The application of Business Intelligence for lay users: A case applied to a military organization of the Brazilian Navy

A aplicação de Business Intelligence para usuários leigos: Um caso aplicado a uma organização militar da Marinha do Brasil

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ABSTRACT
This article aims to analyze the use and application of the Business Intelligence (BI) tool is an organization of the Brazilian Navy, as a tool and model of a management focused on rational decision making. The model presented here refers to the non-use of specialized manpower, so that the results lead to the possibility of replicating the model in other similar public activities.

Keywords: Business Intelligence (BI), Public Administration, Organizational Performance.

RESUMO
O presente artigo tem por objetivo realizar uma análise sobre a utilização e aplicação de ferramenta de Business Intelligence (BI) é uma organização da Marinha do Brasil, enquanto ferramenta e modelo de uma gestão voltada à tomada de decisões racionais. O modelo ora apresentado remonta à não utilização de mão de obra especializada, de forma que os resultados direcionam à possibilidade de replicação do modelo em outras atividades públicas congêneres.

Palavras-chave: Business Intelligence (BI), Administração Pública, Desempenho organizacional.

1 INTRODUCTION

One of the greatest current management challenges is to deal with the decision making process in a rational and technical way. On the other hand, in Public Administration there is, in the daily life of the state bureaucracy (in an epistemological sense), the constant production of data, which are generated by means of management systems, which, if well structured and worked on, may become useful information for the manager's decision making. This, then, is the paradigm to be overcome: adopt solutions to obtain, in a simplified and intuitive way, useful information through the already existing data.

Wrong decisions, whether strategic, tactical, or operational, can ruin the future of organizations,
as well as right decisions define their survival or expansion. That's why surrounding the decision with the largest amount of arguments possible is fundamental to minimize the risk of error. These arguments can be translated into facts and information from the organization's internal or external environment. It is important to decide based on facts or information, without excluding intuition and experience from the process, but using complementarity, seeking the most appropriate decision.

It is also salutary, in a historical context, to observe that, in the 20th century, according to Bastos' (2006) analysis, there was a strong change in the world of work, from an initially Taylorist-Fordist model, to a flexible and rationalized modus operandi, with profiles of less tangible activities, flexible and tending to technological development. In these terms, the role of the state structures within capitalism also undergo changes, "moving it away from the role of main economic agent. [...] which involves the deregulation of economic activity, [...] and the mission of the state apparatus." (BASTOS, 2006, p. 25).

Bresser-Pereira (2015) analyzes this fact in the Brazilian Public Administration, through its "evolution," which began with a patrimonialist state, in which the public is focused only on individual interests, passing through a weberian-style bureaucracy, until the rise of managerial administration, as an attempt to bring contemporary concepts of business administration to the public sector. However, Pinho (1998) points out that, despite the evolution of administrative models, the country coexists in a tangle of patrimonialism (especially in the political sphere), bureaucracy, and managerialism, "where the new molds itself to the old and, dialectically, the old molds itself to the new. (PINHO, 1998, p. 76).

In this approach, it is important to emphasize the need for the public service to benefit from the existing tools, in terms of management, and to adapt them to the public reality, not as a mere mimicry, or in order to undermine the importance of the Public Servant, as a state agent, but to rationalize the service provided to the citizen in terms of economy and effectiveness.

Thus, the adoption of technological solutions for decision making can be seen as a possibility to serve the public interest. In this way, Business Intelligence (BI) emerges as a tool for extracting and transforming data into strategic information for the decision-making process also in the public sphere.

The term Business Intelligence was first coined in the 1950s by Hans Peter Luhn, an IBM researcher, in an article entitled "A Business Intelligence System". The author proposed a development of an autonomous system, based on data processing machines, which would automatically index and codify documents and disseminate such information in organizations according to the action point (CEBOTAREAN and TITU, 2011).

Later, in the 1980s, the Gartner Group became known for developing the first BI systems as they are known today. Thus, in 1989, Howner Dresner, a Gartner Group researcher, defined Business Intelligence as an umbrella term that addressed concepts and methods to assist business decision making with the support of fact-based systems (POWER, 2007).

BI, more broadly, can also be understood as the use of multiple sources of information to define
competitive strategies in business, or the search for innovative solutions. (BOTELHO and FILHO, 2014).

One can also summarize the concept of BI to applications and technologies that are used to collect, access and analyze data and information to support decision making (PRIBISALIĆ and MARTINČIĆ-IPŠIĆ, 2019).

On the other hand, when thinking about the type of application such as BI, one can imagine that it is expensive and technically challenging to implement, or, perhaps, the need for specialized personnel for such an intent. Moreover, when visualizing, in the public sector, the budget shortage, linked to the lack of personnel, one can still think that the implementation of technological tools is challenging, especially when looking at executive level agencies.

However, among the numerous BI tools, it is worth mentioning Google Data Studio, since it is related to the case being studied in this research. Data Studio is a free online tool that transforms databases into easy-to-read reports and informative dashboards, with a range of customizations and the possibility of sharing. All that is required to access the tool is a Google Account. The main advantages of this tool, for application in the public sector, are the fact that it is free and that it is not necessary to be a BI expert, because it has a friendly structure to laymen in this kind of tool.

In this context, this research aims to analyze the possibility of implementing Google's BI tool, called Data Studio, in executive-level public agencies, without the need for skilled labor. To do this, a single case study model was used, which focuses on the deployment of such a tool at the Marine Apprentice School in Espírito Santo (EAMES).

2 METHODOLOGY

This research has, by nature, to be of the applied type, which according to Gerhardt and Silveira (2009) aims to generate knowledge for practical application, directed to the solution of specific problems, involving local truths and interests.

The technical procedure used was the case study, given that, according to the view of Yin (2001), it involves a deep and exhaustive analysis of a specific object, in order to allow its broad and detailed knowledge. In addition, Gil (2010) urges that the case study has by nature the immediate application of knowledge in specific contexts, in order to develop and deepen theories.

In view of the objectives, one can apprehend this as an exploratory research, considering that the object had not been abundantly studied by other authors (LIRA, 2014).

3 FROM METHODOLOGY TO RESULTS: ANALYZING THE CASE

In the methodological meanderings, we started from a practical experience to theory. This researcher, initially, in view of the needs of his profession in the context of EAMES, sought to solve problems related to the dissemination of structured information in his agency, so that managers could,
based on evidence coming from data, which were not structured at first, make decisions with greater impact of effectiveness.

Thus, this researcher, with an academic background related to management, sought solutions to the problem of consolidation of strategic data, finding in the literature BI tools as a possible answer. This author, being a layman in BI development, sought options "within reach" of his level of knowledge, and found the Google Data Studio tool to be a possibility.

- Case Study Object

The object of the case study is the Marine Apprentice School of Espírito Santo (EAMES).

The mission of EAMES is to train its students, who join the Brazilian Navy through public exams, to perform the duties assigned to Sailors of the Navy's Naval Training Program (MN-QPA), which includes the intellectual, physical, psychological, moral, and naval-military preparation of the student.

This military organization also has, in its area of jurisdiction, the mission of providing assistance to military personnel, veterans and pensioners, which today number 6 thousand users, who have the right to enjoy health, social assistance and legal services. In addition, EAMES provides logistical support to Brazilian Navy ships in transit through the ports of Vitória and Tubarão.

Finally, EAMES has agreements with public schools for the provision of sports and citizenship activities for elementary school students, on a after-school basis.

This way, the administrative structure of EAMES needs to deal with an annual budget of R$ 14 million (data taken from the application Tesouro Gerencial, referring to the year 2020), which is responsible for executing the budget provisioned to it, having as a parameter, the respect to legal requirements regarding bidding processes and accounting rules, applied to the public sector. It also manages its assets, besides providing food services to its students, military and civil servants.

Therefore, in the complexity of its activities, it was seen as fundamental to establish an information management system, for correct decision making in the face of the activities developed.

- General Objective

Analyze the possibility of implementing the Google BI tool, called Data Studio, in executive level public agencies, without the need for skilled labor.

- Specific Objective

Analyze a single case study, linked to the research theme, in order to make inferences that can corroborate the general objective and serve as a basic parameter for application in structures similar to the one under study.
- Results

Thus, to use the Google Data Studio tool, it was necessary that the data were structured, i.e., that they contained information line by line, in a standardized way, so that reports could be generated in an integrated manner and with correct information.

In this sense, the first step was to transform and standardize the existing control spreadsheets, and migrate them to the web application google spreadsheets. The main advantages of this migration were the possibility of joint collaboration in filling out the spreadsheets and the availability of always updated information.

This was followed by the extraction of budget and accounting data from the federal government’s management system for this purpose, called Managerial Treasury. Thus, with the standardization of reports from this system, it was possible to receive daily updates of the operations carried out the previous day. In this way the data was updated daily based on this data.

Tools were also developed to analyze the satisfaction of the food service provided to the workforce, who could answer an online questionnaire, on a daily basis and evaluate the service.

In this way, the following reports were developed:

**Financial Execution Dashboard:** This report comprises the data source from the Managerial Treasury, which is unveiled in information of amount of expenditure committed, settled and paid (it is better understood these three concepts through Law No. 4320/1964), the amount of commitment that was processed by the operators, and the amount committed per company.

![Figure 1 - Financial execution panel](https://datastudio.google.com/u/0/reporting/53c71b7c-c1df-4894-aa90-7f85d817e2ba/page/UDMZC)
Credit Control: Allows the Credit Managers, in their area of activity, to visualize, through available filters, the information they need to perform advisory, linked to their attributions. The database is also part of the Managerial Treasury.

Figure 2 - Credit Control

Control of Receivables: Based on the same database as the previous examples, the objective of this report is to allow the same Credit Managers or interested users to filter and search the issued commitments, according to their information needs for decision making.

Figure 3 - Commitment Control
Ranching Satisfaction Survey: This report is generated from the data provided by the users of EAMES' food service, with the purpose of making continuous improvements regarding the menu chosen, the food preparation, and the cleanliness of the dining halls. A survey with three statements on the points listed above is done daily and asked to be rated on a scale of 1 to 5.

Figure 4 - Ranch Satisfaction Survey

Contracts Validity: From the data spreadsheet about the contracts in force, it is possible to build a report that contains their expiration dates, so that you can make the correct planning of their renewal or a new contracting contest.

Figure 5 - Contracts Expiration
4 EXPECTED RESULTS AND FINAL CONSIDERATIONS

It was intended, from the exposure of the present BI tool, the possibility of glimpsing agencies that are conducting similar activities, or, still, reach academics and public managers who are faced with problems that may have as a solution route a BI instrument voted for the development by laymen, such as Google Data Studio.

It was also visualized the opportunity to, from a single case, more cases that can be studied to enhance this research, in order to develop a hypothetical-deductive method of analysis, with the possibility of more robust tests.

The fact is that the present research, in its motto, walks in the direction of reconciling and interweaving theories with practices in the world of work, in order to apply the concepts developed in academia for the benefit of the public administration.

Finally, the present tool is available for the reader's analysis and critical look through the link: https://datastudio.google.com/u/0/reporting/53c71b7c-c1df-4894-aa90-f85d817e2ba/page/p_k3e3x1csnc
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