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### RESEARCH ARTICLE

#### AUTOMATION IN DECISION MAKING AND IT AS A BUSINESS AGENT

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#### Abstract

Making decisions such as checking numbers, analyzing movements, data, values is a very important factor for a company. These are activities that make it a daily challenge for a manager, making it even more difficult if performed manually. If the calculation of the data occurs erroneously, the leader can make the wrong decision and the time lost to get to the result ends up occupying his working schedule completely. The work presents the problems that lead to the stock of a glass factory in Manaus-AM, since the main system of the company in question, does not have the ability to provide the necessary data to do studies of materials, and will be implemented a Business Intelligence tool (BI - Qlik Sense) for the construction of dashboards, able to integrate together with the company's system, automating the updating of data and facilitating the manager to read the data clearly and objectively, facilitating the study of inventory.

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#### Introduction:-

Information Technology (IT) is a profession with numerous benefits and areas that can be explored to add value in society, such as information security, application of techniques with hardware, software development, data communication and even collaborating with business processes, automating possible work routines, solving problems applying concepts and techniques.

Any company that has its steam growth ambitions must continue to update itself on the tools that are available and invest in people qualified to drive the needs of the company. As Advocated by Professor Renato Veloso (2017, pg. 10) Information and Communication Technologies are one of the most expressive modalities of the current technological advance, and the identification and reflection on its possibilities of application to work has been one of the concerns of several professions.

With the advancement of technology, the market has been demanding that corporate activities be executed more quickly, to grow and stay on top among its competitors, which makes it necessary technical knowledge to be possible to deploy new tools. The increasingly strong and marked presence of such technologies in our society has been suggesting and pointing out several modalities of appropriation, aiming at the improvement and improvement of work. (VELOSO, 2017, pg.10)

T.I offers several options of possibilities, such as prospecting the future through existing data, being propagated through studies, which is now evolving in the market data analysis, making the presence of IT professionals to perform techniques and making it a business agent, showing that decision-making in the corporation can be more effective with the help of tools and solutions that simplify the environment for management.

Most companies have their fixed sectors such as HR, Work Safety, Commercial, Marketing, Financial, Tax, Warehouse, and all sectors need to have a responsible to manage the team, production, effectiveness, and indicators showing their production and progress. Good management has a great weight when it comes to the growth of the corporation, making the processes are measured and adjusted if necessary, maintaining the processes already created and facilitating the improvement of existing and creation of new ones.

In a glass industry, located in Manaus-AM, is suffering challenges to manage its stock of products for resale, hindering inventory management and the creation of future projects.

The B.I (Business Intelligence) is the strategy that makes the process of data collection and transformation in a valuable and objective way, in this line of thinking, as advocated by Eliezer Botentuit (2022, pag.1) data analysis is the process of applying statistical and logical techniques to evaluate information obtained from certain processes. The tool allows the creation of dashboards to analyze the data quickly and interactively, with the tool deployed, it is possible to offer real-time data, increasing the level of veracity and assertiveness of the information presented graphically, creating reports by dimensions such as customer, store, seller, product, city, creating opportunities for ideas and parameters for leadership.

In the article will be shown the effectiveness after the implementation of the B.I and made a comparison in the inventory control of the Warehouse of the company P.V with reference in decision making, leaving it more agile in making choices, facilitating the purchasing decision on different occasions, taking some considerations such as the month of the year that most had sales flow of certain items during the life cycle of the company.

### **Theoretical Framework**

The Theoretical Framework was structured in five topics, which are:

1. Importance of Corporate Management for advancement;
2. Efficiency of Information Technology;
3. Data Analysis;
4. The T.I Business Agent;
5. Tool: Qlik Sense (Business Intelligence - B.I);

### **Importance Of Corporate Management For Advancement**

It is a fact that any statement regarding waste in the business field mainly that of time is loss of money, and results. For the time an employee spends with a certain activity without proper instruction could be the time he could be spending to continue another task or finalizing and starting another. To assist on a day-to-day high with maintenance occurrences, equipment failures and machinery, in organizational environments there are tools and methodologies that can be adopted, thus facilitating the direction of our decisions, waste of time and the focus that really impacts on productivity and company results. (PENEDO, 2020, pg 16).

Poorly designed or even unknown processes can become a major enemy of the operation, causing unnecessary efforts, misuse of tools and raw materials causing rework in what could be used for other purposes.

Processes correspond to a set of interrelated resources and activities that receive insums, transforms them, according to a pre-established logic and with value aggregation, into products and services, to respond to the needs of customers. We also say that process is a set of activities, with beginning and end, with inputs and outputs defined.

We can say that the faster an activity is carried out, we can move on to another generating value for the business and showing that the way in which it was performed is effective and that it is a path that must be followed to succeed.

### **Information Technology Efficiency**

Information technology (IT) has been following us since the dawn of humanity, where humans have begun to create tools to facilitate and not be entirely dependent on nature.

Today we live in a society surrounded by technology, information easily accessible, for all ages and genders, for some it is still difficult to adapt with such ease and convenience, for others can no longer imagine themselves without all the benefits that technology brings, according to IBGE more than 155 million Brazilians have mobile phones for personal use.

For many the technology is only for leisure, but companies also use technology to their advantage, efficiently and effectively, some companies are concerned about the advancement of technology, end up updating themselves by the time and use the technology to store data in the cloud, reliability, information security, process automation, use technology to create new software and systems.

IT is also not perfect, carries with it virtual dangerousness, evolution comes both to benefit, as evildoers also evolve to harm users, so it should be used in the right way, for a corporation, is oriented that follow the standards of the LGPD (General Data Protection Law) Law No. 13,709/2018, was created with the aim of guiding how user data should be used, some good practices that must be followed, according to Art. 49. The systems used for the processing of personal data must be structured in such a way as to meet security requirements, standards of good practice and governance and the general principles provided for in this Law and other regulatory standards.

Well-applied IT can reach high levels, moving to areas of security, development, infrastructure, data analyst and other areas that are essential for the company.

### **Data Analysis**

As mentioned above, data analysis has been having a big impact on companies today, a company that can treat their data in various ways that can be imagined and obtains metrics that build competitiveness from it is a great differential.

Currently many of these techniques are being applied to improve decision-making processes in all aspects of sports, a boiling area called sports data analysis (SHARDA, 2019, pg 1).

For data analysis to be performed a proximity to IT is necessary, as it must involve a lot of knowledge in tools and techniques that IT make up, even if it is necessary knowledge in other areas to become complete.

Computerized applications have gone from transaction processing and monitoring activities to analysis and troubleshooting tasks, and much of this through cloud technologies, in many cases accessed via mobile devices. Data analysis and BI tools such as data storage, online analytical processing, dashboards and use of cloud-based systems to support decisions are the pillars of modern management (SHARDA, 2019, PG 9).

### **IT Business Agent**

The business environment is constantly evolving, becoming increasingly complex. Organizations, both public and private, are under pressure to react quickly to such an evolution and innovate their modus operandi. This requires organizations to be agile and make frequent, fast, strategic, and tactical operational decisions, some of which are quite complex. For such a decision to be made, a considerable amount of relevant data, information and knowledge may be required (SHARDA, 2019, pg 1).

As mentioned in Data Analysis, a close proximity to THE is necessary, and what makes it more complete is to have the knowledge in other areas to return a more robust result, but the focus of the article is to make the IT the business agent, and to have decision-making as a determining factor within the organization through the techniques that are performed by it, such as having a complete report extracted by tools and commands in which it develops and can get an overview of how the company is behaving in all sectors, and from there what are the best results that can be obtained based on the information that has been abstracted. Remembering that the main focus is on the warehouse sector in which the research was carried out.

### **Tool: Qlik Sense**

Qlik Sense is a data analysis tool, a BI platform, that uses Artificial Intelligence capabilities to make connections between data automatically and intelligently, where data is provided for decision making. It allows visualization in a dynamic and interactive way, speeding up data analysis, and can show several ways to study a single data, diversifying the ways of being seen by the manager.

The tool has some types of versions, cloud models, server and desktop, but having the tool being used in the cloud, generates an ease, because any device that has access to the Internet, can access and make modifications in data visualization, just have access to an account on the platform, still have the possibility to share projects with other users, so it is possible to create projects collaboratively.

### Methodology:-

Based on the objectives that were explained in the introduction, the procedures that will be performed for the research consist of presenting the results obtained, through a quantitative methodology, and the data were collected by the Google Forms tool, also helped us to obtain information regarding the results that the BI tool is promoting for the company. The form will be of paramount importance to draw the conclusions regarding the project that was implemented in the company, will be divided into two scenarios, the first of which was the decision in the purchase of the products before the tool and the other with the implementation of the same.

The collection of these data will be composed with questions with multiple choices to obtain an average of what the scenario of the warehouse sector was in relation to the decisions made, such as: the time measures in the fulfillment of orders, the metrics of the type of product to be requested, and after the implementation that shows in detail of various topics and that can be measured at the time of making the decision.

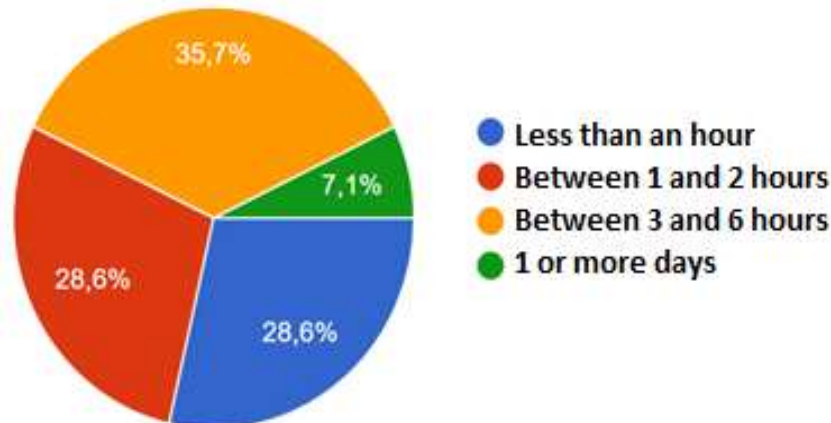
### Results:-

To present the results, internal research was carried out in the company, to demonstrate the effectiveness that the tool brought to employees. The tool was implemented in order to increase management productivity to analyze reports and be able to make faster and more assertive decisions, and the difficulty and the average time to extract information from the company's main system (Webglass) was pointed out before the BI tool was deployed.

During the analysis that was performed, it was taken into account what the scenario was like before the implementation of the tool and after they had contact with it, focusing on the average time of data extraction, the difficulty they encountered, the adaptation with the tool among others.

With the use of Business Intelligence can have several types of prospecting within the company, the same was done only for the sectors that benefited from the tool, which will still be done in several other sectors, the data was generated by Google Forms and answered by 14 people, from this it was possible to assemble graphs that will be demonstrated below.

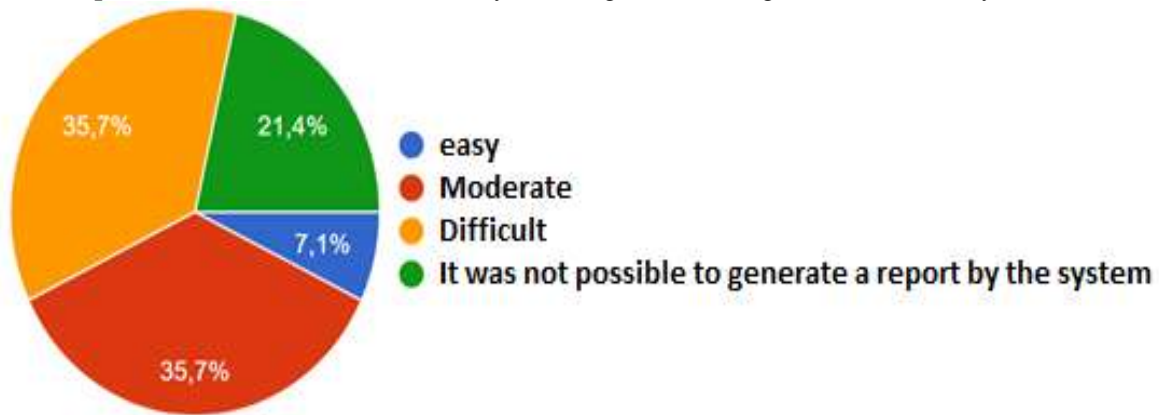
**Graph 1:-** According to the options, how much of your time on average did it take to extract the data from the system as desired?



Source: Own Authorship, 2022.

Graph 1 shows that 35.7% of the people interviewed took between 3 and 6 hours to extract data from the company's main system, the rest were tied with 28.6% between 1 and 2 hours and 28.6% with less than 1 hour to extract the data.

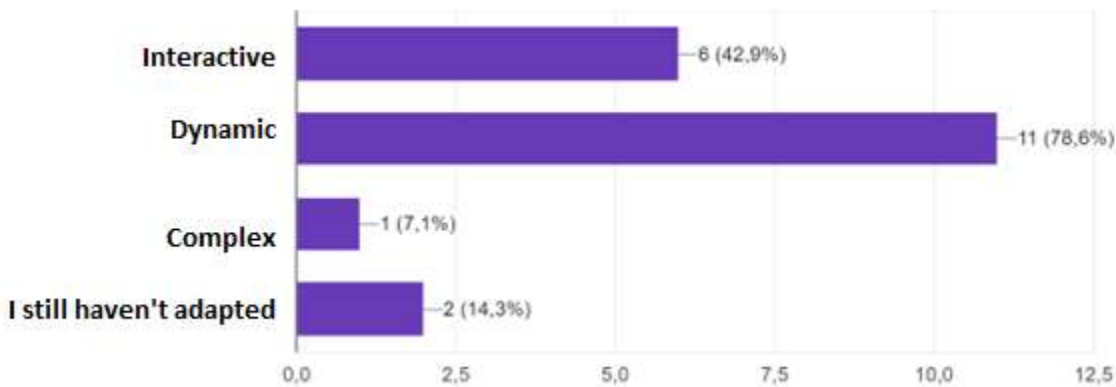
**Graph 2:-** What was the level of difficulty in finding and extracting the data from the system?



Source: Own Authorship, 2022.

Graph 2 shows the relationship of how difficult it was to extract data in the company's system, it is shown that 35.7% had many difficulties in generating reports and 21.4% could not generate a report by the system.

**Graph 3:-** How was your adaptation with the Qlik Sense tool?

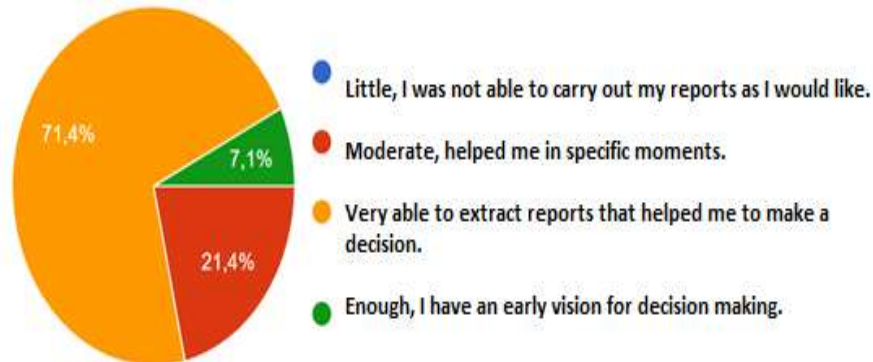


Source: Own Authorship, 2022.

Soon after the implementation of the tool was surveyed to know the level of user satisfaction related to the reports created and how was the adaptation with the new tool, as we can see in graph 3, 78.6% reported that the system is dynamic, 42.9% interactive and 14.3% has not yet fully adapted with the new tool.

The upcoming charts show the level of satisfaction users have had with implementing the tool.

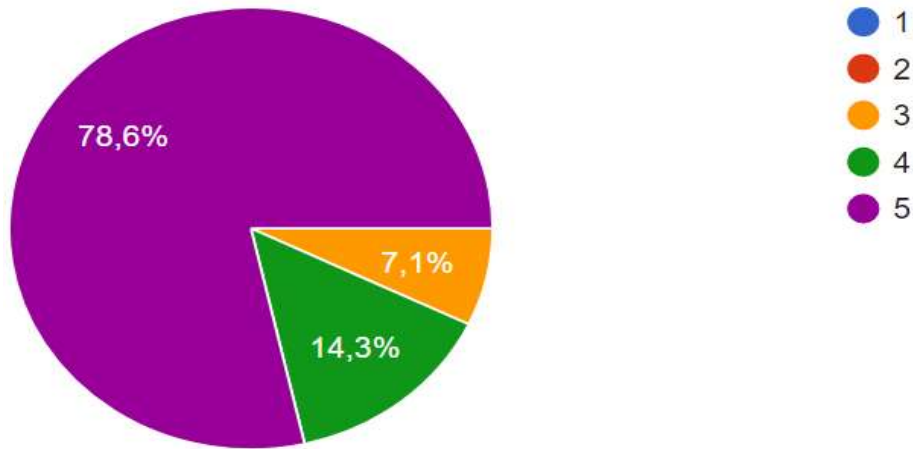
**Graph 4:-** According to the options, how would you rate how much Qlik Sense helped?



Source: Own Authorship, 2022.

In graph 4, the users were asked a classification of how much the tool helped, the data collected is that the tool helped a lot, having an early view for a decision making 7.1%, 71.4% helped a lot, managing to extract reports that helped me for a decision making, among the alternatives 21.4% of people benefited only at specific moments.

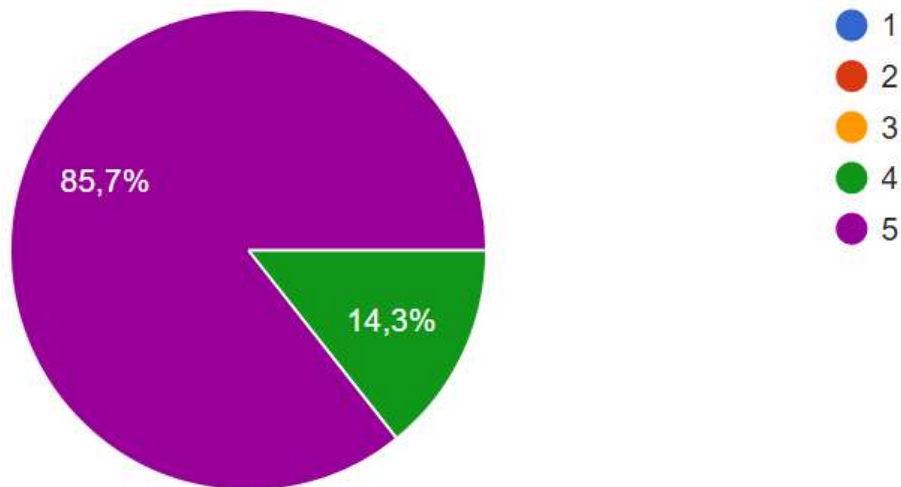
**Graph 5:-** On a scale of 1 to 5, how much do you think can improve data analysis by Qlik Sense?



**Source: Own Authorship, 2022.**

In Graph 5, a scale was put from 1 to 5, and 78.6% believe that data analysis will improve with the help of the BI tool.

**Graph 6:-** On a scale of 1 to 5, how much would you recommend the Qlik Sense tool to other companies?



**Source: Own Authorship, 2022.**

The BI tool, with numerous benefits, was asked to users if in a ladder from 1 to 5 what would be the recommendation of the tool, as shown in the graph 6 85.7% of users would recommend the tool to other companies.

### Discussion Of Results:-

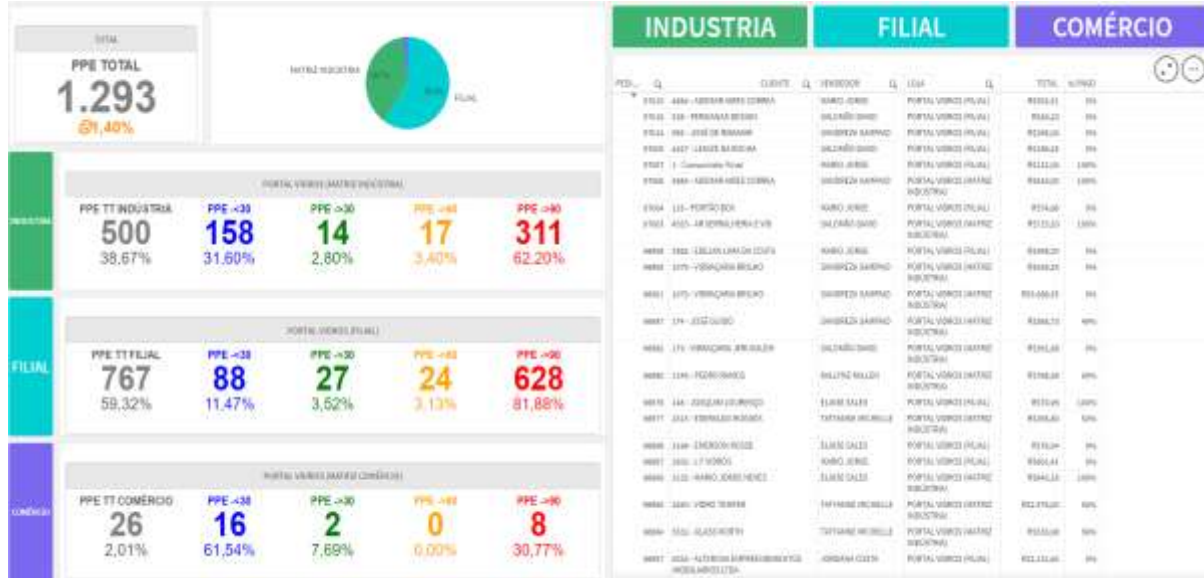
After performing the search, you can see that there are two scenarios, the before and after the deployment of the tool. Having as conclusion that when there were no tool implanted people had difficulties in extracting the reports and draw their conclusions regarding the entry and exit of the stock, and after using the tool they feel easier to follow up and make their decisions as is being commented.

It is possible to identify that for some the tool can be complex, especially with those that do not have ease with the technology, however for the other, the tool perfectly met expectations, streamlined the processes of reporting, even in specific problems, and in more elaborate reports that enabled decision making, as shown in the charts

(Dashboards) below. It was performed with the automatic updating of the graphics was every two hours throughout the day so that there was no overload in the database, because there were other tasks that depended on it around the company.

The Dashboard was created in order to show the manager of the materials sector, the orders that are stop in the shipment, these orders are those that are ready but the customer did not make the withdrawal:

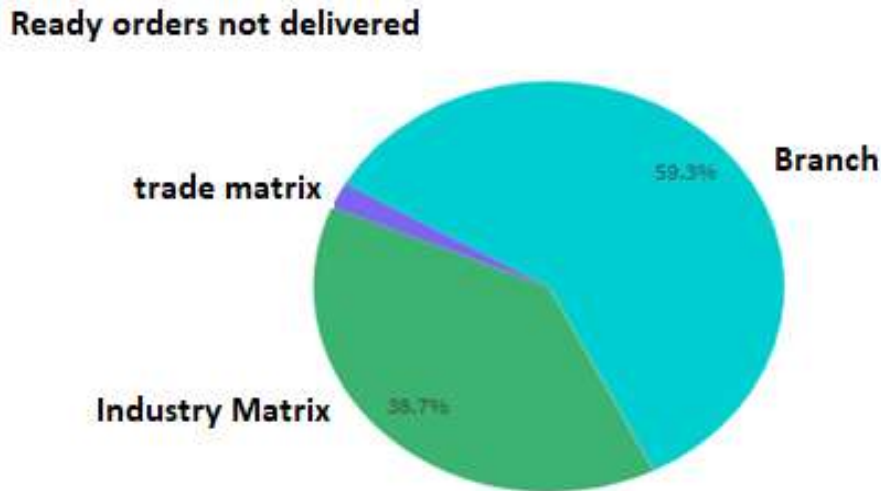
Table 1:- Initial dashboard.



Source: Qlik Sense, 2022.

In this pie chart it was demonstrated the percentage of total orders separated per store, that is, according to the chart, shows that the highest percentage of orders are in the Branch unit with 59.3%:

Graph 7:- Total separate orders.



Source: Qlik Sense, 2022.

This is the detailing of orders separated by stores, quantities of orders ordered ed in shipment (PPE) with the following parameters: less than 30 days, between 30 and 60 days ago, between 60 and 90 days ago and orders more than 90 days that are stop in the shipment, and also shows the percentage equivalent to store, for example, the

Matrix Industry store with 311 orders that are located on shipment with more than 90 days, represents 62.20% of the orders of the Industry Matrix:

**Table 2:-** Filtered stop orders per day.

PORTAL VIDROS (MATRIZ INDÚSTRIA)				
PPE TT INDÚSTRIA	PPE -<30	PPE ->30	PPE ->60	PPE ->90
<b>500</b>	<b>158</b>	<b>14</b>	<b>17</b>	<b>311</b>
38,67%	31,60%	2,80%	3,40%	62,20%

PORTAL VIDROS (FILIAL)				
PPE TT FILIAL	PPE -<30	PPE ->30	PPE ->60	PPE ->90
<b>767</b>	<b>88</b>	<b>27</b>	<b>24</b>	<b>628</b>
59,32%	11,47%	3,52%	3,13%	81,88%

PORTAL VIDROS (MATRIZ COMÉRCIO)				
PPE TT COMÉRCIO	PPE -<30	PPE ->30	PPE ->60	PPE ->90
<b>26</b>	<b>16</b>	<b>2</b>	<b>0</b>	<b>8</b>
2,01%	61,54%	7,69%	0,00%	30,77%

**Source:** Qlik Sense, 2022.

This Dashboard was created to show compactly the revenue obtained, amount of customer served in several cities, colors are separated by routes:

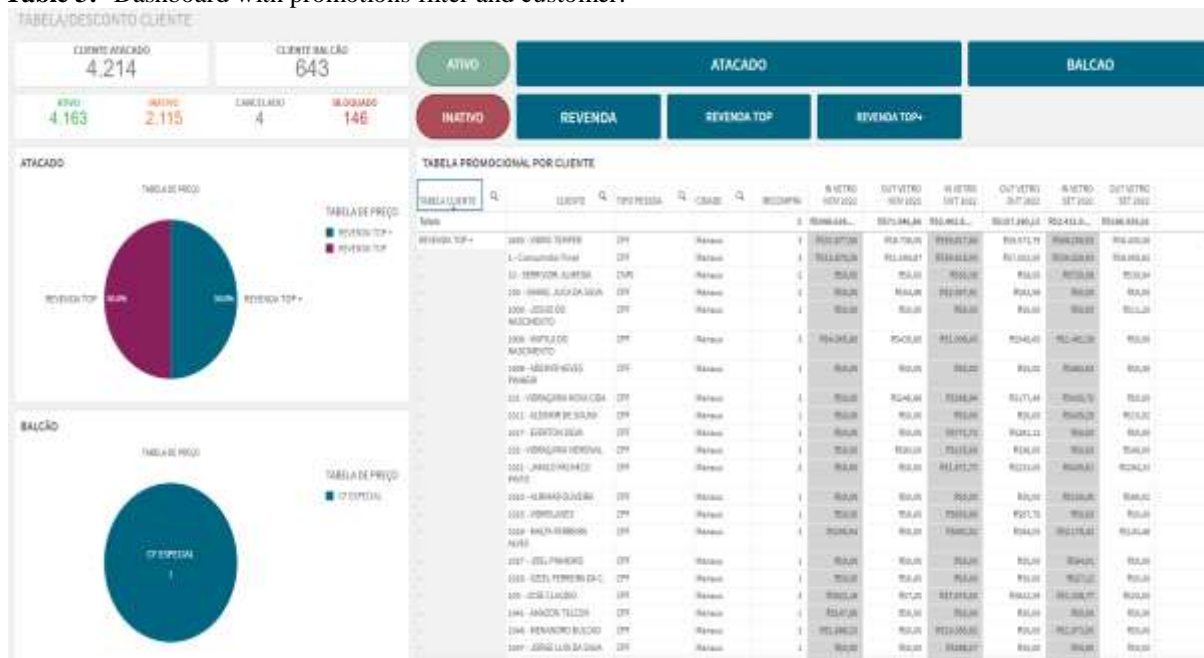
Map 1:- Map of the Amazon by route.



Source: Qlik Sense, 2022.

The following image, refers to a screen that was created to view customers according to the promotional table, that is, a way to facilitate the visualization of the sales manager to see who the customers are according to the filters, analyze the repurchase and billing of the same of the last 3 months, do customer analysis to understand if the customer actually fits into the discount table that it is currently:

Table 3:- Dashboard with promotions filter and customer.



Source: Qlik Sense, 2022.

In this table, it shows in more detail the customers separated by city and type of person, the amount they made purchases in the periods that were determined, as well as the type of glass that was purchased, as well as their repurchase.

Table 4:- Promotional table by customer.

ATIVO		ATACADO				BALCAO				
INATIVO		REVENDA	REVENDA TOP	REVENDA TOP+						
TABELA PROMOCIONAL POR CLIENTE										
TABELA CLIENTE	CLIENTE	TIPO PESSOA	CIDADE	RECOMPRA	IN VETRO NOV 2022	OUT VETRO NOV 2022	IN VETRO OUT 2022	OUT VETRO OUT 2022	IN VETRO SET 2022	OUT VETRO SET 2022
Totais				3	R\$988,628...	R\$71.946,88	R\$2.402,8...	R\$157.280,13	R\$2.412,9...	R\$186.929,61
REVENDA TOP+	3450 - VIDRO TEMPER	CPF	Manaus	1	R\$31.677,40	R\$5.738,00	R\$39.617,94	R\$5.075,79	R\$8.206,30	R\$6.430,00
	1 - Consumidor Final	CPF	Manaus	3	R\$15.879,36	R\$1.039,07	R\$39.618,33	R\$7.002,50	R\$4.329,92	R\$8.900,42
	10 - SERVIDOR ALMEIDA	CNPJ	Manaus	1	R\$0,00	R\$0,00	R\$65,38	R\$6,00	R\$20,00	R\$30,34
	100 - ISMAEL JUCA DA SILVA	CPF	Manaus	2	R\$0,00	R\$0,00	R\$2.397,02	R\$2,58	R\$0,00	R\$0,00
	1000 - JOSUE DO NASCIMENTO	CPF	Manaus	1	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$11,20
	1050 - NATILIA DO NASCIMENTO	CPF	Manaus	3	R\$4.005,88	R\$439,00	R\$1.006,43	R\$346,00	R\$1.483,38	R\$0,00
	1055 - ADEMIR NEVES FINHEIR	CPF	Manaus	1	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$403,43	R\$0,00
	101 - VIDRAÇARIA NOVA CIDA	CPF	Manaus	8	R\$0,00	R\$240,84	R\$98,84	R\$177,44	R\$40,70	R\$0,00
	1013 - ALDEMAR DE SOUSA	CPF	Manaus	1	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$499,28	R\$19,58
	1017 - EVERTON SILVA	CPE	Manaus	1	R\$0,00	R\$0,00	R\$771,72	R\$281,12	R\$9,00	R\$0,00
	102 - VIDRAÇARIA VIDROVAL	CPF	Manaus	3	R\$0,00	R\$40,00	R\$193,44	R\$94,00	R\$0,00	R\$49,00
	1023 - JAMILDO PACHECO FINO	CPF	Manaus	2	R\$0,00	R\$0,00	R\$1.871,73	R\$211,00	R\$439,41	R\$294,43
	1023 - ALRIMAR OLIVEIRA	CPF	Manaus	1	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$128,10	R\$69,00
	1025 - VIDROLAGES	CPF	Manaus	1	R\$0,00	R\$0,00	R\$50,00	R\$47,79	R\$0,00	R\$0,00
	1026 - MALTA FERREIRA RIVES	CPF	Manaus	2	R\$200,34	R\$0,00	R\$83,13	R\$4,00	R\$2.178,43	R\$143,44
	1027 - JOEL FINHEIRO	CPF	Manaus	1	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$4,41	R\$0,00
	1028 - OZIEL FERREIRA DA C.	CPF	Manaus	1	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$27,12	R\$0,00
	103 - JOSE CLAUDIO	CPF	Manaus	3	R\$822,16	R\$7,00	R\$7.879,33	R\$622,58	R\$1.338,77	R\$24,00
	1043 - AMAZON TELCOZ	CPF	Manaus	1	R\$147,40	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$0,00
	1046 - HENRIQUE SULLAO	CPF	Manaus	3	R\$1.006,32	R\$0,00	R\$10.389,82	R\$0,00	R\$1.073,35	R\$0,00
	1047 - JORGE LUIS DA SILVA	CPF	Manaus	1	R\$0,00	R\$0,00	R\$188,17	R\$0,00	R\$0,00	R\$0,00
	1048 - DANI EL SILVA MARIANO	CPF	Manaus	1	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$0,00	R\$0,00

Source: Qlik Sense, 2022.

**Conclusion:-**

Therefore, we have as a result that when the implementation of the tool was carried out with BI Intelligence with the help of the company's IT in the warehouse sector, the manager was made to have several types of reports graphically and that were updating in a short time without having the job of doing the same activity at various times during the office, and made him gain more productivity, such as making a decision in a shorter time, generating profit and in a certain way, since he did not depend on speculation or sentimentality when he should order the materials that were missing or that should be purchased in that given period of time or time, there is also less unnecessary cost, another estimate is that in order to do not have losses can be carried out promotions in certain times that are pointed out as determined by the manager.

It is possible that after the implementation of the tool in several sectors, the company will be able to advance in a very short period of time and can give priorities for other tasks generating even more value to the IT responsible for creating and deploying the tool.

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