

Summary

- There are countries which provide only negative profit.
- There is an outlier among all regions in the face of Southeast Asia.
- the United States of America seems to be the most profitable country if we take the sum of sales among all regions that it belongs to. Moreover, East and West regions are represented only by the US.
- Unprofitable countries are the ones where customers seem to have high personal discounts for goods.
- The most profitable mean of shipping is the "Standard Class", and the least one seems to be the "Same Day".
- There are several Sub-Categories that have brought the losses in the Southeast Asian region.
- Table Sub-Category is unprofitable.
- "Tables" might bring even more losses in the future.
- Copiers are the most beneficial to cell.

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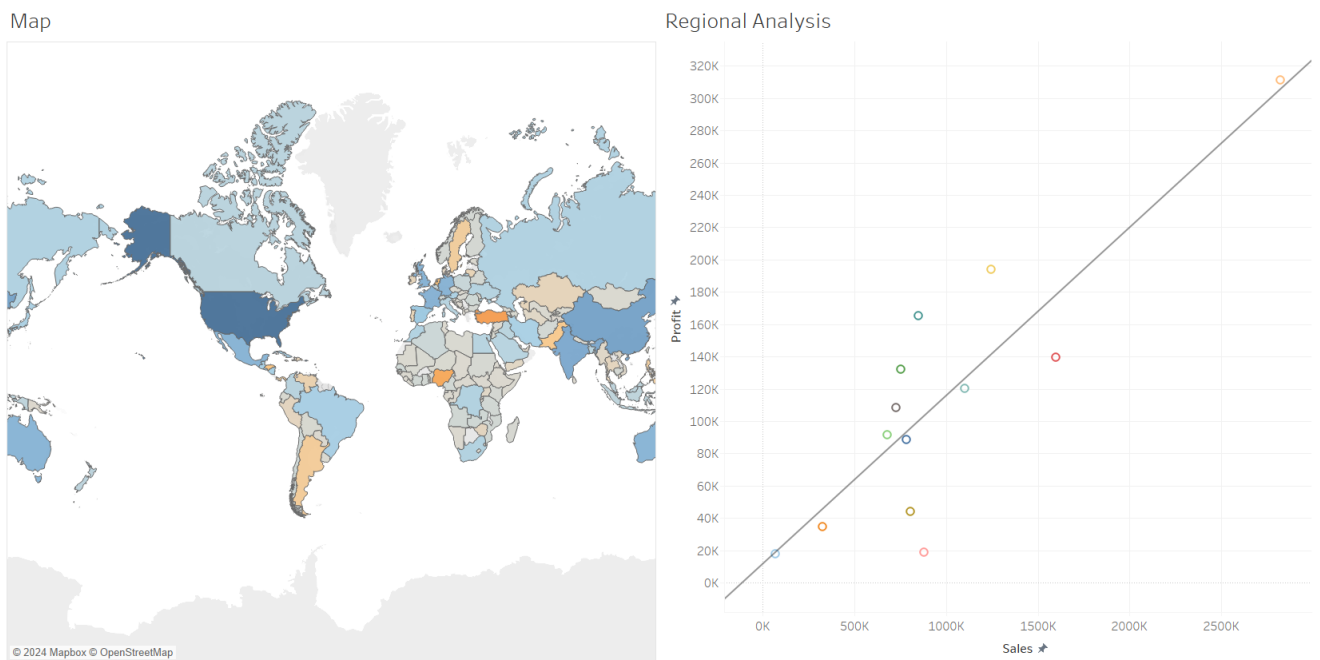
1 Introduction

In the first place, in this data analysis research it seemed essential to start off with a general understanding of the columns of the dataset and the information, which is stored in those columns, as there were no pre-written description to it. With the understanding that I was dealing with the sale of the different products worldwide, that is on all world markets, having dates of purchases, shipments and a lot of other detailed insights into the specific of a concrete unique sale.

In this report I would like to take a closer look into the diverse factors, which might have affected the profitability and provide some advice regarding the business.

2 Analysis of Regions

Let us begin the research with the regional analysis, with it being one of broad spheres, thus giving some additional insights into the dataframe and some ideas for the research continuation.



By creating a simple linear regression line on the left diagram we can observe the Southeast Asian region as an outlier, as for the profit made in this region being pretty much the same as in the Canada, the quantity of goods sold is many times more. We can form a hypothesis to investigate later that a lot of the cheaper products are being shipped into Southeast Asian region and this leads to such result.

Furthermore, Central region stands out as one of the most beneficial in terms of quantity sold and profit made. This can be explained by some of the countries with the strongest economies,

such as the US, French, Germany being included there. However, for instance, Netherlands, which are also a part of the Central region, provide only negative profit from sales, therefore we can highlight phenomenon of heterogeneity among the countries present in the same area. The general observations from the regional analysis:

- **There are countries which provide only negative profit**, this requires further investigation
- **There is an outlier among all regions in the face of Southeast Asia**, this shall be discussed further
- **the United States of America seems to be the most profitable country if we take the sum of sales among all regions that it belongs to. Moreover, East and West regions are represented only by the US**

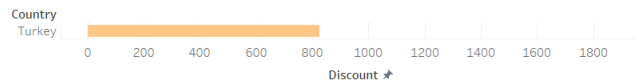
3 Negative Profit Countries

Continuing the investigation of negative profitability of some countries I had two key ideas:

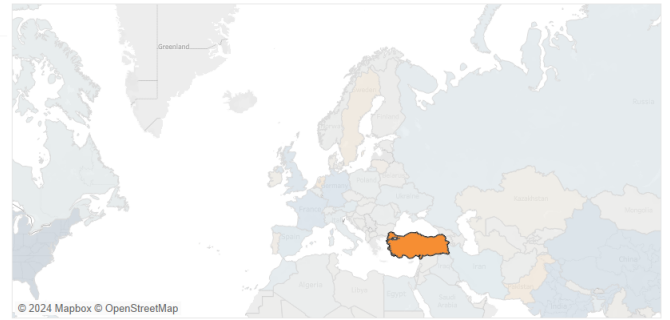
- Shipping costs were extortionate and it was simply not beneficial for company to continue shipping into these countries
- These countries for some reasons had bigger discounts for customers

Although the first point does not seem unreasonable, it cannot be generalised for several reasons. I have pointed out Netherlands as one of the countries on the list, but it has direct access to the water and several port cities. Furthermore it is located right next to some of the most profitable France and Germany. Thus I concluded, that there have to be big discounts for orders in there and tried to find dependencies between the discount and the countries with negative profitability. The results are below.

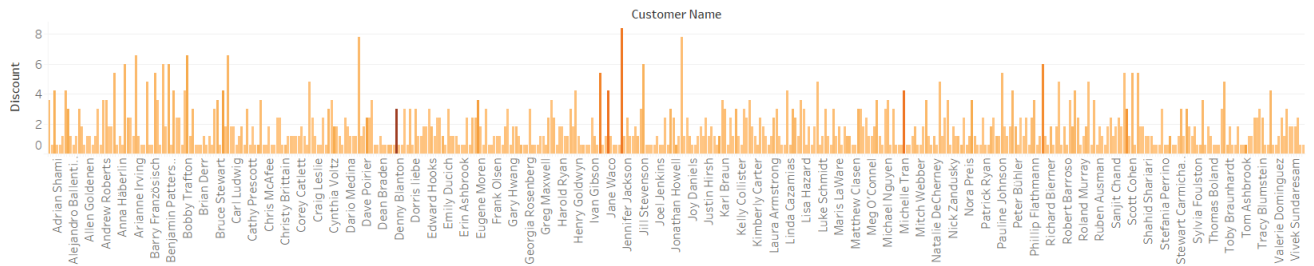
Discount-Country



Negative Profit



All Customers and their discounts



Example country is Turkey, which have not been mentioned before, but is on the list of countries that bring losses. Indeed, the assumption seems correct, people who order products there get high personal discounts. Some bullet points with general observations:

- **Unprofitable countries are the ones where customers seem to have high personal discounts for goods.** The general recommendation would be to:
 - Try to lower the discounts, as almost each client gets one and almost each deal is unprofitable for company
 - Stop operating in those countries
- Some countries may have low profitability or even negative profitability due to the shipping cost, but it is not the general case

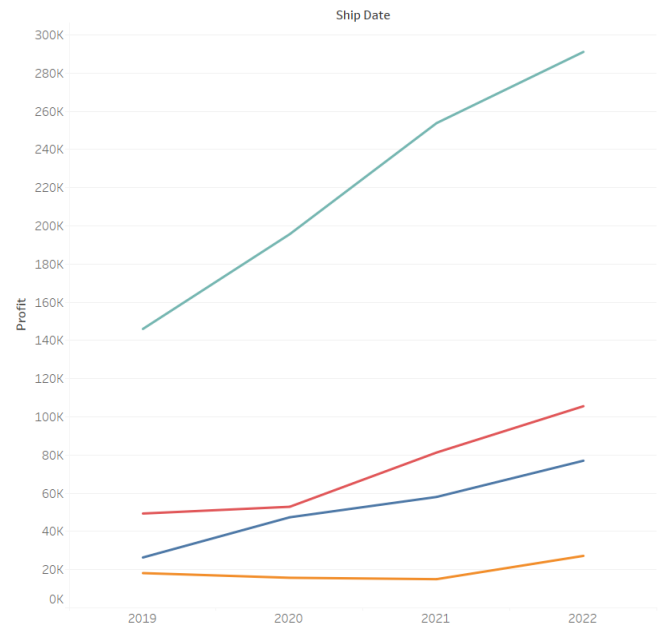
4 Ship Mode Analysis

Although it was mentioned that high shipping expenses might not be the general case of a country being unprofitable, it is better being researched. With that, let us try to build connection with the various shipping modes and find dependencies there.

Country-Ship mode dependency

Country	Ship Mode			
	First C...	Same ..	Secon..	Stand..
Philippines				
Poland				
Portugal				
Qatar				
Republic of the Congo				
Romania				
Russia				
Rwanda				
Saudi Arabia				
Senegal				
Sierra Leone				
Singapore				
Slovakia				
Slovenia				
Somalia				
South Africa				
South Korea				
South Sudan				
Spain				
Sri Lanka				
Sudan				
Swaziland				
Sweden				
Switzerland				
Syria				
Taiwan				
Tajikistan				
Tanzania				
Thailand				
Togo				
Trinidad and Tobago				
Tunisia				
Turkey				
Turkmenistan				
Uganda				

Ship Date - Profit dynamics

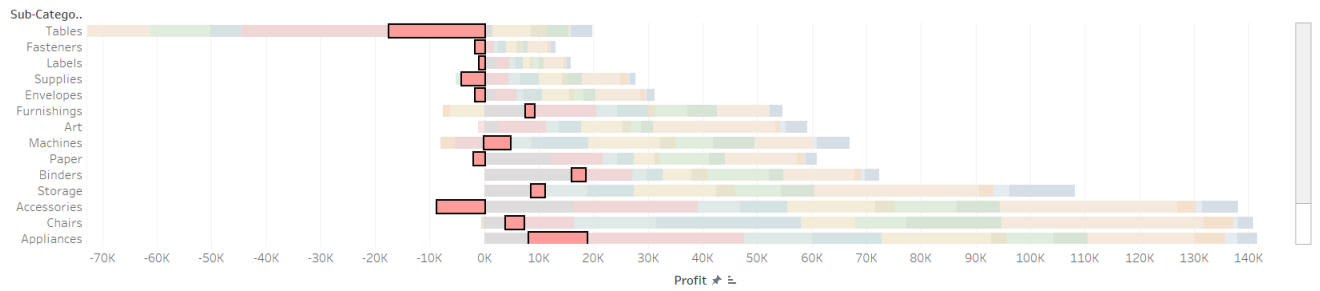


On the figure on the left there is a table with the Country-Ship Mode relation and on the right there is the Ship Date to Profit dependency. There is clearly some positive dynamics and **the most profitable mean of shipping is the "Standard Class", and the least one seems to be the "Same Day"**, which can be explained by the issues connected with the fast delivery higher costs for company. Moreover, looking closer at the Country-Profit dynamics from various shipping modes, we can observe the lower profits for some countries starting from 2021 year, and the growing by the 2022 profits, which I can connect with the COVID-19 pandemic and its new waves and, therefore, the popularisation of the "Same Day" mean of shipping, as the first needs goods started to be more popular and people wanted to get them as early as possible. Then with the positive dynamics in war against the pandemic the profits went up.

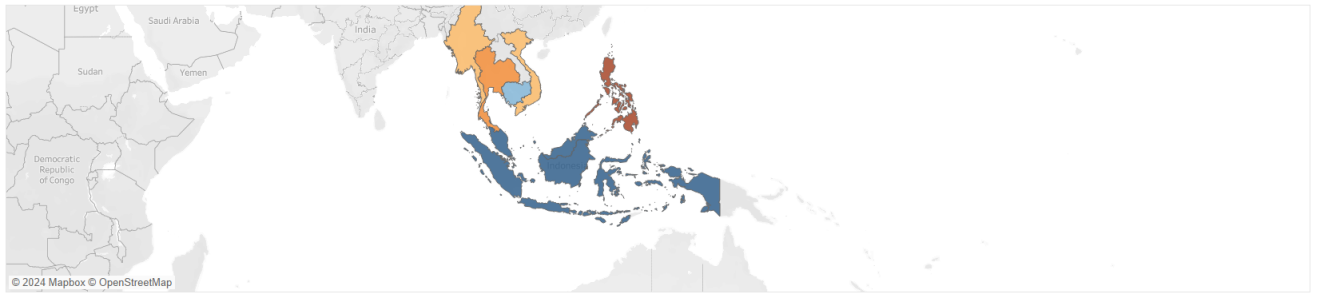
5 Outlier Analytics

There is one aspect of the dataframe, which yet remained untouched, that is the Categories and the Sub-Categories. Earlier I have established the region outlier being the Southeast Asia, let us now take a closer look at the explanation of the rather low profit with high amount of quantity of products sold.

Sub-Category Analysis



Southeast Asia



Now the phenomenon can easily be explained

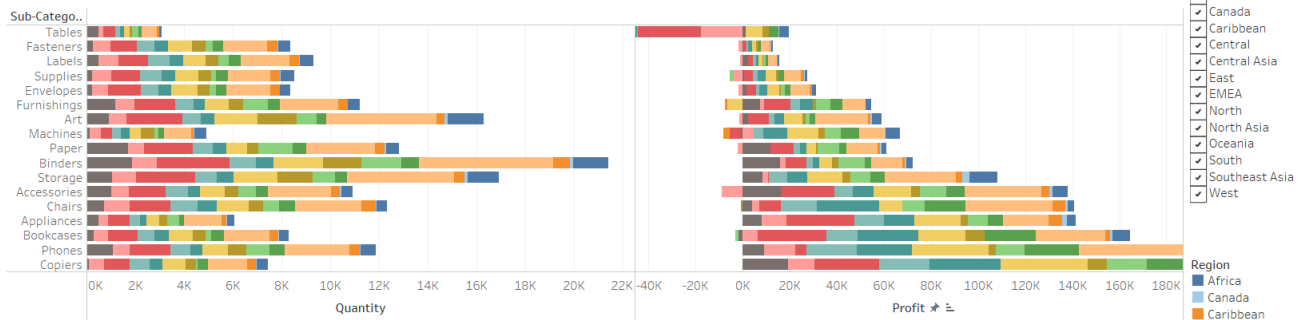
- There are several Sub-Categories that have brought the losses in the Southeast Asian region
- the profits that were made from other Sub-Categories are rather moderate

As a consequence, relatively small profitability combined with some losses from several Sub-Categories of products made this region an outlier. What is interesting is the Table Sub-Category, which seems to bring unprofitable deals for the company and it will be discovered next.

6 Category Analysis

The last, but not least the Category analysis should be conducted. While investigating the regional outlier, I have noticed, that the "Tables" Sub-Category seems to bring losses in each region. Taking a closer look:

Category Analysis



Profit Category Dynamics

Sub-Catego..	2019				2020				2021				2022			
	1-й кв.	2-й кв.	3-й кв.	4-й кв.	1-й кв.	2-й кв.	3-й кв.	4-й кв.	1-й кв.	2-й кв.	3-й кв.	4-й кв.	1-й кв.	2-й кв.	3-й кв.	4-й кв.
Accessories	2336	4021	2800	5766	6399	7920	8790	11192	5711	7806	10503	15472	3886	9000	16563	11259
Appliances	3541	5230	9342	4695	2991	3256	9840	7878	10031	10493	8815	12498	7577	8966	18516	17936
Art	1203	3032	2721	3430	1203	2243	3668	4690	2019	3940	4778	4860	3378	4240	6542	6008
Binders	1390	3307	4288	2460	6510	5454	3190	1440	4440	1068	3703	12800	3929	6037	9796	2588
Bookcases	3137	6404	6187	11211	2606	8312	6010	11551	9939	8118	11449	13392	8302	14337	23714	16953
Chairs	6805	4881	5124	12981	2452	7055	9267	10394	6764	7788	10860	14790	8839	7456	9054	15782
Copiers	1081	5412	7838	16045	5516	20648	10987	14611	8559	14865	20927	27548	20199	17742	25027	40938
Envelopes	453	1518	1965	1112	755	1952	1737	2143	1618	1853	3218	2868	1680	1924	1520	3266
Fasteners	371	427	729	409	642	824	860	620	259	432	998	1267	423	1276	554	1362
Furnishings	1115	516	2562	3128	1158	2768	2895	2840	1981	2721	3498	6388	2904	3779	4777	4040
Labels	339	781	822	1148	632	802	840	954	470	872	1104	1190	676	1273	2029	1048
Machines	1193	1101	92	7023	651	3205	6976	4490	6421	7740	4714	-3398	4863	2973	5311	5918
Paper	1074	2066	3001	4414	1655	1467	3060	4529	3065	4981	4509	4313	3133	4276	5914	7673
Phones	9488	12297	14362	17733	6760	9313	13828	15360	6346	20676	1455	18485	10435	15854	15138	28836
Storage	3696	1685	4389	6163	5775	5503	5144	4982	5955	5037	8587	12107	6026	9952	11942	11207
Supplies	818	976	1776	1010	422	1460	1032	2066	745	1007	2176	1757	943	2006	1467	2808
Tables	-3322	-4223	-745	-2786	-1188	-617	86	-6702	1119	-6751	-3294	-5114	-3343	-8123	-7077	-10808

- **Table Sub-Category indeed is unprofitable.** The company should probably stop selling those goods
- Looking at the dynamics, **"Tables"** might bring even more losses in the future
- **Copiers** are the most beneficial to cell

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