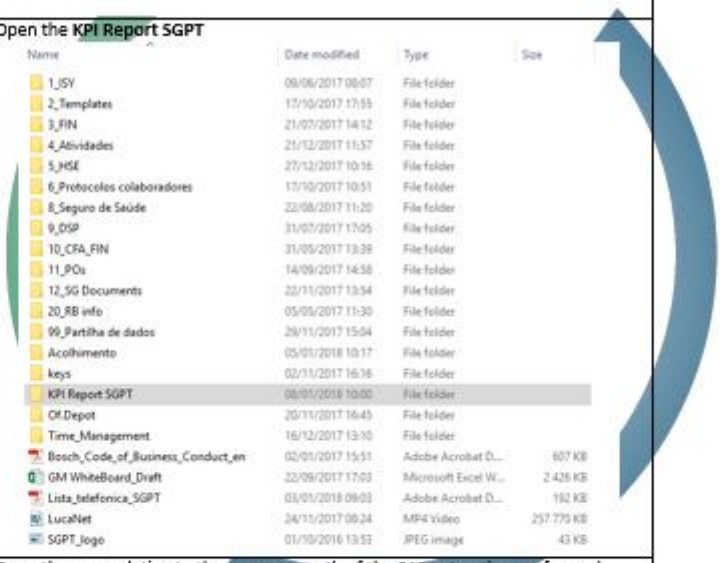
SGPT_SCC_WI_9.1_KPI Analysis_EN_Overdue

	
6	You should visualize an extraction similar to this example. 
7	Clicking in the right button of the mouse, or using Shift+F4 shortcut, extract it from SAP to a Spreadsheet.

SGPT_SCC_WI_9.1_KPI Analysis_EN_Overdue

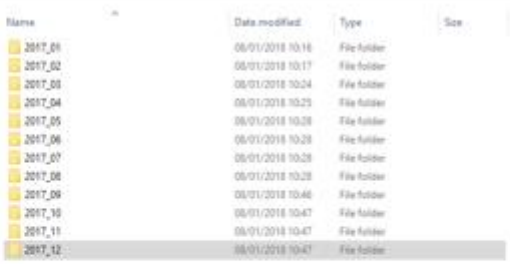
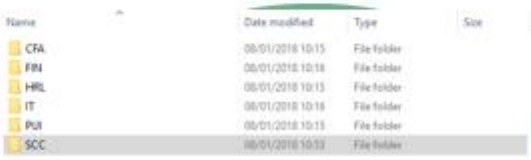
	
8	Save the Excel file in your desktop and open it. You should be presented to an Excel file similar to this one. 
9	Then, go to the SGPT Shared Drive.

SGPT_SCC_WI_9.1_KPI Analysis_EN_Overdue

	
10	Open the Geral folder. 
11	Open the KPI Report SGPT 
12	Open the year relative to the current month of the SAP extraction performed. 
13	Open the month relative to the SAP extraction performed.

Page | 7

SGPT_SCC_WI_9.1_KPI Analysis_EN_Overdue

	
14	Open the **SCC Department** folder. 
15	Open the **KPI Tracking-Tool SCC** file. 
16	Choose the sheet **Overdue Database** [1]. Paste as values your extraction from SAP to this Excel sheet [2]. For all the new values you have pasted, insert the Month-Year in the orange column [3]. 
17	Save the document and Exit.

1.3 Process Linkage

1.4 Reviewed History

Reviewed by	Date	Approved by	Comments

End of Document