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# **Redesigning the Excellence Award Calculator for La Cámara de Industrias de Costa Rica**

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An Interactive Qualifying Project Submitted to the Faculty of WORCESTER POLYTECHNIC INSTITUTE in partial fulfillment of the requirements for the Degree of Bachelor of Science by:

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This report represents the work of four WPI undergraduate students submitted to the faculty as evidence of completion of a degree requirement. WPI routinely publishes these reports on its website without editorial or peer review. For more information about the projects program at WPI, please see <http://www.wpi.edu/Academics/Projects>

# **Abstract**

With La Cámara de Industrias de Costa Rica (CICR), our team produced an indicator calculator to help analyze data from small to large-sized businesses who applied for the Excellence Award. This award promotes positive business practices in Costa Rica and our project should decrease the workload needed to expand the number of companies involved. We created a Google Form for data collection and an Excel spreadsheet for data analysis. Both were chosen with the idea that CICR could continue to use these programs in future years with very few alterations. Also, to change the system for data collection and analysis for the Excellence Award, we came up with recommendations on how to improve our system for the future so that CICR can continue to be a beneficial business presence in Costa Rica.

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The Excellence Award Director of CICR, Sergio Arias Leitón

Our sponsors, Akira Hidalgo and Vinicio Zamora

Our advisors, Professor James Chiarelli and Professor Pratap Rao



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## Executive Summary

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## **Introduction**

The health of the planet has rapidly declined due to the various emissions resulting from production procedures that industry requires, specifically over the past six decades (USGCRP). The effects of climate change can be seen through the frequent widespread fires and the shrinking of glaciers (USGCRP). If action is not taken quickly, the planet's environment will continue to degrade: the temperatures will continue to rise, the growing season will lengthen, there will be more droughts, and hurricanes will become consistently stronger than before (The Effects of Climate Change, 2020). Lack of action will not only negatively impact the planet, but businesses throughout Costa Rica as well.

Global concern for the environment has led many countries and organizations to work for lower anthropogenic emissions. One such country, Costa Rica, has pledged to become carbon neutral by 2050 in order to protect their wildlife, environments, and the planet. With its ambitious goal of carbon neutrality, Costa Rica will not only rely on its government to accomplish this feat but on the companies and people within the country as well.

CICR has engaged our group to redesign a calculator for Excellence Award indicators. The purpose is to allow small to large size companies a way to determine how their outputs compare to those of other Costa Rican businesses. This calculator allows for businesses in Costa Rica to receive feedback on how they are managing their environmental, social, and financial indicators. Costa Rica requires basic standards of environmental stewardship and this tool will work to make such standards more achievable. With the contribution of businesses in Costa Rica, the country can continue to make progress toward a carbon neutral and sustainable society.

## **Background**

The goal of La Cámara de Industria de Costa Rica (CICR) is to advocate for local businesses by writing proposals to the government with the interest of the private sector at heart. To support sustainable actions done by local, private businesses, CICR has developed a nationally recognized award known as the Excellence Award. There are five primary focuses of the Excellence Award:

- Customers and Markets
- Human Talent
- Processes
- Innovation and Technology
- Environment

Over 600 businesses have already been recognized with this award, and in order to be recognized companies must show “leadership and strategic planning, customer and market focus, focus on human talent, processes, innovation and technology, environment and social responsibility.”

Similar to the Excellence Award, the Malcolm Baldrige National Quality Award is based in the United States that recognizes companies who have successfully implemented quality management systems. Businesses must satisfy the following criteria: Leadership, Strategy, Customers, Measurement/Analysis Knowledge Management, Workforce, Operations and Results. Like the Excellence Award, the Malcolm Baldrige Award provides companies with a detailed report of their current operations and ways in which they can improve in the future.

## Methods

The goal of this project is to create an automation tool that CICR can use in their Excellence Award process. Our project will be guided by the following objectives:

1. Meet with the director of the Excellence Award to establish an understanding of current process and design requirements
2. Redesign the method to accurately collect company data
3. Redesign and automate data analysis tool used to generate a report
4. Automate a report generation for companies to receive
5. Communicate proper usage and maintenance of automation tool

Our first goal was to simply meet with the director of the Excellence Award and to determine and understand his process. In our meeting with him, we established how CICR collected and handled their data.

We created a Google Sheet to help companies perform the calculations necessary for submitting their data. This Google Sheet includes each indicator and its corresponding formula and has two separate columns for companies to enter their yearly data. Companies are then able to enter this value from the Google Sheet into the Google Form. Google Form allows an individual to export the responses into a Google Sheet, allowing the Excellence Award director to then copy and paste the responses into the redesigned automation tool that automatically produces the necessary analysis.

The purpose for this objective is to drastically increase the efficiency and accuracy of the analysis process of the company data. By doing so, CICR and the applying companies will receive feedback much faster, which will allow them to more quickly make changes to the current business practices. We automated all of the analysis processes including a summary of the company data, statistical analysis, and the generation of box plots and bar charts. We also made this process expandable if there is a larger variety of companies choosing to apply for this award in the future.

Previously, CICR had to manually input each data set for every company's report; now they will be able to input the name of the company and have all data analysis tables and graphs be updated automatically. This, along with having all graphs and tables on the same active sheets, will allow for easy transferability to the Excellence Award reports.

While the automation tool the team created was designed to be easy to use and efficient, we still believed that instructions for its use would be an important addition for future use. Clear communication of the usage and maintenance of will allow for anyone to be able to operate the tool without training and future edits to the layout could be easily executed.

## **The Design of the Excellence Award Calculator**

When we looked into the existing practices of CICR we found that previously all data collection was done using a template spreadsheet that was distributed to applying companies. All of the analysis had to be manipulated by hand whenever the data changed which leaves things up to human error quite a bit. We also found that there was room to improve upon how reports were



generated. Initially reports required a lot of manual labor and only skimmed the surface in terms of personalization from applicant to applicant.

Our main goal when designing our calculator tool was to make it efficient and easy to use. We wanted to save CICR time and eliminate the possibility of human error when analyzing company data. Our idea was to automate and simplify as much of the data collection, analysis, and reporting processes as possible. This would greatly reduce the need for manual calculations that could lead to human error.

Our primary design was an Excel spreadsheet that featured built-in analysis tools and report generation. The sheet prioritized the elements that we discussed when meeting with the director of the Excellence Award. It was also important that the sheet was flexible and could be expanded or adjusted to better suit the analysis for the award over the years. Therefore we created thorough and complete documentation of how everything in the sheet works and can be adjusted.

After the necessary data analysis is conducted throughout the Excel spreadsheet, a detailed report is generated. A search button feature was implemented which allows for the overall data to be filtered by the applicant. This is a beneficial feature as it makes the customized reports are given back to each applicant easier to craft. The comments report what value that company had entered, describes statistical information, and gives a comparison to other applicants. The comments also indicate companies that may have had any extreme outliers for each indicator.

## **Recommendations**

***CICR should keep a record of each individual company's previous data to allow for comparison over the years.***

A key feature CICR could include in their data analysis process would be the ability to access past records. This provides companies the opportunity to compare how they are currently operating with years prior. These past records could also be presented to local universities or the Costa Rican government, where they could conduct necessary analysis on the award's indicators.

***CICR should provide sustainability recommendations and resources to connect with other companies.***

A beneficial addition that can be implemented on the generated reports would be a list of recommendations CICR gives an applicant to help the applicant improve their data and business practices in future years. These recommendations could also include other organizations the applicant could connect with to learn more about sustainability.

***CICR should develop an app or website to encourage application to the Excellence Award.***

The development of an app or website would not only provide companies with a more accessible way to apply for the Excellence Award, but can provide a more secure platform to do so on. This can help increase participation in the award, all while keeping applicant's data confidential.

***CICR should improve the ways in which they handle outliers in data sets.***

Regardless of the size of a company, one can anticipate that some businesses may have more efficient practices in place, or the converse, which can cause extreme outliers in the data. It

would be beneficial to implement a better way of handling extreme outliers to ensure easy and accurate data analysis.

## **Conclusion**

Our project was to improve CICR's Excellence Award program to promote and encourage companies to work towards better, more sustainable businesses practices. The goal of our project was to create a calculator tool, data collection form, and a calculation sheet to increase the efficiency of the application process and expand the Excellence Award to more companies in Costa Rica. By doing background research about Costa Rica's environmental practices and policies, CICR, and the Excellence Award, we had a strong foundation to improve the current processes of the Excellence Award.

Our results and recommendations will allow CICR to continue to expand their Excellence Award program and ultimately further improve Costa Rica's sustainability efforts. As a world leader in sustainability, Costa Rica has the means to set an example for all countries to improve their sustainability practices. Our project can help CICR make an impact to improve sustainability practices in Costa Rica's business sector that can ultimately reduce environmental impacts on a global scale.

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# Chapter 1: Introduction

The growth of industries due to globalization has been rapid. From this growth, many businesses and factories have negatively impacted the environment at astounding rates. Industry has a direct effect on global warming, multiple forms of pollution, and much more (How Can Factories, 2018). This can cause major disruption and irreversible effects to ecosystems on our planet. One million animal and plant species are predicted to go extinct by 2050 due to global warming (Brown, 2004).

The health of the planet has rapidly declined due to the various emissions resulting from production procedures that industry requires, specifically over the past six decades (USGCRP). The effects of climate change can be seen through the frequent widespread fires and the shrinking of glaciers (USGCRP). If action is not taken quickly, the planet's environment will continue to degrade: the temperatures will continue to rise, the growing season will lengthen, there will be more droughts, and hurricanes will become consistently stronger than before (The Effects of Climate Change, 2020). Lack of action will not only negatively impact the planet, but businesses throughout Costa Rica as well. With drastic changes in climate, there is a risk of new parasites and pests spreading throughout the country, extinction of animal species, potential flooding of company premises that could lead to production disruptions and stoppages and damage to equipment, and increased temperatures that can lower the productivity of workers (Business & Adaptation, 2020).

Global concern for the environment has led many countries and organizations to work for lower anthropogenic emissions. One such country, Costa Rica, has pledged to become carbon neutral by 2050 in order to protect their wildlife, environments, and the planet. The country produces or procures 99% of its energy from renewable sources with hydroelectric dams playing



a major role. The president, Carlos Alvarado Quesada, has invested in converting public busses and other road transportation to electric power. Over the past 30 years, national efforts to regrow trees and protect wildlife land has caused the country's forest coverage to double in area. An increased population of plant life, which converts carbon dioxide to oxygen gas through photosynthesis, aids in the country's efforts of becoming carbon neutral. With its ambitious goal of carbon neutrality, Costa Rica will not only rely on its government to accomplish this feat but on the companies and people within the country as well.

In the past decade Costa Rica has made great strides toward this goal in a broad sense. Unfortunately, costs are associated with this pledge, costs that for small and medium sized businesses can be difficult to address. The Costa Rican Chamber of Industry aimed to make a calculator that can assist these businesses with their tracking and compliance with regulations. La Cámara de Industria de Costa Rica (CICR) is an organization that promotes sustainable advancement of businesses within the country. One of the ways CICR encourages eco-friendly practices is through its Excellence Award. This recognition is given to businesses that meet all the requirements including environmental and social responsibility.

Today, data drives everything, yet knowing how to use it in a meaningful way is still complex. To resolve this issue, CICR has engaged our group to redesign a calculator for Excellence Award indicators. The purpose is to allow small to large size companies a way to determine how their outputs compare to those of other Costa Rican businesses. This tool takes in prior and current annual data of the companies who applied and creates a ratio or percentage for that applicant. Businesses will be graded on environmental effectiveness and additional areas of business. This calculator allows for businesses in Costa Rica to receive feedback on how they are managing their environmental, social, and financial indicators. Costa Rica requires basic

standards of environmental stewardship and this tool will work to make such standards more achievable. With the contribution of businesses in Costa Rica, the country can continue to make progress toward a carbon neutral and sustainable society.

## **Chapter 2: The Background**

In this chapter, we will discuss the aspirations and actions of the Costa Rican government to have a sustainable country as well as an overview of La Cámara de Industria de Costa Rica (CICR), including their role in encouraging the private sector to accomplish carbon neutrality.

### **2.1 - La Cámara de Industria de Costa Rica and the Excellence**

#### **Award**

La Cámara de Industria de Costa Rica (CICR) is an organization that assists businesses in the industrial sector in Costa Rica. They have an award called the Excellence Award that promotes sustainable businesses practices in this sector. This award is broken down into several focuses that evaluates a wide range of a company's business practices.

#### **2.1.1 - History and Mission**

CICR advocates for businesses by writing proposals to the government that has the interest of the private sector at heart. They work with private businesses and represent them to Costa Rica's government so these companies can have a better business climate. This climate includes producing improved productivity and effectiveness, employment opportunities, investment, exports, and developmental opportunities. The organization's mission is to "Promote the sustainable development of the industrial sector and support the competitiveness of our associated companies."

## **2.1.2 - Recognition and Excellence Award**

CICR has institutional representation by State entities such as The National Council for Quality, The Foreign Trade Advisory Council, and many more. CICR also has commissions including Energy, Electricity, and Fuels, Environment and Social Responsibility, etc. It is a well established organization that provides services in many areas of business and not just in the environmental realm. CICR aims to help businesses promote excellent leadership, innovation, and opportunities for their employees as well as promoting sustainable practices that will help protect the environment.

CICR has recognized more than 600 small-to-large businesses with its Excellence Award. This program started in 1997 and, shortly after, was recognized by the Costa Rican government, in 2000. Companies must show “leadership and strategic planning, customer and market focus, focus on human talent, processes, innovation and technology, environment and social responsibility” in order to earn this award. The main three areas companies consider are Excellence Award, Route of excellence, and Commitment to excellence. Some of the organizations that have worked with the CICR are Baxter Medical Products, Bridgestone from Costa Rica, Intel in Costa Rica, and much more. CICR has evaluators that have invested more than 3500 hours per year to provide this award to businesses all over Costa Rica.

## **2.1.3 - Focuses of the Excellence Award**

There are five primary focuses of the Excellence award:

- Customers and Markets
- Human Talent

- Processes
- Innovation and Technology
- Environment

**Customers and markets** ensure companies are practicing sustainability by understanding these two focuses. Companies need to find a balance between meeting their needs while at the same time practicing sustainability. This understanding of a company's customers and markets will improve their processes and allow them to develop innovative products and services. This area of focus is important because it will attract customers and develop their loyalty towards the company.

**Human talent** is one of the most important focuses of the Excellence Award because it impacts the rest of the processes and practices of the whole company. Companies should maximize employee contribution through their involvement and development in the company. The purpose of this focus is to lead companies to excellence by having them encourage and support their employees to reach their goals and improve performance.

**Process management** contributes to improving a company's performance. Processes management should be continuously implementing and improving processes to maintain a high level of trust in stakeholders. Company's practices should also promote social responsibility and sustainability by complying with their applicable legal framework and taking responsibility for their impacts on society and the environment.

**Innovation and technology** lead a company to improve for the future and efficiently use new technology that is continuously changing. Companies constantly need to innovate to keep up

with the world around them and adapt to changes. Innovation will help companies become more sustainable and improve the quality of their products and services. Technology management ensures that a company is using its technological resources efficiently in order to maximize performance and achieve their goals using the least amount of cost in time, resources, etc.

The **environment** focus of the Excellence Award encourages companies to maintain a good relationship with the environment when developing their processes, products, and services. The award emphasizes the importance of companies identifying their impact on the environment and base their practices to minimize that impact.

## **2.2 - The Malcolm Baldrige National Quality Award**

Similar to the Excellence Award, the Malcolm Baldrige National Quality Award (MBNQA) is a United States based award designed for recognizing companies in the United States that have successfully implemented quality management systems. Named after the late U.S. Secretary of Commerce Malcolm Baldrige, the U.S. Congress first established this award in 1987 (What is, 2021).

The MBNQA is awarded to companies that satisfy the following seven criteria: Leadership, Strategy, Customers, Measurement/Analysis/Knowledge Management, Workforce, Operations, and Results. A company that applies also has to be based in the United States and in operation for at least one year. There is an eligibility filing fee of \$360, an application fee that is dependent on a company's size, and \$1250 processing fee. While the application process is expensive, the benefits make it worth the investment. The Baldrige assessment provides companies with vital information regarding these different criteria, which in turn can help

increase their employee satisfaction, customer approval, and increase the company's overall profits (Eastman, 2020). This ties into the Excellence Award, as the Excellence Award provides businesses in Costa Rica with a current, up-to-date stance on environmental sustainability, and provides them with insight on areas in which improvements could be made.

## **2.3 - Sustainability in Costa Rica**

In this section we will discuss Costa Rica's pledge at the 2015 Paris Agreement and how that has fueled their role as a leader in sustainability. We will also provide an overview of the effects of business and tourism on the country's efforts to achieve this pledge.

### **2.3.1 - Carbon Neutrality**

At the 2015 Paris Agreement, Costa Rica pledged to be carbon neutral by 2050. The country has converted to using primarily renewable energy by investing in hydroelectric dams, further positioning itself as a leader in sustainability. As such, it produces 93 percent of its electricity from renewable resources and conserves approximately 30 percent of its national territory (Sustainability in Costa Rica). Emissions from transportation continue to be a difficult challenge to overcome when reducing carbon production. Tourism is a large part of the business in Costa Rica and the government has taken steps to provide electrically powered public transportation. Companies such as Green Airways are committed to bring down the carbon emissions of travel and plan to accomplish this by planting an endemic tree for every ticket bought. Businesses are essential in efforts for Costa Rica to be carbon neutral since they can also work to lower their environmental impact. Being able to track environmental indicators and

analyze areas for improvement for each company can be the difference when decreasing carbon emissions.



## Chapter 3: Methodology

The goal of this project is to create an automation tool that CICR can use in their Excellence Award process. The existing tool was tedious and outdated and had much to be improved upon. Our project will be guided by the following objectives:

6. **Objective 1:** Meet with the director of the Excellence Award to establish an understanding of current process and design requirements
7. **Objective 2:** Redesign the method to accurately collect company data
8. **Objective 3:** Redesign and automate data analysis tool used to generate a report
9. **Objective 4:** Automate a report generation for companies to receive
10. **Objective 5:** Communicate proper usage and maintenance of automation tool

### **3.1 - Objective 1: Meet with the director of the Excellence Award to establish an understanding of current processes and design requirements**

Our first goal was to simply meet with the director of the Excellence Award and to determine and understand his process. In our meeting with him, we established how CICR collected their data and what they did with it once they had it. We discovered that the data were collected in a spreadsheet sent out to the companies individually and then copied and pasted into a separate collective spreadsheet where the analysis was done. When it came to analysis, everything was done by hand and graphs constantly had to be updated every time new data were added. Reports were even more tedious, for every individual report the selected data needed to be changed by hand over 60 times, and then 60 separate screenshots were compiled.

### **3.2 - Objective 2: Redesign the method to accurately collect company data**

Initially, CICR collected each company's data through separate Excel spreadsheets where the Excellence Award director had to then manually enter the collective data into one spreadsheet to conduct data analysis. This data collection method was found to be very tedious and was not an efficient use of time. To combat this issue, we worked to establish a new data collection method for CICR to use in regard to the Excellence Award.

We first created a Google Sheet to help companies perform the calculations necessary for submitting their data. Because of concerns that arise due to the confidentiality of yearly data values, this Google Sheet can be copied to an individual computer, which prevents a potential breach of privacy. This Google Sheet includes each indicator and its corresponding formula and has two separate columns for companies to enter their yearly data. This Google Sheet then performs the appropriate algebraic formula to produce the necessary value for data collection.

Companies are then able to enter this value from the Google Sheet into the Google Form. This Google Form is broken down by each indicator for each category of the Excellence Award and compiles each company's individual data. This information is key for the Excellence Award director to conduct their data analysis. Google Form allows an individual to export the responses into a Google Sheet, which the Excellence Award director is then able to copy and paste into the redesigned automation tool that automatically produces the necessary analysis.

### **3.3 - Objective 3: Redesign and automate data analysis tool used to generate a report**

The purpose of this objective is to drastically increase the efficiency and accuracy of the analysis process of the company data. By doing so, CICR and the applying companies will receive feedback much faster, which will allow them to more quickly make changes to the current business practices. The data they receive will also be more accurate. Therefore, companies can make more effective business decisions and changes relating to matters of sustainability.

By researching the many functions and capabilities in Excel we determined what processes could be completed by Excel instead of the user. We automated all of the analysis processes including a summary of the company data, statistical analysis, and the generation of box plots and bar charts. Therefore, the only manual work that has to be done in the Excel spreadsheet is inputting the raw data into the results sheet. We also made this process expandable in the event there is a larger variety of companies who choose to apply for this award in the future. There is no need for any redesign of additions to the Excel spreadsheet to provide the same analysis.

Automating the analysis of these data will save a substantial amount of time for the director of the Excellence Award when inputting the data into the calculator tool and generating the proper graphs and charts based on the company data. This will allow for the director to generate reports more quickly and in turn, can give the reports back to the companies promptly. These companies will then have more time to improve their sustainability practices to qualify for

the Excellence Award. The director and CICR will be able to make more accurate decisions about which companies are on track to receiving the award. A faster analysis process will allow for the expansion of the Excellence Award to more companies across Costa Rica.

### **3.4 - Objective 4: Automate a report generation for companies to receive**

Prior to this project, the Excellence Award reports were produced from screenshots of the tables and graphs within an Excel sheet. In addition to automating the data analysis, our team wanted to provide a simple way to generate reports for the individual companies. Previously, CICR had to manually input each data set for every company's report; now they will be able to input the name of the company and have all data analysis tables and graphs be updated automatically. This, along with having all graphs and tables on the same active sheets, will allow for easy transferability to the Excellence Award reports.

### **3.5 - Objective 5: Communicate proper usage and maintenance of automation tool**

While the automation tool the team created was designed to be easy to use and efficient, we still believed that instructions for its use would be an important addition for future use. Clear communication of the usage and maintenance of will allow for anyone to be able to operate the tool without training and future edits to the layout could be easily executed.

Some of the aspects described in detail were the functions of the Google Form to collect companies' data and carrying over the results to a Google Sheets. From there, instructions are provided to copy and paste the results into the Excel file which will automatically analyze the

data into the tables and graphs needed for the Excellence Award report. The layout of the Excel file is also provided, allowing a better understanding of the functionality and locations of different sheets. Finally, we show the steps to create the individual reports for each company, through a search cell where one can enter the name of the company, and how to save the active sheets with the data analysis for an efficient report creation.

# **Chapter 4: The Design of the Excellence Award**

## **Calculator**

In this chapter we first discuss various circumstances that we encountered over the course of our project that caused us to change the direction in which our project was moving. We dissect our thought process behind the design of our new project and the overarching emphasis we put on efficiency and time. We then discuss the ways in which we tailored our project to not only fit our sponsors' needs, but also ways in which we improved the functionality of our calculator tool, overall. Lastly, we discuss the capabilities of our calculator and how those findings are expected to hold true in future years. These findings were made throughout the span of our meetings with both our sponsors and the Excellence Award Director, as well as necessary background research on the capabilities of Excel.

### **4.1 - Previous Infrastructure**

When we were introduced to the project lead for the Excellence Award at CICR we were presented with a system that was much different than we imagined. Our first surprise was how the data was collected. Previously all data collection was done using a template spreadsheet that was distributed to applying companies. Upon receiving they would fill out as many of the 30 indicators as they wished and would return it to CICR. From there the data from each sheet was copied and pasted into a centralized worksheet. This was our first indication that there was a lot of room for improvement. From there we were shown what data analysis was performed and what was communicated to the companies. All of the analysis had to be manipulated by hand

whenever the data changed which leaves things up to human error quite a bit. On top of that when reports were generated, each company had to be filled into multiple cells for each indicator, and then around 40 screenshots were compiled to make the report, this took place for each company. Both the data collection and the analysis suffered severely in terms of scalability and if the pool of applicants grew by much it would quickly become unsustainable. The existing structure of the analysis of the award is primarily what guided our project in the direction that we went with.

## **4.2 - Considerations for the Design of our Project**

Our main goal when designing our calculator tool was to make it efficient and easy to use. We wanted to save CICR time and eliminate the possibility of human error when analyzing company data. Our idea was to automate and simplify as much of the data collection, analysis, and reporting processes as possible. This would greatly reduce the need for manual calculations that could lead to human error.

We wanted to make the calculator tool very intuitive. This is due to the possibility of a new individual fulfilling the data analysis role for the Excellence Award at CICR. An intuitive tool would allow for a fast and easy transition or training process. We also made a more presentable and easy-to-use form for CICR to send to companies to collect data and attached a downloadable Google Sheets to assist companies in calculating the data that is to be entered on the form. This will reduce errors in the raw data that is coming from multiple people, all while protecting companies' data privacy. By reducing the errors from the start, it will make for faster and more accurate analysis. We considered the possibility of the Excellence Award becoming

more widespread in Costa Rica where multiple people might become part of the analysis process. Figure 1 provides a visual representation of our solution to achieve our goal and the benefits of the solution.

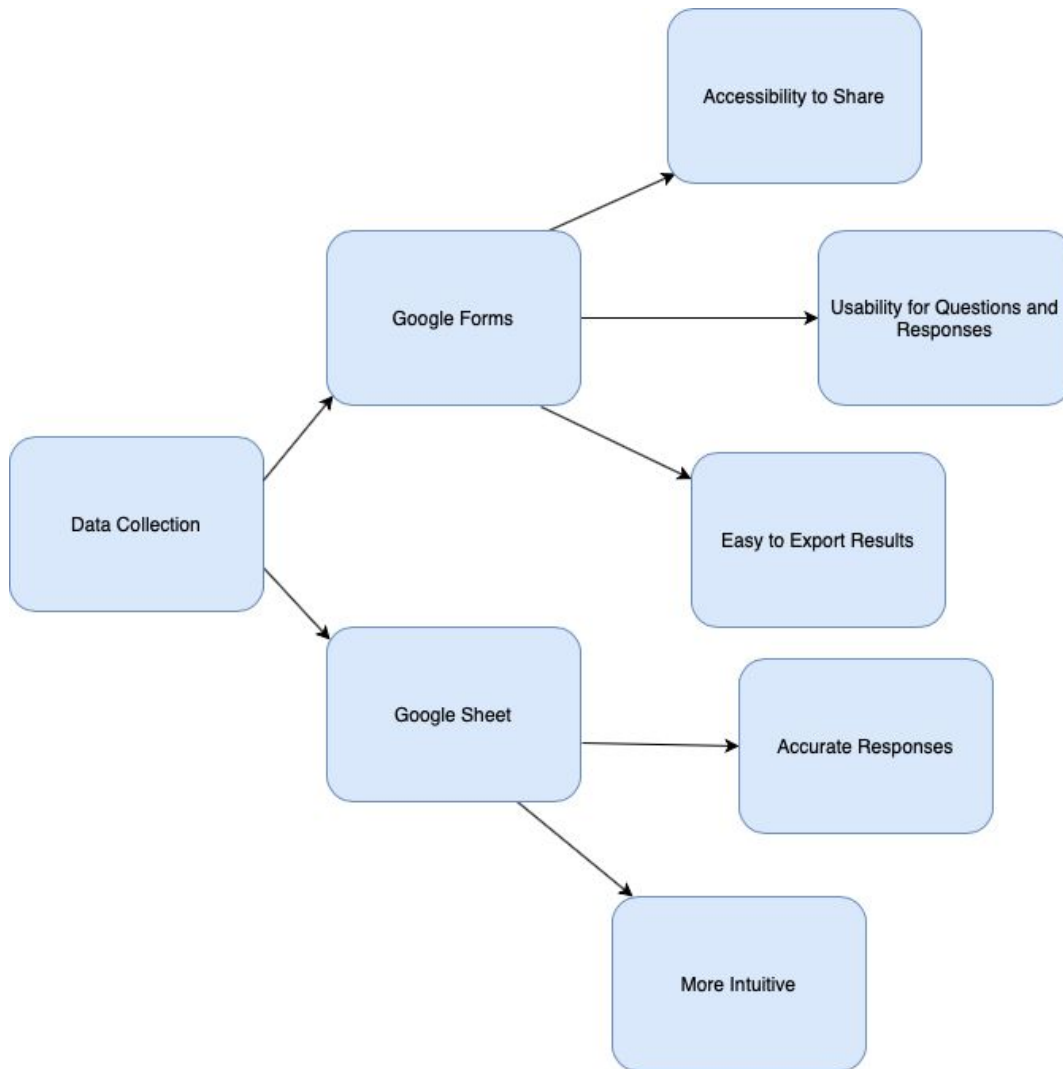


Figure 1: Solutions and Benefits for the Data Collection of our Project

Efficiency and time were very important aspects of our project. We wanted to greatly reduce the time it was currently taking CICR to analyze applicant data. From learning more about CICR and the Excellence Award, we saw the potential of how much this award could



encourage Costa Rican businesses to strive for a more sustainable and productive work environment. By making the analysis process quicker, CICR can focus more of its time on the expansion of the award so more businesses can learn and apply for it. They could put more time into advertising to companies or planning for larger events when granting companies the award. With the greater opportunity of expansion of the award, we wanted to ensure the analysis tool had the capability of expanding and adapting to changes to the award. For example, these changes could be the addition of more categories in the award. Figure 2 provides a visual representation of our solution to achieve our goal and the benefits of the solution.

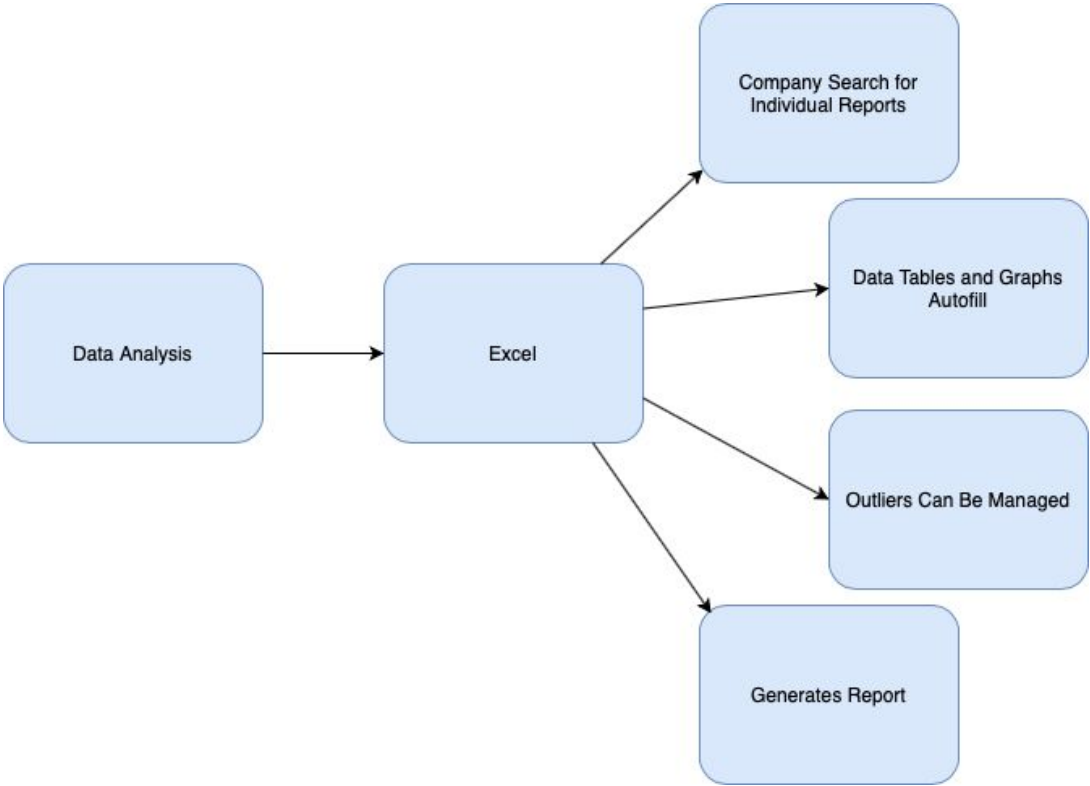


Figure 2: Solutions and Benefits for the Data Analysis Aspect of our Project

### 4.3 - Collecting and Analyzing Data

Our project aimed to satisfy all of CICR needs in order to evaluate companies for its Excellence Award. The product our tool creates are the individual reports for each company applying for the award. Within each report there are multiple graphs and tables for each indicator that analyze the difference between all the companies and within different categories of business. An example of one of the tables is in Figure 3 below, with the minimum, first quartile, median, third quartile, maximum, number of companies (muestra), and mean (promedio) for all the companies in the Muestra general column and for different categories of businesses in the other columns. Servicios and Industria (services and industrial) refer to the sector of companies who applied and Grande and PYME (large and small) refer to the size of the companies. By splitting up the data for every indicator into these groups CICR are able to discover potential trends within applicant businesses. Valor empresa refers to the value of the specific company the individual report is being created for (this value is shown in the mean graph and in comments within the report).

Indicador 2. Razón interanual de utilidad anual neta						
	Muestra general	Servicios	Industria	Grande	PYME	Valor empresa
Mínimo	-447.4040	-2.7800	-447.4040	-447.4040	-2.7800	
1o Cuartil	-0.5473	-0.1800	-0.7480	-0.5825	-0.4268	
Mediana	0.0250	0.2441	-0.0047	0.0300	-0.0634	
3o Cuartil	0.6934	0.6504	1.0000	0.7353	1.0843	
Máximo	3.4850	3.4850	2.1900	3.4850	2.1900	
Muestra	30	15	15	21	9	
Promedio	-15.1639	0.2345	-30.5623	-21.7089	0.1079	0.6504

Figure 3: Table for indicator 2 with data for the different categories of business

The tables along with the dispersion, mean, and box and whisker graphs automatically generate from the “Resultados Aportados” (results) tab ( descriptions for how the sheet generates everything is in Appendix B). Figure 4 & 5 show an example of all three graphs.

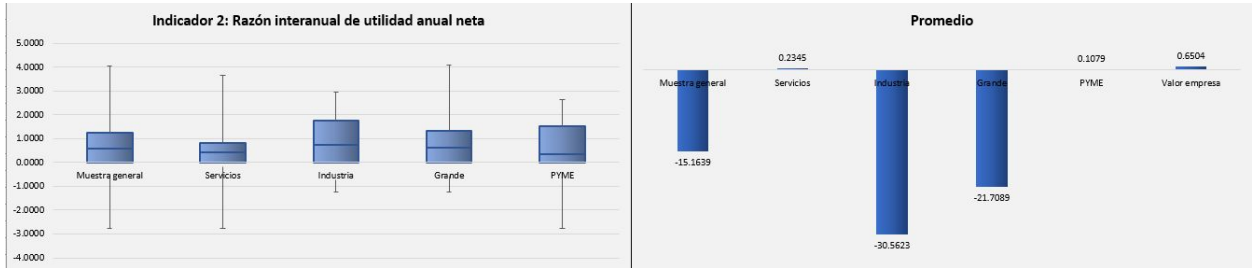


Figure 4: Box and Whisker Graph (left), Mean Graph (right). Both are created from the indicator 2 data table

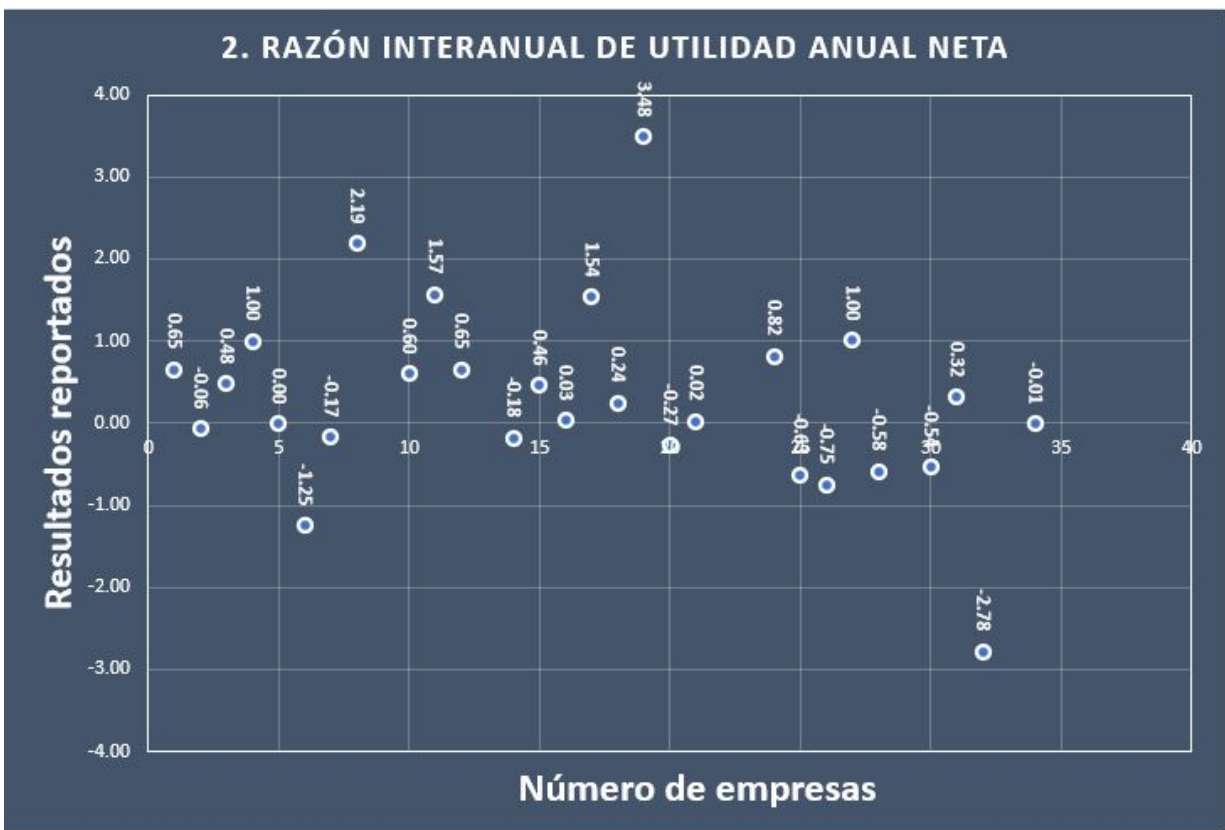


Figure 5: Dispersion Graph for All Applicants for Indicator 2

Both the dispersion graph and the maximum and minimum for the box and whisker graphs could be controlled with the “Valor Atípico” (outlier) page we created. We created this functionality so that the outliers could be removed and provide a more effective range to

compare the majority of the data. The outliers omitted from the graph are included in the final reports being generated as comments. Figure 6 shows an example of the tables for the dispersion and box and whisker graphs within the outlier sheet are below.

Límite Inferior	-10.47
Límite Superior	4.42
<b>2. Razón interanual de utilidad anual neta</b>	
0.65	FALSE
-0.06	FALSE
0.48	FALSE
1.00	FALSE
0.00	FALSE
-1.25	FALSE
-0.17	FALSE
2.19	FALSE
#N/A	TRUE
0.60	FALSE
1.57	FALSE
0.65	FALSE
#N/A	TRUE
-0.18	FALSE
0.46	FALSE
0.03	FALSE
1.54	FALSE
0.24	FALSE
3.48	FALSE
-0.27	FALSE
0.02	FALSE
#N/A	FALSE
#N/A	FALSE
0.82	FALSE
-0.63	FALSE
-0.75	FALSE
1.00	FALSE
-0.58	FALSE
#N/A	FALSE
-0.54	FALSE
0.32	FALSE
-2.78	FALSE
#N/A	FALSE
-0.01	FALSE
#N/A	FALSE
#N/A	FALSE
#N/A	FALSE
#N/A	FALSE

<b>2. Razón interanual de utilidad anual neta</b>	
Muestra General Mínimo	-2.780
Muestra General Máximo	3.485
Servicios Mínimo	-2.780
Servicios Máximo	3.485
Industria Mínimo	-1.245
Industria Máximo	2.190
Grande Mínimo	-1.245
Grande Máximo	3.485
PYME Mínimo	-2.780
PYME Máximo	2.190

Figure 6: Table on the left controls the dispersion graph for indicator 2, table on the right controls the box and whisker maximum and minimums

The outliers are determined if the value is below the limite inferior (lower limit) or above the limite superior (upper limit) (both are at the top of the left table). These values can be changed to any number so that the operator has flexibility when controlling the graphs. Outlier

values are determined by having a red TRUE cell to the right of the value. In the example case of indicator 2, there are two outliers, -447.4 and -15.3, which are both less than the limite inferior (-10.47). These two data points would make the dispersion and box and whisker graphs much harder to compare the majority of the data with each other since all the companies except the outliers would lie close to the zero line. This system greatly improves the effectiveness of the graphs for analysis.

#### 4.4 - Reporting Data

After the necessary data analysis is conducted throughout the Excel spreadsheet, a detailed report is generated that includes the one variable statistic tables, open sections for the graphs to be copied into, and comments regarding the data. Each page is separated by indicator, as depicted in Figure 7.

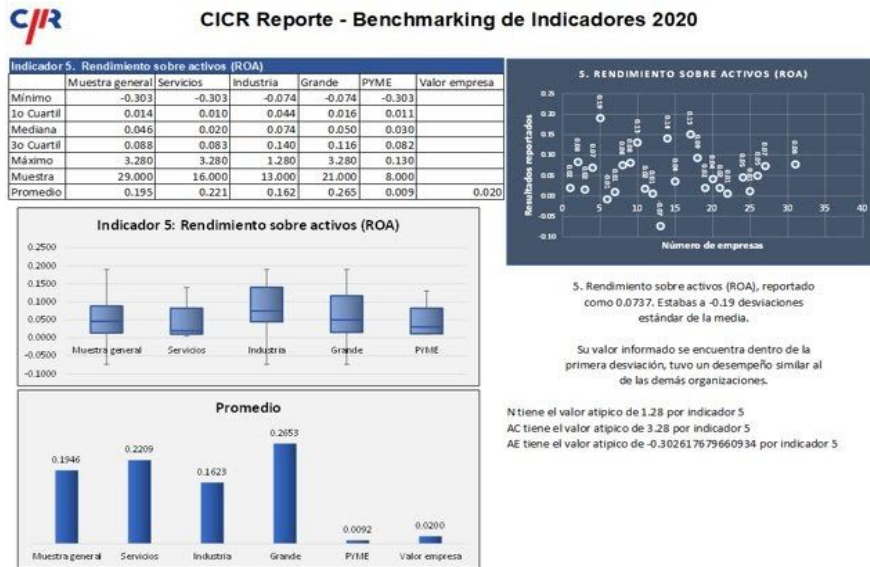


Figure 7: Sheet of the Automated Report for Indicator 5

A search button feature was implemented on an early sheet of the overall spreadsheet, which allows for the overall data to be filtered by applicant. Thanks to this feature, each table throughout this report is updated to include the values a specific applicant has entered. This is a beneficial feature as it makes the customized reports given back to each applicant easier to craft.

Depicted in the bottom right of Figure 7 are the comments that are generated on each page of the report. The comments included in the report describe how one specific company performed in comparison to other applicants of that year. The comments report what value that company had entered, describes how many standard deviations they were away from the mean, and reports whether or not that was similar to other applicants. The comments also include companies who may have had any extreme outliers for each indicator and states both the company and outlier value, in the case that the outlier was removed from the plot to better scale the data representation.

## Chapter 5: Recommendations

In this chapter, we propose recommendations that will expand and grow the Excellence Award overall. We chose these recommendations after carefully analyzing our outcomes and finding ways CICR can produce more useful information to their applicants and expand their Excellence Award to more companies. Our recommendations suggest ways CICR can provide more accurate data and ways CICR can make the Excellence Award more accessible to Costa Rican companies. These recommendations provide the steps CICR can take to improve the Excellence Award process and the benefits of those improvements.

### **5.1 - Recommendation 1: Access past data to compare individual companies and categories of companies with current numbers**

A function that could be added to our project is the ability to access data from past years in order to analyze the progress of the Costa Rican economy. For example, if a company applies for the award more than once, CICR would be able to include the individual company's data as well as how that company performed in earlier years. This will give that company insight into how they've improved and by what magnitude. This information would hopefully work to motivate companies into building upon past benchmarks.

Another area that could benefit from this would be comparing the different categories of business and how they have progressed throughout the years. Analysis on this could give important information to universities or the Costa Rican government on how different areas like industrial or services companies improved in the past few years. With Costa Rica and its

government attempting to be carbon neutral by 2050, the environmental indicators involved in the Excellence Award criteria could be a good way to benchmark the country's advances.

## **5.2 - Recommendation 2: Provide sustainability recommendations and resources to connect with other organizations**

From our discussions with CICR and our research about the Excellence Award, we found that a beneficial aspect of promoting sustainability would be to go beyond just the analysis of company data. Recommending and providing resources to the applying companies will be that extra step CICR could take to improve sustainability in the business sector of Costa Rica.

We recommend that CICR include recommendations to applicants when they give them their analysis report so the applicants can promote better business practices and improve their data in future years. CICR should research or communicate with other organizations that specialize in sustainable practice to provide them with adequate ways to improve their business. These solutions can provide a quicker way for companies to start improving their work environment.

Another useful aspect to the report would be to include resources for applicants to connect with other organizations who promote sustainability. These could be businesses that already have effective business practices in place or organizations who specialize in working with businesses to improve their current business practices. By providing these resources, it would eliminate the time it would take for these companies to have to conduct research



themselves. By having a complete analysis with recommendations together in one report, it would encourage companies to make a change to their business practices.

### **5.3 - Recommendation 3: An app or website to encourage application**

In the latest year the excellence award only had around thirty applicants. In an effort to make the award more accessible it would be beneficial to expand the interface of the award. A great solution to this would be an app or website that has a backend attached to it. There would be many benefits to this. Analysis would be much quicker and have a lot more flexibility allowing for companies to investigate the areas they are most interested in detail. With an interactive calculator tool more companies would be inclined to apply. Web development no longer faces issues of access therefore the largest obstacle for this recommendation would be setting up a secure database. With the accessibility of cloud services much of this has been simplified. Hosting web data no longer suffers the insecurity that it once suffered from. A host such as Amazon Web Services, Microsoft Azure or Google Cloud would have no issue with the demands of a website like this.

Shifting to a web based application would overall save time and money both for the applicants and for CICR's excellence award personnel. Cloud computing is so much more efficient than any other alternative and would be very well suited for this task.

### **5.4 - Recommendation 4: Improving the handling of Outliers**

Our final recommendation is for CICR to cater our Excellence Award tool to better suit businesses with outlier values. While the award is an opportunity that businesses of all sizes are welcomed to, one can anticipate that some businesses may have more efficient practices in place, which could cause their data to look skewed in comparison to other applicants. Having extreme outliers in data sets not only negatively impacts the mean and standard deviation, but also affects the box and whisker plots found throughout the Excel spreadsheet. We have found that the values that compose the plots become indistinguishable in the presence of large outliers, which makes it more difficult to analyze the data.

There are a few ways in which CICR could combat issues surrounding outliers. If participation in the Excellence Award increases, it could be possible to group businesses of similar size with one another to ensure the data analysis has no bias, while still establishing a proper sample size. Another way to combat issues with outliers would be to establish a better data analysis procedure that can handle the presence of large outliers better. This new procedure could include removing them from the data set when conducting an analysis or changing their value to better represent them within the data set.

## **5.5 - Summary of Recommendations**

Our recommendations were created with the goal to expand the Excellence Award to ultimately promote more sustainable practices in the business sector of Costa Rica. These recommendations include providing a further analysis and promotion of the award. It would be beneficial if companies had a more in-depth look into the history of their data. Therefore we recommend that CICR provide access to past data to the applying companies so they can track

their progress and determine what practices do and do not work. Companies would be much more likely to take action on their data if they had better resources to make their business practices more sustainable. We recommend that CICR provide recommendations and resources in their report that they return to their applicants. The most effective way to promote sustainability would be to expand the Excellence Award by incentivising more companies to apply in Costa Rica. We recommend that CICR create a new platform, such as an app or website, for the qualification and analysis process to make it easier for companies to apply. We also recommend that CICR continue to automate their analysis and data collection process so that larger companies with more data can still apply for the Excellence Award. With these recommendations, the Excellence Award can become more known nationwide and make even larger strides in improving Costa Rica's sustainability in the business sector.

## Chapter 6: Conclusion

Our project was to improve CICR's Excellence Award program to promote and encourage companies to work towards better, more sustainable businesses practices. The goal of our project was to create a calculator tool, data collection form, and a calculation sheet to increase the efficiency of the application process and expand the Excellence Award to more companies in Costa Rica. Through close contact and detailed discussions with CICR, we were able to meet the expectation set by them at the start of this project. By doing background research about Costa Rica's environmental practices and policies, CICR, and the Excellence Award, we had a strong foundation to improve the current processes of the Excellence Award. Working on this project provided us with well-informed conclusions and recommendations about the Excellence Award.

This work has explained CICR's current practices and processes for the Excellence Award program and how we planned and executed ways to improve these practices and processes. Our results and recommendations will allow CICR to continue to expand their Excellence Award program and ultimately further improve Costa Rica's sustainability efforts. As a world leader in sustainability, Costa Rica has the means to set an example for all countries to improve their sustainability practices. This will set the world in the right direction to reduce its environmental impact and end anthropogenic climate change. Our project can help CICR make an impact to improve sustainability practices in Costa Rica's business sector that can ultimately reduce environmental impacts on a global scale.

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## Appendix A : Table of evaluation for award (Translated)

<b>1. LEADERSHIP AND STRATEGIC PLANNING</b>		<b>155 points</b>
<b>1.1.</b>	<b>Leadership</b>	<b>40 points</b>
1.1.a.	Organizational culture	
1.1.b.	Strategic direction	
<b>1.2.</b>	<b>Relationship with stakeholders (RS)</b>	<b>25 points</b>
1.2.a.	Understanding the needs and expectations of interested parties	
1.2.b.	Society development	
<b>1.3.</b>	<b>Organizational governance (RS)</b>	<b>15 points</b>
1.3.a.	Transparency and accountability	
1.3.b.	Legal and ethical behavior	
<b>1.4.</b>	<b>Strategic planning</b>	<b>45 points</b>
1.4.a.	Strategy development	
1.4.b.	strategy implementation	
<b>1.5.</b>	<b>Organizational performance</b>	<b>30 points</b>
1.5.a.	Organizational performance indicators	
1.5.b.	Evaluation, analysis and improvement of organizational performance	
1.5.c.	Economic - financial processes	

<b>2. CLIENTS AND MARKETS</b>		<b>120 points</b>
<b>2.1.</b>	<b>Knowledge of the client and the market</b>	<b>40 points</b>
2.1.a.	Culture of knowledge and attention to the customer and the market	

2.1.b. Offering products and services that meet customer requirements	
<b>2.2. Management of customer relationships</b>	<b>30 points</b>
2.2.a. Customer relationship development	
2.2.b. Effective resolution of customer complaints and claims	
<b>2.3. Voice of the customer</b>	<b>35 points</b>
2.3.a. Listen to the voice of the customer	
2.3.b. Determination of customer satisfaction and dissatisfaction	
<b>2.4. Fair commercial relationships with customers and markets (RS)</b>	<b>15 points</b>
2.4.a. Fair competition	
2.4.b. Fair Marketing, Information and Contract Practices	
2.4.c. Customer health and safety	

<b>3. HUMAN TALENT (RS)</b>	<b>90 points</b>
<b>3.1. Commitment and performance (SR)</b>	<b>30 points</b>
3.1.a. Commitment	
3.1.b. Performance management	
<b>3.2. Development and learning (SR)</b>	<b>30 points</b>
3.2.a. Labor competencies	
3.2.b. Integral development	
<b>3.3. Work environment (SR)</b>	<b>30 points</b>
3.3.a. Occupational health and safety	
3.3.b. Satisfaction and well-being	
3.3.c. Dialogue and communication	

<b>4.</b>	<b>PROCESSES</b>	<b>100 points</b>
<b>4.1.</b>	<b>Structure and management of processes</b>	<b>25 points</b>
	4.1.a. Definition of the organization's process structure	
	4.1.b. Design and description of the processes	
<b>4.2.</b>	<b>Analysis of the processes</b>	<b>30 points</b>
	4.2.a. Measurement of process performance	
	4.2.b. Control and monitoring of process performance	
<b>4.3.</b>	<b>Process improvement</b>	<b>30 points</b>
	4.3.a. Identification of opportunities for improvement in processes	
	4.3.b. Continuous improvement	
<b>4.4.</b>	<b>Responsible operating practices (SR)</b>	<b>15 points</b>
	4.4.a. Promotion of social responsibility in the processes of the value chain	
	4.4.b. Relationship with suppliers	
	4.4.c. Continuity of processes in emergencies	

<b>5.</b>	<b>INNOVATION AND TECHNOLOGY</b>	<b>75 points</b>
<b>5.1.</b>	<b>Innovation</b>	<b>25 points</b>
	5.1.a. Organization to innovate	
	5.1.b. Identification of opportunities to innovate	
	5.1.c. Identification and selection of innovative ideas	
	5.1.d. Management of innovation projects	
<b>5.2.</b>	<b>Technology</b>	<b>25 points</b>
	5.2.a. Technological surveillance	
	5.2.b. Technological planning	
	5.2.c. Incorporation of technology	



<b>5.3.</b>	<b>Knowledge and information management</b>	<b>15 points</b>
5.3.a.	Knowledge management	
5.3.b.	Information management	
<b>5.4.</b>	<b>Innovation and socially responsible technology (SR)</b>	<b>10 points</b>
5.4.a.	Socially responsible innovation and technology	

<b>6.</b>	<b>ENVIRONMENT</b>	<b>60 points</b>
<b>6.1.</b>	<b>Environmental responsibility (SR)</b>	<b>20 points</b>
6.1.a.	Commitment to environmental improvement	
6.1.b.	Proactive approach to environmental improvement	
<b>6.2.</b>	<b>Environmental impact management (SR)</b>	<b>25 points</b>
6.2.a.	Comprehensive waste management	
6.2.b.	Energy efficiency	
6.2.c.	Water resource management	
<b>6.3.</b>	<b>Climate change (SR)</b>	<b>15 points</b>
6.3.a.	Identification of sources of greenhouse gases	
6.3.b.	Climate change mitigation	
6.3.c.	Adaptation to climate change	

<b>7.</b>	<b>RESULTS</b>	<b>400 points</b>
<b>7.1</b>	<b>Leadership and strategic planning</b>	<b>75 points</b>

<b>results7.2 Customer and market results</b>	<b>80 points</b>
<b>7.3 Human talent results (SR)</b>	<b>60 points</b>
<b>7.4 Process results</b>	<b>55 points</b>
<b>7.5 Innovation and technology results</b>	<b>50 points</b>
<b>7.6 Environmental results ( SR)</b>	<b>35 points</b>
<b>7.7 Cross-cutting results of social responsibility (SR)</b>	<b>45 points</b>

Based on the above, the cross-sectional area of Social Responsibility is made up of the following:

<b>SOCIAL RESPONSIBILITY</b>	<b>370 points</b>
<b>1.2 Relationship with interested parties (SR)</b>	<b>25 points</b>
1.2.a Understanding the needs and expectations of interested parties	
1.2.b Support to key communities	
1.2.c Relationship with suppliers	
<b>1.3 Organizational governance (SR)</b>	<b>15 points</b>
1.3.a Transparency and accountability	
1.3.b Legal and ethical behavior	
<b>2.4 Fair commercial relations with customers and markets (RS)</b>	<b>15 points</b>
2.4.a Fair competition	
2.4.b Fair marketing, information and contractual practices	
2.4.c Consumer protection	

<b>SOCIAL RESPONSIBILITY</b>	<b>370 points</b>
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<b>3.1 Commitment and performance (SR)</b>	<b>30 points</b>
3.1.a Optimize and evaluate commitment	
3.1.b Performance management	
<b>3.2 Development and learning (SR)</b>	<b>30 points</b>
3.2.a Job skills	
3.2.b Comprehensive development	
<b>3.3 Work environment (SR)</b>	<b>30 points</b>
3.3.a Safe and healthy work environment	
3.3.b Employee satisfaction and well-being	
3.3.c Dialogue and communication with employees	
<b>4.4 Responsible operating practices (SR)</b>	<b>15 points</b>
4.4.a Promotion of social responsibility in the processes of the value chain	
4.4.b Relationship with suppliers	
4.4.c Emergency Preparedness	
<b>5.4 Socially responsible innovation and technology (SR)</b>	<b>10 points</b>
5.4.a Socially responsible innovation and technology	
<b>6.1 Environmental responsibility (SR)</b>	<b>20 points</b>
6.1.a Commitment to environmental improvement	
6.1.b Proactive approach to environmental improvement	
<b>6.2 Environmental impact management (SR)</b>	<b>25 points</b>
6.2.a Comprehensive waste management	
6.2.b Energy efficiency	
6.2.c Water resource management	
<b>6.3 Climate change (SR)</b>	<b>15 points</b>
6.3.a Identification of sources of greenhouse gases	
6.3.b Climate change mitigation	

6.3.c Adaptation to climate change	
<b>7.3 Human talent results (SR)</b>	<b>60 points</b>
<b>7.6 Environmental results (SR)</b>	<b>35 points</b>
<b>7.7 Cross-cutting results of social responsibility (SR)</b>	<b>45 points</b>

**Appendix B : Calculator Tool Instruction Manual**  
**(English Version)**

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**CICR Excellence Award**



**Calculator Tool Instruction Manual**

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Written By: Madyson Kelly, Christopher Martenson, Angela Quackenbos, Philip Rago

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# Introduction

This is the instruction manual for the Calculator for the CICR Excellence Award and the Indicator Benchmarking Report. The Calculator for the CICR Excellence Award is an Excel spreadsheet analyzing the data participating companies provide to CICR. This data is summarized and statistically analyzed using charts and graphs. From this Excel spreadsheet a report is generated and sent back to the participating companies. Indicator Benchmarking Report is a Google Form that is used to collect data from participating companies. There is also a Google Sheet that can be used by companies to help them calculate their indicator usage and fill out the form. This form will collect the data and store it in a Google Sheet where it can be transferred into Excel.



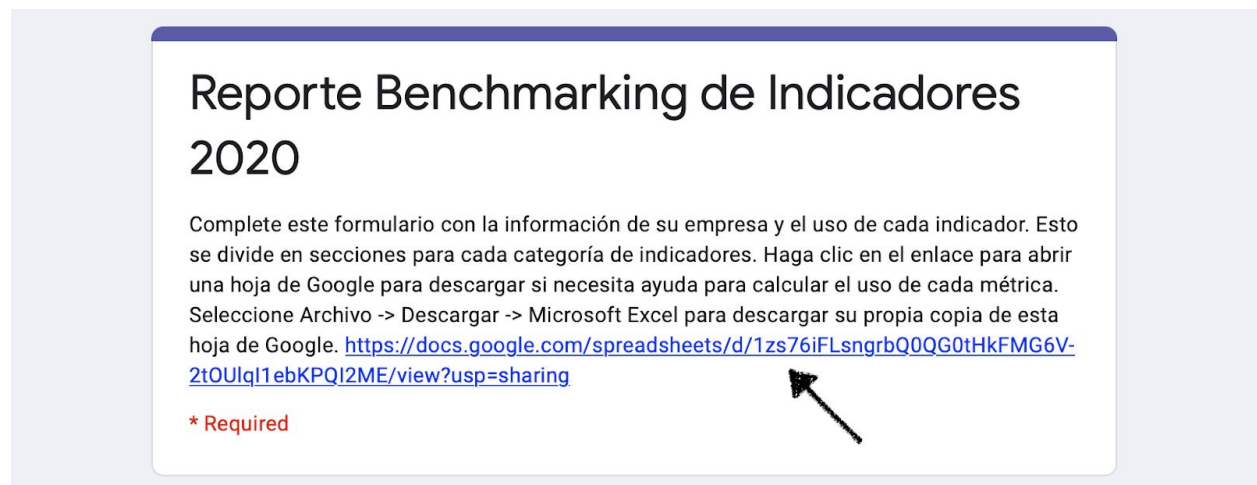
# Chapter 1 - Collecting Data

## 1.1 Indicator Benchmarking Report <Current Year> (Google Form)

The Indicator Benchmarking Report is a form that companies fill out who want to participate in the Excellence Award. They fill out this form with general information about their company and data about their indicator usage. This data will be used in the calculator tool Excel spreadsheet.

### 1.1.1 General Information

- There are filters that eliminate some mistakes companies could make when responding the questions with their data
- There is a link in the description to the Google Sheet that will help with calculations (more in section 1.2)

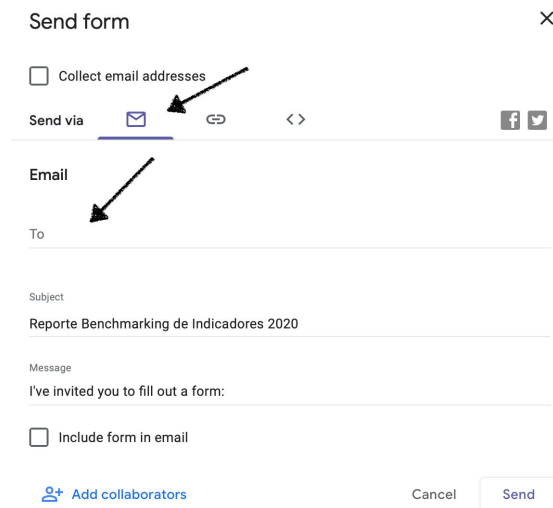


### 1.1.2 Sharing the Form

- The person you send the form to does not need to have a Gmail account to fill out the form but they do need an account to have editor access or be an owner

#### Option #1

- In the editing view, select the “Send” button select the envelope icon at the top
- Type in the email to the person you want to send it to and select “Send”



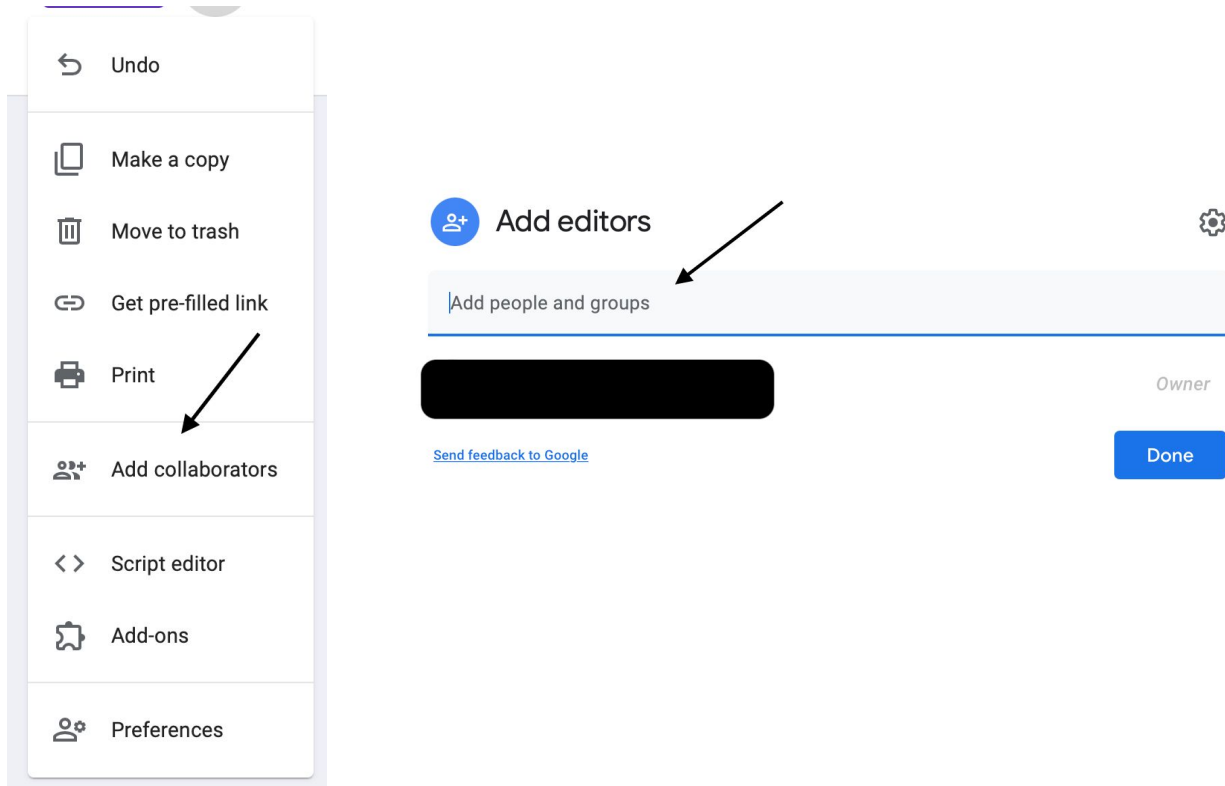
## Option #2

- In the editing view, select the “Send” button select the link icon at the top
- Copy the link and send it to the person you want to fill out the form



### 1.1.3 Giving Access/Ownership

- In the editing view, select the three dots in the top left of the screen
- Select “Add Collaborators”
- Type in the Gmail of the person you want to give access to and select “Send”
- To the right of their name there is a drop down menu to select how much access they have in the form (Editor, Owner, etc.).
- As the owner/editor, you can add, delete, change, etc. questions on the form



← Add editors

info@excelenciacicr.com X Editor

Notify people

Message

Untitled form

Editors will be able to view and delete form responses

[Send feedback to Google](#) Cancel **Send**

2+ Add editors

Add people and groups

Owner

Editor

Editor

Editor

Sergio Arias  
info@excelenciacicr.com

Editor

Editor

Make owner

Remove

[Send feedback to Google](#)

Get link

Restricted Only people added can open with this link

[Change](#)

### 1.1.4 Seeing Responses

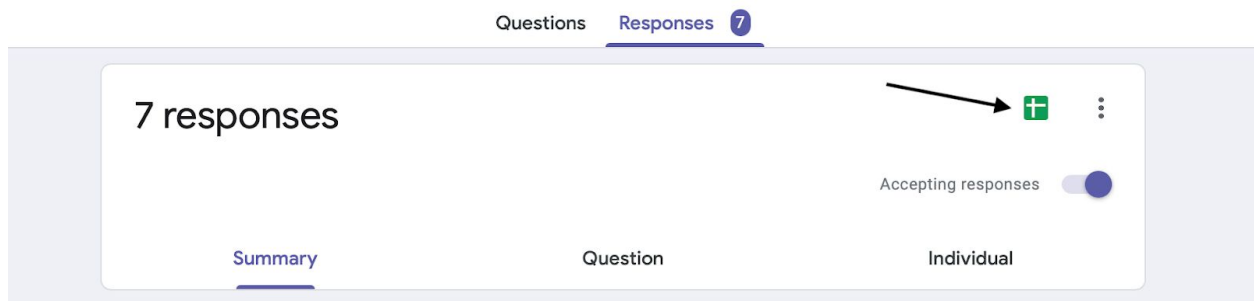
- In the editing view of the Google Form, select “Responses” at the top
- This will give you a summary and general statistics about the responses
- To see responses in a spreadsheet, click on the green Excel icon near the top right of the page
- This will bring you to a Google Sheet with all the responses

Reporte Benchmarking de Indicadores 2020

Questions Responses 7

**CIR**  
CÁMARA DE INDUSTRIAS DE COSTA RICA

Section 1 of 8

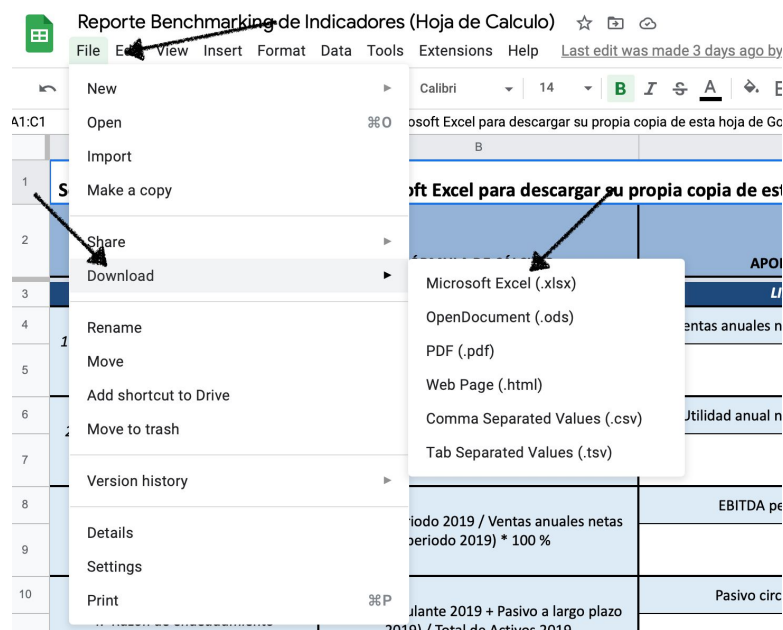


## 1.2 Indicator Benchmarking Report (Calculation Sheet) (Google Sheet)

This is a Google sheet where companies can input their raw data and the sheet will automatically calculate the data that is needed to fill out the Google Form. Companies are provided a link to the Google Sheet where they can download their own Excel version of it for privacy concerns.

### 1.2.1 Download a Copy of the Google Sheet

- There are instructions to download your own copy of the Google Sheet in the description of the Google Form and on the Google Sheet
- Once you open the Google Sheet using the link, select File, Download, Microsoft Excel to download an Excel version of the sheet



## 1.2.2 Calculating Indicator Data

- Each indicator is listed and grouped by category
- There is a formula next to the name of each indicator that is programmed to calculate automatically
- Next to the formula there are multiple boxes for each factor of the formula
- Companies will be able to put their raw data into the white boxes below the factors
- In the last box on the right, the calculated result from formula will appear
- Companies will use those numbers to fill in the questions on the Google Form
- There are instruction in the Google Sheet that tells companies where to input their data and what data to use to for the form
- Each answer is programmed to round to 3 decimal points for numbers and 2 decimal points for percentages

A1:C1    fx    Seleccione Archivo -> Descargar -> Microsoft Excel para descargar su propia copia de esta hoja de Google

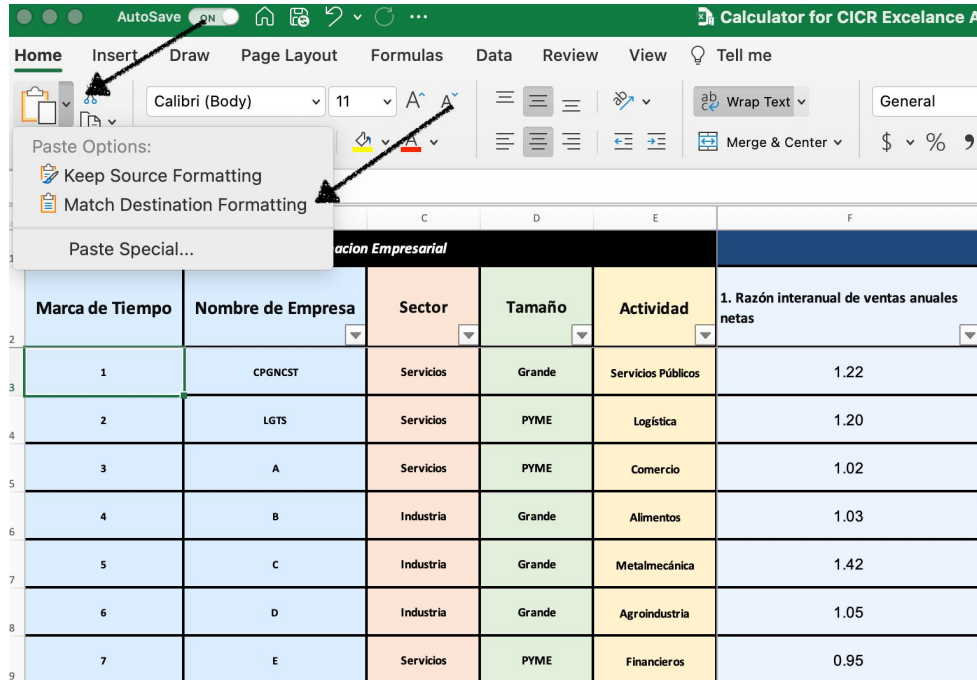
1	Seleccione Archivo -> Descargar -> Microsoft Excel para descargar su propia copia de esta hoja de Google					***Requiere cálculo
2	NOMBRE DEL INDICADOR	FÓRMULA DE CÁLCULO	APORTE #1	APORTE #2	APORTE #3	RESULTADO REPORTADO
3	<b>LIDERAZGO Y PLANIFICACIÓN ESTRATÉGICA</b>					
4	1. Razón interanual de ventas anuales netas	Ventas anuales netas periodo 2019 / Ventas anuales netas periodo 2018	Ventas anuales netas periodo 2019	Ventas anuales netas periodo 2018		#DIV/0!
5					—	
6	2. Crecimiento interanual de utilidad anual neta	(Utilidad anual neta periodo 2019 - Utilidad anual neta periodo 2018) / Utilidad anual neta periodo 2018	Utilidad anual neta periodo 2019	Utilidad anual neta periodo 2018		#DIV/0!
7					—	
8	3. Margen de EBITDA	(EBITDA periodo 2019 / Ventas anuales netas periodo 2019) * 100 %	EBITDA periodo 2019	Ventas anuales netas periodo 2019		#DIV/0!
9					—	
10	4. Razón de endeudamiento	(Pasivo circulante 2019 + Pasivo a largo plazo 2019) / Total de Activos 2019	Pasivo circulante 2019	Pasivo a largo plazo 2019	Total de Activos 2019	#DIV/0!
11						
12	5. Rendimiento sobre activos (ROA)	Utilidad anual neta 2019 / Activo total 2019	Utilidad anual neta 2019	Activo total 2019		#DIV/0!
13					—	
14	<b>ENCUENTRO AL CLIENTE Y EL MERCADO</b>					

# Chapter 2 - Inputting Data & Resultados Aportados Sheet

## 2.1 Inputting and Formatting Data from the Google Sheet to Excel

This process has been automated so that the user only needs to copy and paste the data once from the Google Sheet to the Calculator Tool Excel sheet.

- In the Google Sheet, select all the data that you want to copy over to the Excel sheet
- Ctrl + C or right click and select “Copy”
- Go to the “CICR Calculator Tool” Excel sheet and select the upper, left cell where you want the data to go
- Under the “Home” tab, select the dropdown arrow in “Paste”
- Select “Match Destination Format”
- This will paste all the data from the Google Sheet under the correct indicators and keep the same format in the Excel sheet



Marca de Tiempo	Nombre de Empresa	Sector	Tamaño	Actividad	1. Razón interanual de ventas anuales netas
1	CPGNCST	Servicios	Grande	Servicios Públicos	1.22
2	LGTS	Servicios	PYME	Logística	1.20
3	A	Servicios	PYME	Comercio	1.02
4	B	Industria	Grande	Alimentos	1.03
5	C	Industria	Grande	Metalmecánica	1.42
6	D	Industria	Grande	Agroindustria	1.05
7	E	Servicios	PYME	Financieros	0.95

## 2.2 Resultados Aportados Sheet

- You can filter or sort any column of data (Indicator, Sector, Size, Actividad, etc.)
- Select the arrow pointing down on the header cell of any column
- Select what data you want to see or select “Ascending” or “Descending” to sort

Información Empresarial				
de Empresa	Sector	Tamaño	Actividad	1. Razón interanual de ventas anuales netas
GNCST	Servicios			1.22
LGTS	Servicios			1.20
A	Servicios			1.02
B	Industria			1.03
C	Industria			1.42
D	Industria			1.05
E	Servicios			0.95
F	Industria			1.03
G	Industria			1.23
H	Industria			1.11
I	Servicios			1.05
J	Servicios	Grande	Financieros	
J	Servicios	Grande	Financieros	

Sort

By color:

Filter

By color:

Choose One

Search

- (Select All)
- Industria
- Servicios

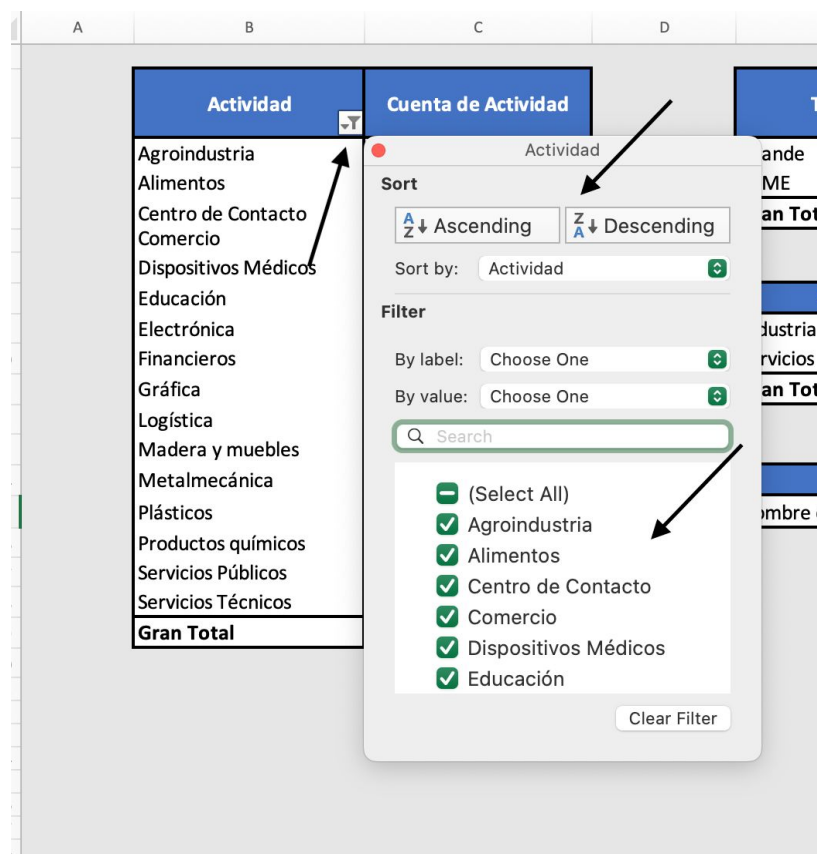


# Chapter 3 - Summary Sheet

## 3.1 Summary of Company Data

This sheet gives you a general summary of the companies' data based on their Sector, Size, and Activity.

- There are 3 pivot tables that give a total of how many companies there are for each Sector, Size and Activity
- At the bottom of each pivot table there is a grand total for all of the company data
- You can filter by each of the following by selecting the down arrow next to the Sector, Size, or Activity cell
- Select which data you want to see to filter or sort by selecting Ascending or Descending



## 3.2 Search by Company Name

Since all the reports are created individually for each company we included the search company name function. This is so when the company's name is typed into the cell, the tables and mean graphs are autofilled with that company's data. There is a search table where you can type the name of a company and specified data will appear in the Dispersion and Cajas tabs for that company.

- Make sure that the company is spelled correctly and has the same capitalization as on the Resultados Aportados sheet
- Any selection on the sumario sheet prompts the code to run

The screenshot shows an Excel spreadsheet with the following data tables:

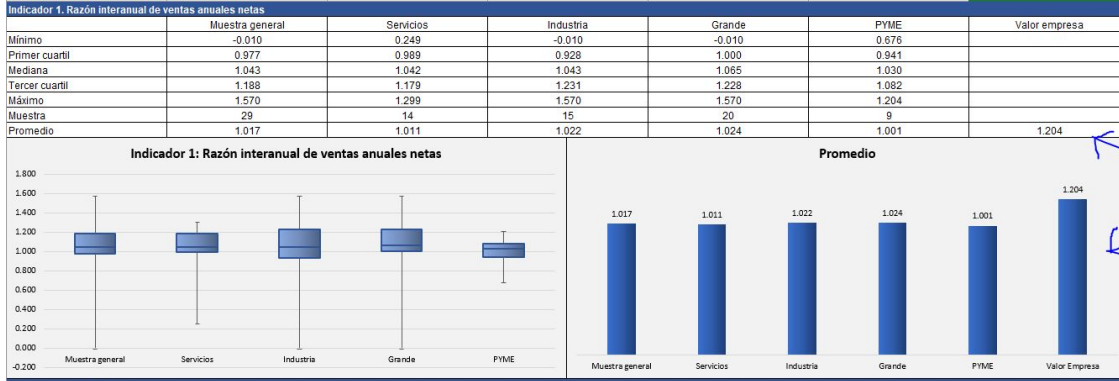
Actividad	Cuenta de Actividad
Agroindustria	1
Alimentos	3
Centro de Contacto	2
Comercio	2
Dispositivos Médicos	7
Educación	1
Electrónica	1
Financieros	5
Gráfica	1
Logística	1
Madera y muebles	1
Metalmecánica	2
Plásticos	1
Productos químicos	1
Servicios Públicos	3
Servicios Técnicos	2
<b>Gran Total</b>	<b>34</b>

Tamaño	Cuenta de Tamaño
Grande	25
PYME	9
<b>Gran Total</b>	<b>34</b>

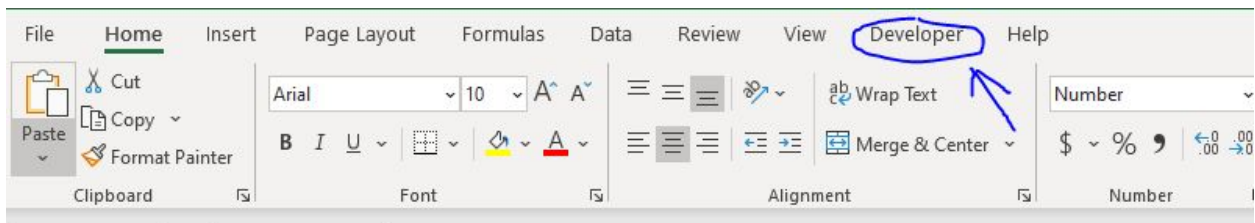
Sector	Cuenta de Sector
Industria	18
Servicios	16
<b>Gran Total</b>	<b>34</b>

Buscar	
Nombre de Empresa	LGTS

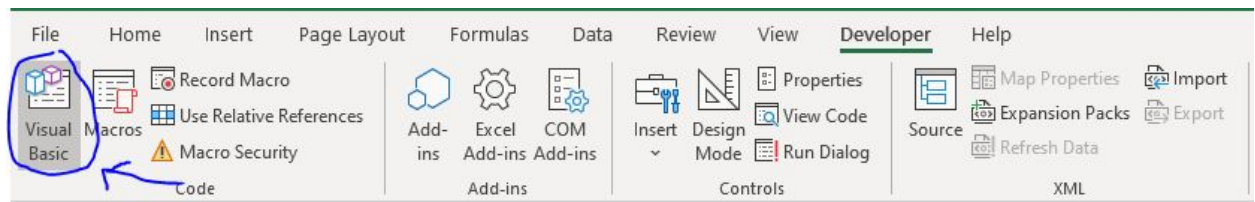
- In this example the company LGTS is in the cell so the rest of the excel file will autofill for that company for the mean graphs and tables as shown below



- Going into the code of the function in case some alterations of the excel file occur. To access the code go to the developer.



- Next press on Visual Basic



- Then press on sheet 3, Summario on the left side as shown below. The code should pop up on the right as shown

Microsoft Visual Basic for Applications

File Edit View Insert Format Debug Run Tools Add-Ins Window Help

Ln 1, Col 1

Project - VBAPProject

VBAPProject (Calculator for C...

Microsoft Excel Objects

- Sheet1 (RESULTADOS AF)
- Sheet10 (CAJAS A)
- Sheet11 (CAJAS RS)
- Sheet12 (DISPERSIÓN P)
- Sheet13 (VALOR ATÍPICO)
- Sheet15 (DISPERSIÓN I)
- Sheet16 (DISPERSIÓN E)
- Sheet17 (DISPERSIÓN B)
- Sheet18 (REPORTE)
- Sheet19 (backend)
- Sheet2 (CAJAS LYPE)
- Sheet20 (DISPERSIÓN A)
- Sheet21 (DISPERSIÓN R)
- Sheet3 (SUMARIO)
- Sheet4 (DISPERSIÓN LYF)
- Sheet5 (PORTADA)

Properties - Sheet3

Sheet3 Worksheet

Alphabetic Categorized

(Name)	Sheet3
DisplayPageBreaks	False
DisplayRightToLeft	False
EnableAutoFilter	False
EnableCalculation	True
EnableFormatConditions	True
EnableOutlining	False
EnablePivotTable	False
EnableSelection	0 - xlNoRestrictions
Name	SUMARIO
ScrollArea	
StandardWidth	10.14
Visible	-1 - xlSheetVisible

Worksheet SelectionChange

```
Private Sub Worksheet_SelectionChange(ByVal Target As Range)
Dim row As Integer
Sheets("CAJAS LYPE").Range("G9") = ""
Sheets("CAJAS LYPE").Range("G34") = ""
Sheets("CAJAS LYPE").Range("G59") = ""
Sheets("CAJAS LYPE").Range("G84") = ""
Sheets("CAJAS LYPE").Range("G109") = ""
Sheets("CAJAS EACVM").Range("G9") = ""
Sheets("CAJAS EACVM").Range("G34") = ""
Sheets("CAJAS EACVM").Range("G59") = ""
Sheets("CAJAS EACVM").Range("G84") = ""
Sheets("CAJAS EHTH").Range("G9") = ""
Sheets("CAJAS EHTH").Range("G34") = ""
Sheets("CAJAS EHTH").Range("G59") = ""
Sheets("CAJAS EHTH").Range("G89") = ""
Sheets("CAJAS EHTH").Range("G114") = ""
Sheets("CAJAS P").Range("G9") = ""
Sheets("CAJAS P").Range("G34") = ""
Sheets("CAJAS P").Range("G59") = ""
Sheets("CAJAS I+I").Range("G9") = ""
Sheets("CAJAS I+I").Range("G34") = ""
Sheets("CAJAS I+I").Range("G59") = ""
Sheets("CAJAS A").Range("G9") = ""
Sheets("CAJAS A").Range("G34") = ""
Sheets("CAJAS A").Range("G59") = ""
Sheets("CAJAS A").Range("G84") = ""
Sheets("CAJAS A").Range("G109") = ""
Sheets("CAJAS RS").Range("G9") = ""
Sheets("CAJAS RS").Range("G34") = ""
Sheets("CAJAS RS").Range("G59") = ""
Sheets("CAJAS RS").Range("G84") = ""

```

## How the code works:

```

Calculator for CICR Excelance Award .xlsm - Sheet3 (Code)
Worksheet
Private Sub Worksheet_SelectionChange(ByVal Target As Range)
Dim row As Integer
Sheets("CAJAS LYPE").Range("G9") = ""
Sheets("CAJAS LYPE").Range("G34") = ""
Sheets("CAJAS LYPE").Range("G59") = ""
Sheets("CAJAS LYPE").Range("G84") = ""
Sheets("CAJAS LYPE").Range("G109") = ""
Sheets("CAJAS EACYM").Range("G9") = ""
Sheets("CAJAS EACYM").Range("G34") = ""
Sheets("CAJAS EACYM").Range("G59") = ""
Sheets("CAJAS EACYM").Range("G84") = ""
Sheets("CAJAS EHTH").Range("G9") = ""
Sheets("CAJAS EHTH").Range("G34") = ""
Sheets("CAJAS EHTH").Range("G59") = ""
Sheets("CAJAS EHTH").Range("G89") = ""
Sheets("CAJAS EHTH").Range("G114") = ""
Sheets("CAJAS P").Range("G9") = ""
Sheets("CAJAS P").Range("G34") = ""
Sheets("CAJAS P").Range("G59") = ""
Sheets("CAJAS I+I").Range("G9") = ""
Sheets("CAJAS I+I").Range("G34") = ""
Sheets("CAJAS I+I").Range("G59") = ""
Sheets("CAJAS A").Range("G9") = ""
Sheets("CAJAS A").Range("G34") = ""
Sheets("CAJAS A").Range("G59") = ""
Sheets("CAJAS A").Range("G84") = ""
Sheets("CAJAS A").Range("G109") = ""
Sheets("CAJAS RS").Range("G9") = ""
Sheets("CAJAS RS").Range("G34") = ""
Sheets("CAJAS RS").Range("G59") = ""
Sheets("CAJAS RS").Range("G84") = ""
Sheets("CAJAS RS").Range("G109") = ""

```

- The lines starting with “Sheets” replace the cells with “ ” which makes them blank. This is so if there are no companies in the cell or it is spelled incorrectly the operator will know that they must put in a valid company name
- This along with the second part below will probably only need to be edited if the cells where the valor empresa are in change

	A	B	C	D	E	F	G
1	Indicador 1. Razón interanual de ventas anuales netas						
2		Muestra general	Servicios	Industria	Grande	PYME	Valor empresa
3	Mínimo	-0.010	0.249	-0.010	-0.010	0.676	
4	Primer cuartil	0.977	0.989	0.928	1.000	0.941	
5	Mediana	1.043	1.042	1.043	1.065	1.030	
6	Tercer cuartil	1.188	1.179	1.231	1.228	1.082	
7	Máximo	1.570	1.299	1.570	1.570	1.204	
8	Muestra	29	14	15	20	9	
9	Promedio	1.017	1.011	1.022	1.024	1.001	1.204

- For example right now Valor Empresa is in cell G9, if that changes the cell in the line Sheets("CAJAS LYPE").Range("G9") = "" must change as well as all the lines below to the new locations

```

For row = 1 To 1000
If Sheets("SUMARIO").Range("F15") = Sheets("RESULTADOS APORTADOS").Cells(row, 2) And Sheets("SUMARIO").Range("F15") <> "" Then
Sheets("CAJAS LYFE").Range("G9") = Sheets("RESULTADOS APORTADOS").Cells(row, 6)
Sheets("CAJAS LYFE").Range("G34") = Sheets("RESULTADOS APORTADOS").Cells(row, 7)
Sheets("CAJAS LYFE").Range("G59") = Sheets("RESULTADOS APORTADOS").Cells(row, 8)
Sheets("CAJAS LYFE").Range("G84") = Sheets("RESULTADOS APORTADOS").Cells(row, 9)
Sheets("CAJAS LYFE").Range("G109") = Sheets("RESULTADOS APORTADOS").Cells(row, 10)
Sheets("CAJAS EACYM").Range("G9") = Sheets("RESULTADOS APORTADOS").Cells(row, 11)
Sheets("CAJAS EACYM").Range("G34") = Sheets("RESULTADOS APORTADOS").Cells(row, 12)
Sheets("CAJAS EACYM").Range("G59") = Sheets("RESULTADOS APORTADOS").Cells(row, 13)
Sheets("CAJAS EACYM").Range("G84") = Sheets("RESULTADOS APORTADOS").Cells(row, 14)
Sheets("CAJAS EHTH").Range("G9") = Sheets("RESULTADOS APORTADOS").Cells(row, 15)
Sheets("CAJAS EHTH").Range("G34") = Sheets("RESULTADOS APORTADOS").Cells(row, 16)
Sheets("CAJAS EHTH").Range("G59") = Sheets("RESULTADOS APORTADOS").Cells(row, 17)
Sheets("CAJAS EHTH").Range("G89") = Sheets("RESULTADOS APORTADOS").Cells(row, 18)
Sheets("CAJAS EHTH").Range("G114") = Sheets("RESULTADOS APORTADOS").Cells(row, 19)
Sheets("CAJAS P").Range("G9") = Sheets("RESULTADOS APORTADOS").Cells(row, 20)
Sheets("CAJAS P").Range("G34") = Sheets("RESULTADOS APORTADOS").Cells(row, 21)
Sheets("CAJAS P").Range("G59") = Sheets("RESULTADOS APORTADOS").Cells(row, 22)
Sheets("CAJAS I+I").Range("G9") = Sheets("RESULTADOS APORTADOS").Cells(row, 23)
Sheets("CAJAS I+I").Range("G34") = Sheets("RESULTADOS APORTADOS").Cells(row, 24)
Sheets("CAJAS I+I").Range("G59") = Sheets("RESULTADOS APORTADOS").Cells(row, 25)
Sheets("CAJAS A").Range("G9") = Sheets("RESULTADOS APORTADOS").Cells(row, 26)
Sheets("CAJAS A").Range("G34") = Sheets("RESULTADOS APORTADOS").Cells(row, 27)
Sheets("CAJAS A").Range("G59") = Sheets("RESULTADOS APORTADOS").Cells(row, 28)
Sheets("CAJAS A").Range("G84") = Sheets("RESULTADOS APORTADOS").Cells(row, 29)
Sheets("CAJAS A").Range("G109") = Sheets("RESULTADOS APORTADOS").Cells(row, 30)
Sheets("CAJAS RS").Range("G9") = Sheets("RESULTADOS APORTADOS").Cells(row, 31)
Sheets("CAJAS RS").Range("G34") = Sheets("RESULTADOS APORTADOS").Cells(row, 32)
Sheets("CAJAS RS").Range("G59") = Sheets("RESULTADOS APORTADOS").Cells(row, 33)
Sheets("CAJAS RS").Range("G84") = Sheets("RESULTADOS APORTADOS").Cells(row, 34)
Sheets("CAJAS RS").Range("G109") = Sheets("RESULTADOS APORTADOS").Cells(row, 35)
Else
End If
Next row
End Sub

```

- The second part searches from 1 to 1000 rows (can be increased if needed) in column B of Resultados Aportados to see if it's the same as the Summario cell
- If so it takes the same cells as shown with the first part of code and auto fills each with that individual company's data for each indicator
- If the company column changes on the resultados aportados then the 2 from Sheets("RESULTADOS APORTADOS").Cells(row, 2) must change (instead of letter, it must be a number for example A=1,B=2)

# Chapter 4 - Outliers

## 4.1 Outlier Tables for Dispersion Graphs and Limit Inferior/Superior

- The outliers tab controls the data points included in the dispersion graphs as well as the maximum and minimum values for the box and whisker graphs. Once the outliers have been chosen for each indicator there is a code that can be run to automatically generate comments for the reports which is discussed below.

Límite Inferior	-0.07	Límite Inferior	-10.47	Límite Inferior	-30.94%
Límite Superior	1.82	Límite Superior	4.42	Límite Superior	151.00%
<b>1. Razón interanual de ventas anuales netas</b>		<b>2. Razón interanual de utilidad anual neta</b>		<b>3. Margen de EBITDA</b>	
1.22	FALSE	0.65	FALSE	7.37%	FALSE
1.20	FALSE	-0.06	FALSE	2.46%	FALSE
1.02	FALSE	0.48	FALSE	8.62%	FALSE
1.03	FALSE	1.00	FALSE	9.00%	FALSE
1.42	FALSE	0.00	FALSE	22.00%	FALSE
1.05	FALSE	-1.25	FALSE	17.06%	FALSE
0.95	FALSE	-0.17	FALSE	0.00%	FALSE
1.03	FALSE	2.19	FALSE	18.02%	FALSE
1.23	FALSE	#N/A	TRUE	10.43%	FALSE
1.11	FALSE	0.60	FALSE	9.00%	FALSE
1.05	FALSE	1.57	FALSE	3.47%	FALSE
#N/A	FALSE	0.65	FALSE	#N/A	FALSE
1.04	FALSE	#N/A	TRUE	#N/A	TRUE
1.00	FALSE	-0.18	FALSE	34.00%	FALSE
1.30	FALSE	0.46	FALSE	73.21%	FALSE
1.03	FALSE	0.03	FALSE	11.16%	FALSE
1.57	FALSE	1.54	FALSE	16.00%	FALSE
1.09	FALSE	0.24	FALSE	16.15%	FALSE
1.17	FALSE	3.48	FALSE	73.48%	FALSE
0.68	FALSE	-0.27	FALSE	25.38%	FALSE
1.00	FALSE	0.02	FALSE	8.00%	FALSE
#N/A	FALSE	#N/A	FALSE	#N/A	FALSE
#N/A	FALSE	#N/A	FALSE	#N/A	FALSE
1.33	FALSE	0.82	FALSE	10.62%	FALSE
0.79	FALSE	-0.63	FALSE	75.28%	FALSE
0.76	FALSE	-0.75	FALSE	10.30%	FALSE
1.13	FALSE	1.00	FALSE	17.31%	FALSE
0.93	FALSE	-0.58	FALSE	18.18%	FALSE
#N/A	FALSE	#N/A	FALSE	#N/A	FALSE
1.08	FALSE	-0.54	FALSE	25.00%	FALSE
0.25	FALSE	0.32	FALSE	8.20%	FALSE
1.03	FALSE	-2.78	FALSE	1.24%	FALSE
#N/A	FALSE	#N/A	FALSE	#N/A	FALSE
-0.01	FALSE	-0.01	FALSE	#N/A	FALSE
#N/A	FALSE	#N/A	FALSE	#N/A	FALSE
#N/A	FALSE	#N/A	FALSE	#N/A	FALSE
#N/A	FALSE	#N/A	FALSE	#N/A	FALSE
#N/A	FALSE	#N/A	FALSE	#N/A	FALSE

- Above is an example of 3 indicators and their outlier columns. The Limit inferior and superior control what data points are outliers. Any points outside of the two points are considered outliers and have TRUE in red to the right of the value. The

cells with #N/A and a FALSE next to it are companies who didn't submit any data for that indicator. To extend the amount of companies in the list just drag down on the bottom right of the cell for both columns. The dispersion graphs are directly linked to the list of data points on the left so if a value becomes an outlier and changes to #N/A it would not be included on the graph.

=IF('RESULTADOS APORTADOS'!G3<>"",OR('RESULTADOS APORTADOS'!G3<=\$E\$1,'RESULTADOS APORTADOS'!G3>=\$E\$2),FALSE)									
	C	D	E	F	G	H	I	J	K
0.07		Límite Inferior	-10.47		Límite Inferior	-30.94%		Límite Inferior	-0.91
1.82		Límite Superior	4.42		Límite Superior	151.00%		Límite Superior	3.97
etas		2. Razón interanual de utilidad anual neta			3. Margen de EBITDA			4. Razón de endeudamiento	
SE		0.65	FALSE		7.37%	FALSE		0.49	FALSE

- An example of the right column and explaining the code: The code looks at the value of G3 (the first company for the 2nd indicator) and looks to see if the value is not equal (<>) to "" (a blank cell). If it isn't blank then it asks if the point is less than the E1 the limit inferior or greater than E2 the limit superior. If either are true the point is an outlier and gets TRUE in the right column otherwise it gets a FALSE.

=IF('RESULTADOS APORTADOS'!G3<>"",IF(E4=FALSE,'RESULTADOS APORTADOS'!G3,NA()),NA())							
	C	D	E	F	G	H	I
0.07		Límite Inferior	-10.47		Límite Inferior	-30.94%	
1.82		Límite Superior	4.42		Límite Superior	151.00%	
etas		2. Razón interanual de utilidad anual neta			3. Margen de EBITDA		
SE		0.65	FALSE		7.37%	FALSE	

- The same example in the left column code: The code asks again if the point is blank or not. If it is blank then the cell is NA() as shown at the end of the code. If the cell has a value then it asks another if statement. It asks if the cell to the right is FALSE, if so then it gives the value from the table (a non blank and non outlier value). If the cell is TRUE then the cell is also NA().

## 4.2 Outlier Tables for Box and Whisker Graphs

- While the Outliers don't affect the cajas tables, mean tables, and the median, first quartile, third quartile of the box and whisker graphs they can change the maximum and/or minimums for the box and whisker graphs. On the same Outlier tab at the end of the Dispersion outlier tables are the tables for the box and whisker graphs.



=MIN(IF(ISNUMBER(A:A),A:A,""))		
CN	CO	CP
<b>1. Razón interanual de ventas anuales netas</b>		
Muestra General Mínimo	-0.010	
Muestra General Máximo	1.570	
Servicios Mínimo	0.249	
Servicios Máximo	1.299	
Industria Mínimo	-0.010	
Industria Máximo	1.570	
Grande Mínimo	-0.010	
Grande Máximo	1.570	
PYME Mínimo	0.676	
PYME Máximo	1.204	

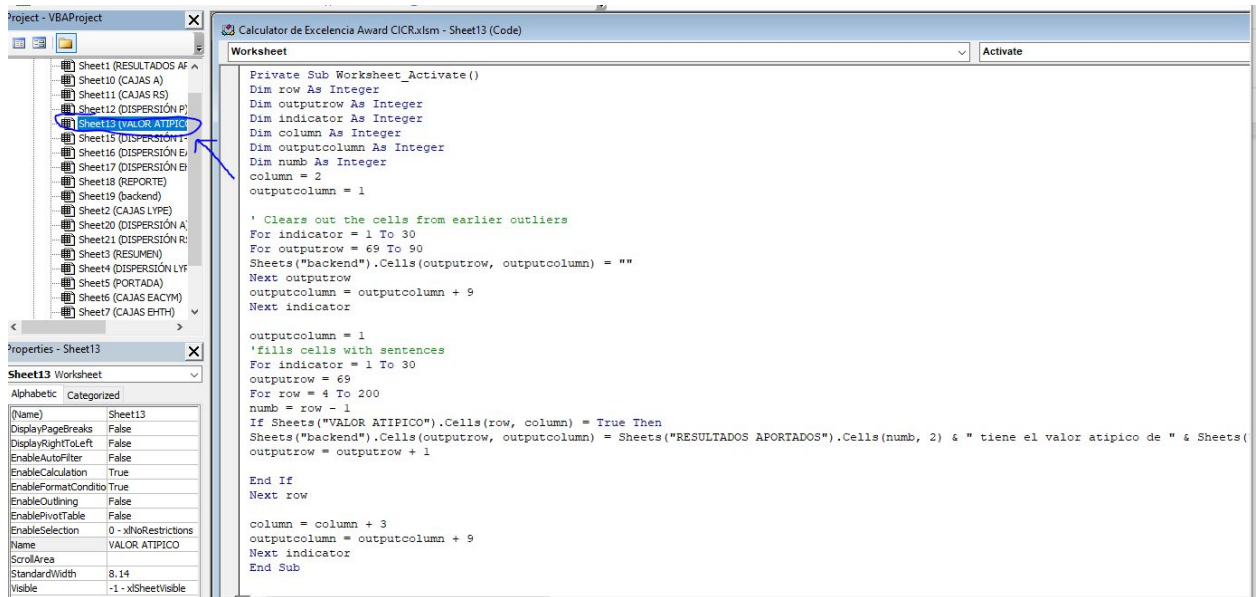
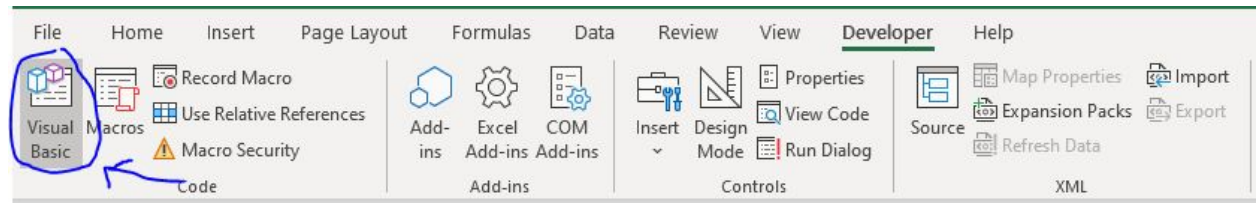
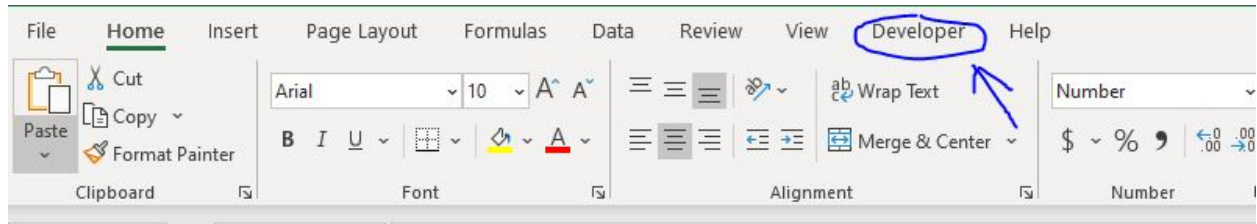
- For muestra general minimum and maximum the code is just like above (except max instead of min for maximum). The code references the corresponding indicator column from the dispersion outlier tables. The ISNUMBER function determines if a cell has a value and ignores cells with #N/A. If the cell has an acceptable value then it is considered for the min or max for that indicator (Outliers and blank cells are therefore not included).

=MIN(IF('RESULTADOS APORTADOS'!C:C = 'CAJAS LYPE'!C\$2, IF('RESULTADOS APORTADOS'!F:F>\$B\$1,IF('RESULTADOS APORTADOS'!F:F<>'', 'RESULTADOS APORTADOS'!F:F))))											
CN	CO	CP	CQ	CR	CS	CT	CU	CV	CW	CX	CY
<b>1. Razón interanual de ventas anuales netas</b>			<b>2. Razón interanual de utilidad anual neta</b>			<b>3. Margen de EBITDA</b>			<b>4. Razón de endeudamiento</b>		
Muestra General Mínimo	-0.010		Muestra General Mínimo	-2.780		Muestra General Mínimo	0.00%		Muestra General Mínimo	0.090	M
Muestra General Máximo	1.570		Muestra General Máximo	3.485		Muestra General Máximo	75.28%		Muestra General Máximo	3.102	M
Servicios Mínimo	0.249		Servicios Mínimo	-2.780		Servicios Mínimo	0.00%		Servicios Mínimo	0.217	Se

- For Servicios and the rest of the categories below Muestra General use the code above with a few alterations for each one. The first if statement, IF('RESULTADOS APORTADOS'!C:C = 'CAJAS LYPE'!C\$2, looks in column C which has the sectors and looks to see what companies have the same name as C2 on the Cajas Lype sheet which is Servicios. Industria is the same as Servicios where it searches column C but instead looks to see if it's the same as D2 on the same sheet which is Industria. Therefore Grande and PYME are the next two cells over on Cajas Lype but instead search column D which has the size of the companies. Once the right pool of companies are collected from the first if statement, it checks to see if the value is greater than the lower limit for the minimum cells or less than the upper limit for the maximum cells ( this removes the outliers from the pool). Finally the code checks to make sure the value isn't blank with the <>"" language. All these values are then put into the box and whisker graphs as the maximums and minimums instead.

### 4.3 Outlier Comments for the Report

- Finally once all the outliers are removed from the graphs as discussed above we wanted there to be an automated way to include comments for every indicator that included these outliers. That way all outliers can be known immediately and taken into account when looking at the graphs. We created a macro for this as well in the developer. Instructions for how to access it are below.



- Click on Sheet 13 (Valor Atipico) from the top left list to access the code

```

Private Sub Worksheet_Activate()
Dim row As Integer
Dim outputrow As Integer
Dim indicator As Integer
Dim column As Integer
Dim outputcolumn As Integer
Dim numb As Integer
column = 2
outputcolumn = 1
|
' Clears out the cells from earlier outliers
For indicator = 1 To 30
For outputrow = 69 To 90
Sheets("backend").Cells(outputrow, outputcolumn) = ""
Next outputrow
outputcolumn = outputcolumn + 9
Next indicator

```

- The first few lines of code defines 6 variables as integers and recognizes column as 2 and outputcolumn 1 to begin with. The below grouping of lines clears the cells in case prior outlier sentences were in the cells where the new sentences might go. It goes through all 30 indicators and from row 69 to 90. How it works is that the sentences start in row 69 and go down from there so the code clears every cell from column 1 (indicator 1) on the backsheet from 69 to 90. This should allow it to delete all passed sentences unless the outliers for that indicator reach greater than 21 (this number can be increased). The output column is increased by 9 for every indicator because the sentences generate every 9 columns for each indicator.

```

outputcolumn = 1
'fills cells with sentences
For indicator = 1 To 30
outputrow = 69
For row = 4 To 200
numb = row - 1
If Sheets("VALOR ATIPICO").Cells(row, column) = True Then
Sheets("backend").Cells(outputrow, outputcolumn) = Sheets(
outputrow = outputrow + 1

End If
Next row

column = column + 3
outputcolumn = outputcolumn + 9
Next indicator
End Sub

```

- The next few lines generate the sentences. Just like above the outputrow starts at 69 and the code goes through 1 to 30 indicator steps. This code searches the right column for each indicator of the dispersion outlier tables. It searches from row 4 (start of the list) to 200 which allows for 196 companies to be involved (this can be increased). The if statement asks if any of that column is TRUE. If so then it starts to generate the sentences.

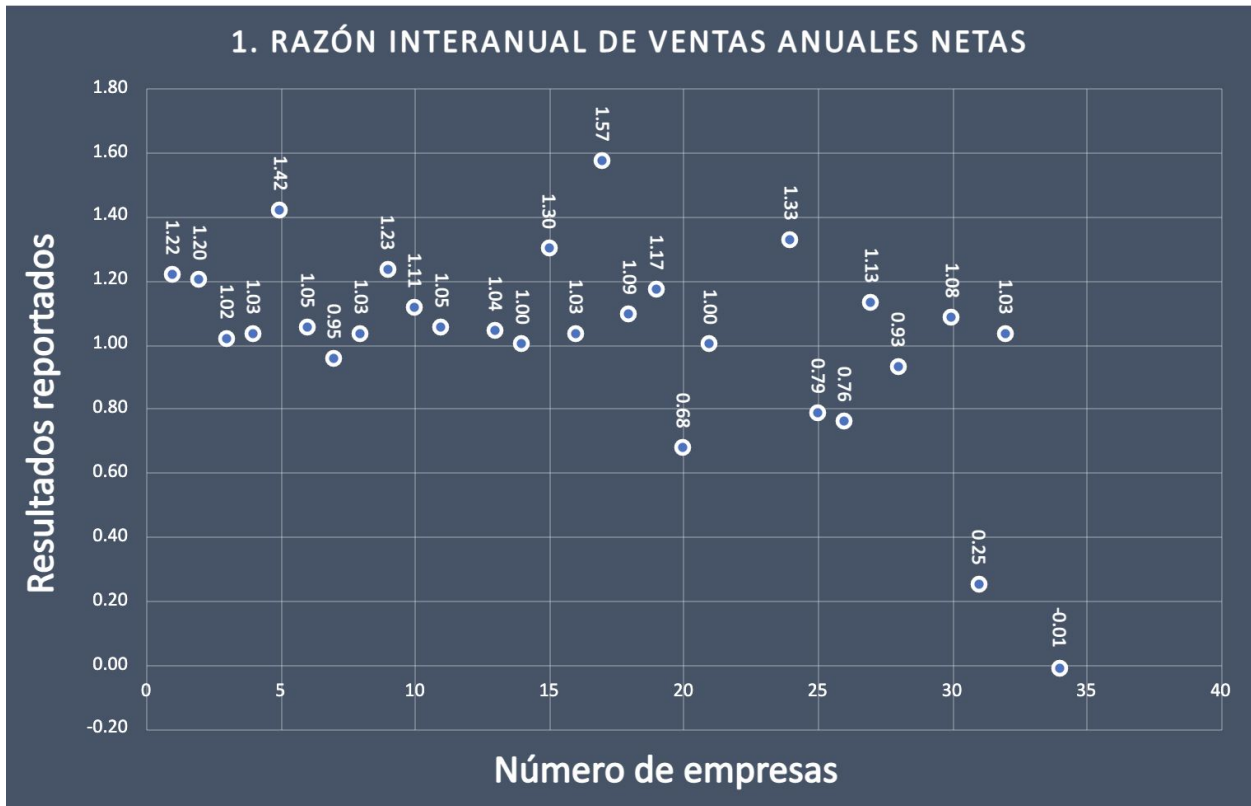
The Sentence code is as follows: Sheets("backend").Cells(outputrow, outputcolumn) = Sheets("RESULTADOS APORTADOS").Cells(num, 2) & " tiene el valor atipico de " & Sheets("RESULTADOS APORTADOS").Cells(num, indicator + 5) & " por indicador " & indicator Sheets("RESULTADOS APORTADOS").Cells(num, 2) = Company name Sheets("RESULTADOS APORTADOS").Cells(num, indicator + 5) = Outlier Value Indicator = indicator #

- The line reads as: (Company name) tiene el valor atipico de (Outlier Value) por indicador (indicator #). This sentence can be edited as long as all words or phrases that are not in a cell have quotations around them. The outputrow = outputrow + 1 makes sure the sentences don't get placed into the same cell and move down the column. The column = column + 3 and the outputcolumn = outputcolumn + 9 just make sure that the code is searching and placing the sentences in the right columns for each indicator.
- The result is produced on the Backend sheet which then sends it to the report. An image of the sentences on the backend sheet is below.

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Valor Atipico																								
1. Razón interanual de ventas anuales netas							2. Razón interanual de utilidad anual neta							3. Margen de EBITDA										
							G tiene el valor atipico de -447.404032 por indicador 2							K tiene el valor atipico de -0.818774403109818 por indicador 3										
							K tiene el valor atipico de -15.3504331798314 por indicador 2																	

# Chapter 5 - Developing Dispersion Graphs

- Dispersion tables are generated from the “Valor Atipico” sheet. In order to preserve formatting it is recommended to copy and paste the graphs and change the data and title.



# Chapter 6 - Developing Tables and Graphs

## 6.1 Tables

This section will go into detail about the coding for the multiple tables for each indicator. The muestra general column utilizes the same code as before and only changes the column it searches per indicator.

Indicador 1. Razón interanual de ventas anuales netas						
	Muestra general	Servicios	Industria	Grande	PYME	Valor empresa
Mínimo	-0.010	0.249	-0.010	-0.010	0.676	
1o Cuartil	0.977	0.989	0.928	1.000	0.941	
Mediana	1.043	1.042	1.043	1.065	1.030	
3o Cuartil	1.188	1.179	1.231	1.228	1.082	
Máximo	1.570	1.299	1.570	1.570	1.204	
Muestra	29	14	15	20	9	
Promedio	1.017	1.011	1.022	1.024	1.001	1.219

- Servicios and Industria have similar codes for all the values below them. For example below is the maximum value for services for indicator 1
  - =MAX(IF('RESULTADOS APORTADOS'!C:C='CAJAS LYPE'!C2,IF('RESULTADOS APORTADOS'!F:F<>'', 'RESULTADOS APORTADOS'!F:F)))
- The max function finds the maximum so this will change along the column depending on what the value is. The first if statement looks in the C column of Resultados Aportados which is the sector column and looks for rows with the same name as C2 which is the Servicios cell above ( needs to be exact including capitalization ej. Servicios is not the same as servicios). Once it finds the rows, the second if statements make sure that the column F of the Resultados Aportados, which has the values for indicator 1, isn't blank. Then the function runs and finds whatever values it needs to find.
  - F:F part will change to the column of the indicador from the resultados aportados
  - C2 will be D2 for the industria column and so on
  - Since Grande and PYME are located in a different column in the resultados aportados sheet you would change the C:C to D:D since it's in the next column

- To make another column all you need to do is utilize the same code as the other 4 discussed and first change C2 to the cell where the name of the new category is on the cajas sheet
- Then change C:C to whatever column that category is in (ej. C:C -> sector, D:D -> size, E:E -> activity)
- Finally change the code F:F to whatever the column the indicator you are working with is in (ej. F:F is indicator 1, G:G is indicator 2)

## 6.2 Box and Whisker Plots

- Begin by creating a separate table on the side with the following table labels

Diferencias (1)	Muestra general	Servicios	Industria	Grande	PYME	Valor Empresa
Q1	0.977	0.989	0.928	1.000	0.941	
Med-Q1	0.065	0.053	0.115	0.065	0.089	
Q3-Med	0.145	0.138	0.188	0.162	0.052	
Q1-Min	0.987	0.740	0.938	1.010	0.266	
Max-Q3	0.382	0.119	0.339	0.342	0.122	
Promedio	1.017	1.011	1.022	1.024	1.001	1.204

- For cells in rows “Q1”, “Med-Q1”, “Q3-Med” and “Promedio,” fill in the necessary values as described by the name of the row by using the original table (e.g., under “Muestra general” use Q1: =B4, Med-Q1: =B5-B4, etc.). Use these formulas under each column, excluding “Valor empresa.”

The screenshot shows an Excel spreadsheet with a formula bar containing `=B4`. A red arrow points to cell F4, which contains the value 0.676. To the right, a table titled "Diferencias (1)" is shown with columns for "Muestra general" and "Servicios". A red arrow points to the cell containing 0.977 in the "Muestra general" column for the "Q1" row.

	F	G
	PYME	Valor empresa
	0.676	
	0.941	
	1.030	
	1.082	
	1.204	
	9	
	1.001	1.204
<b>Promedio</b>		
		1.204

Diferencias (1)	Muestra general	Servicios
Q1	0.977	0.989
Med-Q1	0.065	0.053
Q3-Med	0.145	0.138
Q1-Min	0.987	0.740
Max-Q3	0.382	0.119
Promedio	1.017	1.011

- For cells in rows “Q1-Min” and “Max-Q3” instead of using the original table to fill in the necessary values you will need to use values from the tables found in the “Valor Atipico” sheet. Using the minimum and maximum values for each category under each indicator you will be able to complete the table as follows.

fx =B4-VALOR ATIPICO!CO2

	H	I	J	K	L	M	N
presencia							
4							

Diferencias (1)	Muestra general	Servicios	Industria
Q1	0.977	0.989	0.928
Med-Q1	0.065	0.053	0.115
Q3-Med	0.145	0.138	0.188
Q1-Min	0.987	0.740	0.938
Max-Q3	0.382	0.119	0.339
Promedio	1.017	1.011	1.022

1. Razón interanual de ventas anuales netas	
Muestra General Mínimo	-0.010
Muestra General Máximo	1.570
Servicios Mínimo	0.089
Servicios Máximo	1.199
Industria Mínimo	-0.110
Industria Máximo	1.170
Grande Mínimo	-0.010
Grande Máximo	1.570
PYME Mínimo	0.676
PYME Máximo	1.204

- Highlight entire table and go to insert -> table to define it as a table
- To create the box and whisker plot, highlight the following cells and go to insert -> chart and choose "Stacked Column"

	K	L	M	N	O	P	Q
Diferencias (1)							
Q1							
Med-Q1							
Q3-Med							
Q1-Min							
Max-Q3							
Promedio							

	Muestra general	Servicios	Industria	Grande	PYME	Valor Empresa
Q1	0.977	0.989	0.928	1.000	0.941	
Med-Q1	0.065	0.053	0.115	0.065	0.089	
Q3-Med	0.145	0.138	0.188	0.162	0.052	
Q1-Min	0.987	0.740	0.938	1.010	0.266	
Max-Q3	0.382	0.119	0.339	0.342	0.122	
Promedio	1.017	1.011	1.022	1.024	1.001	1.204

- Select the "Q1" values on the graph and change fill color to "No Fill." With the same values selected, go to Table Design -> Add Chart Element -> Standard Error Bar -> More Error Bar Options. With the Options window open, select Minus, Cap, and open the Specify Values tab. For the negative error values, select the values in the Q1-Min row of your table. This will create the bottom line of the box and whisker plot.

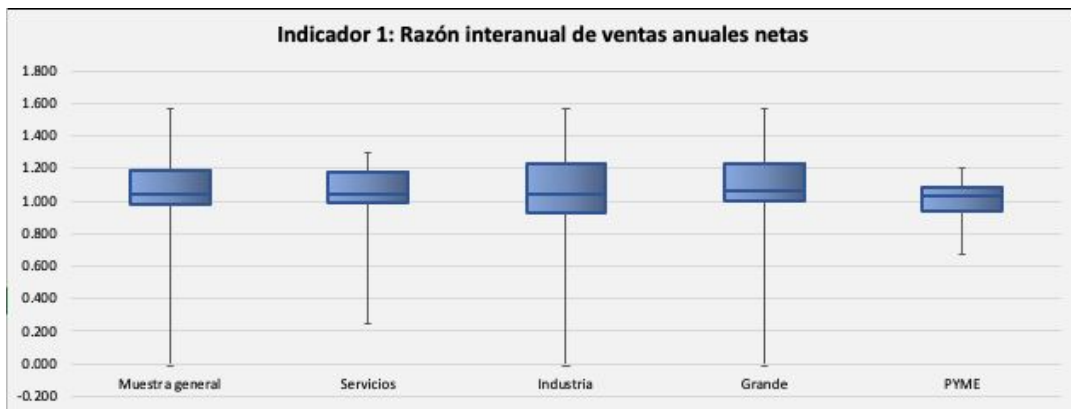


The image shows an Excel spreadsheet with two tables of data. The first table, 'Diferencias (1)', has columns for 'Muestra general', 'Servicios', 'Industria', 'Grande', and 'PYME'. The second table, 'Diferencias (2)', has the same columns. A 'Custom Error Bars' dialog box is open, showing 'Positive Error Value' and 'Negative Error Value' fields. The 'Negative Error Value' field contains the formula '=CAJAS LYPE!\$L\$6:\$P\$6'. The 'Format Error Bars' task pane is also visible, with 'Vertical Error Bar' selected. Under 'Direction', 'Plus' is selected. Under 'End Style', 'Cap' is selected. Under 'Error Amount', 'Custom' is selected, and the 'Specify Value' button is highlighted.

Diferencias (1)	Muestra general	Servicios	Industria	Grande	PYME
Q1	0.977	0.989	0.928	1.000	0.941
Med-Q1	0.065	0.053	0.115	0.065	0.089
Q3-Med	0.145	0.138	0.188	0.162	0.052
Q1-Min	0.987	0.740	0.938	1.010	0.266
Max-Q3	0.382	0.119	0.339	0.342	0.122
Promedio	1.017	1.011	1.022	1.024	1.001

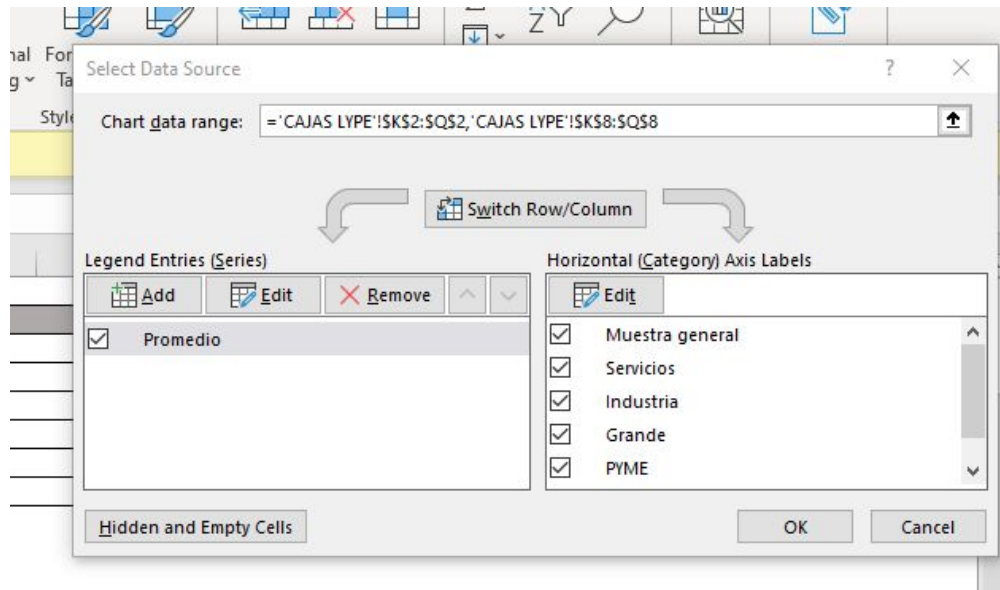
Diferencias (2)	Muestra general	Servicios	Industria	Grande	PYME
Q1	-0.5473	-0.1800	-0.7480	-0.5825	-0.4268
Med-Q1	0.5723	0.4241	0.7433	0.6125	0.3634
Q3-Med	0.6684	0.4063	1.0047	0.7053	1.1478

- Select the “Q3-Min” values on the graph and insert the same error bars. This time, select Plus, Cap, and open the Specify Values tab. For the positive error values, select the values in the Max-Q3 row of your table. This will create the top line of the box and whisker plot.
- Customize as needed, the resulting box and whisker plot should look like this

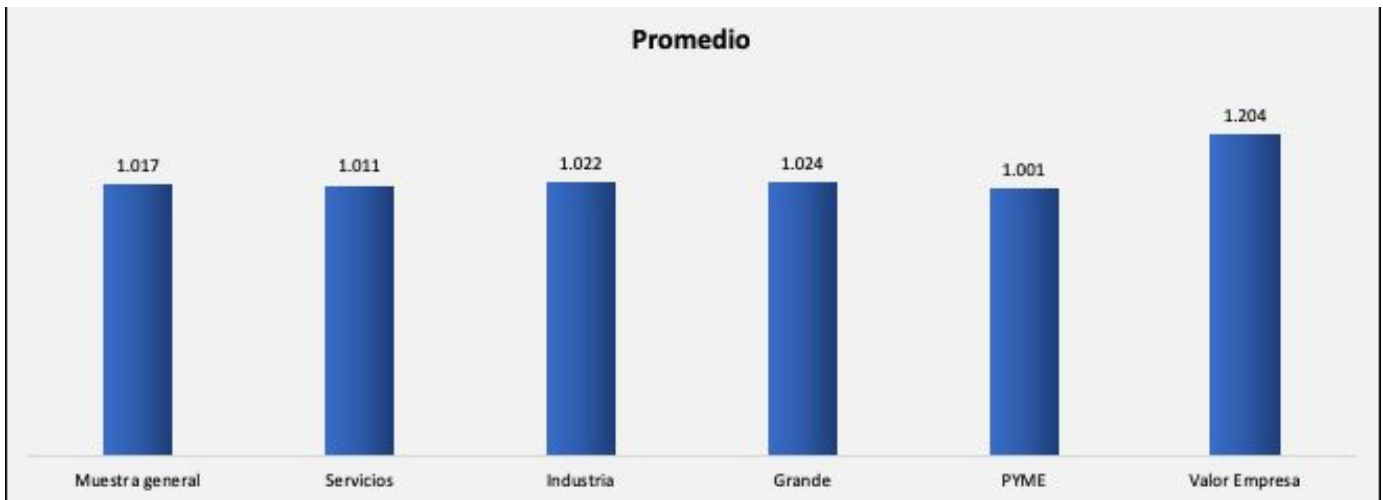


### 6.3 Mean Graphs

- Using the same table created for the box and whisker plots, select any spot on the table and go to Insert -> Chart -> and select “Clustered Columns”. Right click any data point on the graph and go to Select Data. Select “Switch Rows/Columns,” and then unselect Q1, Med-Q1, Q3-Med, Q1-Min, and Max-Q3 so that the only piece of data being graphed is Promedio.



- Customize as needed, the resulting graph should look like this

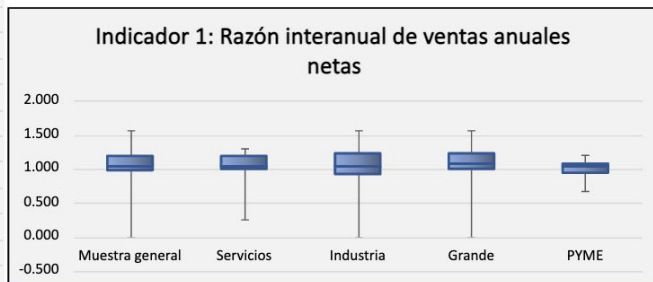
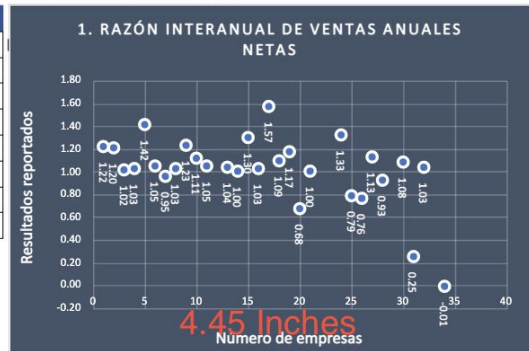


# Chapter 7 - Report

- Reports are controlled via the company search mechanism on the Summary tab. To create a report for a company simply select that company on the summary tab.
- The automation behind the report's text is on the Backend tab. If you want to change the sentences make sure to keep the formulas inside the sentences since they are variable.
- The graphs for each indicator are copied directly from the CAJAS and the dispersion tabs and then sized down. If you wish to expand the report with new indicators, copy the graphs you need, for the two graphs on the left set their width to 5.5 inches, for the dispersion graph set its width to 4.45 inches. The dispersion graph will likely need its font sizes decreased as well.
- The single variable statistics are direct references to the cells on the Cajas tabs, this way if things change there the change is reflected everywhere.

## LIDERAZGO Y PLANIFICACIÓN ESTRATÉGICA

Indicador 1. Razón interanual de ventas anuales netas						
	Muestra general	Servicios	Industria	Grande	PYME	Alimentos
Mínimo	-0.010	0.249	-0.010	-0.010	0.676	
1o Cuartil	0.977	0.989	0.928	1.000	0.941	
Mediana	1.043	1.042	1.043	1.065	1.030	
3o Cuartil	1.188	1.179	1.231	1.228	1.082	
Máximo	1.570	1.299	1.570	1.570	1.204	
Muestra	29	14	15	20	9	
Promedio	1.017	1.011	1.022	1.024	1.001	1.219



1. Razón interanual de ventas anuales netas, reportado como 1.22. Estabas a 0.65 desviaciones estándar de la media.

Su valor informado se encuentra dentro de la primera desviación, tuvo un desempeño similar al de las demás organizaciones.