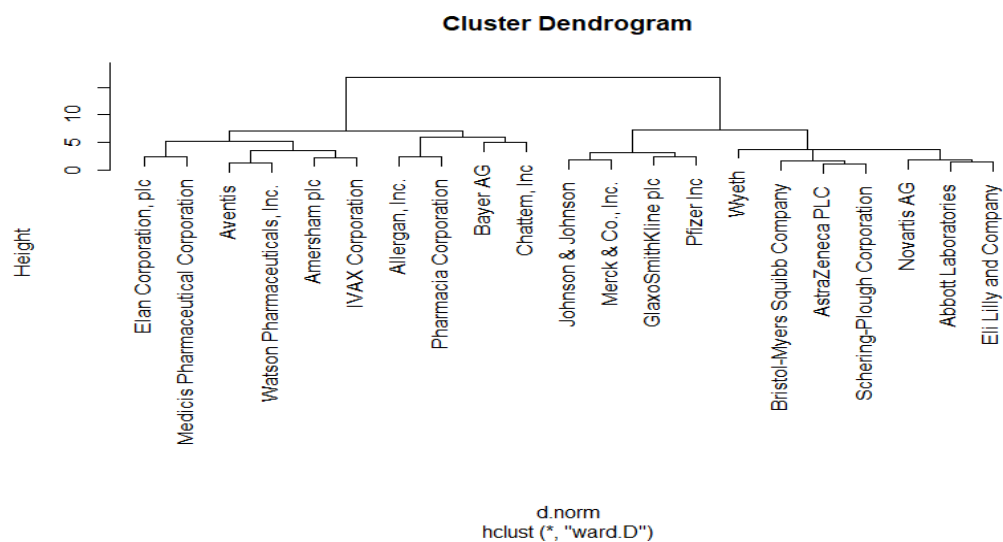


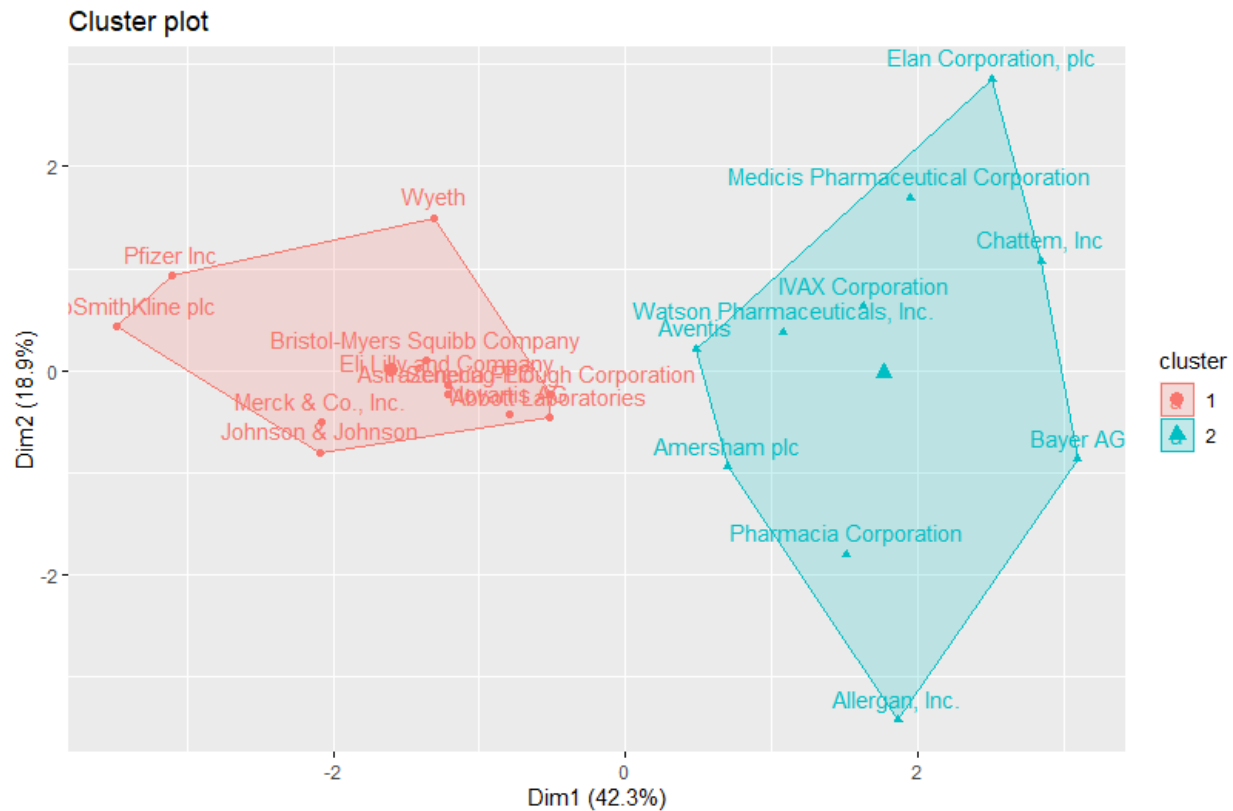
```
> clusters
```

Abbott Laboratories	Allergan, Inc.	Amersham plc
1	2	2
AstraZeneca PLC	Aventis	Bayer AG
1	2	2
Bristol-Myers Squibb Company	Chattem, Inc	Elan Corporation, plc
1	2	2
Eli Lilly and Company	GlaxoSmithKline plc	IVAX Corporation
1	1	2
Johnson & Johnson	Medicis Pharmaceutical Corporation	Merck & Co., Inc.
1	2	1
Novartis AG	Pfizer Inc	Pharmacia Corporation
1	1	2
Schering-Plough Corporation	Watson Pharmaceuticals, Inc.	Wyeth
1	2	1

Cluster dendrogram depicting 2 distinct clusters



Visual Representation of the clusters



3. Centers of the clusters(mean) using the aggregate function.

clusters	Market_Cap	Beta	PE_Ratio	ROE	ROA	Asset_Turnover	Leverage	Rev_Growth
1	0.6733825	-0.3586419	-0.2763512	0.6565978	0.8344159	0.4612656	-0.3331068	-0.2902163
2	-0.7407208	0.3945061	0.3039863	-0.7222576	-0.9178575	-0.5073922	0.3664175	0.3192379
Net_Profit_Margin								
1	0.6823310							
2	-0.7505641							

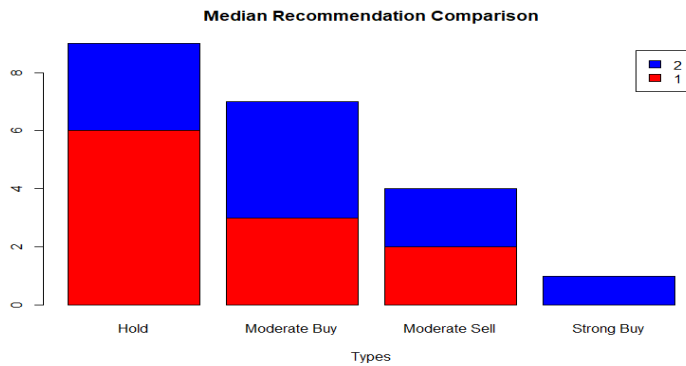
Cluster 1: Lowest Market cap, net profit margin, leverage cluster, high beta, high leverage and high rev growth.

Cluster 2: Low ROE, high PE ratio, low ROA, asset turnover, high market capitalization, high rev growth cluster.

1. **Cluster 1:** Pharmaceutical companies which are comparatively young, with an inefficient cost structure. These have a high capital appreciation which mean they have a high opportunity for capital appreciation, these companies also have a comparatively higher return on investment, but due to the young age of the company can also lead to a higher risk.
2. **Cluster 2:** These are pharmaceutical companies have a comparatively lower return on investment, they also do not have high efficiency for using its assets to generate profits. However, compared to cluster 1, these are larger and older companies, having a higher PE_ratio, therefore rendering them overvalued. The companies have a lower asset turnover ratio which indicates that the companies not efficiently using its assets to generate sales. The companies

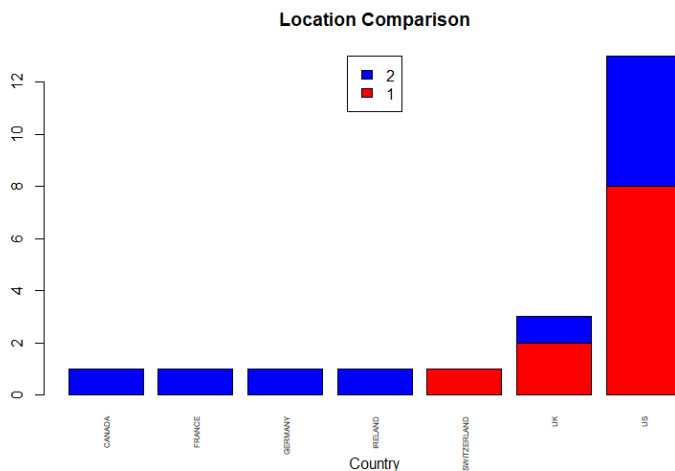
have a higher market capitalization which means that these companies benefit from competitive advantages related to their competitions in the market.

c)

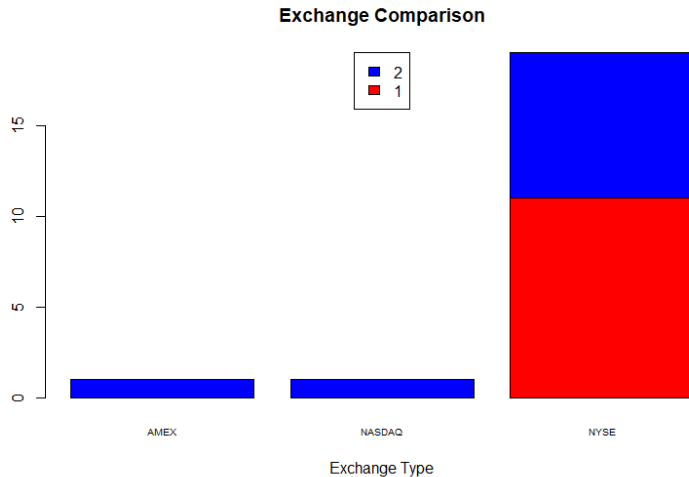


The above depicts a stacked bar plot, with the legend shown in the upper right corner of the plot. The blue colored portion of the stacked bar plot represents the pharmaceutical companies in the 2nd cluster, whereas the red colored portion of the stacked bar plot represents the pharmaceutical companies in the 1st cluster.

On the basis of median recommendation comparison, we can understand that majority of the 1st cluster companies had a hold, 50-60% in moderate buy and moderate sell. However, the strong buy type of median recommendation comparison only comprises of the 2nd cluster companies.



On the basis of location comparison, headquarters of the companies in the 1st cluster, are mostly located in the US, UK and in Switzerland. We can also understand that the pharmaceutical companies in the 2nd cluster are located mostly in Europe and northern America (Canada).



On the basis of exchange comparison. We can understand that the pharmaceutical companies in the first cluster are only stated in the New York stock exchange whereas the companies in the 2nd cluster are more spread out, and have exchanges completely in AMEX and NASDAQ, with almost 45% in NYSE.

d) Names of the clusters

Considering the attributes, we can understand the following:

- **Market Cap**: High market cap companies have better financing terms, and these companies benefit from competitive advantages.
- **Beta**: It is the measure of a stocks' volatility in relation to the stocks in the market.
- **PE ratio**: The ratio of the company's share price to the company's earnings per share. The ratio is used for valuing companies and to find out whether they are overvalued or undervalued.
- **ROE**: Is a measure of financial performance calculated by dividing the net income by shareholder's equity.
- **ROA**: Return on assets (ROA) is a measure of how efficiently a company uses the assets it owns to generate profits.
- **Asset Turnover**: Asset turnover is the ratio of total sales or revenue to average assets.
- **Leverage**: Stock market leverage can result in an increase in your return on investment.
- **Rev Growth**: Denotes the company's ability of having substantial room for capital appreciation.
- **Net Profit Margin**: The net profit margin, or simply net margin, measures how much net income or profit is generated as a percentage of revenue.

Now as per the clusters, they can be named as the following:

Cluster 1: Younger companies, with high opportunities but with high risk associated with it.

Cluster 2: Comparatively older companies, with high market cap, and higher opportunity to generate profit from its stocks.