BUSINESS INTELLIGENCE: DECISION MAKING FOR MICRO-BUSINESSMEN, A REVOLUTIONARY IDEA FOR ACHIEVE SUCCESS

William Pacheco Machado[16]

Hugo Silva Ferreira

SUMMARY

With the global economy and international trade becoming increasingly integrated and widespread, companies face competitive rivalry among competitors, and having good quantitative and qualitative methods for decision analysis are some performance indicators. From small organizations to large multinationals around the world, they are continually seeking a predictable and profitable future scenario. So that they can control or anticipate any eventualities. In the commercial market, there is a growing search by organizations for more information and data to assist in decision making. On the other hand, there is an increase in Information Technology (IT) tools, capable of managing, analyzing, generating reports and graphs that are decisive for decision analysis (whether for investments, purchases, contracting services, projects and events). Decision making in the *Business Intelligence (BI)* are accurate, and their information (data + evidence = strategic decision), based on dynamic statistical data and their environment meets business demands. Project managers must put into practice both in *BI* with no *ERP*, need to be aware of the impact of these systems, otherwise the implementation will lead to failure, as in the case study of *Hershey's.* The benefits of systems *ERP* and *BI* bring are countless and the results are reflected positively within the organization, bringing profitability, and the difficulties faced in implementing the systems are overcome, making the investment worthwhile. **Keywords:** *Business Intelligence (BI).* Decision Making*. Enterprise Resources Planning (ERP). WorkFlow.*

ABSTRACT

With the world economy and international trade increasingly integrated and diffuse. Companies find a competitive rivalry between competitors, and having good quantitative and qualitative methods for making decisions are some performance indicators. From small organizations to large multinationals in the world, they continually seek a predictable and profitable future scenario. So that they can control or anticipate any eventualities. In the commercial market there is a growing search by organizations for more information and data to assist in decision making. On the other hand, there is an increase in Information Technology (IT) tools, capable of managing, analyzing, generating reports and decisive graphics for decision making (whether for investments; purchases; contracting services; projects and events). Business Intelligence (BI) decision making is accurate, and its information (dice + evidence = strategic decision), based on dynamic statistical data and its environment meets business demands. Implementation project managers, both in BI and ERP, need to be aware of the impact of these systems, otherwise the implementation will fail, as in the Hershey's case study. The benefits that ERP and BI systems bring are numerous and the results are reflected positively within the

[16]Graduated in Business Administration from Castelo Branco University (UCB). Specialized in Business Logistics from Signorelli International College. Master's degree in Business Administration from Miami University of Science and Technology (MUST UNIVERSITY). E-mail: < willianpmachado@gmail.com >.

organization, bringing profitability, and the difficulties faced to implement the systems are overcome, making the investment worthwhile.
Keywords:*Business Intelligence (BI). Decision-making. Enterprise Resources Planning (ERP). WorkFlow.*

1 INTRODUCTION

From small organizations to large multinationals around the world, they are constantly seeking a predictable and profitable future scenario. So that they can control or anticipate any eventualities. In the commercial market, there is a growing search by organizations for more information and data from people (potential customers) that help in decision analysis. In return, there is an increase in Information Technology tools.[17](IT), capable of managing, analyzing, generating reports and graphs that are decisive for decision-making (whether for investments; purchases; contracting services; projects and events).

If we look at ancient peoples, they also used technology to benefit their decisions. By predicting the seasons of the year; knowing the stars for navigation and construction; thus facilitating decision-making. Today, these tools are interactive with the environment, called Artificial Intelligence, which makes their use dynamic and practical. Information technology (IT) systems,It undoubtedly brings benefits to the organization that has the system. However, you cannot forget to do your homework, with an excellent implementation of the database.

A good example of this tool is the system*Business Intelligence (BI)*. Which contributes to assertive decisions, through databases and information, in this way managers have an effective alternative. According to Ageloni and Reis (2006),*Business Intelligence (BI)*is the transformation of data into knowledge. A decision-making process with the objective of generating competitive advantages. Other systems such as: Integrated business management system (*ERP*), workflow*(WorkFlow[18]),*and Warehouse Management System (*WMS[19]*); they are

[17]Information Technology (IT) infrastructure is a fundamental part of developing effective and high-performance work processes. Available at: https://blog.teclogica.com.br/como-funciona-o-sistema-degovernanca-de i/#:~:text=IT%20infrastructure%20to%optimize%20investments%20in%20the%20Area.

[18]Workflow is the flow/work process of an organization's management system to increase work efficiency, continuous improvement in the processes used by teams. Available at: https:// rockcontent.com/br/blog/workflow/

[19]WMS is the acronym in English for Warehouse Management System. Available at: https:// eccosys.com.br/guia/o-que-e-wms-quais-sao-os-seus-beneficios/

examples of systems that also assist in decision making, within the logistics warehouse, which interact with the system *Business Intelligence (BI)*.

It is hard to imagine an organization that controls its business solely with pen and paper, or even with spreadsheets, these days. These obsolete tools cause the organization to waste time and money, compared to a company that uses a system. If you want your business to grow, there is no longer room for amateurism in the business market. Increasingly advanced and autonomous systems are the reality in decision-making, innovation and change in an organization.

For the problem raised in this article, supported by Gil's classification (2002), and observing the objectives explained, the appropriate model for investigation is exploratory research, as the aim is to deepen knowledge about a given topic.

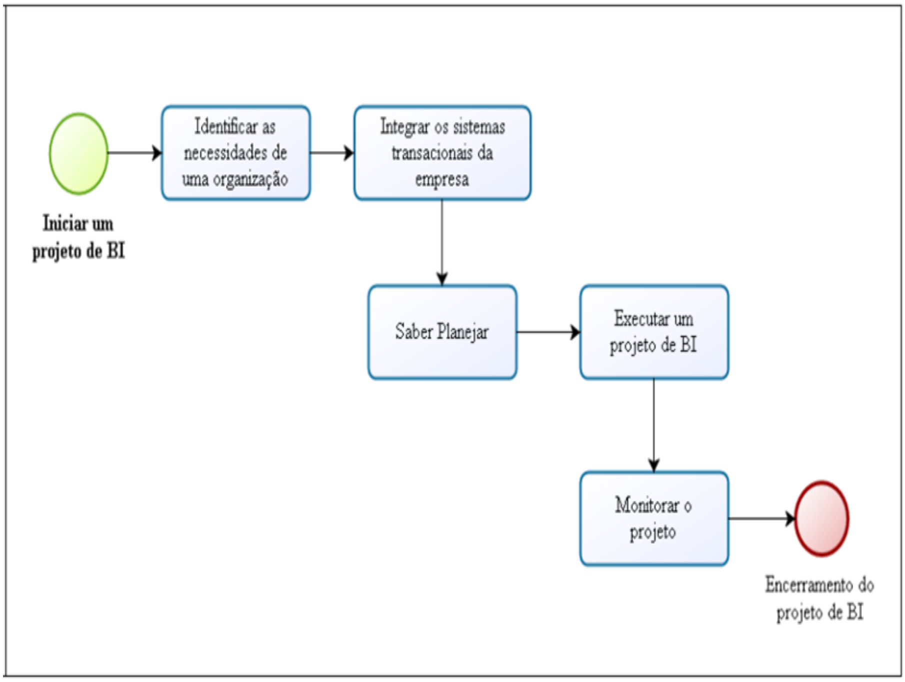
As for the general objective of the research, the procedures indicated to achieve it are bibliographic research, as the necessary data will be found in scientific works related to the topic. *Business Intelligence* -a decision-making process for micro-entrepreneurs, a revolutionary idea to achieve success, to achieve the organization's competitiveness.

2 *BUSINESS INTELLIGENCE* (*BI*) AN IMPORTANT BUSINESS DECISION MAKING

With an increasingly voracious, competitive market and an unpredictable scenario, there is no opportunity for amateurism, entrepreneurs have to choose to be digital, integrating themselves into the system *Business Intelligence (BI)* or be unstable, missing out on several opportunities to move up in the scarce market.

Angeloni and Reis (2006), *define that Business Intelligence* It is business intelligence or business intelligence, which comprises several methodologies and software tools, which have the function of promoting gains in the decision-making processes of senior management.

Figure 1- Implementation Scheme of the *Business Intelligence* (*BI).*



Source: Adapted from UFPE Magazine[20] (2015).

Based on information, analytical capacity of tools in one place, making decision-making decisive; as shown in Figure 1 above, it shows the beginning of the project, identification of the real need, integration of systems, planning, execution, monitoring and completion of the implementation. For assertive decision-making, in addition to the system *Business Intelligence* (BI) the entrepreneur must start with investigation; observation; technical knowledge and deductive reasoning *(feeling[21]).*

Where a scenario will be drawn up or a future for the organization will be envisioned; where the company will grow. However, there are several uncontrollable variables and the administrator must be aware of everything, for example the global pandemic of 2020.[22]. Attentive Brazilian businesspeople had 5 months in advance to prepare in Brazil, and even so it took many by surprise.

Business planning and decision-making strategies define the future of the company every day, as shown in figure 1 above, at each stage of management. The decision-making process *Business Intelligence (BI)* are accurate, and your information (data

---

20 UFPE Magazine (2015). Implementation and Use of *Business Intelligence*: An Experience Report at the Provider Group Available at: https://periodicos.ufpe.br/revistas/gestaoorg/article/view/22121.

21 *Feeling* is the way or capacity of feeling a situation; perception, sensitivity, feeling. Available at: https://fia.com.br/blog/feeling/.

22 First contagion by corona virus. Available in: https://noticias.uol.com.br/ultimas-news/efe/2020/03/13/newspaper-claims-that-the-first-covid-19-contagion-in-china-has-occurred-in-november.htm .

+ evidence = strategic decision), with a dynamic statistical database and its environment meets business demands. The *Business Intelligence* has become essential for achievements, growth and success in the business market. According to the authors Moscove, Simkin and Bagranoff (2002, p.22), to have "the success or failure of the company is linked to the way in which information is managed". It should be something routine for leaders (not to be afraid of fears), because the choice of the best scenario is always changeable and full of risks and opportunities.

Technical knowledge, observation and deductions as in Sherlock Homes[23] It is essential for companies to make decisions, even when they have operating systems that facilitate each action taken. When we make a decision, we use preference, inference, classification and judgment – whether consciously or not.

In other words, within companies, decision-making implies great responsibility and is essential for business management. Structured and planned decisions are essential for the growth and success of an organization. On the other hand, if this process fails, it can generate serious consequences and losses. Profits and job opportunities or debts and bankruptcy.

2.1 *BUSINESS INTELLIGENCE (BI)* IMPLEMENTING DECISION MAKING

As the name suggests *Business Intelligence* is to seek more information and wisdom in decision-making. Deciding the future of the company without basing it on... is bad for business. According to Roehe (2013), the term *Business Intelligence* "***BI***" was given in 1990 by *Gartner Group* . However, this fact was only possible due to Management Information Systems (MIS) in 1970, which generated reports. In the 1980s, Executive Information Systems (EIS) emerged, which generated high-level management data. According to Loh (2014), with technological developments, *Business Intelligence (BI)* is the set of data storage (collection), information research to have advantages in organizations. Thus, the basic objective is the interpretation and analysis of data, identifying opportunities. The implementation of *Business Intelligence (BI)* brings to the entrepreneur:

- Agility and speed in decision-making;
- Scenario assessments;

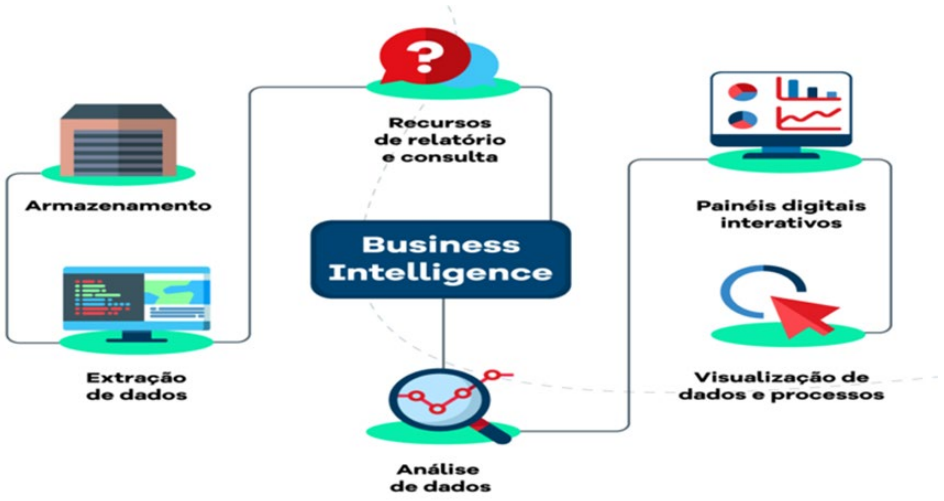
[23] Sherlock Holmes is a fictional character in British literature created by the physician and writer Sir Arthur Conan Doyle. Holmes is a detective from the late 19th and early 20th centuries. Available at: < https:// pt.wikipedia.org/wiki/Sherlock_Holmes >.

- Cost reduction;
- Decisions close to reality;
- Fearlessness in information;
- Risk management control among others.

Attention must be paid to each stage of implementation, as the system does not do everything on its own, and it is not a magic solution.

Don't make the same mistake as other entrepreneurs who implemented the system without a more detailed study of their business. A solution of this level requires extreme lucidity and care when installing the system in the line of work.

Figure 2 – The Pillars of *Business Intelligence.*



Source: Adapted, Strategic Management Blog – What is it? *Business Intelligence*?[24]

Primak (2008) highlights the process of choices and alternatives that aims to solve problems, in the face of decision-making options, as demonstrated in the diagram in figure 2 above, the pillars of *Business Intelligence*. Nowadays, even the smallest companies have or want to have a system that helps them with strategies, data collection, organization, and business intelligence analysis. Tips for implementing the *Business Intelligence (BI):*

- **First step -**make a price quote. Check the implementation time and the return on investment in the system and the company's installed capacity, check whether the computers support the system.

[24] Blog Management Strategic – What is Business Intelligence? Available at: https://www.siteware.com.br/blog/gestao-estrategica/o-que-e-bi-businessintelligence/ #:~:text=O%20BI%20%C3%A9%20uma%20sigla,%2C %20comercial%2C%20at%C3%A9%20o% 20marketing.

- **Second step -**to implement the system in the company, you need trained or qualified employees. A good team of analysts is essential. There would be no point in having the system *BI*, and not having anyone to operate it correctly.

- **Third step -**is the objective and operational definition that is desired from the system *BI*; to have only what is useful to the company, then you can add more if necessary.

- **Fourth step -**data sources (collection) and quality information research, and according to the KPI parameters[25] and interests of the organization.

- **Fifth step -**the basic objective, which is the interpretation, generation of graphs, spreadsheets and reports with strategic analyses of the data collected.

Business intelligence (BI) can be important in decision making for changes and how Enterprise Resource Planning (*ERP*) generates innovation and efficiency for the organization. The integration of *Business Intelligence (BI*) with the *Enterprise Resource Planning (ERP)* is ideal in management decision-making. These actions must be common in such a way that it is the organizational culture of the company, where everyone in the company uses and knows how to use the *Business Intelligence (BI);* thus achieving speed in negotiations, keeping it always up to date and competitive.

2.3 ERP SYSTEM IMPLEMENTATION PROCESSES

With the development of computers in the 1950s and the Internet in the 1990s, the world took a technological leap, resulting in production systems, artificial intelligence, automation and computerization of work.

Today's companies have Information Systems (IS) and Information Technologies (IT) in their management, which assist in decision-making processes, making the company competitive. One of these systems is *ERP*, which integrates the entire company, with its areas, departments and sectors, providing control, organization and agility.

THE *Enterprise Resources Planning (ERP),* in Portuguese it is Business Management System that interfaces (integrates) with the entire company. The system *ERP* evolved from the MRP I and MPR II systems which means *Manufacturing Resource Planning*, or Manufacturing Resource Planning. However, the *ERP* meets the demands related to manufacturing and decision-making in other sectors of the company, with a single database. The ERP interconnects all

[25] KPI is a highly relevant metric for measuring the performance of a strategy and management processes. Available in:< https://rockcontent.com/br/blog/kpi/#:~:text=KPI%20%C3%A9%20uma%20m%C3%A9trica%20altamente,Desemprenho%20e%20Key%20Success%20Indicator. >

company through: Human Resources; Logistics; Finance; Accounting; Sales and Marketing; Customer Relations, etc.

The big difference between *ERP* is the database that everyone can access, obtaining real-time information on operations and decision-making. For the implementation of the *ERP* , it will not be decisive to have an efficient and good quality information system, the manager must have technical knowledge to transform the available information into results, having good decision-making.

Corrêa (2001) reports that there are three phases to the *ERP* can bring transformation to the company and improve its operational performance, they are: analysis of business suitability, system implementation and maintenance.

1. Business suitability analysis: check the functionalities and whether they meet the requirements company objectives;

2. System implementation: defined packages, carry out training and development of the team of employees, carry out the management transition and change in the organizational culture, organize the performance parameters and indicators;

3. Maintenance: prevent damage, seal for the integrity of information and the employee engagement.

According to Norris Grant, *et. al*. (2001), what the *ERP* actually does is standardize, organize, and encode sets of processes and data into useful information, so that this data can be analyzed. In this way, the data and information collected by the organization will be used in decision-making. The implementation of the system *ERP*, must be taken very seriously, setting goals and strategic plans, and bringing changes to the entire organization. Care should not only be taken by the implementation team, but by the entire organization, to avoid failures in the process of implementing the new system. Ensuring the success of the company.

2.3.1 *WORKFLOW*-WORKFLOW TO AUTOMATE BUSINESS PROCESSES

In any organization or sector, control of values, quality and deadlines are essential to achieve safety and profitability. Strategies and action plans (*WorkFlow*) are important processes for automating tasks and documentation that passes from employee to employee. For the Technology Blog (2018), the workflow system defines and manages the organizational workflow through software, whose automation is related to communication and data exchange between the different sectors of the company.

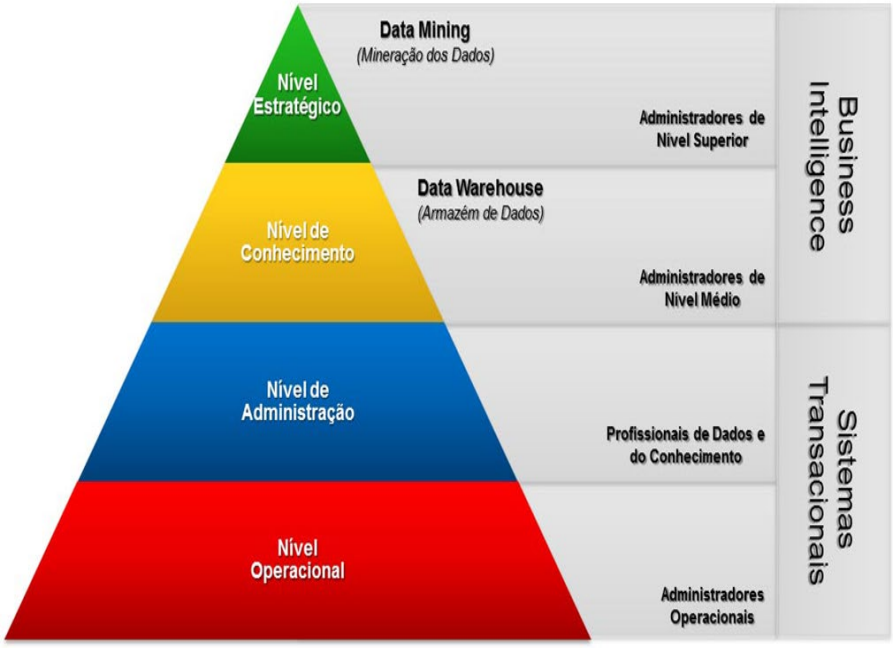
The development of the workflow (*WorkFlow*), will allow continuous actions of efficiency, effectiveness and efficacy – thus reducing team indecisions, making it easier to recognize failures (knowing where they occurred and how), improvements and reducing bureaucracy. The benefits of implementing the *WorkFlow* are continuous improvements, reduction of uncertainties and identification of overloads. Where each team member has their roles and responsibilities and the system monitors progress, signaling any deviation or delay.

The techniques that motivate courage and values result in increased applicability. In this way, a role is assigned to each member, that is, to the entire team, resulting in increased efficiency, effectiveness and efficacy.

The challenge is not to capture information but to transform it into useful data with added value. As shown in Figure 3 below. Too much information can cause panic in a new team of analysts (collaborators), losing rich information during the process. This same information in the hands of experienced professionals *Business Intelligence,* acted more efficiently, advising on more assertive decision-making for the organization. In order to have good quality in the analysis of data and information in the organization's business, the team of collaborators (*Know-how* technical[26]), must have experience and know the most current forms of data processing.

[26]Know-how is an English term that means “knowing how” or “knowing how to do”. It is directly linked to practical and technical knowledge. Available at: <https://www.ibccoaching.com.br/portal/vida-profissional/o-quee-know how/#:~:text=Know%2Dhow%20%C3%A9%20um%20termo,t%C3%A9cnicas%2C%20procedimentos%2C%2 0etc.).

Figure 3 - Use of data in the organization.



Source: Adapted from the Probability and Statistics Blog[27](2014).

Recruitment and selection methods, whether internal or external, have their limitations when it comes to hiring or forming teams. Whether it's bringing in people with experience or who have recently graduated, or taking advantage of company employees. Having an excellent IT technology tool is of utmost importance for an organization. After all, an organization can make the mistake of having an excellent team and a poor system – average to poor results. There's no doubt that spreadsheets help, but they are obsolete compared to systems that recognize scalable data and logic and enable the automation of the organization's processes.

3 SUCCESSFUL CASE STUDY REPORTS: CADBURY (ERP SYSTEM IMPLEMENTATION)

Founded in 1824, the British company "*Cadbury*" London-based confectionery company, implemented the system*Enterprise Resources Planning (ERP),*in the organization, as it was unable to meet the demand for products. In Brazil, the company distributes Adams brand products, with its focus on the following products:*Trident, Halls, Chiclets and Bubbaloo*. The reasons for implementing the*Enterprise Resources Planning (ERP),*the systems that the company

[27]Probability and Statistics Blog (2014). Available at: <http://tadsestatistico.blogspot.com/2014/09/aula-1-piramide-do-conhecimento.html.

used was not able to cope due to constant growth, so the *Cadbury* decided to implement the system *ERP*.

Implementation strategy of the *Cadbury* - Like any company, it took time for everyone to learn how to use the new system and pre-established routines, making the transition easier. A monitoring base and a feedback communication system were built to check whether the guidelines were in line.

The results achieved – the *Cadbury* had an exponential increase in processes and efficiency in the face of accelerated growth, which was its main problem, facilitating the flow of stock to branches and leveraging profits.

3.1 REPORTS OF A FAILURE CASE STUDY: HERSHEY'S

The company *Hershey's* has been operating in the Brazilian market since 1998, when it began importing to the country. *Hershey's* is one of the largest chocolate, confectionery and candy factories in the United States. It has operations in more than 70 countries and its production exceeds more than 2,400 *sku's*[28] for 80 brands. For example: *Hershey's, Reese's, Kisses and Kit Kat*.

In 2001, the company purchased Visconti's chocolate division and began producing national chocolate lines. Offering the Brazilian market high-quality products and differentiated packaging to the consumer. The implementation strategy of the *Enterprise Resources Planning (ERP)*, started the project in 1996 with an implementation time of four years. However, the company's senior management demanded that the implementation be completed in two and a half years.

THE *Hershey's*, by underestimating the design and complexity involved in system implementation *ERP*, ended up planning with a short schedule. Everything went wrong; there was no training on the system for employees and no feedback. What we can see is that, no matter how fast we want the results, the required implementation time is necessary and must be respected. The implementation time is necessary to identify the system's functionalities, what works and what doesn't. And, the interfaces that must be in the process, such as feedback, training and indicators so that points for improvement can be identified.

[28] the term *Stock Keeping Unit (SKU)*, in Portuguese Stock Keeping Unit is part of warehouse logistics, it is associated with an identifier code. Available at: https://pt.wikipedia.org/wiki/Stock_Keeping_Unit.

FINAL CONSIDERATIONS

Information technology is an undeniable reality that has been gaining strength in the business world through its tools. It is the revolution brought about by the integrated economy. The implementation applications of *BI*, makes it very clear that in order to be used, there must be strategic planning, risk control and monitoring. So that there is no negative impact on the decision-making process. *BI* It becomes a strong basis for quantitative and qualitative methods for decision-making, a foundation with the potential to advise managers in their business decisions.

THE *BI* together with the *ERP* are in full evolution, as these tools have a prominent position within organizations. They develop several competitive advantages and decision-making. In order to differentiate products, reduce costs and services in the market, the Enterprise Resource Planning System (ERP) is increasingly being used by organizations to achieve success.

However, it is necessary to be aware of the implementation of the *ERP*; the actions, processes and strategies should be the practice of the organization, these processes do not consist of just a technological change.

The project managers implementing both the *BI* with no *ERP*, they need to be aware of the impact of these systems, otherwise the implementation will lead to failure, as we saw in the case study of *Hershey's.* The benefits of systems *ERP* and *BI* bring are countless and the results are reflected positively within the organization, and the difficulties faced in implementing the systems are overcome, making the investment worthwhile.

REFERENCES

ALFA NETWORK - **Case Study:** The Implementation of the Business Management System (*ERP*) of Cadbury and Hershey's Available at: https:// www.alfanetworks.com.br/noticias/sistema-erp-estudo-de-caso-da-Cadbury-ehersheys. Accessed on February 10, 2021.

ANGELONI, MT; REIS, ES *Business Intelligence* as a Support Technology for the Definition of strategies to improve the quality of teaching. **ANPAD Meeting**, 2006, Salvador.

STRATEGIC MANAGEMENT BLOG. **What is Business Intelligence?** Available at: https:// www.siteware.com.br/blog/gestao-estrategica/o-que-e-bi-businessintelligence/ #:~:text=O%20BI%20%C3%A9%20uma%20sigla,%2C%20comercial%2C%20a t%C3%A9%20o%20marketing. Accessed on: February 11, 2021.

BLOG **Probability and Statistic, 2014.** Available at: http://tadsestatistico.blogspot.com/2014/09/aula-1-piramide-do-conhecimento.html. Accessed on: February 11, 2021

BLOG TECHNOLOGY, Workflow System (year 2018): 4 essential steps for managing your team. Available at: < https://blog.teclogica.com.br/sistema-deworkflowetapas/#:~:text=O%20sistema%20de%20workflow%20define,por%20uma%20hierarquia%20pr%C3%A9%2Ddefinida. > Accessed on: February 10, 2021.

CORREA, I. H; GIANESI, I; CAON, M. Production Planning, Programming and Control: ***MRP II / ERP***.4th ed. Atlas: Sao Paulo, 2001.

GARTNER GROUP.**The Gartner glossary of information technology acronyms and terms,** 2004. Available at: <www.tc.suny.edu/pdf_docs/gartnerglossary.pdf>. Accessed on: February 12, 2021.

GIL, Antonio Carlos.**People Management:**Focus on Professional Roles, São Paulo: Atlas, 2002.

LOH, S. BI in the Big Data Era for Data Scientists: Going Beyond Cubes and*dashboards*in the search for whys, explanations and patterns. Porto Alegre, 2014. 158 p.

MOSCOVE, S.; SIMKIN, M.; BAGRANOFF, N. Accounting information systems. São Paulo: Atlas, 2002.

NORIS, Grant, et. al.**E-Business and ERP:**Transforming organizations. Translation, Bazán Technology and Linguistics. Rio de Janeiro: Qualitymark, 2001.

PRIMAK, FV Decisions with BI (Business Intelligence). Rio de Janeiro: Ciência Moderna, 2008. 168 p.

UFPE Magazine.**Implementation and Use of Business Intelligence:**An Experience Report at GrupoProvider, 2015. Available at: https://periodicos.ufpe.br/revistas/gestaoorg/article/view/22121. Accessed on: February 12, 2021.

ROHE, L.M.**Business Intelligence as Support for IT Team Management**. 2013. 45 p. Final Course Work (Bachelor's Degree in Information Systems) – Information Systems Course, Lutheran University of Brazil, Santa Maria –RS.