### Current Ratio

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Industries** | **Companies** | | | **Average** | **Standard Deviation** |
| **Clusters with Highest Performance** | | | | | |
| Consumer Specialties  Wholesale Distributors | | 4  2 | 4.55 | | 1.88 |
| Agricultural Chemicals  Apparel  Electrical Products  Medical Specialities  Medical/Dental Instruments  Ordnance And Accessories  Precious Metals | | 13  12  14  17  14  3  39 | 3.71 | | 3.45 |
| **Clusters with Lowest Performance** | | | | | |
| Air Freight/Delivery Services  Aluminum  Beverages (Production/Distribution)  Coal Mining  Computer Manufacturing  Consumer Electronics/Appliances  Environmental Services  Hotels/Resorts  Integrated oil Companies  Movies/Entertainment  Oil & Gas Production 1  Other Pharmaceuticals  Railroads | | 12  2  14  10  4  7  6  17  23  7  25  5  11 | 1.28 | | 0.71 |
| Consumer Electronics/Video Chains  Diversified Commercial Services  Electric Utilities: Central  Oil/Gas Transmission  Power Generation  Publishing  Real Estate Investment Trusts  Retail: Computer Software & Peripheral  Television Services | | 2  16  59  12  19  4  177  2  7 | 0.98 | | 0.73 |

The first two clusters are characterised by an average current ratio of approximate 4, i.e. companies in those industries utilise 4 times more current assets than their amount of current liabilities. Industries in the two best performing clusters such as distributors, apparel, precious metals or agricultural chemicals have one characteristic in common: high inventory, i.e. high inventory as a contributing factor to current assents results in higher current ratios than compared to the clusters with the lowest performance. Industries represented by a current ratio approximately equal to one are characterised by utilising the same amount of current assets and current liabilities. Thus, in the two worst performing clusters in terms of the current ratio, several service industries can be found, such as Power Generation, Oil/Gas Transmission, Air Freight/Delivery, Environmental or Television services. A common characteristic of service industries is low to no inventory, i.e. the major contributing factor to current assets is only accounts receivable. As the structure of current liabilities is similar in all industries in all four clusters, the major factor is the amount of inventory and accounts receivable leading to the difference between the best and worst performing clusters.

### Gross Margin

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Industries** | **Companies** | | **Average (%)** | **Standard Deviation** | |
| **Clusters with Highest Performance** | | | | | |
| Banks  Building operators  Commercial Banks  Finance: Consumer Services  Investment Bankers/Brokers/Service  Investment Managers  Major Banks  Miscellaneous  Savings Institutions  Specialty Insurers | | 2  3  23  32  18  24  58  2  6  10 | 91.88 | | 10.77 |
| Advertising  Computer peripheral equipment  Computer Software: Prepackaged Software  Software: Programming, Data Processing  Diversified Commercial Services  Diversified Financial Services  Hospital/Nursing Management  Major Pharmaceuticals  Newspapers/Magazines  Oil & Gas Production 1  Real Estate  Real Estate Investment Trusts  Services-Misc. Amusement & Recreation  Television Services | | 8  3  35  11  16  2  15  24  10  25  26  177  11  7 | 69.35 | | 23.98 |
| **Clusters with Lowest Performance** | | | | | |
| Automotive Aftermarket  Engineering & Construction  Integrated oil Companies  Meat/Poultry/Fish  Medical Specialities  Military/Government/Technical  Steel/Iron Ore | | 16  7  23  5  17  18  18 | 17.10 | | 19.26 |
| Aluminum  Building Products  Retail: Computer Software & Equipment | | 2  5  2 | -0.94 | | 32.65 |

The major industries included in the cluster with the highest gross margin are financial and investment services, such as banks, investment managers and savings institutions. The first cluster has a much higher average gross margin than the second best performing cluster by also having a lower standard deviation, even both clusters contain services. One explanation for the difference is that financial services generate much more revenue than services such as advertising or television due to the nature of their business models. In general, service industries do not have major cost of goods sold, because expenses for labour is the only contributing factor to direct costs of the production of their services. In contrast, manufacturing industries have to include expenses for production material which results in higher cost of goods sold and, thus, in a lower gross margin. Therefore, industries requiring larger amounts of raw material, such as Automotive Aftermarket or Steel/Iron Ore outline a significant lower gross margin of 17.10 percent. The cluster with the lowest gross margin also has the highest standard deviation amongst all, i.e. higher statistical outliers by fewer companies in comparison to the other clusters. Thus, a single contributing factor explaining the worst performance cannot be derived.

### Net Margin

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Industries** | **Companies** | | | **Average (%)** | **Standard Deviation** |
| **Clusters with Highest Performance** | | | | | |
| Oil & Gas Production  Real Estate Investment Trusts | | 25  177 | 37.03 | | 172.12 |
| Aerospace  Banks  Biotechnology: Electromedical Apparatus  Business Services  Coal Mining  Commercial Banks  Diversified Commercial Services  Investment Managers  Major Banks  Property-Casualty Insurers  Railroads  Savings Institutions  Television Services  Water Supply | | 9  2  2  32  10  23  16  24  58  51  11  6  7  7 | 14.25 | | 12.44 |
| **Clusters with Lowest Performance** | | | | | |
| Building Products  Computer Communications Equipment  Electronic Components  Finance: Consumer Services  Industrial Machinery/Components | 5  4  8  32  63 | | | -20.23 | 102.60 |
| Biotechnology: Physical & Biological Research  Major Chemicals  Precious Metals | 3  44  39 | | | -44.19 | 218.87 |

The best performing cluster in terms of the net margin consists of two industries: Oil/Gas Production and Real Estate Investment Trusts. Both industries are also included in the cluster with the second best performance with respect to the gross margin. The comparison of the income statements of companies operating in the Oil & Gas Production industry and in Real Estate Investment Trusts gave the following explanation why both industries outline similar net margins, even if their business models (asset structure, customer segments, source of revenue, etc.) completely differ from each other: Oil and Gas Production companies are characterised by higher revenues due to the enormous quantities produced, but also by higher operating expenses due to their equipment necessary for operating oil and gas plants. In contrast, companies operating in Real Estate Investment Trusts outline less revenue, but also less cost of goods sold and operating expenses resulting from their activities only focused on collective investment. However, the high standard deviation of 172.12 represents a large fluctuation within both industries, i.e. the aforementioned explanation can be seen as general, but not all encompassing.

The industries Aerospace, Coal Mining and Railroads are not contained in the two best performing clusters in terms of the gross margin, but associated with the second best performing cluster in terms of the net margin. Those industries present lower gross margins compared to the service industries because higher cost of goods sold occur due to the focus on production and manufacturing. With respect to the second cluster, service industries also represent highly profitable industries. The high profitability may be a result of low capital and operational expenditure, as production facilities or raw materials are not required for revenue generation. The standard deviation for this cluster is 10 times lower compared to the other three clusters, i.e. the explanation for the industries performance in this cluster can be seen as generally valid.

The clusters with the lowest performance in terms of the net margin are characterised by having high standard deviations (102.60 and 218.87). Thus, exact reasons explaining the negative net margin of both clusters cannot be given as high fluctuations in the net margins would require the analysis of every single industry in isolation.

### ROI

|  |  |  |  |
| --- | --- | --- | --- |
| **Industries** | **Companies** | **Average** | **Standard Deviation** |
| **Clusters with Highest Performance** | | | |
| Computer Manufacturing  Integrated Oil Companies | 4  23 | 9.08 | 27.51 |
| Auto Manufacturing  Building operators  Commercial Banks  Department/Specialty Retail Stores  Major Banks | 10  3  23  11  58 | 2.09 | 3.31 |
| **Clusters with Lowest Performance** | | | |
| Computer Communications Equipment  Computer peripheral equipment  Computer Software: Prepackaged Software  Miscellaneous manufacturing industries  Recreational Products/Toys  Transportation Services | 4  3  35  4  5  5 | -0.02 | 0.17 |
| Aluminum  Catalog/Specialty Distribution | 2  4 | -0.18 | 0.26 |

The best performing cluster in terms of ROI includes Computer Manufacturing and Integrated Oil Companies.

The average ROI for this cluster is more than 4 times higher than the average ROI of the second best performing cluster. Thus, on average, companies in those industries generate 4 times more operating profit (Earnings Before Interest & Tax) than companies in the second cluster while assuming similar asset structures. However, a heavily depreciated plant or a large amount of intangible assets causes a distortion of the value. Significant is the amount of industries focused on computer equipment and software found in the cluster with the second lowest performance in terms of ROI. The majority of those industries in the four clusters are also found in the best and worst performing clusters for measuring asset turnover. The only difference between asset turnover and ROI is that asset turnover does not consider cost of goods sold and operating expenses. This leads to the conclusion that the industries grouped in the same ROI and asset turnover clusters in terms of performance level (high/low), are characterised by the same proportion of cost of goods sold and operating expenses in relation to their revenue.

The comparison of the number of industries per cluster shows, that the first (best performance) and fourth cluster (worst performance) contain significantly less industries than the second and third cluster.

### ROE

|  |  |  |  |
| --- | --- | --- | --- |
| **Industries** | **Companies** | **Average** | **Standard Deviation** |
| **Clusters with Highest Performance** | | | |
| Integrated Oil Companies | 23 | 11.53 | 62.26 |
| Clothing/Shoe/Accessory Stores  Computer Manufacturing  Medical/Nursing Services  Precious Metals | 22  4  9  39 | 3.21 | 10.22 |
| **Clusters with Lowest Performance** | | | |
| Diversified Commercial Services  Oil Refining/Marketing | 16  13 | -1.65 | 6.09 |
| Farming/Seeds/Milling | 9 | -6.44 | 19.84 |

The highest average ROE is presented by a cluster only including one industry: Integrated Oil Companies. Companies in this industry are on average more than 3 times more efficient in utilising shareholders’ equity than companies associated with industries in the second best performing cluster. The balance sheets of companies within the Integrated Oil industry contain significant more shareholders’ equity than injected into companies associated with industries in the second best performing cluster. The multiplicative effect of investment can be a potential reason for the high ROE. However, the standard deviation (62.26) for the industry hinders a general conclusion.

Even more than 100 industries were analysed, only 5 industries are allocated to the two clusters showing the highest average ROE. In addition, only 3 industries are included in the two clusters having the lowest ROE. Thus, more than 90 industries outline a ROE between -2 and 3, i.e. no significant performance differences between industries are identified.

### Accounts Receivable Turnover

|  |  |  |  |
| --- | --- | --- | --- |
| **Industries** | **Companies** | **Average** | **Standard Deviation** |
| **Clusters with Highest Performance** | | | |
| Catalog/Specialty Distribution  Commercial Banks  Restaurants | 4  23  14 | 161.63 | 326.46 |
| Automotive Aftermarket  Clothing/Shoe/Accessory Stores  Consumer Electronics/Video Chains  Department/Specialty Retail Stores  Food Chains  Integrated oil Companies  Major Banks  Other Pharmaceuticals  Other Specialty Stores  RETAIL: Building Materials | 16  22  2  11  11  23  58  5  17  5 | 58.84 | 161.44 |
| **Clusters with Lowest Performance** | | | |
| Biotechnology: Physical & Biological Research  Biotechnology: Electrotherapeutic Apparatus  Biotechnology: Laboratory Analytical Instruments  Broadcasting  Building operators  Computer Communications Equipment  Computer peripheral equipment  Consumer Electronics/Appliances  Diversified Financial Services  Electronic Components  Engineering & Construction  Fluid Controls  Industrial Machinery/Components  Investment Bankers/Brokers/Service  Medical/Dental Instruments  Metal Fabrications  Military/Government/Technical  Miscellaneous  Oilfield Services/Equipment  Paints/Coatings  Property-Casualty Insurers  Real Estate  Semiconductors  Water Supply | 3  2  4  10  3  4  3  7  2  8  7  7  63  18  14  36  18  2  16  5  51  26  21  7 | 4.91 | 2.11 |
| Advertising | 8 | 3.17 | 1.08 |

The highest standard deviation (326.46) is found for the best performing cluster in terms of accounts receivable turnover. Even if no general conclusions can be drawn because of the high standard deviation, it is remarkable that three industries having completely different business models are grouped together. Restaurants are characterised by collecting their accounts receivable after guests leave the restaurant, i.e. very low accounts receivable are typical. The loans lend by Commercial Banks are not recorded as accounts receivable, i.e. loans receivable would be used instead in the banks’ general ledgers.

The two worst performing clusters in terms of accounts receivable turnover include industries … do not include the part about accounts receivable.

Only few industries are allocated to the best and worst performing clusters. In contrast, a significant higher amount of industries is allocated to the second best and worst performing cluster. The difference between the

### Collection Period

|  |  |  |  |
| --- | --- | --- | --- |
| **Industries** | **Companies** | **Average** | **Standard Deviation** |
| **Clusters with Highest Performance** | | | |
| Catalog/Specialty Distribution  Clothing/Shoe/Accessory Stores  Consumer Electronics/Video Chains  Department/Specialty Retail Stores  Food Chains  Integrated oil Companies  Other Pharmaceuticals  Other Specialty Stores | 4  22  2  11  11  23  5  17 | 13.37 | 13.18 |
| Air Freight/Delivery Services  Aluminum  Automotive Aftermarket  Oil Refining/Marketing  Restaurants  RETAIL: Building Materials | 12  2  16  13  14  5 | 27.27 | 31.54 |
| **Clusters with Lowest Performance** | | | |
| Accident & Health Insurance  Advertising  Biotechnology: Biological Research  Biotechnology: Electrotherapeutic Apparatus  Broadcasting  Building operators  Business Services  Software: Programming, Data Processing  Industrial Machinery/Components  Life Insurance | 8  8  3  2  10  3  32  11  63  30 | 112.45 | 106.36 |
| Diversified Financial Services  Finance: Consumer Services  Investment Bankers/Brokers/Service  Oil & Gas Production  Property-Casualty Insurers | 2  32  18  125  51 | 256.42 | 707.85 |

Industries allocated to the two best performing clusters in terms of collection period are on average able to collect outstanding payments between 15 and 30 days. Major industries in the two clusters are focused on retail, such as clothing stores, restaurants, speciality retail, food chains or building material stores. The reason for this characteristic might lay in the fact, that such stores allow their customers payments with cash, debit or credit card within 30 days. The fourth cluster consists of three financial services, i.e. a high collection period might be characteristic for this type of industry. In contrast to the clusters focused on ROI and ROE, the amount of companies is more or less equally spread over all four clusters.

### Asset Turnover

|  |  |  |  |
| --- | --- | --- | --- |
| **Industries** | **Companies** | **Average** | **Standard Deviation** |
| **Clusters with Highest Performance** | | | |
| Auto Manufacturing  Computer Manufacturing  Integrated oil Companies | 10  4  23 | 40.89 | 49.48 |
| Department/Specialty Retail Stores  Other Pharmaceuticals  Retail: Computer Software & Peripheral Equipment | 11  5  2 | 24.61 | 38.83 |
| **Clusters with Lowest Performance** | | | |
| Broadcasting  Business Services  Computer Software: Prepackaged Software  Diversified Commercial Services  Diversified Financial Services  EDP Services  Electrical Products  Engineering & Construction  Forest Products  Home Furnishings  Homebuilding  Hotels/Resorts  Investment Bankers/Brokers/Service  Investment Managers  Miscellaneous manufacturing industries  Office Equipment/Supplies/Services  Oil/Gas Transmission  Oilfield Services/Equipment  Ordnance And Accessories  Other Consumer Services  Other Specialty Stores  Plastic Products  Professional Services  Recreational Products/Toys  Specialty Chemicals  Textiles  Water Supply | 10  32  35  16  2  32  14  7  7  10  26  17  18  24  4  9  12  16  3  28  17  6  17  5  5  4  7 | 1.26 | 1.06 |
| Banks  Biotechnology: Biological Research  Biotechnology: Laboratory Analytical Instruments  Building Products  Computer Communications Equipment  Computer peripheral equipment  Software: Programming, Data Processing  Fluid Controls  Marine Transportation  Mining & Quarrying of Nonmetallic Minerals  Miscellaneous  Movies/Entertainment  Newspapers/Magazines  Publishing  Real Estate  Real Estate Investment Trusts  Savings Institutions  Services-Misc. Amusement & Recreation  Transportation Services | 2  3  4  5  4  3  11  7  49  11  2  7  10  4  26  177  6  11  5 | 0.57 | 0.39 |

Comparing the number of industries within the clusters presenting the performance in terms of asset turnover clearly shows a significant difference between best performing and worst performing clusters. Both best performing clusters contain together 6 industries, whereas the two lowest performing clusters contain over 40 industries by having a low standard deviation. In contrast, the standard deviation for the 6 industries is 40 to 50 times higher. Many industries are characterised by low asset turnovers and only few industries by high turnovers, i.e. over 40 industries in the last two clusters only generate revenue approximately equal to their assets. Major industries in those clusters are services, i.e. service industries are characterised by very low asset turnovers resulting from their type of business model. Thus, asset turnover might not be a suitable key performance measure to compare service industries.

Pearson Correlations:

|  |  |
| --- | --- |
| **Financial Ratio** | **Pearon’s Correlation** |
| Current Ratio | 0.95 |
| Gross Margin | 0.73 |
| Net Margin | 0.66 |
| ROI | 0.99 |
| ROE | 0.67 |
| Collection Period | 0.99 |
| Asset Turnover | 0.99 |

The Pearon’s Correlation Coefficient between a ratio’s mean and standard deviation is represented in figure XX. The means of Current Ratio, ROI, Collection Period and Asset Turnover for each cluster is highly positive correlated the standard deviation of the ratio, i.e. the better the performance of a cluster expressed in terms of a single ratio, the more variation between the performances of single industries can be found. The means for Gross Margin, Net Margin and ROE are low positive correlated with the standard deviations. Thus, an increase in the average Net Margin within a cluster containing several industries does not necessarily leads to a proportional increase the spread of the Net Margins. The some behaviour can be found for ROE.