Business Analytics, Applied Modeling and Prediction

Coursework Report

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Executive Letter

The exploration of the transaction datasets makes it clear that EMEA market has extraordinary low sales and profit. At the same time EMEA has the highest average discount. 7 out of 38 countries in EMEA have negative profit and create a loss of approximately 120000USD. It is clear, that these countries conduct a dumping policy in order to increase sales. It is possible to increase profit by around 30% in the short term without decreasing sales by eliminating discount levels. It is also possible to increase the total profit of EMEA in the long term by adjusting discounts and increasing sales in countries with positive profit.

Introduction

In this work I am going to investigate a dataset of an online retailer with multiple clients all around the world. The dataset contains information about all transactions of the store for four years – from 2011 to 2014. There are 51290 transactions overall. Each transaction has 23 parameters describing it from a logistic and financial point of view. My goal is to find a flaw in the system and suggest a way to fix it in order to improve the company's performance.

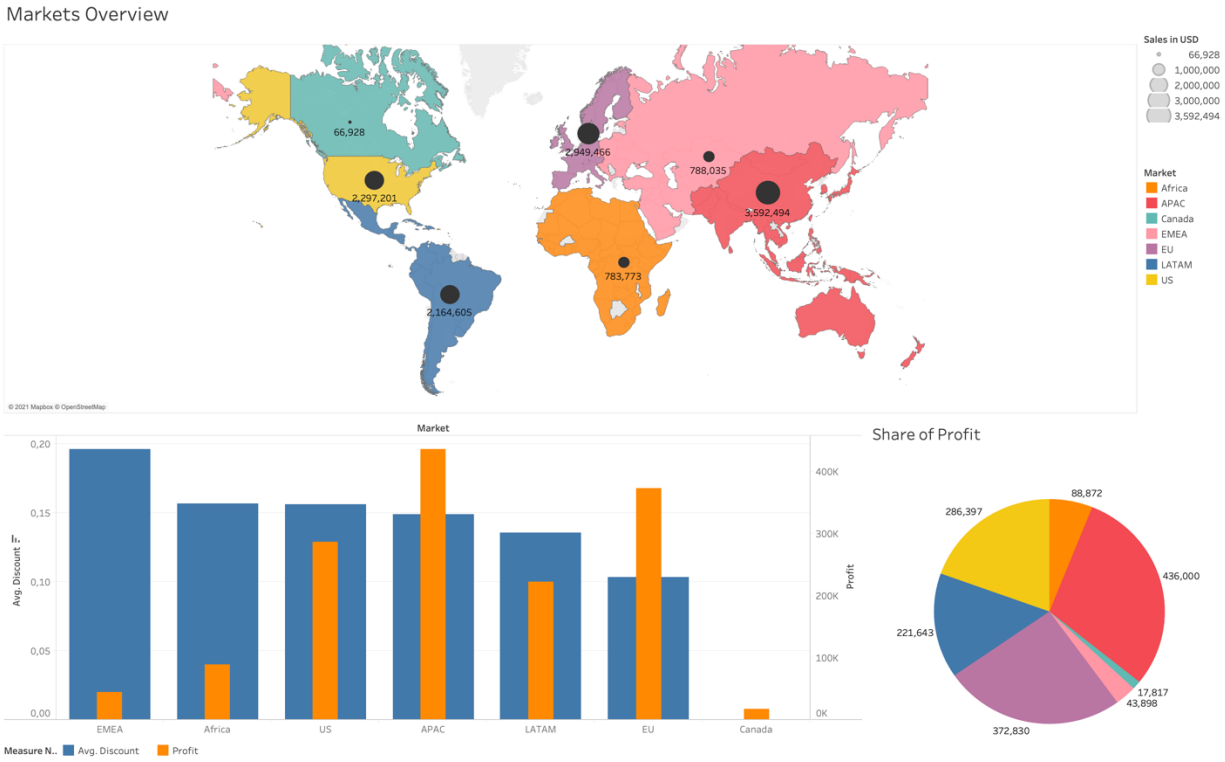
I am interested in finding a way to increase the profit of the company, so I focus most of my attention to the “Profit” parameter of each transaction and parameters which are mostly related to it. I decided to examine the last part of the dataset that represents the latest period – year 2014 (further on “the data”), – because it demonstrates the most actual information and makes it possible to suggest relevant ideas. Nevertheless, I do not neglect the earlier periods (2011 – 2014). I use them in order to demonstrate the dynamics of the statistics which I find important for supporting my hypothesis.

After exploring the data, I have noticed that there are many unprofitable transactions. It appears that the negativity of the profit relates to the region where the transaction was made. It would be logical to assume that this dependency is due to logistics, i.e. shipping cost and shipping mode, however as the data examination shows the major parameter that affects the sign of the profit is the discount. A simple analysis shows that correlation between the sign of the profit and the discount is -0.8 which proves a significant relation between the two parameters.

	Profit	Profit/Unit	isProfitPos	Discount
Profit	1.0	0.9	0.3	-0.3
Profit/Unit	0.9	1.0	0.4	-0.4
isProfitPos	0.3	0.4	1.0	-0.8
Discount	-0.3	-0.4	-0.8	1.0

It is obvious, that discount cannot be simply omitted, since it attracts clients and compensates the decrease in per unit profit by increasing the sales volume. However, there are some regions that do not bring profit at all due to exorbitant discounts. These regions create a loss for the company, which may be fixed by lowering discount rates. Most of these regions are located in EMEA market.

Dashboard 1 – Markets Overview

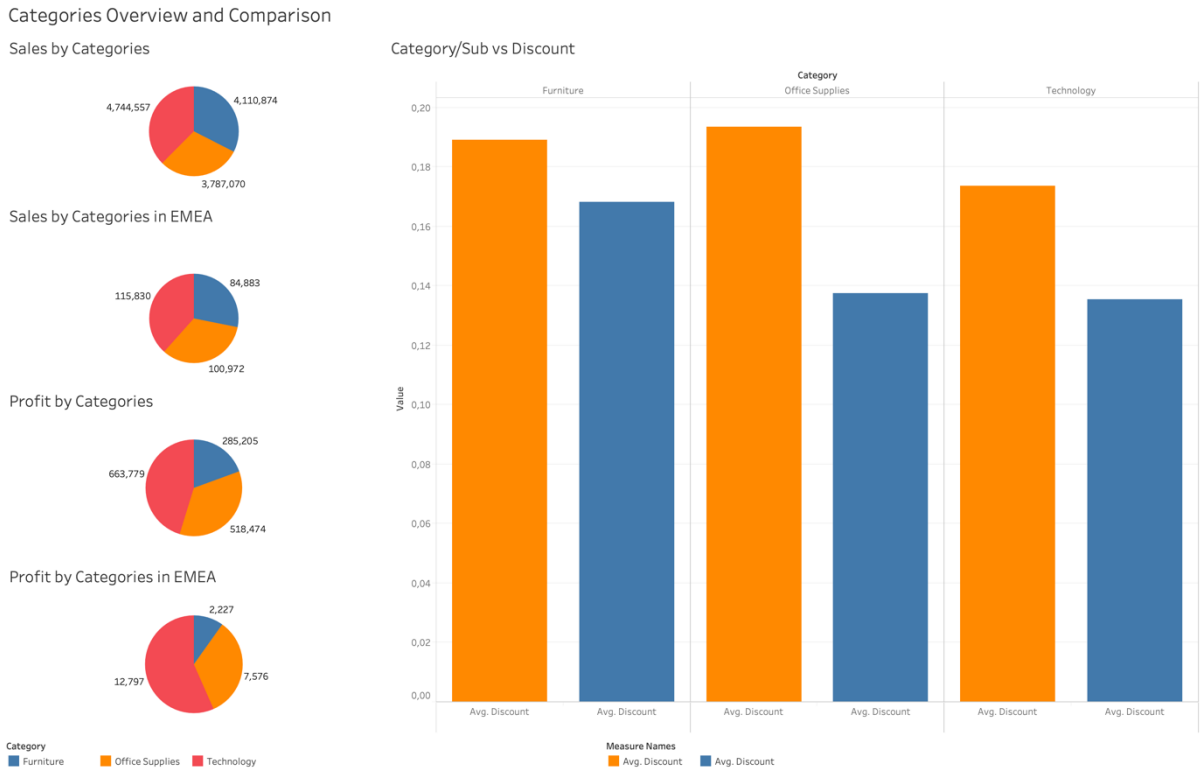


It can be seen from this dashboard, that in addition to low sales in the period from 2011 to 2014 EMEA has ertremely low profit, making its profit-sales ratio the smallest among the markets. Colors of the map depict markets with circles representing total sales. Overall, during the observed period in EMEA goods were sold for only 788,035 USD making a tiny profit of 43,898USD, as can be seen from the piechart. The barchart shows the relationship between profit and average discount in each market. EMEA has the highest discount of 19.6 percent and the lowest profit not taking Canada into consideration.

It seems like the whole problem of unprofitability of EMEA is in its exorbitant discounts. This may be true, but before suggesting to simply lower the discounts it is important to scrutinise other factors that may affect the profit and check what effect will discount lowering have. Lets take a closer look at EMEA.

My analysis has shown, that discount significantly depends only on categories and subcategories of products in the transactions. Since discount distribution over subcategories in EMEA does not differ much from the rest of the world, I prefer to pay more attention to categories.

Dashboard 2 – Categories Overview and Comparison

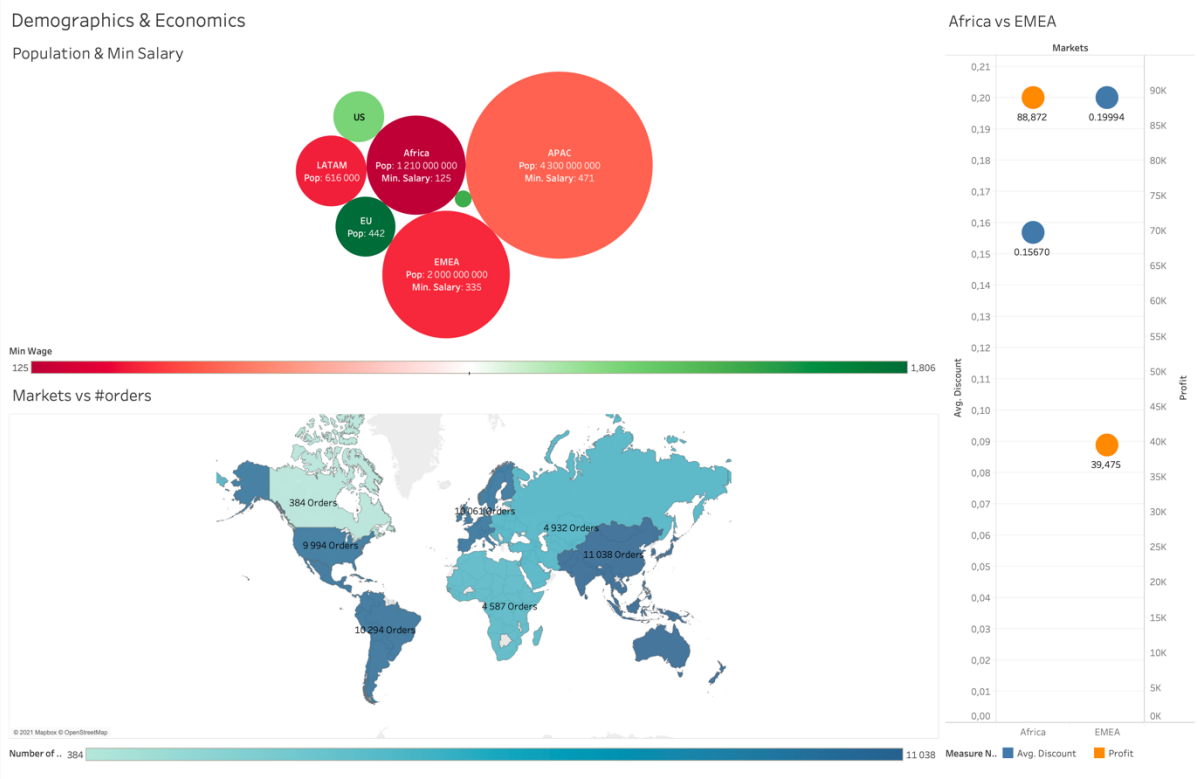


The dashboard above shows that sales, profit and, most icymportantly, discount in EMEA are distributed among the goods categories in a different way from the rest of the world. The barchart represents the average discount-category distribution and shows that the “Office Supplies” category has an uncommonly high discount, which leads to inconsistency in sales and profit, that is shown on the piecharts. Due to higher discounts, “Office Supplies” make a greater share of sales in EMEA than in the world. Higher sales compensate lower profit per transaction, thus keeping the share of profit from “Office Supplies” at the same level with the world, as can be seen on the last piechart. This leads to two other categories ddistribution inversely to discounts on them. As a result, the priority of the goods categories according to profit in EMEA remains common, although a different distribution.

Demographics and economics may also have a strong effect on the profit. Since this information about the markets is not presented in the given dataset I have found in the internet population and

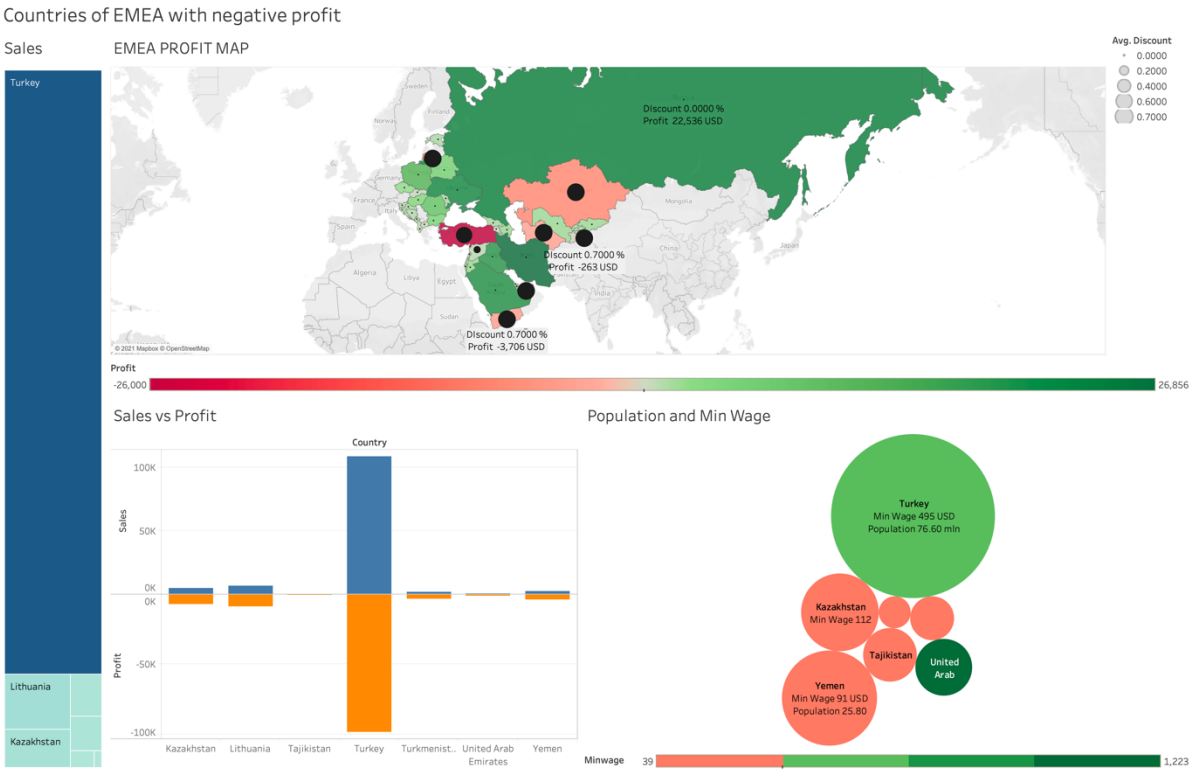
minimum wage distribution among the markets. The following dashboard presents the data (source - https://ilostat.ilo.org/data/) in a way easy to analyse and make conslusions about profit, demogrphics and economics re;ationship.

Dashboard 3 – Demographics and Economics



It can be noticed, that despite its high population EMEA has very rare orders and low sales.
The color of the bubbles of the bubblechart represent the minimum monthly wage in the market and size – its population. EMEA has population of around 2bn people and minmum wage of 335USD.
The map on the right shows number of orders per market for the whole period, which can be proved to be equivalent to sales. EMEA looks very inactive. In contrast, Africa has a population of 1.2bn and minimum wage of 125USD – both twice lower than those of EMEA. In spite from this, there are almost as many orders in Africa as in EMEA, and its profit is twice higher than in EMEA. The reason is higher discount in EMEA.
There are 7 countries out of 38 in EMEA that made a total loss of 122,822USD in the observed period.

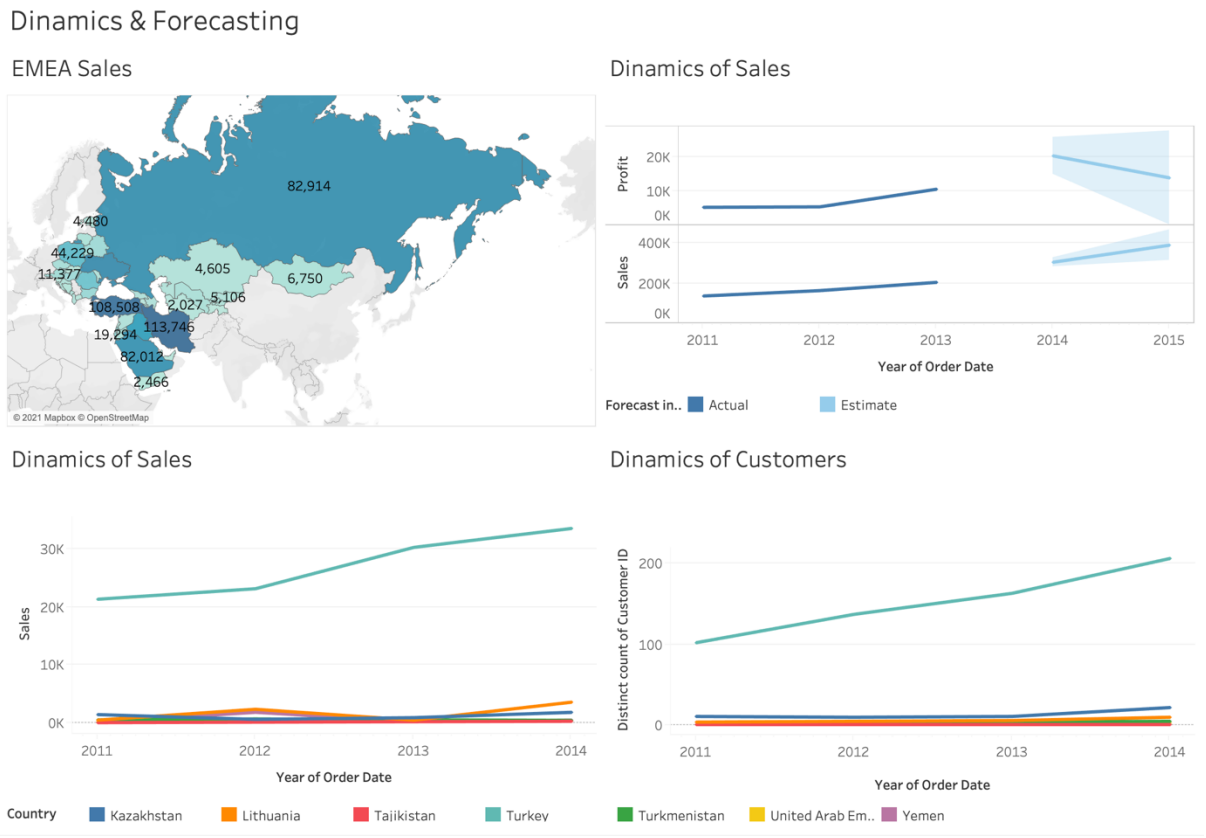
Dashboard 4 – Countrie of EMEA



The main reason of the loss is that these countries have an average discount of 70 percent, which is extremely high compared to the world average discount of 14 perscent, and even compared to 19 percent in EMEA. There is a visible correlation between sales and profit for these countries – the higher the sales are – the more negative the profit is. This can be seen on the butterfly chart. Turkey is the leader of sales in EMEA making more than 100,000USD which is around 35 percent of the total sales in EMEA. In contrast, profit in Turkey is extremely negative making it responsible for arround 80 percent of the loss.

It may be concluded, that the company's loss in the EMEA market is related to these 7 countries. It is also clear, that the loss is in sake of sales growth. However, the analysis shows that there is an opportunity to end the loss in some countries by lowering discounts, because the dumping strategy has already increased sales. On the other hand, there are some countries in which dumping does not work and the decision on lowering discount is harder.

Dashboard 5 – Dinamics and Forecasts



Turkey has the largest population among the observed countries and minimum wage above the average in EMEA, making it a good market. The number of customers has increased twice during the observed period and annual sales grew from 22,000USD to 32,000USD a year. This demonstrates that the dumping strategy has worked. It can be seen on the Dinamics of Sales by country graph, that the growth of sales in this region is slowing down. For this reason it may be practical to slowly decrease the discount in this region in order to increase profit.

Unlike Turkey, six other countries were not affected by a high discount level. As can be seen from the plot, sales in these countries did not grow significantly and nor did the number of customers.

Overall, as sales are predicted to be growing it may be logical to keep discounts high until the profit in EMEA hits close to zero, thus attracting more customers and letting sales grow. However, if the discounts are minimzed – it is possible to increase the total profit in EMEA by eleiminating the loss of 120,000USD.

In the future, other countries in EMEA may be taken in consideration. Maybe it would be practical to increase discounts in the countries with low sales and zero discounts, such as Russia and Latvia.