Data Ops Business Intelligence Analyst Assessment

Please indicate the tools you used for this assessment: **AWS QuickSight**

Scenario

Greenwall is a company that produces wall sheathing made of sustainably grown materials. They've recently decided to invest in building an Analytics team and hired you to the role of Business Intelligence Analyst. They are eager to learn what Analytics can provide to assist in their day-to-day decision making, so they have asked you to perform some specific analyses using data from Greenwall's business systems.

Below is a small dataset of historical performance consisting of 2 tables:

- The first table is from the CRM for Sales and Marketing
- The second is from an ERP for inventory management and billing

CRM

Month	Leads	Opportunities
1/1/2022	123	65
2/1/2022	145	72
3/1/2022	167	86
4/1/2022	208	89
5/1/2022	225	117
6/1/2022	261	122
7/1/2022	286	166
8/1/2022	270	188
9/1/2022	223	141
10/1/2022	199	121
11/1/2022	162	135
12/1/2022	143	92
1/1/2023	154	80
2/1/2023	180	86
3/1/2023	205	103
4/1/2023	252	149
5/1/2023	271	128
6/1/2023	313	162
7/1/2023	342	189
8/1/2023	324	167
9/1/2023	269	189
10/1/2023	242	151
11/1/2023	199	133
12/1/2023	177	121

ERP

Month	Orders	Sales
1/1/2022	44	$116,610
2/1/2022	49	$131,430
3/1/2022	60	$138,310
4/1/2022	61	$131,900
5/1/2022	83	$195,440
6/1/2022	88	$200,760
7/1/2022	120	$284,540
8/1/2022	136	$301,250
9/1/2022	107	$251,010
10/1/2022	85	$174,920
11/1/2022	97	$228,190
12/1/2022	61	$209,890
1/1/2023	57	$135,810
2/1/2023	58	$135,870
3/1/2023	73	$172,030
4/1/2023	103	$266,546
5/1/2023	99	$269,214
6/1/2023	107	$287,574
7/1/2023	123	$327,758
8/1/2023	113	$316,169
9/1/2023	131	$327,499
10/1/2023	105	$277,032
11/1/2023	93	$241,750
12/1/2023	82	$230,100

Question 1

While reviewing the data, you notice a few things. So, you decide to further analyze the data.

Using the data provided, calculate the Average Order Value for each month. Do you see any anomalies? What do you think would've caused that?

Answer 1

Yes, I do see an anomaly for December 2022, where the Average Order Value spiked. This was caused by the order count being smaller than usual with only 61 orders that month. This could be explained by December being a holiday month and Greenwall customers possibly wanted to order more material per order. Other logistical and business decisions could be at play as well that I'm unaware of such as production time and shipping.

Sales, Orders, Avg Value Order

Date	Orders	Sales	Avg Order Value
Jan 2022	44	$116,610	$2,650
Feb 2022	49	$131,430	$2,682
Mar 2022	60	$138,310	$2,305
Apr 2022	61	$131,900	$2,162
May 2022	83	$195,440	$2,355
Jun 2022	88	$200,760	$2,281
Jul 2022	120	$284,540	$2,371
Aug 2022	136	$301,250	$2,215
Sep 2022	107	$251,010	$2,346
Oct 2022	85	$174,920	$2,058
Nov 2022	97	$228,190	$2,352
Dec 2022	61	$209,890	$3,441
Jan 2023	57	$135,810	$2,383
Feb 2023	58	$135,870	$2,343
Mar 2023	73	$172,030	$2,357
Apr 2023	103	$266,546	$2,588
May 2023	99	$269,214	$2,719
Jun 2023	107	$287,574	$2,688

Question 2

You just remembered that the Executive team decided to implement a price increase in 2023. Explain when you think that price increase took place and what you noticed to make you think that.

Answer 2

I tried looking at the progression of Orders, Sales, and Avg Order Value from January 2022 to December 2023. Besides the spike in Avg Order Value in December 2022, there weren't any major outliers that popped out to me.

So I decided to create some tables that showed the values of Orders, Sales, and Avg Order Value shown side by side with the years 2022 and 2023 as columns and the percent difference change as an additional column. Seeing these new tables showed an interesting trend in both Orders and Sales. It revealed that in April of 2023 there was a noticeable spike in the percent difference change. In April 2023, Orders increased 69% YoY and Sales more than doubled with a 102% increase YoY. This seems to imply to me that the price change in 2023 occurred in April.

Orders by Month, YoY

	Year			
	2022		2023	
Month	Orders	Orders	Orders	Orders
1	44		57	29.55%
2	49		58	18.37%
3	60		73	21.67%
4	61		103	68.85%
5	83		99	19.28%
6	88		107	21.59%
7	120		123	2.50%
8	136		113	-16.91%
9	107		131	22.43%
10	85		105	23.53%
11	97		93	-4.12%
12	61		82	34.43%

Sales by Month, YoY

	Year			
	2022		2023	
Month	Sales	Sales	Sales	Sales
1	$116,610		$135,810	16.47%
2	$131,430		$135,870	3.38%
3	$138,310		$172,030	24.38%
4	$131,900		$266,546	102.08%
5	$195,440		$269,214	37.75%
6	$200,760		$287,574	43.24%
7	$284,540		$327,758	15.19%
8	$301,250		$316,169	4.95%
9	$251,010		$327,499	30.47%
10	$174,920		$277,032	58.38%
11	$228,190		$241,750	5.94%
12	$209,890		$230,100	9.63%

Question 3

You decide to take one final look at the data to see if anything interesting pops out at you. You also decide to develop a set of recommendations for the Executives to show the value of Analytics. Combining what you've identified so far, and any new insights you discover, provide a summary and recommendations for the Executive team.

Answer 3

Some other things that stuck out to me were that Sales and Orders improved in 2023 compared to 2022. For Sales, 2023 was higher in every month compared to 2022, where for Orders 2023 was higher than 2022 in all but 2 months. Avg Order Value, even accounting for the outlier in December 2022, was higher in 2023 than 2022 in all but 3 months.

Another thing I noticed is that the Order to Opportunity ratio (Orders/Opportunities) stayed mostly consistent between all of 2022 and 2023. The ratio always stayed between 65-77% implying that the Sales team has always been pretty consistent in obtaining orders from opportunities/qualified leads month over month.

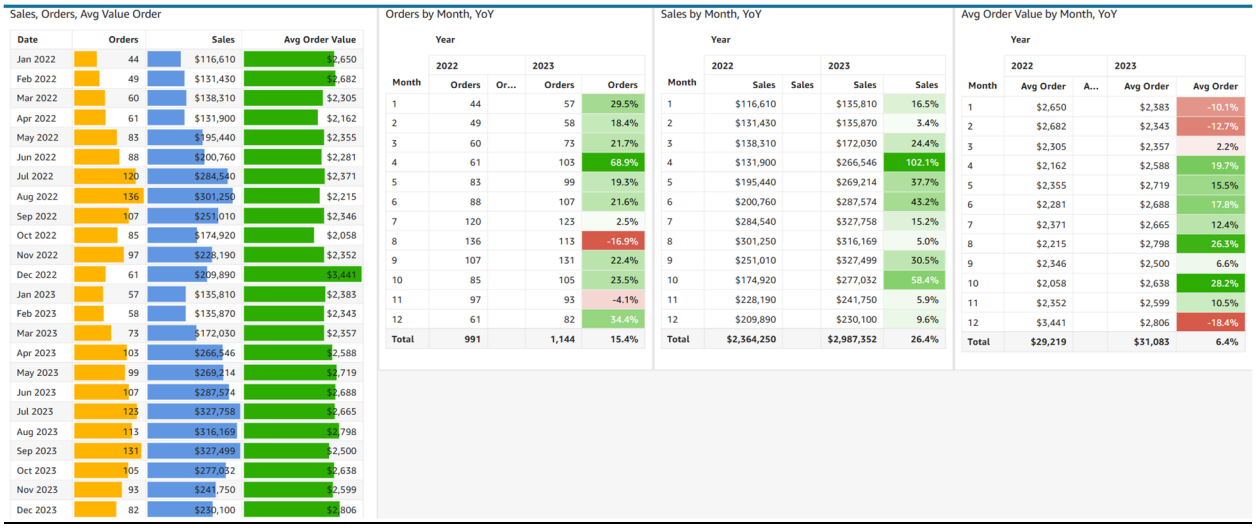
A recommendation would be to investigate the Opportunity to Lead ratio (Opportunities/Leads). In general, the average Opp/Lead ratio was a bit lower at around 57%, with the range covering anywhere from 42-83%. This tells me that there can be a wide variance from month to month, even considering some of the peak months around the holidays. In addition, this also says that finding qualified leads from an initial group of leads can be a tricky task as buyer interest can be as varied as the people involved. Once we know that we can get more opportunities, we know that we'll consistently have around a 70% chance of converting those opportunities to orders.

Question 4

Lastly, you decide to create a page in your favorite BI tool of this data so you can come back regularly and review these trends.

Using your go-to tool of choice, create a page with at least 1 temporal visual of Sales, and at least 1 other visual of your choice. Explain why you chose the other visual(s), and please format the page as you would any other report you build. Also, indicate the tool you used.

Answer 4



Sales, Orders, Avg Value Order

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May 2023	99	$269,214	$2,719
Jun 2023	107	$287,574	$2,688
Jul 2023	123	$327,758	$2,665
Aug 2023	113	$316,169	$2,798
Sep 2023	131	$327,499	$2,500
Oct 2023	105	$277,032	$2,638
Nov 2023	93	$241,750	$2,599
Dec 2023	82	$230,100	$2,806

Orders by Month, YoY

	Year			
	2022		2023	
Month	Orders	Or...	Orders	Orders
1	44		57	29.5%
2	49		58	18.4%
3	60		73	21.7%
4	61		103	68.9%
5	83		99	19.3%
6	88		107	21.6%
7	120		123	2.5%
8	136		113	-16.9%
9	107		131	22.4%
10	85		105	23.5%
11	97		93	-4.1%
12	61		82	34.4%
Total	991		1,144	15.4%

Sales by Month, YoY

	Year			
	2022		2023	
Month	Sales	Sales	Sales	Sales
1	$116,610		$135,810	16.5%
2	$131,430		$135,870	3.4%
3	$138,310		$172,030	24.4%
4	$131,900		$266,546	102.1%
5	$195,440		$269,214	37.7%
6	$200,760		$287,574	43.2%
7	$284,540		$327,758	15.2%
8	$301,250		$316,169	5.0%
9	$251,010		$327,499	30.5%
10	$174,920		$277,032	58.4%
11	$228,190		$241,750	5.9%
12	$209,890		$230,100	9.6%
Total	$2,364,250		$2,987,352	26.4%

Avg Order Value by Month, YoY

	Year			
	2022		2023	
Month	Avg Order	A...	Avg Order	Avg Order
1	$2,650		$2,383	-10.1%
2	$2,682		$2,343	-12.7%
3	$2,305		$2,357	2.2%
4	$2,162		$2,588	19.7%
5	$2,355		$2,719	15.5%
6	$2,281		$2,688	17.8%
7	$2,371		$2,665	12.4%
8	$2,215		$2,798	26.3%
9	$2,346		$2,500	6.6%
10	$2,058		$2,638	28.2%
11	$2,352		$2,599	10.5%
12	$3,441		$2,806	-18.4%
Total	$29,219		$31,083	6.4%

For this dashboard I decided to use QuickSight. I included a number of different visuals to try and have greater insights into what each field could tell us and how it has evolved over time.

Sales, Orders, Avg Order table *– I included this, especially with the data bars, to show how they've progressed from January 2022 to December 2023. This could've also been shown as line charts for each metric, but I wanted to save some space for other visuals I planned on putting in.*

Orders by Month YoY / Sales by Month YoY / Avg Order Value by Month YoY *– Included each of these to show a pivot table side by side of the 2022 values along with the 2023 values, and the percent difference change as a 3rd column to see what changes were made Year over Year. I needed to create some additional calculated columns in QuickSight for the Year and Month. As a note, in QuickSight I had to sort the charts by Month Number instead of Month Name if I wanted to keep the percent difference column in the pivot chart still.*

Orders / Sales / Avg Order Sales line charts *– I included these as a way to support the inventory management and billing department. I wanted to also include these visuals with the years as different colors to compare Year over Year instead of having a long line chart from Jan 2022 to Dec 2023, which sometimes isn't always as helpful.*

(Opportunity/Lead Ratio) / (Order/Opportunity Ratio) / (Order/Lead Ratio) line charts *– I included these as a way to support the Sales and Marketing departments. I wanted to also include these visuals with the years as different colors to compare Year over Year instead of having a long line chart from Jan 2022 to Dec 2023, which sometimes isn't always as helpful.*