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Generación de estrategias basados en business intelligence para la competitividad en empresas de distribución de material eléctrico

Generation of strategies based on business intelligence for competitiveness in electrical material distribution companies

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Palabras clave:
business intelligence, distribución, material eléctrico, competitividad empresarial, islas Galápagos, sostenibilidad ambiental.

Resumen

Introducción: Las estrategias de negocios basadas en *Business Intelligence* (BI) en la distribución de material eléctrico en las Islas Galápagos, Ecuador, son clave para mejorar la competitividad empresarial al facilitar decisiones más informadas. **Objetivos:** Este estudio se centra en generar estrategias de negocios basadas en BI para aumentar la competitividad de las empresas distribuidoras de material eléctrico. **Metodología:** Comienza con un análisis teórico de negocios basados en BI, seguido de un diagnóstico situacional del uso de BI en la distribución de materiales eléctricos, utilizando la isla Santa Cruz – Galápagos como caso de estudio mediante encuestas aplicadas. El *Business Intelligence* utiliza herramientas como el análisis de negocios, la minería de datos y la visualización de los mismo para lograr objetivos empresariales. **Resultados:** Según el estudio, el 69.7% de las empresas encuestadas considera utilizar herramientas de BI para el desarrollo de estrategias, y el 52.94% de quienes usarían estas herramientas creen que aumentaría considerablemente la eficiencia en los negocios. Un análisis de chi-cuadrado revela que el uso de herramientas de BI impacta en la competitividad de las empresas de distribución de material eléctrico en la región de la isla Santa Cruz de las Galápagos con un 95% de confianza y un margen de error del 5%. **Conclusiones:** Esto destaca la relevancia de implementar estrategias basadas en BI para mejorar la eficiencia y competitividad en el sector de distribución de material eléctrico en las Islas Galápagos. **Área de estudio general:** Administración. **Área de estudio específica:** Gestión y Administración. **Tipo de estudio:** original.

Keywords:
business intelligence, distribution, electrical equipment, business competitiveness, Galapagos islands,

Abstract

Introduction: Business strategies based on Business Intelligence (BI) in the distribution of electrical material in the Galapagos Islands, Ecuador, are key to improving business competitiveness by facilitating more informed decisions. Objectives: This study focuses on generating business strategies based on BI to increase the competitiveness of electrical material distribution companies. Methodology: It begins with a theoretical analysis of businesses based on BI, followed by a situational diagnosis of the use of BI in the distribution of

environmental sustainability.

electrical materials, using the Santa Cruz – Galapagos Island as a case study through applied surveys. Business Intelligence uses tools such as business analysis, data mining and data visualization to achieve business objectives. Results: According to the study, 69.7% of the companies surveyed considered using BI tools for strategy development, and 52.94% of those who would use these tools believe that it would increase business efficiency. A chi-square analysis reveals that the use of BI tools impacts the competitiveness of electrical material distribution companies in the region of Santa Cruz de Galapagos Island with 95% confidence and a margin of error of 5%. Conclusions: This highlights the relevance of implementing BI-based strategies to improve efficiency and competitiveness in the electrical material distribution sector in the Galapagos Islands. General Study Area: Administration. Specific study area: Management and Administration. Study type: original.

Introduction

For decades, SMEs in Latin America in general and Ecuador in particular have not taken advantage of the significant volume of data generated by their operations. A large amount of data is simply stored without any further use.(Mera et al., 2017). Since 2010, it is known that there are processes, architectures and technologies capable of transforming this data into relevant data that allow them to make profitable operational and commercial decisions. It is this set of processes, architectures and technologies that is known as Business Intelligence (BI) and according to Muntean et al.(2021)With BI comes the closely related concept of Data Mining (DM). Schuh et al.(2019)Indicates that it is a subdomain of the concept of artificial intelligence, which refers to the process intended to generate knowledge from data and provide users with comprehensive findings(Wixom, 2010).

The generation of business strategies based on*Business Intelligence*It is an increasingly common practice in companies in various sectors, including the distribution of electrical material.(Arghandeh & Zhou, 2017). Business intelligence, or BI, is a set of tools and techniques that enable business data to be collected, analyzed, and presented effectively, so the goal of BI is to help organizations make more informed and efficient decisions by providing current and relevant information within the business context.(Tableau, 2023).

For companies focused on the distribution of electrical material, the implementation of BI-based strategies can be especially useful to increase competitiveness. By collecting and analyzing data on market behavior, customer purchasing trends, and the efficiency of internal processes, companies can identify opportunities to improve their performance and increase their profitability.(Cano, 2008).

Implementing a BI system can be a complex process, requiring the selection of appropriate tools, the integration of data from various sources, and the training of staff for its effective use.(Kaloyan, 2019)However, the potential benefits are significant, and may include increased operational efficiency, better decision making, and a competitive advantage in the marketplace.(Ahumada & Perusquia, 2015).

Business strategies based on*Business Intelligence*In the distribution of electrical material in Latin America, specifically in Ecuador and the Galapagos Islands, it can be a valuable tool to increase the competitiveness of companies. However, it is necessary to consider that the region faces unique challenges in terms of climate change and environmental conservation that must be considered when implementing these strategies.(Bhattarai et al., 2019).

It should be noted that this article aims to promote the use of BI in the distribution of materials in the electrical sector of the Galapagos region. It is important to note that in Galapagos the history associated with electrical energy began on July 27, 2000 through a public contract in which CONELEC grants ELECGALAPGOS SA a participation in the generation, transmission and distribution of electrical energy. The obligations of the concessionaire include: the provision of electrical energy service under the technical standards and regulations that govern the quality and delivery regimes(Ministry of Electricity and Renewable Energies, 2020).

The Galapagos Islands have a population of around 25,200 inhabitants and are one of the most vulnerable places to the effects of climate change, according to UNESCO.(Casey, 2018)It is important to note that the temperature is increasing due to the El Niño phenomenon, which is becoming more frequent and intense, which may have an impact on the distribution of electrical material in the region (IDEM). In addition, the conservation of biodiversity in the Galapagos Islands is an important issue, as it is one of the most exceptional places in the world in terms of endemic and unique native flora and fauna.(United Nations Educational, Scientific and Cultural Organization [UNESCO], 2023).

The implementation of business strategies based on*Business Intelligence*In the distribution of electrical material in Ecuador and in the Galapagos Islands area, these unique factors must be taken into account and work together with local communities and authorities to ensure sustainability and environmental conservation.(Grenier, 2007).

Likewise, this can be a valuable tool to increase the competitiveness of companies, since it is a set of tools and techniques that allow collecting, analyzing and presenting business data effectively, which allows increasing productivity and the quality of service to the customer.(Tableau, 2023).

Ulloa et al.(2020), mention that in Ecuador the implementation of a BI system can be especially useful to improve the operational efficiency of electrical material distribution companies, by collecting and analyzing data on market behavior, customer purchasing trends and the efficiency of internal processes. In addition, the implementation of a BI system allows companies to identify opportunities to optimize their performance and increase profitability.

However, the implementation of a BI system in Ecuador must also take into account the unique challenges that the region faces in terms of climate change and environmental conservation, considering that this study will be carried out on the island of Santa Cruz, province of Galapagos, which has 15,000 inhabitants and its energy matrix is based on renewable energies such as the Photovoltaic system has been highly effective in generating energy, with a production of 1,749.4 MWh (Benalcázar, 2020; Castillo, 2013).

Dini et al.(2021), argue that it is important to work together with local communities and authorities, which is key to ensuring sustainability and environmental conservation. In addition, the implementation of a BI system must comply with Ecuador's legal and regulatory framework.

The implementation of business strategies based on*Business Intelligence*in the distribution of electrical material in Ecuador is based on the need to understand the idea of the company, from the use of knowledge and information, you can obtain ways to increase productivity, as well as the proper functioning of the company, which will allow the performance of the company to improve. In addition It can be indicated that the implementation of a BI system in the distribution of electrical material in Ecuador can be especially useful to improve the operational efficiency of companies, by collecting and analyzing data on market behavior, customer purchasing trends and the efficiency of internal processes.(Ahumada & Perusquia, 2015).

Implementing a BI system can be a complex process, requiring the selection of the right tools, the integration of data from various sources, and the training of staff to use it effectively. However, the potential benefits are significant, and can include increased operational efficiency, better decision-making, and a competitive advantage in the marketplace.(Cano, 2008).

Santa Cruz Island has investment projects in the electrical sector that have a clear research objective: to analyze and develop business strategies that promote the distribution of

electrical material in the area. These projects seek to identify opportunities to improve efficiency and sustainability in the distribution of electrical energy, as well as to promote the adoption of innovative technologies and practices in the sector.(Gobierno Autónomo Descentralizado Municipal de Santa Cruz, 2012). Research in this field is crucial to boost the development and growth of the electricity sector on the island, providing benefits to both the local community and the environment.

Based on the above, it can be stated that, firstly, the theoretical foundation of business strategies based on*Business Intelligence*based on the history of construction and basic services, using collected data. According to Muñoz et al.(2016)A BI allows organizations to access information critical to success in various areas, such as finance, sales, innovation, marketing, international business, production and customer satisfaction.

It must be considered that the implementation of business strategies based on*Business Intelligence*In the distribution of electrical material in Ecuador must comply with the legal and regulatory framework of Ecuador(Castillo, 2013). In addition, it is important to work together with local communities and authorities to ensure sustainability and environmental conservation. The methodology for implementing a BI system should consider the selection of appropriate tools, the integration of data from various sources, and the training of staff for its effective use. In addition, the methodology should include continuous evaluation of the BI system to ensure its effectiveness and efficiency in business decision making. (Quintero, 2018).

Methodology

This research analyzed the current situation on San Cruz Island, where a diagnosis was made through the application of data collection instruments in the population, regarding the acquisition of electrical materials.

Based on the above, the methodology was proposed using the analytical and synthetic method, where here we sought to meet objective 1 of this study, which is to analyze the theoretical foundation of business strategies based on Business Intelligence. Here we seek to obtain data from projects focused on the use of electrical materials in Ecuador and the Galapagos. The inductive-deductive, historical method was also used, with which, considering objective 2, the current situation in the distribution of electrical materials on Santa Cruz Island was diagnosed. Here we seek to obtain data from projects focused on the use of electrical materials on Santa Cruz Island, finally, to achieve objective 3, the analytical and synthetic method was used again to analyze whether the use of BI tools impacts the competitiveness of electrical material distribution companies on Santa Cruz Island. This section aims to present the tabulation of survey information regarding the acquisition of electrical materials on the island of Santa Cruz, as well as the analysis of the relationship between the variables of use of BI tools in business strategies and the

increase in competitiveness, as well as generating strategic business guidelines focused on business intelligence (BI) in the distribution of electrical materials.

The study variables are competitiveness as a dependent variable, in which the perceived or generated value is analyzed to offer high quality products and services, competitive prices, with efficient management of the supply chain. On the other hand, there are independent variables such as Business Intelligence, where the implementation of business intelligence tools in the technical aspects of companies focused on the distribution of electrical material is reviewed, and the business strategies variable, where the sustainability and viability of the strategies adopted in the distribution of electrical material on the island of Santa Cruz is evaluated.

For the research design, a mixed type of research was carried out, combining qualitative and quantitative elements. The target population is the general population of users of electrical services and companies dedicated to the distribution of electrical material on the island of Santa Cruz.

Regarding data collection, this was done through direct observations in companies to collect data on their operation, processes and challenges, in addition to the analysis of the current situation in the distribution of electrical materials on the island of Santa Cruz, the data collected in direct observations will be used to analyze the current situation in the distribution of electrical materials on the island of Santa Cruz.

Likewise, to analyze the Business Intelligence and competitiveness variables, an analysis of the variables is carried out, using secondary data and the design of the survey directed to the population of Santa Cruz Island, using a Likert scale to formulate questions about the perception of the population regarding business strategies based on Business Intelligence and its impact on the competitiveness of electrical material distribution companies.

The survey is used to analyze the data collected in the survey and to obtain conclusions about the perception of the population regarding business strategies based on Business Intelligence and its impact on the competitiveness of electrical material distribution companies. To implement this technique, surveys were conducted with 200 people, who were randomly selected in the area to obtain real data regarding the acquisition of electrical materials focused on the consumer. These questions were applied with a focus on electrical material marketing companies. Based on the survey and considering the data modeling and BI tools, a cross-table and figure analysis is carried out with the aim of determining the relationship between the feasibility of using strategies based on BI tools in increasing competitiveness, taking into account the efficiency in the distribution of materials in such a way that it can be inferred whether there is a statistical relationship between these variables and how these can be proposed some strategic guidelines on

electrical businesses in the Santa Cruz Island area, in addition to the above, it is analyzed using the chi-square statistical technique to see if there is a relationship between the independent variables, Use of Business Intelligence and Business Strategy, with the dependent variable competitiveness, to carry out this procedure the statistical software SPSS was used (Narváez, 2023).

The chi-square statistic is given by the following formula:

$$x^2 = \sum_{i=1}^{r}\sum_{j=1}^{c}\frac{(O_{ij} - E_{ij})^2}{E_{ij}} \qquad (1)$$

Where:

Oij: is the observed frequency of the cell in row i, column j

Eij = (Ri*Cj) /n; is the expected frequency of cell (i, j)

Finally, as part of the information analysis, the first phase for the analysis of the information is data collection with the purpose of taking a pilot sample to test the questionnaires and obtain an approximation of the variability of the population, in order to calculate the exact size of the sample that leads to an estimate of the parameters with the established precision (Ramos et al., 2020).

Finally, a comprehensive analysis of the sustainability and viability of the strategies implemented for the distribution of electrical material on the island of Santa Cruz is carried out using BI. This analysis allows us to evaluate the competitiveness and long-term impact of the strategies adopted, ensuring that they are viable in economic, social and environmental terms, and that they contribute to sustainable development on the island and are focused on the country's productive energy matrix (DatosAbiertos.gob, 2023).

With this information, a data table was created to generate business strategies for the development of competitiveness through SWOT analysis and strategic guidelines were generated through CAME analysis for companies focused on the distribution of electrical material.

It should be noted that the SWOT analysis (Strengths, Opportunities, Weaknesses and Threats) is a tool used to understand the situation of a business and develop effective strategies (Galiana, 2023; Antevenio.com, 2021).

This analysis will have the following categories:

- Internal analysis: identification of competitive strengths and internal weaknesses.
- External analysis: market opportunities and threats.
- Business strategies: based on the SWOT, the FO, FA, DO and DA strategies that correspond to the CAME strategies will be presented, these being the strategic guidelines of the companies that market electrical inputs using BI in the region.

Based on the results of the analysis of the current situation, the analysis of sustainability and viability variables, and the analysis of the survey, recommendations will be drawn up for the generation of business strategies based on Business Intelligence that can increase the competitiveness of electrical material distribution companies on the island of Santa Cruz.

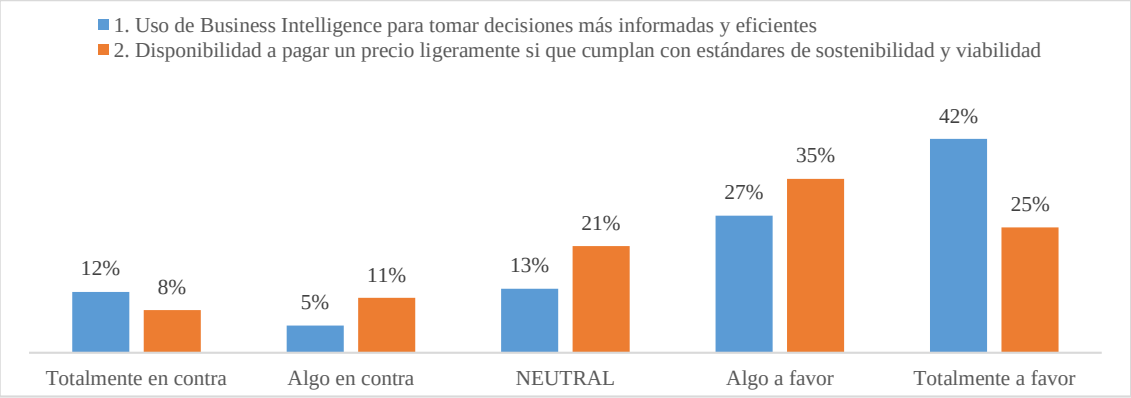
Results

Based on the results of the field research of the surveys, it is observed that there is a positive relationship between the use of BI tools in business strategies and the impact on competitiveness. Thus, the results can be seen considering the variables analyzed such as the use of Business Intelligence tools, business strategies and the impact on competitiveness in electrical materials distribution companies.

Business Intelligence

Figure1

Variable analysis business intelligence



Note:data obtained from market research.

Analyzing the use of Business Intelligence to make more informed and efficient decisions, it was found that based on Figure 1, the analysis of the results shows that the

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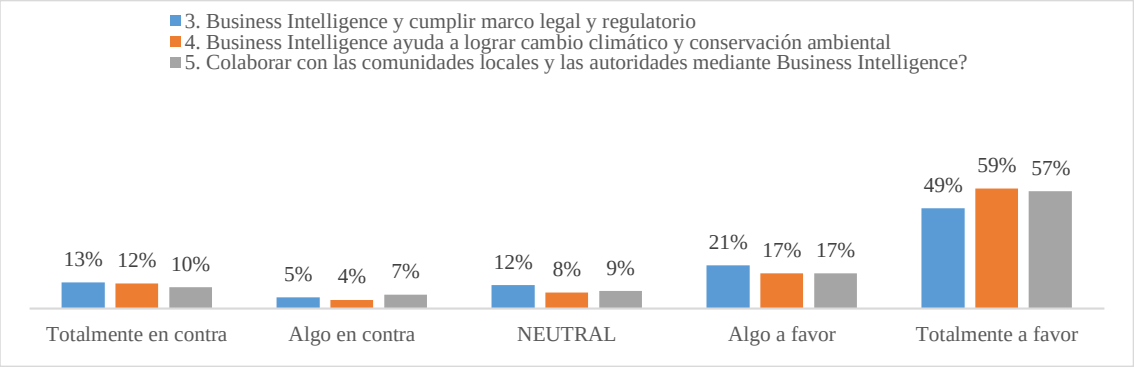
majority of respondents (42%) are in favor of using Business Intelligence to make more informed and efficient decisions, closely followed by those who are somewhat in favor (27%). However, there is also a significant percentage of respondents who are neutral (13%) and totally against (12%) this idea. The results indicate that there is a general interest in using Business Intelligence for decision making, although some respondents may have doubts or concerns about it.

On the other hand, in relation to the willingness to pay a slightly higher price for sustainable and viable products, it can be observed from Figure 1 that the analysis of the results shows that the majority of respondents were somewhat in favour (35%) or totally in favour (25%) of paying a slightly higher price for sustainable and viable products. Likewise, a significant percentage of respondents were neutral (21%) or somewhat against (11%) this idea, which indicates a division of opinions in the population. Finally, only 8% of respondents were totally against paying a higher price for sustainable and viable products. This indicates that the willingness of consumers to pay a slightly higher price for sustainable and viable products varies. Although a considerable percentage of the population is neutral or very much in favour of this idea, there is also a significant group of people who are willing to pay more for products that meet sustainability and viability standards.

Business strategy

Figure2

Business strategy analysis



Note:data obtained from market research.

In relation to whether Business Intelligence-based strategies and compliance with the legal and regulatory framework, based on Figure 2, the descriptive analysis of the results shows that 13% of respondents are against and 5% are somewhat against the idea that Business Intelligence contributes to compliance with the legal and regulatory framework. 12% of respondents remain neutral regarding this statement and 70% of respondents are

in favor or totally in favor of the relationship between Business Intelligence and compliance with the legal and regulatory framework. A significant percentage of respondents remain in favor of this statement, which suggests that there are still certainties about this relationship.

One of the important issues is to analyze whether Business Intelligence can help achieve climate change and environmental conservation. In this case, it was possible to see that, based on Figure 2, the majority of respondents were totally in favor (59%) or somewhat in favor (17%) of the idea that Business Intelligence can help achieve climate change and environmental conservation. A percentage of respondents were against (12%) or somewhat against (4%) this statement, which suggests that in a small part of the population there are doubts or lack of information about this relationship. 8% of respondents were neutral about the idea that Business Intelligence can help achieve climate change and environmental conservation. The results indicate that the majority of respondents are in favor of the idea that Business Intelligence can help achieve climate change and environmental conservation. This means that there are certainties about this statement.

On the other hand, in relation to the strategy of collaborating with local communities and authorities through Business Intelligence, based on Figure 2, these results show a fairly oriented distribution towards supporting collaboration with local communities and authorities through the use of Business Intelligence. The fact that 74% of respondents are in favour or somewhat in favour of this idea indicates that there is a recognition of the potential benefits of collaboration with external stakeholders. Collaboration can help companies better understand the needs and expectations of local communities and authorities, which in turn can influence strategic decision-making and the implementation of more sustainable and socially responsible practices.

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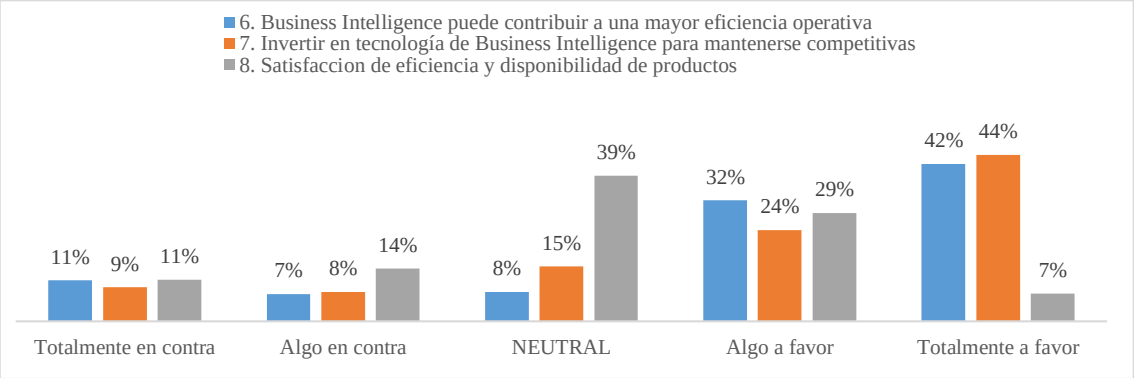
Competitiveness

Figure3

Competitiveness analysis



Note: data obtained from market research.

Analyzing whether Business Intelligence can contribute to greater operational efficiency, it can be seen that based on Figure 3, the survey shows that a significant group of respondents were in favor (32%) or totally in favor (42%) of the idea that Business Intelligence can contribute to greater operational efficiency. A smaller percentage of respondents were neutral (8%) and somewhat against (7%). Therefore, it is considered that Business Intelligence can contribute to greater operational efficiency.

One of the key aspects that needs to be contrasted is to verify whether investing in Business Intelligence technology is necessary to remain competitive. Based on Figure 3, it can be observed that the majority of respondents (24%) are somewhat in favor, 44% are totally in favor, of investing in Business Intelligence technology to remain competitive, while 15% remain neutral. On the other hand, 8% are somewhat against this idea and 9% are totally against it, either totally or to a certain extent. These results suggest that there is a significant interest in investing in Business Intelligence technology to maintain the competitiveness of companies dedicated to the distribution of electrical material.

Satisfaction with product efficiency and availability was analyzed and it was found from Figure 3 that it was mostly neutral with 39%, but in general they stated that they were in favor with 29% and 14% against. These results suggest that most consumers are satisfied with the efficiency and availability of the products in question. As can be seen, it is important to highlight the benefits of strategies based on Business Intelligence, such as the ability to provide current and historical data within the business context, helping organizations to operate in a more agile and efficient manner. Thus, it can be seen that companies dedicated to the distribution of electrical material could consider the implementation of business strategies based on Business Intelligence to effectively

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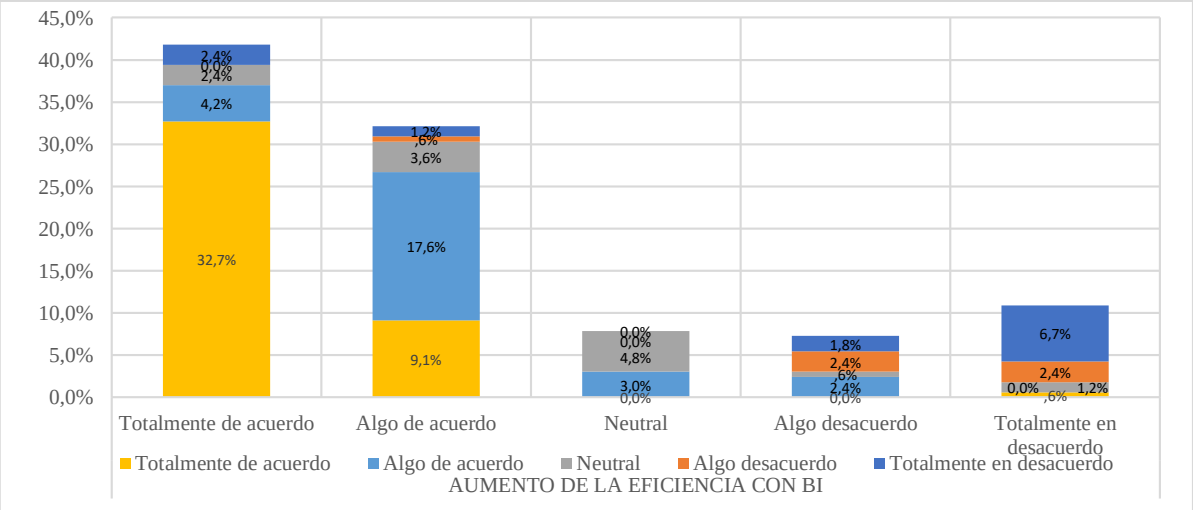
communicate the benefits of their sustainable and viable products, in order to attract this segment of environmentally conscious consumers willing to pay more for quality products.

Based on the results of the research, it is noted that the majority of respondents consider that Business Intelligence can be a useful tool to comply with the efficiency, competitiveness, regulations and laws applicable to the distribution of electrical material on the island of Santa Cruz.

Taking this into account and considering the previous results, the relationship between the variables was calculated, with this it was possible to identify that there is an impact between the use of BI-based strategies and the improvement of efficiency in electrical materials distribution companies in Santa Cruz as seen in Figure 4.

Figure4

Relationship between BI-based strategies and their impact on efficiency



Note: data obtained from market research.

As can be seen in the graph, it was found that mainly of the companies that would use BI tools, which corresponds to the 69.7% that are committed to using this type of solutions, 52.94% (36.9% of the global total) of those that would use BI tools, consider that business efficiency would increase considerably by using BI-based strategies. This can be observed in more detail in Table 1.

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Table 1

Increasing efficiency with the use of BI tools

		Increasing efficiency with BI					Total
		Totally agree	Somewhat agreed	Neutral	Somewhat disagreement	Totally disagree	
Using Business Intelligence	Totally agree	32.7%	9.1%	0.0%	0.0%	.6%	42.4%
	Somewhat agreed	4.2%	17.6%	3.0%	2.4%	0.0%	27.3%
	Neutral	2.4%	3.6%	4.8%	.6%	1.2%	12.7%
	Somewhat disagreement	0.0%	0.6%	0.0%	2.4%	2.4%	5.5%
	Totally disagree	2.4%	1.2%	0.0%	1.8%	6.7%	12.1%
Total		41.8%	32.1%	7.9%	7.3%	10.9%	100.0%

Note: data obtained from market research.

In addition to this, it can be seen that just as positive results were obtained in relation to efficiency, competitiveness is also impacted, since companies that use these BI-based strategies allow intelligent decisions to be made considering the data, which will allow them to identify potential opportunities to increase profits, analyze the behavior of potential buyers, make comparisons with competitor data, optimize operations and predict the success of commercial and operational processes in the distribution of electrical materials.

This is known by business owners very clearly and they are committed to using these tools for their business operations as seen in Figure 5.

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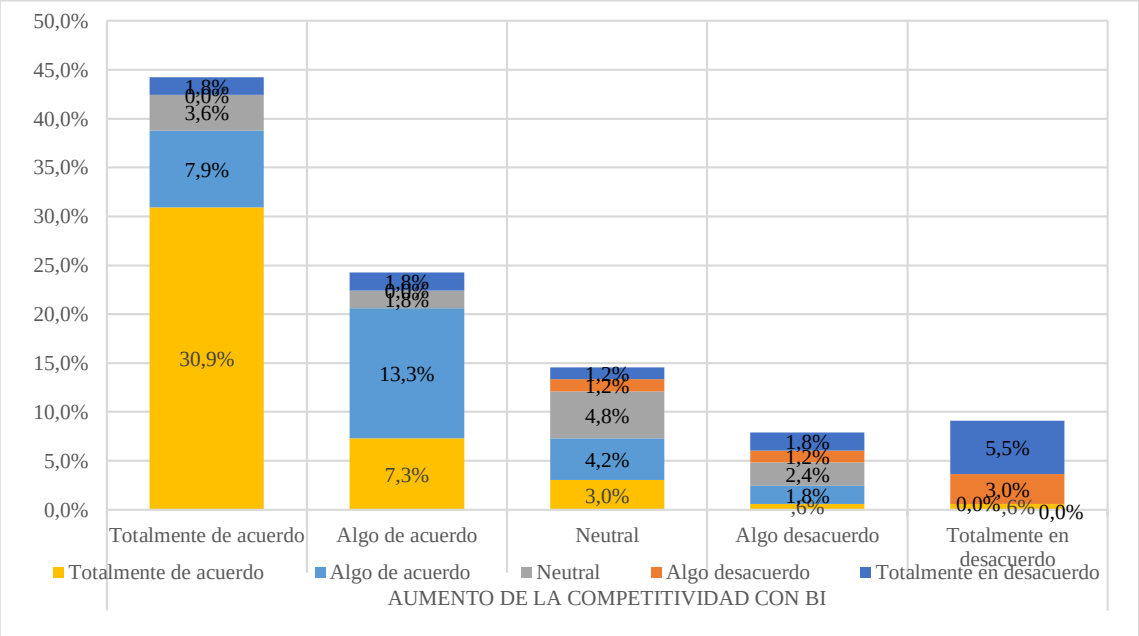
Figure 5

Relationship between BI-based strategies and their impact on competitiveness



Note: data obtained from market research.

As can be seen in the graph, it is already known from the previous analysis that mainly the companies that would use BI tools, which corresponds to the 69.7% that are committed to using this type of solutions, of this it is considered that 55.67% (38.8% of the total) of those who would use BI tools, would considerably increase the competitiveness of their businesses by using BI-based strategies, this can be observed in more detail in table 2.

Table 2

Increasing competitiveness with the use of BI tools

		Increasing competitiveness with BI					Total
		Totally agree	Somewhat agreed	Neutral	Somewhat disagreement	Totally disagree	
Using Business Intelligence	Totally agree	30.9%	7.3%	3.0%	0.6%	0.6%	42.4%
	Somewhat agreed	7.9%	13.3%	4.2%	1.8%	0.0%	27.3%
	Neutral	3.6%	1.8%	4.8%	2.4%	0.0%	12.7%
	Somewhat disagreement	0.0%	0.0%	1.2%	1.2%	3.0%	5.5%

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Table 2

Increasing competitiveness with the use of BI tools (continued)

	Increasing competitiveness with BI					Total
	Totally agree	Somewh at agreed	Neutral	Somewhat disagreeme nt	Totally disagree	
Totally disagree	1.8%	1.8%	1.2%	1.8%	5.5%	12.1%
Total	44.2%	24.2%	14.5%	7.9%	9.1%	100.0%

Note: data obtained from market research.

This can be verified through a Chi-square statistical test analysis, as proposed in the methodology section, where it is analyzed if there is a statistical relationship between the 2 variables, indicating with this after the test that there is a 95% confidence and a 5% margin of error that the use of BI tools does impact the competitiveness of electrical material distribution companies in the Santa Cruz de Galápagos island region.

Table 3

Chi-square analysis of the competitiveness variable and the use of BI tools

Chi-square tests			
	Worth	Gl	Asymptotic Sig. (2 faces)
Pearson Chi-square	123, 172a	16	0.000
Likelihood ratio	107,828	16	0.000
N of valid cases	165		
a. 14 boxes (56.0%) have expected a count less than 5. The minimum expected count is .71.			

Note:a. 14 boxes (56.0%) have expected a count less than 5. The minimum expected count is 0.71.Own research, data obtained from market research.

As you can see, Business Intelligence (BI) allows organizations to make better decisions, since with it, analysts can establish benchmarks for performance, operations, and competition. In this way, the organization will be able to operate more quickly and efficiently, focus on improving service, establish a closer relationship with the community, and seek to meet objectives aligned with sustainability.

These results are useful to understand how the population perceives the implementation of business strategies based on Business Intelligence in the distribution of electrical material on Santa Cruz Island. It is important to note that these results are specific to the population surveyed and may not be generalizable to other populations or contexts.

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In the case of companies dedicated to the distribution of electrical material, the generation of business strategies based on Business Intelligence (BI) can be key to increasing their competitiveness, so considering the variables and surveys carried out, we have the following SWOT:

Table 4

SWOT analysis BI-based strategies

STRENGTHS	**OPPORTUNITIES**
Business Intelligence can contribute to greater operational efficiency, which can improve the competitiveness of companies.	Investing in Business Intelligence technology can help companies stay competitive in an ever-changing marketplace.
Implementing business strategies based on Business Intelligence can help companies make more informed and efficient decisions, which can improve their competitiveness.	Using Business Intelligence can help companies comply with legal and regulatory frameworks, which can improve their competitiveness.
Collaboration with local communities and authorities through Business Intelligence can improve the sustainability and social responsibility of companies, which can improve their competitiveness.	
WEAKNESSES	**THREATS**
A significant percentage of respondents were not yet committed to using Business Intelligence tools and how they can help achieve climate change and environmental conservation, suggesting that there are still doubts or lack of information about this relationship.	Low market competitiveness can make it difficult to implement business strategies based on Business Intelligence, since other more technologically advanced companies may also be using these tools to improve their competitiveness.
A significant percentage of respondents were found to be unwilling to embrace the use of Business Intelligence and how it can contribute to greater operational efficiency, suggesting there is still room for improved communication and education on the benefits of Business Intelligence in terms of operational efficiency.	Lack of financial and technological resources can limit companies' ability to implement business strategies based on Business Intelligence, which can affect their competitiveness.

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Table 4

SWOT analysis BI-based strategies

WEAKNESSES	THREATS
Dependence on external suppliers.	**Competition from larger, more established companies.**
Lack of diversification in the products and services offered.	Changes in government regulations.
Low adoption of Business Intelligence technologies.	Economic instability and fluctuations in the prices of electrical materials.

Note: data obtained from market research.

It should also be noted that for the technical study in the implementation and construction of housing, companies focused on the distribution of electrical material have such material for low voltage energy; however, there are problems in acquiring supplies in medium voltage.

Discussion

As already seen, strategies based on Business Intelligence (BI) are a series of processes, architectures and technologies capable of transforming this data into relevant data that allows profitable operational and commercial decisions to be made, which combines all data sources into something beyond the sum of its components. To do this, it uses the operational data provided by the company's resource planning system and transforms it into meaningful intelligence that directly supports the company's strategic objectives.

Business intelligence vendors are concerned with offering suitable solutions for managers, business intelligence solutions that are competent in implementing balanced scorecards, corporate reports and performance dashboards. This relates to managerial visions and a strategic planning tool that offers a global view of a company, transforming its strategy and mission into concrete and quantifiable goals.

According to a study, 89% of companies believe that if they do not integrate Big Data and Blockchain, they will lose market share (Columbus, 2014), and companies that generate, distribute or consume electricity have a large volume of data resulting from their operations that can generate relevant information. Currently, such data is not used to improve their operational and commercial management. Risco-Ramos et al.(2022)He also stated that the latest generation of electrical systems require the implementation of smart grids (GS) at all levels (generation, distribution and consumption).

It is important to mention that the implementation of BI tools in the generation of strategies for the distribution of electrical materials in the Santa Cruz sector of the Galapagos Islands, contributes to developing viability and sustainability by collecting

technical, market, economic and financial data, since as mentioned by Osorio et al.(2015)Market analysis is advantageous for marketing, as it allows identifying business opportunities offered by home construction and maintenance companies on the island.

This benefits both society and the energy sector, since the implementation of strategies based on Business Intelligence allows the optimization of those business administrative resources that current and modern organizations have, which as Muñoz et al. mention.(2016), can count on making the most of all the information they have about their customers, suppliers and even their competitors, all with the aim of achieving competitive advantages in a hostile and overly dynamic market.

It is important to note that data analysis to generate advanced strategies involves not only optimization but also continuous innovation, which is plausible by unlocking information that has not yet been processed, while advanced Big Data analysis results in estimation, prediction, diagnosis and forecasting conclusions from historical and real-time data streams.

This can provide more refined insights into planning grid operations, as extracting valuable information and discovering underlying data patterns enables BI to make quick and effective decisions for different organizations. Companies that manage electricity should therefore be no exception.

The relationship between the use of strategies based on Business Intelligence tools and the increase in efficiency is positive since the results of the survey conducted in the study on the generation of business strategies based on BI to increase the competitiveness of companies dedicated to the distribution of electrical material suggest that the majority of respondents consider that BI can contribute to greater operational efficiency and to making more informed and efficient decisions, so based on what was stated above about the electrical materials sector in the area, the implementation of business strategies based on Business Intelligence can be proposed for the distribution of electrical material in the Galapagos Islands, Ecuador, considering that this can be a valuable tool to increase the competitiveness of companies.

Finally, based on the results and analysis, a CAME proposal can be made for strategic guidelines for decision-making on business generation based on Business Intelligence. Thus, based on the results and the SWOT, the following business strategies based on Business Intelligence can be identified to increase the competitiveness of electrical material distribution companies:

- Strengths-Opportunities (FO): Using market knowledge and customer needs to identify growth opportunities in the renewable energy sector. Implementing Business Intelligence technologies to collect and analyze data on

technological advances and energy efficiency, and using this information to develop new products and services.

- Strengths-Threats (ST): Establish strategic alliances with suppliers and customers to meet competition from larger companies. Use market knowledge and customer needs to adapt to changes in government regulations and minimize the impact of economic instability and price fluctuations.

- Weaknesses-Opportunities (DO): Diversify the product and service offering to take advantage of growth opportunities in the renewable energy sector. Implement Business Intelligence technologies to identify and take advantage of energy efficiency opportunities.

- Weaknesses-Threats (WTH): Establish strategic alliances with suppliers and customers to face competition from larger companies. Use Business Intelligence technologies to identify and mitigate risks associated with changes in government regulations, economic instability, and price fluctuations.

The above highlights the positive relationship between the use of Business Intelligence (BI)-based strategies and increased efficiency in the electrical material distribution sector in the Galapagos Islands, Ecuador. According to this analysis, it is perceived that BI can contribute to greater operational efficiency and facilitate more informed decisions.

Conclusions

- Based on the analysis, it was possible to verify the positive relationship between efficiency and competitiveness, since companies that use these BI-based strategies allow for smarter data-based decisions and predict success in the distribution of electrical materials, and this would be achieved since 69.7% are committed to using this type of solutions. Of this, it is considered that 55.67% (38.8% of the total) of those who would use BI tools would considerably increase competitiveness in their businesses by using BI-based strategies, likewise,Chi-square analysis reveals that the use of BI tools impacts the competitiveness of electrical material distribution companies in the region of Santa Cruz de Galápagos Island with 95% confidence and 5% margin of error. This highlights the relevance of implementing BI-based strategies to improve efficiency and competitiveness in the electrical material distribution sector in the Galápagos Islands.
- The implementation of business strategies based on Business Intelligence can be highly beneficial for electrical material distribution companies in the Galapagos Islands. The combination of internal strengths with external opportunities, as well

as the mitigation of weaknesses through strategic alliances, highlights the capacity of BI to improve competitiveness, adapt to changes in the environment and take advantage of new opportunities.

- The CAME proposal provides a structured framework for strategic decision-making, allowing companies in the distribution of electrical supplies to address, exploit, improve and correct based on the SWOT of the sector as they implement Business Intelligence as a key tool for informed decision-making and sustainable improvement in the efficiency and competitiveness of the electrical material distribution sector in the region.
- Business intelligence (BI) enables business analysis, data visualization, mining, data tools and infrastructure, and strategic practices in order to achieve business achievements where it can be seen that 69.7% of the companies surveyed would be committed to using BI tools to generate strategies for the development of their businesses, where 52.94% (36.9% of the global total) of those who would use BI tools, consider that it would considerably increase business efficiency by using BI-based strategies, this suggests that the majority of respondents consider that BI can contribute to greater operational efficiency and to making more informed and efficient decisions, this suggests that companies dedicated to the distribution of electrical material could consider the implementation of business strategies based on Business Intelligence to improve the efficiency of their operations and, therefore, increase their competitiveness in the market.
- Using Business Intelligence enables more informed and efficient decision making for the majority of respondents (42%), so the results indicate that there is a general interest in using Business Intelligence for decision making, although some respondents may have doubts or concerns about it.
- It is important to highlight that the implementation of business strategies based on Business Intelligence can contribute to sustainability and environmental conservation by providing current and relevant information within the business context. This is because the majority of respondents were totally in favor (59%) or somewhat in favor (17%) of the idea that Business Intelligence can help achieve climate change and environmental conservation. The results indicate that the majority of respondents are in favor of the idea that Business Intelligence can help achieve climate change and environmental conservation.
- Companies should strive to build strong relationships with local communities and authorities, and demonstrate how the use of Business Intelligence can benefit both parties in terms of operational efficiency, sustainability and shared value creation.
- Investing in Business Intelligence technology can be an effective strategy to remain competitive. It is important to carefully consider the associated costs and benefits, as well as adapt the implementation of these technologies to the specific needs and capabilities of each company.

Conflict of interest

There is no conflict of interest in relation to the submitted article.

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