Business Intelligence Applied in the Corporate Sector: A Systematic Review

Jorge Isaac Necochea-Chamorro [1], Luigui Larrea-Goycochea [1]

[1] *Facultad de Ingeniería de Sistemas, Universidad César Vallejo, Lima, Perú*

***Abstract* – Companies rely on technological tools like Business Intelligence (BI) to make efficient decisions and gain a competitive edge in the market. This study investigates the implementation of BI in various company areas, methodologies used, benefits obtained, tools applied, and elements of BI in the business sector. Following the Kitchenham and Charters methodology, a bibliographic search in 5 databases yielded 16 relevant articles. According to the main results of the work: logistics was one of the areas where BI was most implemented, followed by sales and finance; the most used methodology was Ralph Kimball; also, the most cited benefits were decision-making, cost optimization, and knowledge generation; the most used BI tool was Power BI, followed by QlikView; and the BI elements most applied in the business area were ETL and OLAP, closely followed by dashboards.**

***Keywords* – Business intelligence, technological tools, decision making, productivity, methodology to implement business intelligence.**

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Corresponding author: Jorge Isaac Necochea Chamorro,
Facultad de Ingeniería de Sistemas, Universidad César Vallejo, Lima, Perú
Email: jnecochea@ucvvirtual.edu.pe

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1. Introduction

Corporations are computerizing and flattening hierarchically in the search for efficiencies hand in hand with technology that will enable them to position themselves prominently in the labor market, for which they have an excellent human resource with multiple skills and competencies, knowledgeable in each process involved in the service provided to people [1].

Companies store data on their activities and collaborators through computer programs [2]. These data are inputs that make it possible to obtain specific information on each process and to apply appropriate decision-making through the tool known as BI, which is the process of making actionable business decisions based on the analytical manipulation and presentation of data within the confines of a business environment [3]. All the information obtained helps companies to improve their positioning in their industry by choosing the best decision [3], [4], [5]. As we know, the effective management of goods in transactions is fundamental in the business environment, and to achieve this, a logistics system is required to cover the transport, storage, and control of goods. This system is an essential element in the functioning of the modern market [6]. Improved decision-making related to the actions associated with the business sector is one of the reasons why companies are willing or even already implementing solutions through BI so that 2022, 30% of customer interactions will be influenced by the analysis of data such as real-time location, preferences and behaviors [7].

Business intelligence (BI) works through some technologies: Data Warehouse, ETL, Data Mining, and OLAP [8], among others. The benefits of using this BI tool are already palpable and measurable.

Many companies are moving towards a new way of managing their respective processes, such as logistics, administrative, financial, and customer service, among others, more efficiently and competitively, in such a way that a BI infrastructure would help to convert and transform a source of decisions [9], into great benefits.

Concerning the review articles related to this topic, several have been found in the virtual databases, and their contributions are related to the use of BI in different business areas, looking particularly at the authors and countries most valued in the development of this topic, the landing publication media and whether these results are related to improvements in decision-making [10] in both small and medium-size enterprise SMEs [11], to give a global and sufficiently complete idea of the idea of BI, as well as to contemplate studies on concepts, terms, and methodologies that address the implementation of a BI solution and the advantages and benefits of BI in organizations [12], publications related to BI and analytics, specifically aimed at micro-enterprises in the commercial sector. The aim is to find opportunities to reduce information asymmetries in decision-making in this relevant economic sector [13], to generate new knowledge on learning issues between BI and small and medium enterprises [14], to know the origin, development, and application of BI directly focused on problem-solving in the financial area of different organizations [15]. However, only a few studies related to BI mention aspects of the areas where it is being applied, the implementation of BI in the business sector, the benefits of using BI in companies, and which tools have been applied to the business sector.

In consideration of the topic above, this article aims to carry out a systematic review of the application of BI in the business sector, more precisely, the methodology that can be adapted for the use of this technological tool, the benefits it provides in companies for good positioning in the working environment and to find the possible general problems regarding the provision of the service.

2. Methods

The methodology used to carry this out systematically will be the literature review protocol used by Kitchenham and Charters [16], which has been applied to topics other than software engineering [17], [18], consisting of three major phases as follows.

2.1. Planning the Review

At this stage, the work is aligned with this article's objective considering the research questions.

The following scientific article repositories were searched: Scopus, ScienceDirect, IEEE Xplore, and repositories of the Universidad César Vallejo (UCV) and Los Angeles de Chimbote (ULADECH). The questions posed for the information search are shown in Table 1.

Table 1. Research questions

Id	Research questions
Q1	What studies are available on BI applied in areas of a company?
Q2	What methodologies are used to implement BI in the business sector?
Q3	What are the benefits of using BI in companies?
Q4	What tools does BI have to be applied to the business sector?
Q5	What elements of BI can be applied to the business sector?

2.2. Conducting the Review

At this stage, all the articles are studied according to the points to be included and excluded, so only the primary studies will remain for the results.

2.2.1. Initial Search

A succession of searches was carried out to prepare this article starting on 08 April 2022. It began with the first searches with the terms business intelligence, company, areas, decision making, DataMart, and methodologies in the following databases Scopus, ScienceDirect, IEEE Xplore, UCV, and ULADECH repositories; we took the research that was conducted in the last five years, ranging from 2017 to 2022.

Searches were aggregated using operators such as AND and OR, using the union of keywords such as 'business intelligence,' 'methodologies,' 'benefits,' 'decision making,' and 'tools.'

These types of terms were used for a proper and deep search, and they came to find and show quality results; a considerable amount of research results were found, some of them were repetitive, but it helped to support information better and in the use of words that were more accurate in this search for information (Table 2).

By employing refined search queries, accompanied by meticulous inclusion and exclusion criteria and supplementary filters, we successfully acquired the outcomes showcased in section 2.3.

Table 2. Search lines

Id	Search string
Q1	((BUSINESS INTELLIGENCE AND STUDIES) AND PRODUCTIVITY)
Q2	(((BUSINESS INTELLIGENCE AND DECISION MAKING) AND METHODOLOGIES) AND COMPANY)
Q3	(((BUSINESS INTELLIGENCE AND DECISION MAKING) AND BENEFITS) AND COMPANY)
Q4	((BUSINESS INTELLIGENCE AND TOOLS) AND COMPANY)
Q5	((BUSINESS INTELLIGENCE AND ITEMS) AND COMPANY)

2.3. Result of the Review

The results are shown in Table 3 at this stage, with the corresponding analysis for further discussion.

Through the research conducted to obtain information, we found a better search with precise words for the correct result in the databases mentioned in Table 2.

2.3.1. Inclusion and exclusion criteria

To fulfill the filters of the studies, the inclusion and exclusion points were made; these criteria are shown below:

As inclusion criteria, publications related to the use of BI in different areas of companies, publications related to the use of methodologies for applying BI, and publications mentioning the benefits of BI applied to the business sector were considered.

As exclusion criteria, publications that did not meet the established filters and publications that were not related to companies were excluded.

2.3.2. *Additional Filters*

To select the primary studies, a filtering process was applied using precise filters:

First filter: Reading the title and abstract: A thorough reading is performed.

Second filter: A full-text review was conducted on the studies that passed the first filter.

As a result of the comprehensive search conducted, 41,201 studies were initially identified from various academic sources. These studies were distributed as follows across different repositories and databases: Dialnet (13), Dspace (3), Science Direct (15), Scielo (23), IEEE Xplore (26), EBSCO (40,543), and Redalyc (500). However, after applying rigorous inclusion and exclusion criteria, additional filters, and the removal of duplicates, a final selection of 16 relevant studies was obtained for our analysis. (Table 3).

Table 3. Related articles

Ref.	Information
[19]	Modern management comprises relatively young managers, which is positive for adapting to changing methodological and technological trends in organizational management and governance to increase business confidence; a Business Intelligence (BI) application should offer immediate reporting, reliable indicators, handle multiple sources of information and support decision making while being economically accessible. Key business performance indicators show that customer satisfaction and sales are the most important, followed by employee performance and profitability indices. However, investment in business intelligence solutions is limited, as most companies have a budget of less than $5000; this indicates that, despite its importance, the budget available to invest in BI technology could be higher in modern companies. In addressing customer needs, the frequency varies, with "sometimes" being the most common response, followed by "rarely."
[20]	This research study aims to implement a Datamart using the Ralph Kimball methodology to improve decision-making. Employee feedback revealed the following issues: 1. Lack of storage system, 87.5% reported a lack of storage system; 2. Difficulty when accessing information, 75%; 3. Ineffectiveness in current processes, 87.5%; 4. The information provided is unreliable, with 62. 5%; 5. Delayed information delivery with 87.5%; 6. Non-confidential information, 75%; 7. Dispersed information, 100%; Due to these high and negative percentages, it was the justification for the implementation of a data mart.
[21]	Business intelligence was assessed across three dimensions: information systems, innovation, and decision-making. The companies surveyed reported that they have information systems that facilitate their operations. In terms of innovation, it was observed that the companies focus on strategies, incorporation of new products, and budget allocation for new projects, which reflects a constant process of innovation. In addition, it was verified that they use information from information systems to make business decisions. Regarding business performance, sales revenues, and profits were measured for 2019 and 2020. Some companies experienced a decrease in these indicators in 2020 due to the pandemic, while others performed higher, related to the adaptation of business intelligence. Business intelligence was positively associated with and highly significant for profits and sales revenue generated by companies in the commercial sector in the last two years. This shows that the implementation of business intelligence has optimized business processes, providing tools for innovation and guiding decision-making based on the information generated by the programs. In addition, control variables, such as the firm's age, were positively related to high business performance. In contrast, firm size has a minor influence on improving business performance.

[22]	Business intelligence has proven its applicability in the shipping industry, particularly intermodal transportation. The focus lies on establishing a foundation for BI, providing instructions for its creation and implementation to control various types of cargo effectively. Large companies and industry leaders are highly interested in adopting technological tools that enable efficient logistics process management. By utilizing BI, logistics companies can analyze the costs and benefits associated with transportation. The BI tools for this endeavor were Power Query and Power Pivot, both available in Microsoft Excel for free, along with DAX, a SQL Server Analysis Service (SSAS) component. This application aims to enhance information management and transform it into a user-friendly tool for managing train operations, specifically individual containers. The application successfully fulfills its purpose, surpassing attempts to create a similar application using MS Access or Power BI. Power Query, Power Pivot, and DAX emerged as the optimal tools for handling dedicated train data. This modern toolset automates the load control process and efficiently processes intermodal train data, resulting in an advanced online reporting system. The system allows for comprehensive cargo review, including container units, trains, round trips, and specific products. Additionally, the application enhances commercial transport design, enabling timely reactions to additional train costs and automating train result reports.
[23]	Courier agencies have been a vital link between their customers; this communication creates a variety of information (addresses, areas, names, among others.), as they are always in daily transactions; therefore, to perform such management, a useful tool for storing and transforming data is required. To apply business intelligence the methodology called Ralph Kimball was used, as it is the most adaptable to provide solutions and provide data integration for further analysis. For the use of a data mart, the Ralph Kimball methodology helps in the flow of information to make decisions at the operational level and strategically since the processes of unification, transformation, and loading are automated to generate useful information and knowledge reports. It is also indicated that Pentaho and Power BI tools are used for this development. The author also mentions certain BI elements: ERP, ETL, Datawarehouse, OLAP, and Dashboards.
[24]	A Business Intelligence (BI) solution was implemented in OTECEL, a mobile phone company. The flexible methodology of Hefesto and the open-source tool called Pentaho were used. Implementing this solution reduced the response time in information retrieval, which benefited the test area managers and engineers. They could access indicators and task control more efficiently through predefined dynamic reports and analysis views.
[25]	This paper examines the optimization and development of processes in sales and distribution, segmenting customers according to their sales volume and the type of product most consumed, taking into account the turnover of each brand in the shops. The study concludes that implementing a BI project requires the backing of top management, both in terms of financial support and in terms of contributing to creating a corporate culture.
[26]	Business intelligence through the use of Power BI was implemented in a telecommunications services project organization to evaluate its influence on decision-making efficiency. They worked with a sample of 8 projects and found that, in this sample, the use of BI reduced management errors by 50% and costs by 9% and time by 6%; this impacted five of the eight projects evaluated.
[27]	The study assessed the development level of four companies in the context of Industry 4.0, using a framework consisting of four levels: Digital Novice, Horizontal Integrator, Vertical Cooperation, and Digital Champion. These levels were further broken down into seven dimensions, with data and analytics identified as a critical capability. The findings revealed that the Belgian companies examined are currently positioned at the Digital Novice and Horizontal Integrator levels. In the former, data analysis relies on semi-manual retrieval with selective monitoring and processing. However, there needs to be more systems for managing unexpected events. On the other hand, the analytical capability of the latter level is supported by centralized BI system.
[28]	This research focuses on improving transport processes in an explosives company by implementing BI. This tool made it possible to process data from GPS devices installed in each transport unit, which record events related to the transport of explosives. The data processed by BI addressed three previously identified problems: unsafe behavior of transporters, delays in delivery times, and cost overruns.
[29]	This article assesses the maturity level of BI implementation in two SMEs in the IT sector. The authors use maturity models to measure the development and management of Business Intelligence projects or initiatives in these companies. The objective is to identify strengths, weaknesses, and opportunities for improvement in implementing Business Intelligence in SMEs. The researchers found that the two SMEs assessed had different maturity levels according to the Fedouaki model. Company A showed higher maturity in analysis and design, while Company B showed higher maturity in construction and deployment. Both companies had a medium level of maturity in justification and planning. They also found that the companies had reversed maturity levels in the dimensions of Tan et al.'s (2011) model. Company A showed higher maturity in the analytical dimension, while Company B showed higher maturity in information quality, master data management, and data warehouse architecture. The authors concluded that SMEs in the IT sector face challenges and opportunities to improve their business intelligence implementation and that maturity models can help them identify areas for improvement and establish action plans.

[30]	This paper leverages the power of BI to convert data into valuable insights, empowering companies to enhance decision-making, boost operational efficiency, and increase productivity. The study demonstrates the effectiveness of the ODM-BDA method through experimental analysis, showcasing impressive results, including a remarkable accuracy rate of 96.1%, a minimal error rate of 0.66%, and an outstanding efficiency level of 97.2%. Furthermore, the method achieves a commendable accuracy rate of 96.3%, a high valid positive rate of 80.6%, and a low delay rate of 52.8%, highlighting its robust performance and reliability.
[31]	This study investigates the impact of BI, organizational learning (OL), and innovation on the financial performance of companies. The sample comprises 196 employees from innovation companies within the Science Park. The findings reveal that business intelligence and innovation are pivotal in driving company performance. However, the study needs to establish a significant relationship between organizational learning and the financial performance of these companies.
[32]	This study introduces a novel approach to knowledge management in higher education institutions (HEIs) by leveraging business intelligence and analytics (BI&A). The proposed solution encompasses a hybrid information infrastructure, integrating an educational data warehouse (EDW) and an enterprise architecture (EA) repository. This infrastructure facilitates the digitization of knowledge, enhancing the visualization and analysis of crucial organizational elements, including individuals, processes, and technology. A key benefit of applying BI&A is its adaptability to accommodate disruptive changes in strategic direction and management. For instance, in public universities, where board of trustees elections occur every four years in Spain, BI&A provides the flexibility to navigate such transitions effectively.
[33]	Intelligence (BI) in establishing a well-aligned BI project lifecycle according to an organization's BI maturity. The aim is to ensure that BI projects' phases, activities, and tasks are in sync with the maturity model. Given their strategic nature, recognizing the importance of identifying risks in such projects is crucial. Neglecting to address these risks can lead to project disruption and hinder the realization of benefits or impact. By integrating BI into the project lifecycle, organizations can mitigate risks and optimize the outcomes of their BI initiatives.
[34]	This paper presents a proposal for applying a BI model in the operations area of a company that offers last-mile logistics services to small and medium-sized companies in the e-commerce channel. The objective is to achieve an integral improvement in decision-making. As a result of this study, specific indicators were developed based on the organization's needs. In addition, a dashboard was proposed using the Microsoft Power BI visualization tool; This will allow the operations area to have a clear, accurate, and real-time visualization of their indicators, eliminating the need for manual reporting. It will also help management to have information to make better decisions within the company.

3. Analysis of the Results

Based on the discovered results, an analytics will be conducted in alignment with the research questions formulated at the beginning of the systematic review.

Q1. What studies do exist on BI applied to areas of a company?

BI brings not only to all areas of the company [31] but to all stakeholders that are affected by the company's activity [19]; there are some areas more precious for BI implementation, which are: customers (customer satisfaction indicator) and the movement of their sales (sales indicator and trend) [19], followed by human resources (measurement of staff performance) and finance (profit indexes) [19] and logistic (optimization the decision-making process [20], (Table 4).

As is known, implementing BI brings institutions some advantages and disadvantages. Among the disadvantages are the difficulty in adapting qualitative and quantitative information, outdated, duplicated, and omitted data, measuring their performance, updating the data system in real-time, the cost of implementation service, acquisition of licenses for the selected BI solution, cost for staff training and minor and significant changes to the tool [4].

Regarding the advantages of implementing BI, we observe the following benefits: enhanced control over the company's operations to monitor process status, resource utilization, and personnel availability; increased employee productivity; technological support for goal achievement; promotion of a data-driven organizational culture; and enhanced decision-making across all levels [4], [19], [20].

Financial efficiency is related to and is the responsibility of all company areas. These areas working together will ensure the long-term sustainability and growth of the company [35]. As can be seen in Table 4, the most demanded areas to implement BI are logistics [20], [22], [26], [28], [31] to optimize and improve logistics processes, followed by finance [19] to analyze financial data, make informed decisions and improve the financial management of a company, [21], [30], [31] and sales [19], [25], [30], [31], marketing strategies [25], [30], [31], marketing to better understand market trends, consumer behavior and optimizing marketing strategies [25], [30], [31], human resources (which could be used to make strategies decisions related to human talent and customer needs and preferences, improving the customer experience and making decisions along these lines [19], [31]; we also have test areas of construction management [23], all areas of the company [31], operations [34] and others [30].

Table 4. Areas of the companies where BI has been implemented

Area	Ref
Sales	[19], [25], [30], [31]
Logistics	[20], [22], [26], [28], [31]
Finance	[19], [21], [30], [31]
Human resources	[19], [31]
Customer service	[19], [31]
Construction management testing area	[23]
Marketing	[25], [30], [31]
Other	[30]
All areas of the company	[31]
Operations	[34]

Q2. What methodologies do you use to implement BI in the business sector?

As can be seen in Table 5, the methodologies that have been used for the implementation of BI in the company are: Ralph Kimball [20], [26], [32], [34], and Hefestos, the first methodology has a bottom-up approach to data warehouse design, allows for rapid and incremental development of the solution, ensuring usability for users in projects, where the Hefestos methodology is a broader and more general approach to the implementation of BI projects. It focuses on general aspects of the implementation process, from initial planning to implementation and ongoing support [23]. No article mentions Bill Inmon, SAS, and other methodologies. The Bill Inmon methodology has a top-down approach to data warehouse design, i.e., it is not based on specific requirements. It is used for more complex systems where it is necessary to ensure the durability and consistency of information [20], even if there are changes or variations in the organization's processes [36].

Table 5. Methodologies used for BI implemented

Methodologies	Ref
Ralph Kimball	[20], [26], [32], [34]
HEFESTO	[23]

Q3. What are the benefits of using BI in companies?

Table 6 presents a list of benefits of BI in enterprises, SMEs, and companies: An analysis of the mentioned benefits follows:

We can observe that cost optimization [21], [24], [28], [29], [30] helps companies to identify areas where costs can be reduced and improves financial efficiency [31]; moreover; the importance of BI in decision-making [19], [20], [21], [22], [23], [24], [25], [26], [27], [28], [29], [30], [32], [33], [34] by providing information and data analysis can be observed; BI can also help increase the efficiency [28] (including operational efficiency) of a company by identifying areas where improvements can be made; BI can also help improve overall performance [19] by providing information and analysis to support informed decision making; BI also helps companies by aligning company actions with established strategic objectives [19]; it can identify trends and patterns [19], [22] by analyzing the hidden potential in the data collected during the company's operational activities; also, BI can provide tools and analysis that helps companies to forecast their future performance and areas where the company can make improvements to increase efficiency and effectiveness [19]; also the implementation of BI helps to eliminate repetitive, cross-functional or unnecessary processes [20] and support data management [20], [24] to improve performance [21], [23], for example by reducing response times in information retrieval; also in data organization and analysis [23]; knowledge generation [25], [31], [32], [33] by showing hidden patterns in data, learning in decision making; it would also be helpful in route safety for carriers and reduction of delivery times [28]; data management support [29].

The previous paragraphs show that BI can positively impact several company areas including information management, performance, safety, knowledge generation, innovation, process efficiency, and employee productivity. However, it is essential to remember that the successful implementation of BI depends on factors such as data quality, adequate technological infrastructure, and the organization's commitment to make the most of the information generated by BI.

Q4. What tools does BI have to be applied to the business sector?

To implement BI, it is necessary to use BI tools. Table 7 presents the tools that have been used in the reviewed papers.

Power BI [21], [28], [34] is one of the most used BI tools in the reviewed studies; Qlik View [20], [26] is another BI tool, the second most used; Pentaho, Power Query, Power Pivot, Ms. Excel, and Data Analysis Expressions (DAX) are other BI tools used in companies, but less used in the reviewed papers.

Table 6. Benefits of using the BI tool

Benefits	Ref
Cost optimization	[21], [24], [28], [29], [30]
Decision making	[19], [20], [21], [22], [23], [24], [25], [26], [27], [28], [29], [30], [32], [33], [34]
Increasing Efficiency	[28]
Improving performance	[19]
Achieve strategic objectives	[19]
Identify trends, patterns	[19], [22]
Make predictions about future performance	[19]
Identify areas for improvement	[19]
Reduce unnecessary processes	[20]
Improve information management	[20], [24]
Improve performance	[21], [23]
Organize and analyze data	[23]
Generate knowledge	[25], [31], [32], [33]
En route safety	[28]
Reduced turnaround times	[28]
Data management support	[29]
Organizational effectiveness	[30]
Expose risks	[30]
Disclose industry information	[30]
Risk reduction	[30]
Faster and more reliable reporting	[30]
Better customer service	[30]
Increased business revenue	[30]
Increased competitive advantage	[30]
Increased operational and productive efficiency	[30]
Financial efficiency	[31]
Enhance organizational learning	[31]
Foster innovation	[31], [32]
Facilitating experimentation	[32], [33]
Ease of understanding and provision of a tool to compare different companies or parts of companies with each other.	[33]
Improved process efficiency	[34]
Improved employee productivity	[34]

The above tools offer diverse data analysis, visualization, and management capabilities, enabling companies to extract valuable information and make data-driven decisions.

Each tool has its features and strengths, so the choice of the right tool will depend on each organization's specific requirements and objectives.

Table 7. BI tools

Area	Ref
Power BI	[21], [28], [34]
Pentaho	[23]
QlikView	[20], [26]
Power Query	[22]
Power Pivot	[22]
Ms. Excel	[22]
Data Analysis Expressions (DAX)	[22]

Q5. What elements of BI can be applied to the business sector?

It can be seen in Table 8 that the most used elements when implementing BI are: ETL [20], [23], [26], [34] and OLAP [20], [23], [26], [31], followed by dashboards [22], [23], [34] and finally, the data warehouse [23] and critical performance indicators and the use of multidimensional services [19].

Table 8. Elements of BI

Elements	Ref
ETL	[20], [23], [26], [34]
Data Warehouses	[23]
OLAP	[20], [23], [26], [31]
DASHBOARDS	[22], [23], [34]
Key Performance Indicators	[19]
Use of Multidimensional Services	[19]

4. Limitations and Future Research

Concerning the limitations encountered we fear:
There needs to be more technical knowledge about business intelligence in the local productive sector. The reason behind this may be that businesses have a low investment budget allocated to this technology, leading to a marked gap between business intelligence and strategic management processes. Additionally, there is research where the application of business intelligence is limited to one area, keeping it disconnected from other areas or companies in the same field. Furthermore, it is essential to consider the potential presence of additional variables that may impact business performance and the applicability of the findings to different regions or sectors. Other limitations found are solutions that only work with regional settings, limiting compatibility with other operating systems or languages [22]. Results may be biased by having a non-representative and non-generalizable sample.

Instruments can capture participants' subjective and biased perceptions due to their experience or knowledge. There is a lack of intelligent sources of big data, a shortage of accessible real-time analytics capabilities, access to adequate network capacity to run applications, increased network reach, data protection and data protection legislation, interoperability, fragmentation, and insufficient availability. Problems in hardware technologies that enable big data analytics, such as single computer configuration, network infrastructure, and storage power of magnetic disks.

In future research, it can mention that:

Transferring theoretical, practical, and technical knowledge about business intelligence to local companies is essential. It is also important to design business intelligence solutions that fit the needs and characteristics of each company [19] extending the scope of the business intelligence solution to other areas or companies and integrating all IT systems with the business intelligence solution; Evaluating various BI methods to determine the most suitable approach for the specific requirements and aims of each enterprise or project [20]; Incorporation of other dimensions and indicators of business intelligence, such as integration of information systems, flexibility and adaptability to changes in the environment, data quality, and advanced tools and technologies. Internal and external information sources could be integrated to improve accuracy and reliability. It is crucial to determine the congruence between various research regarding the influence of BI on the dimensions of cost, time, and errors [26]. It is necessary to use a suitable maturity model to assess business intelligence implementation in SMEs, including all relevant dimensions or factors. Compare results from different maturity models or develop a specific one for SMEs that incorporates organizational culture, innovation, added value, and impact of business intelligence. Implement procedures to establish contractual limits on the disclosure of information to unauthorized users, prohibit the copying of information, create a background search for staff who may have access to the report, and limit the use of such information on a contractual basis. Develop data protection regulations to enhance big data in the coming years. Explore the role of big data analytics in business intelligence and contribute to understanding the effects of information technology on business intelligence. Improve industry understanding and increase decision-making and productivity by developing plans to use big data. It is vital to connect BI with elements of Industry 4.0 to extract information and present it in a way that is accessible and convenient for users.

5. Conclusions

The documentary analysis conducted on business intelligence has examined the business areas where it has been applied, the methodologies, benefits, tools, and critical elements associated with its application in the business sector.

The articles reviewed show that it is feasible to implement a model that allows BI tools to support strategic components of the company, improve information management and significantly reduce many unnecessary processes, improve performance, competitiveness, detect opportunities for improvement and growth and innovation of commercial enterprises, all measured by profits and sales revenue. They are accompanied by factors such as the age and size of the company and human capital.

It is also vital to support the theoretical knowledge of business managers with practical solutions based on BI technology.

Likewise, a gap in general culture and technical knowledge related to BI and its application in companies has been identified, and we do not exploit the competitive advantage in business environments located in small localities, which could be had; therefore, universities could take a more active role, by taking responsibility and supporting the dissemination, application, and use of techniques and computer technologies related to business intelligence and thus connect BI with elements of industry 4.0, as this will allow having more updated, accessible and convenient information for users. Implementing BI in organizations requires maturity, i.e., the degree of development and effectiveness of their BI initiatives or projects. For this purpose, there are several BI maturity models (BIMM), including the Gartner model, evaluate different dimensions, levels, and critical factors.

To achieve good results with BI, it is vital to have quality data from as many sources (external and internal) as possible, among other points.

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