



**PERFORMANCE ANALYSIS OF INDUSTRIES :  
GLOBAL AND REGIONAL PERSPECTIVES  
REPORT  
DATA ANALYSIS WITH R**

FIHAVANANTSOA K.  
MANITRINIAINA (Aina)

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## Executive Summary

This report investigates global and regional industry sectors to determine the most profitable, riskiest, and those with notable market sizes. By analyzing financial and operational metrics, the report provides a descriptive understanding of how industries perform and behave across various regions.

Understanding the profitability, risk, and market size of different industry sectors is crucial for making informed business decisions. Even though the analysis performed here is relatively simple, examining these key metrics can still provide valuable insights. It helps businesses identify high-performing industries to target for investment or expansion, assess potential risks to mitigate, and allocate resources more effectively across regions. This data-driven approach allows for better strategic planning, improved competitive positioning, and enhanced decision-making processes, enabling businesses to gain a competitive edge in a dynamic global market.

## Research Question:

Which industry sectors stand out in key areas such as profitability, risk, and market size, both globally and regionally?



## Analytical Approach

To address this question, the analysis explores industry-level trends, emphasizes key metrics, and highlights variations across regions and industry sectors..

### **Steps to Answer the Research Question:**

#### **1. Global Profitability Analysis:**

- Identify the most profitable industry sectors based on net margin.

#### **2. Regional Performance Comparison:**

- Compare industry performance across regions, focusing on profitability, risk, and operational characteristics.

#### **3. Risk Assessment:**

- Analyze industry sectors with high variability in cost structures to identify sectors prone to operational instability.

#### **4. Market Size Assessment:**

- Assess industry size by evaluating the number of firms to understand market competition and concentration.

#### **5. Econometric modelling:**

- Develop a statistical model to describe the relationships between key metrics and profitability, accounting for industry-specific and region-specific effects.

# Data Overview

## ❖ Sources:

The data are originally from the website of Damodaran Online, on the Data archive, Under the Cash flow category, in the Operating and Net Margins by Industry section. Here after the link for the website: [https://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/dataarchived.html](https://pages.stern.nyu.edu/~adamodar/New_Home_Page/dataarchived.html)

Please note that there is an error in the link for the 2018 (1/19) dataset for Japan. The correct file can be found at this link: <https://pages.stern.nyu.edu/~adamodar/pc/archives/marginJapan18.xls>

## ❖ Regions:

The regions considered here are the ones with available data on the website, namely the USA, Europe, Japan, the emerging countries, and a global region.

## ❖ Period:

Data from 2014 to 2023 were selected, as earlier data were incomplete. Comprehensive metrics are available starting from 2014.

## ❖ Industries:

The dataset covers 92 industries (excluding the total market). The analysis focuses on these sectors.

## ❖ Structure of the Data:

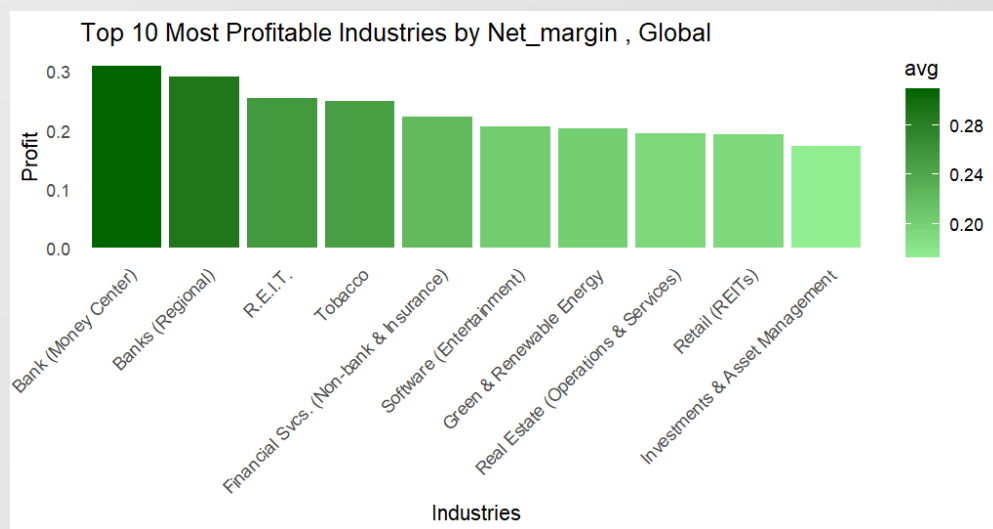
- Each file, has a different number of metrics. However, they have many columns in common. After cleaning and combining the data, it contains 21 columns. Each row represents an industry-region-year combination with 18 detailed performance metrics.
- Notable metrics include:
  - Net Margin: Profitability as a percentage of revenue.
  - Lease Expense/Sales: Cost variability relative to revenue.
  - Number of Firms (log-transformed): Measures industry size to capture market concentration.
- Variable definitions and the names of companies in each industry are available on the website for 2020 and later.



# Findings:

## 1. Global Profitability Analysis:

To see the profitability of the industries, the Net margin metric have been used to rank the industries by mean values within each region. The graphic below displays the top 10 most profitable industries globally



Excluding Money Center Banks, tobacco and financial services industries and related are among the most profitable industries globally.

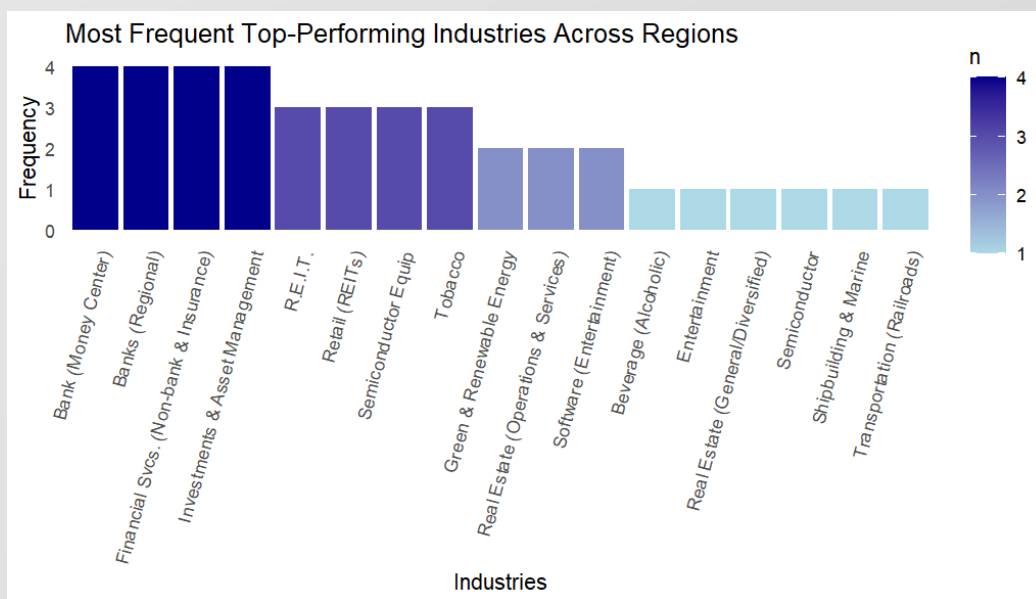
## 2. Regional Performance Comparison:

The regional rankings were derived similarly to the global analysis. A table is used for clarity due to the number of regions.

### Top performing industries by Region

rank	emerg	Europe	Global	Japan	US
1	R.E.I.T.	Real Estate (Operations & Services)	Bank (Money Center)	R.E.I.T.	Transportation (Railroads)
2	Banks (Regional)	R.E.I.T.	Banks (Regional)	Retail (REITs)	Banks (Regional)
3	Bank (Money Center)	Tobacco	R.E.I.T.	Investments & Asset Management	Tobacco
4	Retail (REITs)	Real Estate (General/Diversified)	Tobacco	Bank (Money Center)	Bank (Money Center)
5	Real Estate (Operations & Services)	Banks (Regional)	Financial Svcs. (Non-bank & Insurance)	Financial Svcs. (Non-bank & Insurance)	Financial Svcs. (Non-bank & Insurance)
6	Green & Renewable Energy	Financial Svcs. (Non-bank & Insurance)	Software (Entertainment)	Tobacco	Retail (REITs)
7	Software (Entertainment)	Green & Renewable Energy	Green & Renewable Energy	Banks (Regional)	Investments & Asset Management
8	Financial Svcs. (Non-bank & Insurance)	Bank (Money Center)	Real Estate (Operations & Services)	Semiconductor Equip	Software (Entertainment)
9	Beverage (Alcoholic)	Semiconductor Equip	Retail (REITs)	Entertainment	Semiconductor
10	Investments & Asset Management	Investments & Asset Management	Investments & Asset Management	Shipbuilding & Marine	Semiconductor Equip

Here, we can see for each region the most profitable industries. We can show the ones that come most frequently in these ranking across regions. This is shown in the following graph.

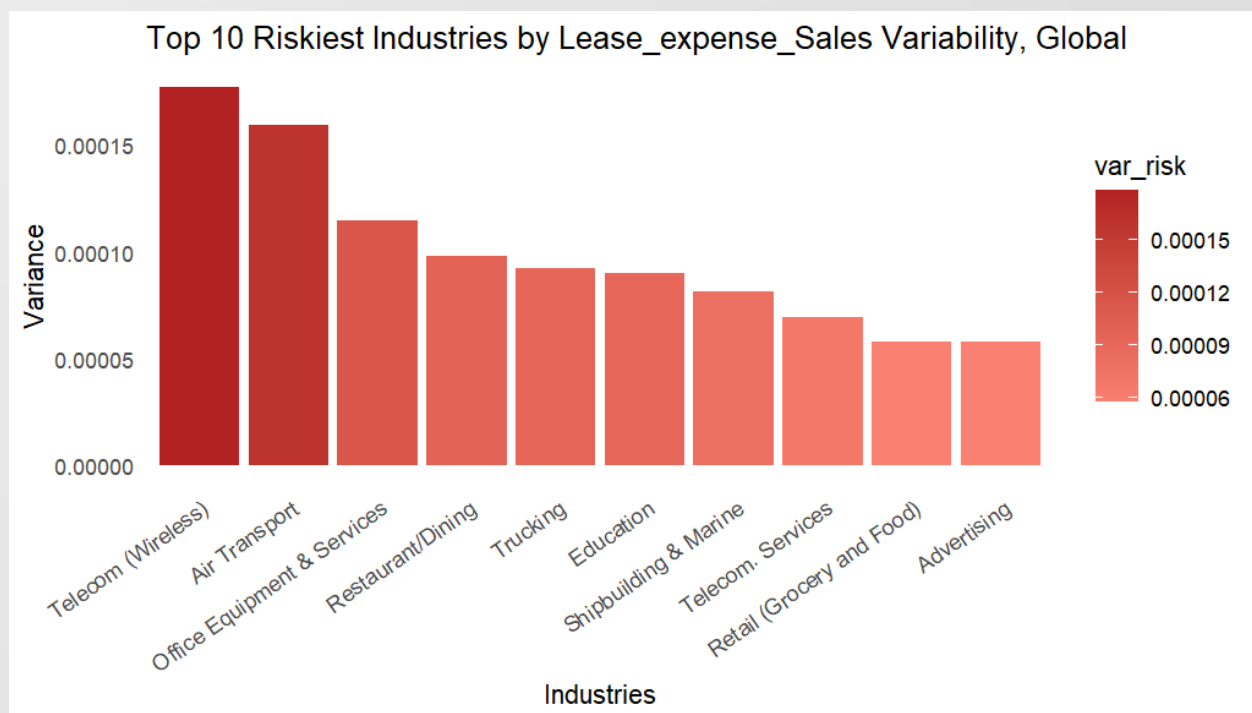


It is shown here that financial services and related industries are performing well across all the regions.

### 3. Risk Analysis:

Risk in the industry can be measured by using the Lease Expense/Sales metric, which highlights cost variability relative to revenue. Indeed, high cost and high variability in cost structures often correlates with operational instability.

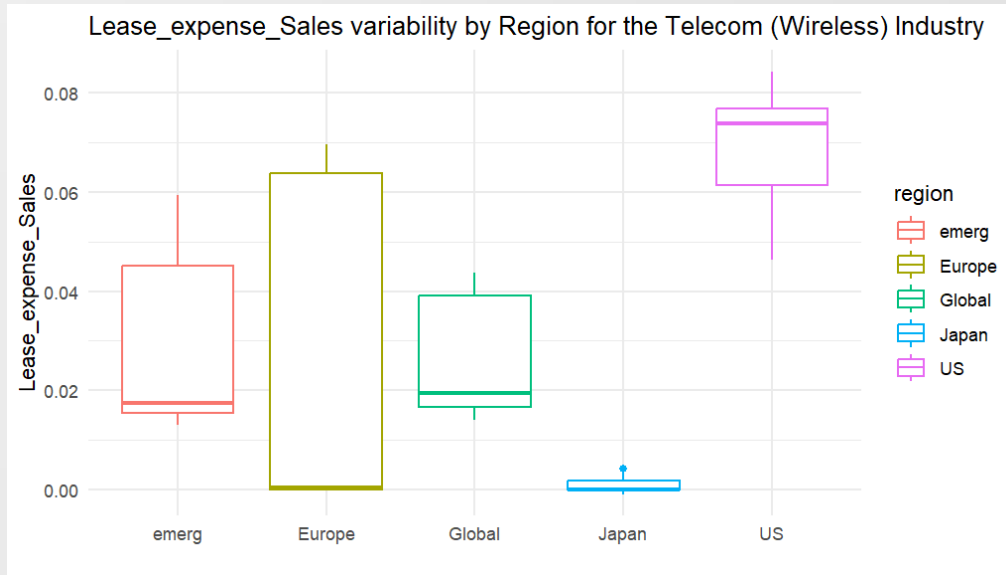
At a global level, we can see the following results in terms of lease expense/ Sales variability.



As no surprise, Air transport and telecom (wireless) are the riskiest industries when it comes to lease expenses. They may struggle more than the other industries in times of reduced revenue due to their high fixed costs, increasing their financial risk.

Across the different regions, the range of variability of the lease expenses/Sales for Telecom (Wireless) industry is represented as follows.



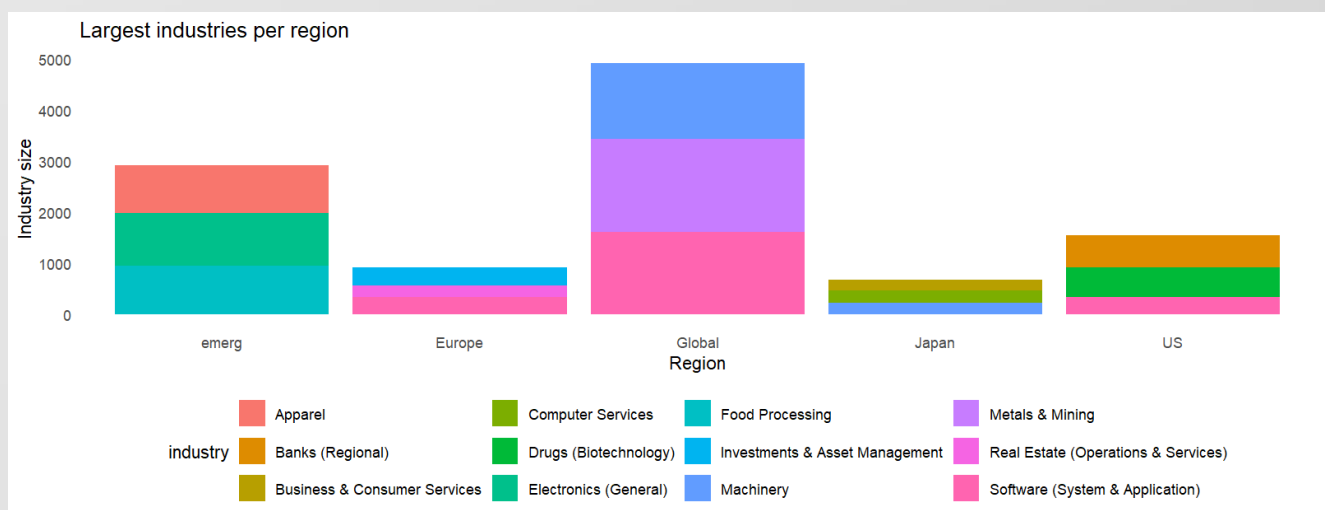


We can observe that the ratio of lease expense to sales is generally higher in the US compared to the other regions. Additionally, the variability is significantly greater in Europe, implying that lease expenses as a proportion of sales can vary widely across companies within the Europe Wireless telecom industry.

#### 4. Market Size Assessment:

- **Largest Industries** (based on the number of firms):

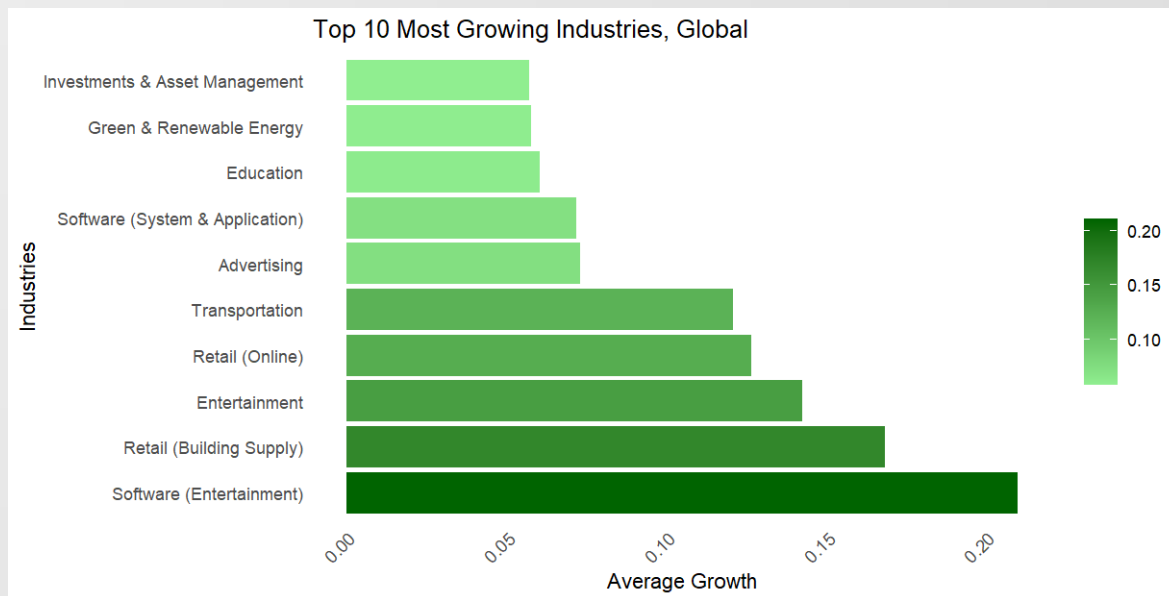
Largest industries per region can be represented using the number of firms in these industries.



While globally, the Metals & Mining, Software (System & Application) and Machinery industries dominate in size, at regional level, industry specialization varies, (e.g., Apparel in emerging markets, and Investments and asset management for Europe).

- **Top 10 growing industries:**

By examining size growth, we can see that software (entertainment) is significantly ahead, with an average growth rate of more than 20% per year



## 5. Econometric modelling:

Based on the dataset, we can attempt to estimate the causal relationship between the net margin of industries and their lease expenses as a percentage of sales, R&D expenditure as a percentage of sales, and the number of firms in the market.

Given the structure of our data, we propose using a mixed-effects model with:

- Fixed Effects: Lease expenses, R&D spending, number of firms. This means that the effects of these variables on net margin are assumed to be the same across all industries and regions.
- Random Effects: Industry and the effect of Lease expenses by industry, and region. This means that the baseline values and the effect of Lease expenses differ by industry, and the baseline value differs by region.

Thus, the form of our equation will be:

$$net\_margin_i = \beta_0 + \beta_1 Lease\_expense\_Sales_i + \beta_2 RD\_Sales_i + \beta_3 \ln(number\_of\_firms_i) + \mu_{j0} + \mu_{j1} Lease\_expense\_Sales_i + \mu_k + \varepsilon_{i,k}$$

- i = observation level
- j = industry level
- k = region level

We proceeded to the estimation and the diagnostic tests, and unfortunately, the model was found to be heteroskedastic. While this analysis could be extended by exploring and developing an alternative model to address the heteroskedasticity issue more effectively, we have opted not to pursue this approach in the current analysis. Given this, here are the results of the estimation :

For the fixed effects:

Effect	Estimate	Std. Error	t value
(Intercept)	0.071151	0.014637	4.861
Lease_expense_Sales	-0.705229	0.321974	-2.190
RD_Sales	-0.417094	0.073434	-5.680
ln_nof	0.005272	0.002558	2.061

The 3 coefficients are significant, we can interpret it as follows:

- For each unit increase in Lease expenses relative to sales, the net margin decreases by 0.705
- For each unit increase in R&D spending relative to sales, the net margin decreases by 0.417
- For each 1% increase in the number of firms (as the variable is log-transformed), the net margin increases by 0.005, which is relatively small.

For the random effects, we got:

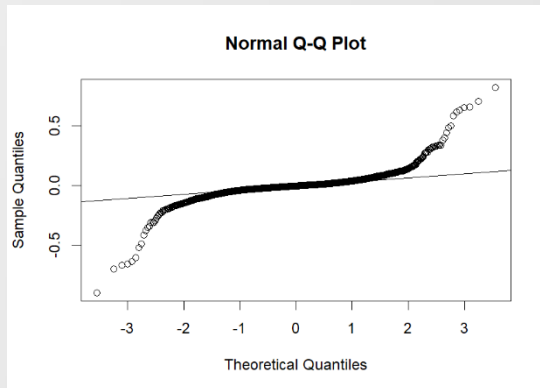
Group	Name	Variance	Std. Dev.	Correlation
Industry	(Intercept)	0.0047742	0.06910	
Industry	Lease_expense_Sales	3.6970392	1.92277	-0.36
Region	(Intercept)	0.0002009	0.01417	
Residual		0.0071800	0.08473	

The variation in the net margin across industries and regions is minimal, meaning that industry- and region-specific differences in net margin are not significant. However, there is a large variation in how Lease expenses affect the net margin across industries. The negative correlation (-0.36)

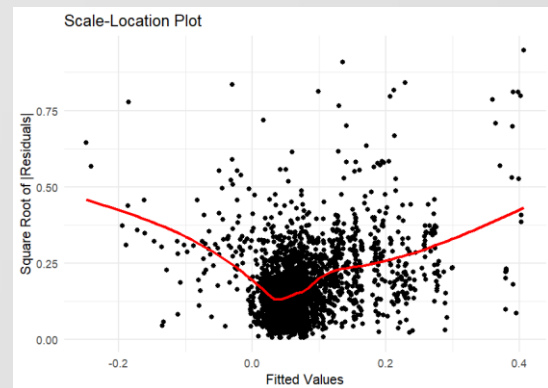
suggests that industries where Lease expenses have a stronger negative impact also tend to have lower net margins.

Model diagnostics:

Normality test



Heteroskedasticity test



Non normality : given the deviation of the tails from the normal distribution, the residuals are not normally distributed.

Heteroskedasticity : the red curve displays a distinct U-shape, indicating that the residuals exhibit greater variability at both very low and very high fitted values, while the variability is lower at intermediate fitted values, which suggests the presence of heteroskedasticity.

## Conclusion

The analysis highlights several key trends and characteristics of industries on a global and regional scale. Financial services and real estate sectors emerge as the most profitable across regions, while high-cost industries such as air transport and telecom face substantial risks due to cost variability. Additionally, industry specialization varies significantly by region, with software-related sectors demonstrating notable growth on a global scale.

