Original Article

Data Analytics to Increase Performance in the Human Resources Area

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ABSTRACT

In a digital era, traditional areas like Human Resources have to adapt themselves to stay alive and competitive. The processes have been drastically changing from paper and talks into systems and workflows. Data is now more than ever in the spotlight and have become an essential asset to ensure delivery, performance, quality and predictability. But first, data has to be organized, combined, verified, treated and transformed to become meaningful information, not forgetting automatized to be delivered in time and supporting decision making in a daily basis. Business Intelligence (BI) is the tool capable to do it and we are the minds to pull it off.

Keywords: Data; Analytics; Digital; Human Resources; Performance; BI; Power BI

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1. Measuring the HR

One of the most crucial element of any BI model and Data Analytics is a well stablished data acquisition method, as Peter Drucker once said "You can't manage what you can't measure.", but is it really possible to measure HR work? And what gains can we have? Digital tools and standardized processes are the key to allow it and if Peter Drucker (again) wasn't wrong "What's measured improves".

For today's standard remain competitive, very often it means to be cost-efficient while ensuring good services quality. In order to accomplish it and stay in front of the competition, data analytics prove to be a strong ally. Isn't a simple task, HR is a very traditional area and to introduce a data-driven mindset can be challenging and probably only visible results can open the way for the digital transformation.

1.1 Data acquisition, definitions and reporting

Data can be anywhere at any format and it requires the right tools and skills to identify and mining it. In this work we faced the likes of nine different HR systems each one of them with their own purpose and format. Microsoft's software Power BI was used to pull the data from all of those and make sense of it.

The ETL (Extract, transform and load) is handled by Power Query within Power BI, which has multiple connectors to bring data from a variety of sources and uses the M language to transform, merge, combine and enrich. It has to be done very carefully and takes in overall a considerable time to ensure data quality and accuracy for the next stages of creating reports, dashboards and KPIs.

Once ETL is completed, the data is transferred to a new environment inside the software, previously called as Power View, where you can visualize the treated information and build reports using a set of visuals (charts, tables, cards etc.) to help you to tell the story and bring the insights, also allowing you to take full advantage of the powerful DAX language to do from the simpler to the most

complex calculations, called as measures within the software.

2. KPI and BI Dashboard

The KPI (Key point indicator) is a quantifiable measure used to evaluate the success of an organization, employee, etc. in meeting objectives for performance[1]. That said, it's required to be well defined by the leadership what are the measurable of the processes related to quality, performance and/or others factors that will be evaluated over time.

A business intelligence dashboard (see **Figure 1**) is an information management tool that is used to track KPIs, metrics, and other key data points relevant to a business, department, or specific process. Through the use of data visualizations, dashboards simplify complex data sets to provide users with at a glance awareness of current performance[2].

Figure 1. A sample of BI dashboard utilized by HR to follow up on KPIs, performance and quality metrics.

In a modern HR there will be traditional metrics related to the business like turnover, overtime and absenteeism, but also more recent ones related to the performance of the HR operating model such as SLA, backlog, response time and customer satisfaction survey.

3. SLA

A service-level agreement (SLA) is a commitment between a service provider and a client. Particular aspects of the service-quality, availability, responsibilities-are agreed between the service provider and the service user[3]. It's on the highest level of importance and directly reflects if the services are reliable and respectful with the customer expectations. The equation (1) show how it was calculated and the results (see **Figure 2**) can be analyzed over time before and after the implementation of data analytics.

$$= CALCULATE(DIVIDE([.Closed\ InTime];[.Closed\ cases]); [SLA\_time]>0) \tag{1}$$

Figure 2. The SLA attainment over time of the HR requests, extracted from the HR performance report.

4. Backlog

Value of unfulfilled orders, or the number of unprocessed jobs, on a given day. Backlog indicates the workload that is beyond the production capacity of a department[4]. It can reflect how much stable or not the process behaviors and how sustainable it is over time, also has an indirect impact in the SLA and customer satisfaction. The equation (2) show how it was calculated and the results (see **Figure 3**) can be analyzed over time before and after the implementation of data analytics.

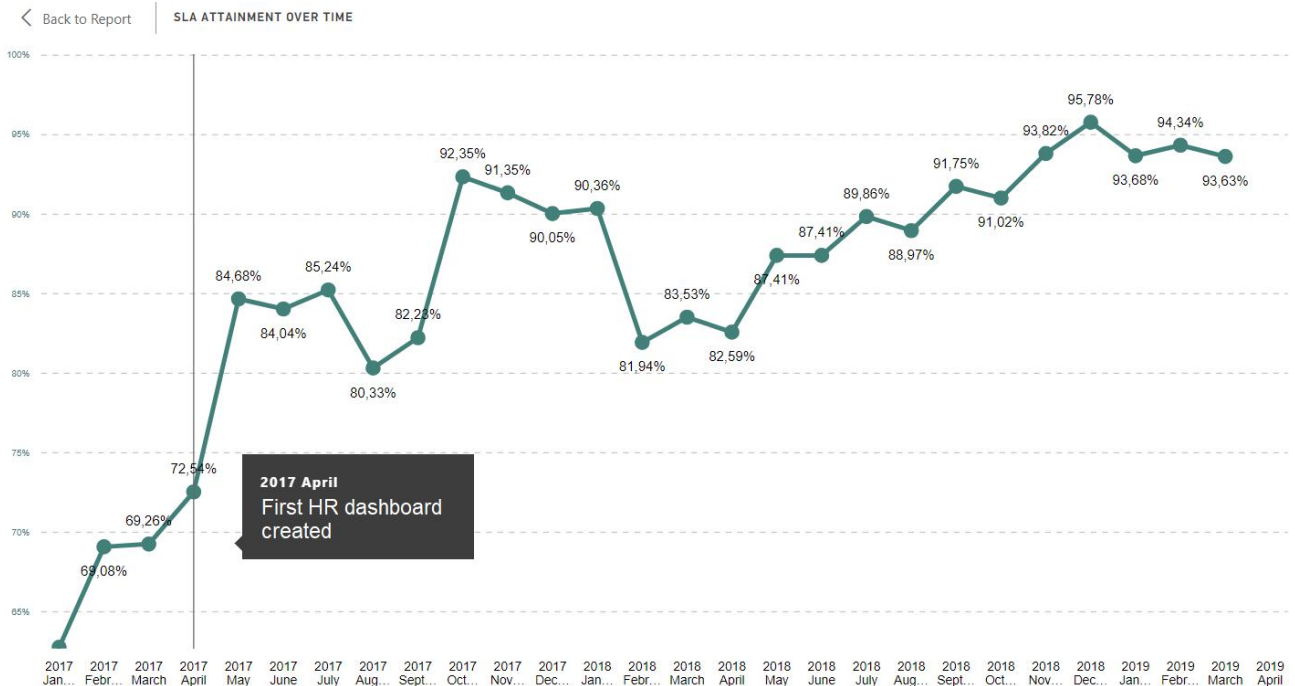*[.Opened (acum)]-[.Closed (acum)]* $\quad$ (2)

[.Opened (acum)] = CALCULATE([.Opened cases] ;

FILTER(ALL('Calendar') ; 'Calendar'[Date] <= MAX('Calendar'[Date]))) $\quad$ (3)

[.Closed (acum)] = CALCULATE([.Closed cases] ;

FILTER(ALL('Calendar') ; 'Calendar'[Date] <= MAX('Calendar'[Date])) ; $\quad$ (4)

USERELATIONSHIP('Calendar'[Date] ; 'System'[closed date]))

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Figure 3. The backlog of requests that HR had day-by-day, extracted from the HR performance report.

5. Response time

Customer response time is the period between the placement of an order and the delivery goods or services. It can also refer to the delay in communication or response from business to customer. In other words, it is the time between when a customer makes an inquiry about a product or commits to a purchase a good or service and when it is actually received by said customer[5]. Directly impact the customer and his perception of the services delivered. The equation (5) show how it was calculated and the results (see **Figure 4**) can be analyzed over time before and after the implementation of data analytics.

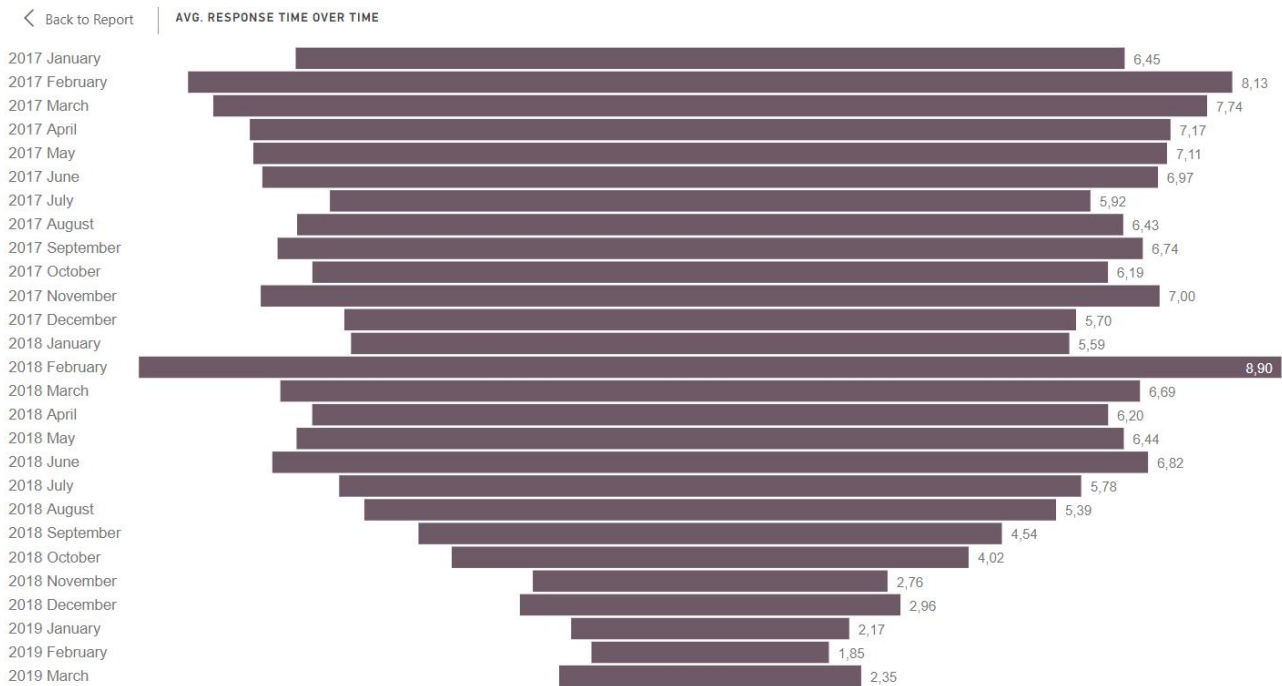$$= IF([closed]="0";DATEDIFF([createdate];TODAY();DAY);[time\_to\_close]) \tag{5}$$

Figure 4. The average of the response time in days by month and over time, extracted from the HR performance report.

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6. Customer Satisfaction Survey

Process of discovering whether or not a company's customers are happy or satisfied with the products or services received from the company. Customer answers to questions are then used to analyze whether or not changes need to be made in business operations to increase overall satisfaction of customers[6]. An important factor to ensure that services are being delivered not just within the agreed time but also with satisfactory quality. Results (see **Figure 5**) can be analyzed over time since it was implemented.

Figure 5. The overall result and the average over time of the customer satisfaction survey, extracted from the HR performance report.

6.1 Notes on the KPI and rates calculation

There is no universal convention on how to calculate those metrics and it can have different formulas for different companies and/or countries, depending on factors as such systems, culture, company values, labor law etc.

7. Final conclusions

Finally, we can attest that Drucker was right. Of course the amazing results we saw are merits of a lot of hard work from all HR people involved but is unquestionable that when you know and have property, ownership on something you can work to improve it more and more. The gains in performance were incredible in a relatively short period of time and with no increase of personnel, sustainable quality and predictability were achieved allowing the right allocation of resources in the right moment with data-driven decisions. Data analytics and BI tools has proven indeed to be a strong ally and partner to business even on traditional areas such as Human Resources, once you have the information operating without it is like operating blindly, there is no turn back, the hunger for information only increases. "In God we trust, all others must bring data." said W. Edwards Deming.

Data has already become a valuable asset for all type of business and the good news is it's getting bigger. According to Forbes, the amount of data we produce every day is truly mind-boggling. There are 2.5 quintillion bytes of data created each day at our current pace, but that pace is only accelerating with the growth of the Internet of Things (IoT). Over the last two years alone 90 percent of the data in the world was generated[7].

The rest of this paper is arranged as follows: Section 2 introduces related works including signal acquisition, signal preprocessing and feature extraction. Section 3 introduces the design method of deep neural network. Section 4 the experimental results are discussed.

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