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# DealerFox Data Visualization

by

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with help of mentor

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working with company

**Dealer Fox**



dealerfox

## **Executive Summary**

Dealer Fox is a start-up that provides data visualization and consulting for advertisements of car dealerships online to help increase efficiency of sales. The business project was to streamline the process of data visualization, from collecting the data to presenting it using Infogram. The final use of this was for individual car dealerships to be able to see both a monthly view and daily view for updates on how their dealerships are performing. The deliverables were custom database sheets that used monthly input to output information necessary to be entered into Infogram. These “Update-Monthly” sheets allowed members at the company to update a few pieces of information each month in order to generate the custom databases. The impact was a user-friendly system that could be replicated every month for every dealership. Other employees at Dealer Fox no longer have to look multiple places to gather information to enter on Infogram. This has helped in the process of allowing the company to scale because the process of collecting data for reports is automatic.

## **Business Context**

Dealer Fox is in the automobile advertising industry, specifically dealing with helping car dealerships to advertise. Dealerships spend large sums of money on different forms of advertising, specifically on different websites such as cars.com, but often they are mispending their money. Additionally, data they get is not necessarily correct due to errors in the widely-used software to report sales from car websites. Dealer Fox helps to fix these problems. When gaining a client, they use their own software to gather data from the reporting software dealerships use. Then, they visualize sales data to find where the client is losing customers. From there, they can advise customers on how to improve their advertising, such as retaking pictures of stock to improve quality. This advice helps more consumers engage with the dealership and in turn helps the dealership sell more

cars. The internship was focused on data visualization to create the reports that are presented to car dealerships.

## Business Project Description

The business project was streamlining the process of data visualization. At the beginning of the internship, data was entered into Infogram manually. For each dealership, an employee would manually find around 50 pieces of information inside a large Google Sheet consisting of around 15 tabs/sheets, and then enter each piece of information into Infogram. Some of the information also needed to be calculated based on figures in other sheets. For example, one of the categories in the report is a 90-day average. In order to attain this, employees had to access three past monthly spreadsheets and calculate an average. This process averaged 4-6 hours per dealership. With a growing number of dealerships, this process was unfeasible to do every month.

Figure 1. An example of a spreadsheet for one month from which data must be collected

	1	2	3	4	5	6	7	TOTALS
Digital Lead Source	L A S M C	L A S M C	L A S M C	L A S M C	L A S M C	L A S M C	L A S M C	L A S M C
100 Year Cash New	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0
100 Year Cash Used	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0
Apollo New	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0
Apollo Used	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0
Autoleadstar New	2 0 0 0 0	0 2 2 2 0	2 0 0 0 0	1 0 0 0 0	0 0 0 0 0	0 1 1 1 0	0 2 1 1 0	5 5 4 1
Autoleadstar Used	1 0 0 0 0	2 1 0 0 1	0 0 0 0 1	1 0 0 0 0	1 0 0 0 0	2 0 0 0 1	2 0 0 0 1	9 1 0 0
AutoMart New	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0
AutoMart Used	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0
AutoTrader New	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	1 0 0 0 0	1 0 0 0
AutoTrader Used	2 0 0 0 0	1 0 0 0 0	2 0 0 0 0	1 0 0 0 0	1 0 0 0 0	0 0 0 0 0	0 2 1 1 0	7 2 1 0
AutoWeb New	0 0 0 0 0	2 0 0 0 0	1 0 0 0 0	1 0 0 0 0	1 0 0 0 0	0 0 0 0 0	0 3 2 2 0	5 3 2 0
AutoWeb Used	0 0 0 0 0	0 0 0 0 0	1 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	1 0 0 0
CarChat24 New	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	1 0 0 0 0	0 0 0 0 0	0 0 0 0 0	1 0 0 0
CarChat24 Used	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0
CarFax New	0 0 0 0 0	0 0 0 0 0	0 0 0 1 0	0 0 0 0 0	0 1 1 1 0	0 0 0 0 0	0 1 1 1 0	0 2 2 0
CarFax Used	1 0 0 0 0	2 1 0 0 0	3 0 0 0 1	3 0 0 0 0	3 0 0 0 1	2 0 0 0 0	5 3 1 1 1	19 4 1 1
Cargurus New	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0
Cargurus Used	0 0 0 0 0	2 0 0 0 0	2 0 0 0 0	0 0 0 0 0	1 0 0 0 0	1 0 0 0 0	1 0 0 0 0	7 0 0 0
Cars.com New	0 0 0 0 0	0 0 0 0 0	0 1 1 1 0	0 0 0 0 0	0 0 0 0 0	0 1 1 1 0	0 0 0 0 0	0 2 2 0
Cars.com Used	0 0 0 0 0	1 0 0 0 0	1 0 0 0 1	0 0 0 0 0	3 0 0 0 0	1 0 0 0 1	5 3 1 0 0	11 3 1 0
Carsaver New	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0 0	0 0 0 0

Visible on the bottom are a few of the multiple tabs information was coming from. Names have been blocked out for privacy.

The first and most pressing problem to fix was the spread-out information. There needed to be a way to automatically gather and compute the data. It was

important that this monthly report be stored for future use, so it was decided the monthly report information be another tab in the month spreadsheet for each dealer, to be named “*Dealership Database*” (the word dealership was replaced with the name of the dealership). This had many advantages, one of the main ones being that as each new month arrived and the overall spreadsheet was copied, the formulas would also be copied and as data was changed the numbers would change automatically. There would be a few pieces of information that needed changing each month, because a few of the tabs are named after the current month (visible in Fig. 1). For this, there needed to be a second “variable” sheet called “Update-Monthly” that would contain the information needed to be changed.

Figures 2 & 3. Two examples of the Update-Monthly sheet as it's been developed.

	A	B	C	D
1	This sheet's URL:	<a href="https://docs.google.com/spreadsheets/d/1...">https://docs.google.com/spreadsheets/d/1...</a>		
2				
3	MTD Sheet Name	Dec 2019 MTD		
4	120-Day Review:	120-Day review		
5	Master Tracking	Dec 2019 (Master Tracking)		
6	Column Letter of Current Month (120-Day Review):	J		
7	Column Letter of Projected (120-Day Review):	K		
8	Column Letter of Days in Month (20-Day Review):	U		
9	Cell with Total Traditional Meetings:	HN82		
10	Column with Total Month Meetings (Master Tracking):	HN		
11	Column with Total Month Sold (Master Tracking):	HO		
12	New and Used Autotrader:		40	41
13	New and Used cars.com		47	48
14	New and Used cargurus:		43	44
15	New and Used Truecar:		57	58
16	New and Used Costco:		51	52
17	New and Used KBB:			
18	All Website Costs:		88	89
19	Dealer Website:		26	27
20	Dealer Inspire:		53	54
21	New and Used Accelerate Autotrader		36	37
22	New and Used Accelerate Dealer.com		38	39
23	New and Used FS		28	29
24	New and Used Codify		55	56
25	New and Used BMW USA		12	13
26	New and Used Autobytel:			
				101

	A	B	C	D
1	This Sheet's URL	<a href="https://docs.google.com/spreadsheets/...">https://docs.google.com/spreadsheets/...</a>		
2	Last Month's URL	<a href="https://docs.google.com/spreadsheets/...">https://docs.google.com/spreadsheets/...</a>		
3	Two Months Ago URL	<a href="https://docs.google.com/spreadsheets/...">https://docs.google.com/spreadsheets/...</a>		
4	Three Months Ago URL	<a href="https://docs.google.com/spreadsheets/...">https://docs.google.com/spreadsheets/...</a>		
7	MTD Sheet Name	Dec 2019 MTD		
8	MTD Last Month	Dec 2019 MTD		
9	MTD Two Months Ago	Dec 2019 MTD		
10	MTD 3 Months Ago	Dec 2019 MTD		
12	120-Day Review Name	20-Day review		
14	Master Tracking Name	Dec 2019 (Master Tracking)		
15	Master Tracking Last Month	Dec 2019 (Master Tracking)		
16	Master Tracking Two Months Ago	Dec 2019 (Master Tracking)		
17	Master Tracking Three Months Ago	Dec 2019 (Master Tracking)		
19	Column Letter of Current Month (120-Day Review)	J		
20	Column Letter of Last Month (120-Day Review)	I		
21	Column Letter of 2 Months Ago (120-Day Review)	H		
22	Column Letter of 3 Months Ago (120-Day Review)	G		
24	Row Number of Budget		105	
25	Row of Budget Last Month		105	
26	Row of Budget Two Months Ago		105	

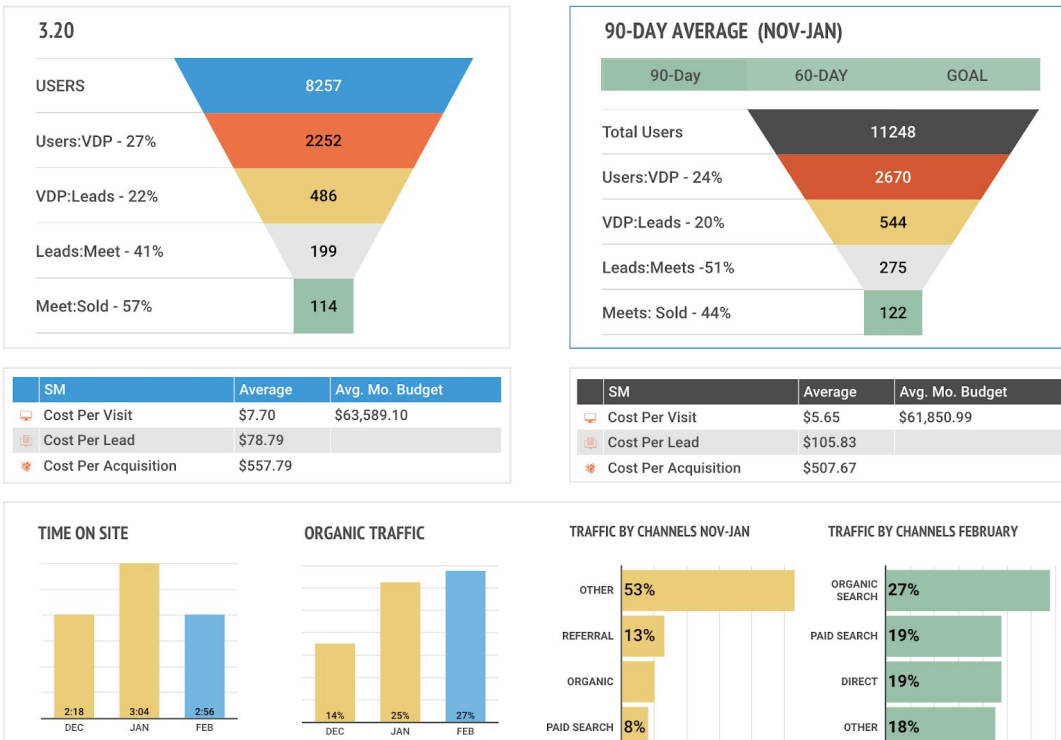
*The information highlighted in yellow is the information to be updated each month*

The majority of the project was completed in this step. Employees that used to manually compute this information were consulted in order to generate the formulas. A database sheet was constructed and Google Sheets formulas were created based on the information necessary to be entered into Infogram. Just as this lengthy process was complete, the monthly report format changed. This simplified some of the information, but also required that information for the past three months. Google Analytics reports were also automated to Google Sheets in order to skip the step of checking a separate Google Analytics website.

*Figure 4. A portion of a sample database utilizing the formulas*

	A	B	C	D	E	F	G	H
1								
2	<b>MONTH FUNNEL</b>				<b>90-DAY MONTH FUNNEL</b>			
3		<b>November</b>	<b>Percentage</b>		<b>1</b>	<b>November</b>	<b>Percentage</b>	
4	Total Users	18271	1		Total Users	18271	1	
5	Users:VDP	9672	53.00%		Users:VDP	9672	53.00%	
6	VDP:Leads	1256	13.00%		VDP:Leads	1094	11.00%	
7	Leads:Meetings	755	60.00%		Leads:Meetings	694	63.00%	
8	Meetings: Sold	301	40.00%		Meetings: Sold	230	33.00%	
9								
10								
11	<b>WEBSITE REVIEW DATA</b>				<b>90-Day WEBSITE REVIEW DATA</b>			
12	<b>Website Review</b>	<b>Page 3</b>			<b>Website Review</b>	<b>Page 3</b>		
13	Cost	\$62,331.97			Cost	\$62,331.97		
14	Cost Per Visit	\$3.41			Cost Per Visit	\$3.41		
15	Cost Per Lead	\$49.63			Cost Per Lead	\$56.98		
16	Cost Per Acquisition	\$207.08			Cost Per Acquisition	\$271.40		
17								
18								
19	<b>TIME ON SITE</b>				<b>ORGANIC TRAFFIC</b>			
20	<b>Month</b>	<b>Time</b>			<b>Month</b>	<b>Traffic</b>		
21	Sep				Sep	17.45%		
22	Oct				Oct	17.45%		
23	Nov	5:16			Nov	17.45%		
24								
25	<b>BOUNCE RATE</b>				<b>GOOGLE ADS BOUNCE %</b>			
26	<b>Month</b>	<b>Time</b>			<b>Month</b>	<b>Time</b>		
27								

Figure 5. An example of one page of the monthly report



*This is the information that corresponds with the spreadsheet in Figure 4. These two figures were not taken from the same dealership, so the data is not identical.*

Many different ways to streamline the publishing process were investigated. Dealer Fox uses Infogram, a data visualization program that automatically generates graphs from data. They have a monthly report set up that contains all the graph formats, but the numbers are changed month to month for each dealership. However, the monthly report setup changed halfway through the internship. The main objective of the project was to decrease time spent on generating the reports. Originally, the plan was to automate the process from Google Sheets directly to Infogram. There were two methods for that. The first was using SQL to get data from the Google Sheets, get it in a database, and then push that data using SQL to Infogram. The second method was to use Infogram's automatic integration directly from Google Sheets. Both methods eventually proved ineffective.

The main problem with both methods was that they required too much effort to set up for the monthly report. Since there was a new report for each dealership each month, the SQL would have to be set up on every new spreadsheet and every new Infogram sheet. This would be two setups, per dealer per month. It also required the time of somebody who knew how to set up the SQL, of which there were not many people. The second plan, involving direct from Google Sheets integration, was even worse. Not only would it have to be set up every month on Infogram, the direct integration required one sheet per graph. For the 15+ graphs on the monthly report, there would have to be 15+ tabs on each monthly report. This would be inconvenient to view the collective data and would also clutter the monthly reports unnecessarily. Each chart in Infogram would have to be set up monthly as well. It was decided that since there was no convenient way to automate data directly from a monthly sheet to the Infogram charts, the generated data would be copy-pasted from the Google Sheets database into Infogram. This was the most time-efficient plan. It also reduced the possibility of technological errors that could take time and be complicated to fix.

## **Business Project Research**

The research question that was addressed the most was how to optimize the internal process of displaying information to a client. This is a question that cannot have a complete answer, but can be constantly researched and improved. The form of this research came in learning Google Sheets formulas and meeting with other members of the company in order to get insight. The restraints were very specific because there needed to be an in-depth knowledge of operations at the company in order to learn how to optimize the process. Therefore, there were weekly meetings going over progression in the project and adjustments that needed to be made based on impact. The secondhand research was more in the form of looking up different formula commands in order to figure out how to most effectively calculate different subcategories.

The insights of the firsthand research were that it is important to consider human interaction with a process. Sometimes, even if the process seems more efficient one way, people less familiar with the technology will find that process confusing and difficult. When considering overall time efficiency, it is better to take the simpler although clunkier outcome if it will help shorten the process. Sometimes it takes too long to train people on how to use a system, and the system itself needs to be simplified. Also, through firsthand research, another insight that was that intermediate steps are necessary to facilitate meaningful and dynamic change. Projects can often be modified halfway through, so establishing a middle ground, though it may take a little bit longer, can be better in the long run. Also, intermediate steps can help more immediately decrease time in projects, instead of making employees perform the inefficient process for a long time. The secondhand research insights were mainly just specific processes used in Google Sheets formulas, such as the ImportRange function. These insights helped increase the amount of information that could be automatically displayed. Limitations on the project were mainly that of time and system ability. There was not time enough to implement a system that was as user-friendly as possible and to train the employees to completely understand that system. The other limitation was system ability. The system in place to pass data was a set of spreadsheets that got copied each month on Google Sheets. Google Sheets had advantages and drawbacks, but it was necessary to keep in place because there was not enough time to change the system. It did not allow for completely smooth integration with Infogram, which another system possibly could.

## **Business Project Key Learnings & Recommendations**



The key learnings for this project were in Google Sheets formulas, systems design, and communication. Google Sheets formulas were integral to the process of streamlining data visualization because they could routinely perform calculations that often took hours to complete. One of the learnings for this project was more complex Google Sheet formulas. This process would almost certainly transfer to Excel as well. Another key learning was system design. There was a lot of analysis of the system of data transfer and presentation. Lots of different types of processes were prototyped. This learning included critical analysis and decision making for which process was optimal. The final learning was communication. Many employees involved in the process had a difficult time grasping the system process that was designed, so communication was essential. Without employee understanding, it was useless to implement the system. Employees needed to understand the system in order to use it. Communication skills were developed immensely over the course of the project.

Recommendations for the business are somewhat unnecessary because this business project will continue after the IMSA Internship program. Instead, there continues to be parts of this project that need work in the future. One future part of this project is using Google Apps Script to customize Google Sheet functions. This could help simplify the process for those not familiar with the lengthy formulas found in the monthly reports currently. Another part of the project is developing a daily report for dealerships. This daily report could be more static and directly connected to an Infogram sheet through SQL, because it would only have to be set up once. There lies a new set of challenges with this daily report. It has been a pleasure working on this business project and it will be a pleasure to continue to work on it.

## **Reference List**

“IMPORTRANGE - Docs Editors Help.” *Google*, Google,  
[support.google.com/docs/answer/3093340?hl=en](https://support.google.com/docs/answer/3093340?hl=en).

*This site assisted in using the "Import Range" function which imported Google Sheets information from different spreadsheets. This function was used in nearly every formula.*

“Using Integrations in Your Projects.” *Infogram Support Center*,  
[support.infogram.com/hc/en-us/articles/360013375053-Integrating-with-data-bases-iframes-and-more](https://support.infogram.com/hc/en-us/articles/360013375053-Integrating-with-data-bases-iframes-and-more).

*This website helped to understand which services can be integrated with Infogram and how they are integrated. It clarified the design process dealing with uploading data to Infogram.*

Walton, Philip. “Google Analytics Spreadsheet Add-On.” *Google Analytics*,  
Google, Mar. 2014,  
[developers.google.com/analytics/solutions/google-analytics-spreadsheet-add-on](https://developers.google.com/analytics/solutions/google-analytics-spreadsheet-add-on).

*This was a general guide for including Google Analytics data in Google Sheets. It helped automate the process of getting Google Analytics data.*

## **Reference List**

*Figure 6. Proof of meetings to review the final version of the database*

Database Review with Zoe Inbox x



Dan Trinidad via BlueJeans Network <invite@bluejeans.com>  
to me ▾

Wed, Mar 25, 12:43 PM ☆ ↶ ⋮

<p>Mar <b>25</b> Wed</p>	<p><b>Database Review with Zoe</b> <a href="#">View on Google Calendar</a></p> <p>When <b>Wed Mar 25, 2020 2:15pm – 3:15pm (CDT)</b></p> <p>Where <a href="https://bluejeans.com/8...?15?src=calendarLink">https://bluejeans.com/8...?15?src=calendarLink</a></p> <p>Who @dealerfox.com, @dealerfox.com, Dan Trinidad*</p>	<p><b>Agenda</b> Wed Mar 25, 2020</p> <p><i>No earlier events</i></p> <p><b>2:15pm Database Review with Zoe</b></p> <p><i>No later events</i></p>
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