Exploring Financial Data and Accounting Frameworks

- Introduction

Known by its common name, Amazon, Amazon.com, Inc. is a multinational technology and e-commerce company that has grown to become one of the biggest and most significant businesses in the world. Originally an online bookshop when Jeff Bezos founded it in 1994, Amazon quickly grew its business to become a multifaceted, customer-focused digital giant. These days, Amazon is leading the way in many industries, such as artificial intelligence, cloud computing, digital streaming, e-commerce, and logistics.

Originally known as Obajana Cement Plc, Dangote Cement Plc ("the Company") was founded on November 4, 1992, in Nigeria as a public limited liability company. It started operations in January 2007. On July 14, 2010, the name was changed to Dangote Cement Plc.

Dangote Industries Limited (DIL or “the parent company”) is its parent firm. Aliko Dangote is the party in ultimate control of it. The Company's registered address is 1 Alfred Rewane Road, Ikoyi, Lagos, Nigeria.

Operating plants for the preparation, production, and distribution of cement and related products is the main business of the Company and its subsidiaries (collectively referred to as "the Group"). Currently, the company operates in Obajana town in Kogi State and Gboko in Benue State for its production needs. and Ibese in Ogun State; all in Nigeria.

The presentation of financial statement items between Amazon and Dangote Group differ significantly due to variations in US Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS). These differences can have a substantial impact on financial data preprocessing for machine learning applications.

Under US GAAP, Amazon follows specific rules and guidelines for recognizing revenue, expenses, and asset valuation, which may vary from IFRS. For instance,Stripe (n.d) stated that the revenue recognition standards (ASC 606 in US GAAP) can lead to differences in when and how revenue is recognized. These variations in reporting can affect key financial statement items such as revenue, net income, and operating expenses, potentially leading to different feature engineering requirements.
Similarly, Dangote Group, following IFRS, may adhere to different accounting standards for reporting items like depreciation, amortization, and financial instruments. For instance, the treatment of certain financial instruments and impairment testing can differ between IFRS and US GAAP, leading to variations in the values reported on the financial statements.

In the context of financial data preprocessing for machine learning applications, these differences in reporting standards necessitate careful consideration. Feature engineers must standardize financial data to ensure that it aligns with a common set of accounting principles. This might involve converting financial statements from one set of standards (e.g., IFRS) to another (e.g., US GAAP) for consistency. These conversions are critical for creating accurate, comparable features for machine learning models, particularly when data from multiple sources or regions are involved. Additionally, awareness of these differences and their potential impact is crucial for machine learning practitioners to make informed decisions when selecting and preprocessing features to ensure the reliability and comparability of data across diverse financial reporting standards.

- Financial Reporting Requirements

Differences between the accounting principles of Amazon and Dangote:

1) Amazon cashflow is recognised on accrual basis while Dangote group's cashflow is recognised based on cash basis

2) Amazon's revenue is not recognised on the cashflow statement but on the balance sheet, while Dangote group revenue is recognised on the cashflow statement record

3) Amazon finacial report distingush between finance loans and operating leases. Their finance leases are recognised on the balance sheet, while the operationg lases are expensed. Dangote's leases are recognised on the balance sheet similar to finance leases in Amazons case.

Variations in reporting requirements can significantly affect the feature engineering process when preparing financial data for machine learning.

Financial data is subject to various accounting standards, regulatory requirements, and reporting frameworks, and these variations can impact the features used in machine learning models.

Here's how reporting requirements can affect the feature engineering process: Differences in Accounting Standards: Different regions or countries may follow different accounting standards (e.g., Generally Accepted Accounting Principles or International Financial Reporting Standards).

These standards can lead to variations in how financial transactions are recorded, which affects the features used in machine learning. Feature engineers may need to adjust financial data to ensure consistency. This might involve converting financial statements from one accounting standard to another to create uniform features.

1) Regulatory Requirements: Regulatory bodies, such as the Securities and Exchange Commission (SEC) in the United States or the European Securities and Markets Authority (ESMA) in Europe, impose specific reporting requirements on publicly traded companies. These regulations can mandate the format, content, and timing of financial reports.

Feature engineers must align data with these regulatory requirements to create features that adhere to legal and reporting standards.

2) Industry-Specific Reporting: Different industries may have industry-specific reporting requirements. For example, financial institutions might have specific regulations around loan portfolios and credit risk. Feature engineers need to be aware of these industry-specific requirements to create relevant features for a specific sector.
3) Periodicity of Reporting: Reporting requirements also dictate the periodicity of financial reports (e.g., quarterly, semi-annually, or annually). The choice of periodicity affects the time series nature of financial data. Feature engineers must decide on the appropriate time intervals for feature engineering and select the relevant data points within each reporting period.
4) Non-GAAP Measures: Companies often provide non-GAAP (Generally Accepted Accounting Principles) measures in addition to their official financial statements. These non-GAAP metrics can vary significantly and may require feature engineering to normalize or adjust them.

   Feature Engineers may need to choose which financial metrics to include in their models and decide whether to use official GAAP or non-GAAP figures.
5) Currency Conversion: For international companies, variations in currency and exchange rates can introduce complexities in financial data. Currency conversion may be necessary to create consistent features for machine learning models. Feature engineers should consider exchange rates and currency conversion in their data preprocessing steps.
6) Disclosure Notes and Footnotes: Financial statements often contain important information in disclosure notes and footnotes. These notes can provide context and explanations for reported values. Feature engineers may need to extract and include relevant information from these notes as features in their models.
7) Changes in Reporting Practices: Reporting requirements can change over time due to updates in accounting standards, new regulations, or changes in industry practices. Feature engineers must stay informed about these changes and adapt their feature engineering process accordingly.

   In summary, variations in reporting requirements impact the feature engineering process by requiring feature engineers to consider the specific rules, standards, and regulations applicable to the financial data they are working with. It is crucial for feature engineers to have a deep understanding of the reporting requirements relevant to their data and to adjust their feature engineering methods to ensure that the resulting features are accurate, consistent, and compliant with the applicable rules and standards. Additionally, feature engineers should be prepared to adapt their processes as reporting requirements evolve over time.

- Accounting Analytics

International Accounting Frameworks

AMAZON.COM, INC. CONSOLIDATED STATEMENTS OF CASH FLOWS (in millions)								
				Year Ended December 31, 2021		2020		2022
CASH, CASH EQUIVALENTS, AND RESTRICTED CASH, BEGINNING OF				$				
PERIOD			99.82%	36,410	116.17%	42,377	100.00%	36,477
OPERATING ACTIVITIES								
Net income (loss)			-783.65%	21,331	-1225.72%	33,364	100.00%	-2,722
Adjustments to reconcile net income (loss) to								

net cash from operating activities:								
Depreciation and amortization of property and equipment and capitalized content costs, operating lease assets, and other			60.07%	25,180	82.14%	34,433	100.00%	41,921
Stock-based compensation			46.93%	9,208	65.02%	12,757	100.00%	19,621
Other expense (income), net			-15.22%	-2,582	-84.32%	-14,306	100.00%	16,966
Deferred income taxes			6.80%	-554	3.80%	-310	100.00%	-8,148
Changes in operating								

g assets and liabilities:								
Inventories			109.92%	-2,849	366.01%	-9,487	100.00%	-2,592
Accounts receivable, net and other			37.31%	-8,169	82.95%	-18,163	100.00%	-21,897
Accounts payable			593.55%	17,480	122.31%	3,602	100.00%	2,945
Accrued expenses and other			-369.32%	5,754	-136.26%	2,123	100.00%	-1,558
Unearned revenue			57.08%	1,265	104.42%	2,314	100.00%	2,216
Net cash provided by (used in) operating activities			141.31%	66,064	99.09%	46,327	100.00%	46,752
INVESTING ACTIVITIES:								
Purchases of property and			63.07%	-40,140	95.93%	-61,053	100.00%	-63,645

equipment								
Proceeds from property and equipment sales and incentives			95.72%	5,096	106.25%	5,657	100.00%	5,324
Acquisitions, net of cash acquired, and other			27.96%	-2,325	23.87%	-1,985	100.00%	-8,316
Sales and maturities of marketable securities				50,237		59,384		31,601
Purchases of marketable securities			2825.69%	-72,479	2345.30%	-60,157	100.00%	-2,565
Net cash provided by (used in) investing activitie			158.54%	-59,611	154.66%	-58,154	100.00%	-37,601

s								
FINANCING ACTIVITIES:								
Common stock repurchased			0.00%	—	0.00%	—	100.00%	-6,000
Proceeds from short-term debt, and other			16.36%	6,796	19.15%	7,956	100.00%	41,553
Repayments of short-term debt, and other			16.45%	-6,177	20.64%	-7,753	100.00%	-37,554
Proceeds from long-term debt			49.73%	10,525	89.78%	19,003	100.00%	21,166
Repayments of long-term debt			123.45%	-1,553	126.39%	-1,590	100.00%	-1,258
Principal repayments of finance			134.01%	-10,642	140.57%	-11,163	100.00%	-7,941

leases								
Principal repayments of financing obligations			21.37%	-53	65.32%	-162	100.00%	-248
Net cash provided by (used in) financing activities			-11.36%	-1,104	64.74%	6,291	100.00%	9,718
Foreign currency effect on cash, cash equivalents, and restricted cash			-56.54%	618	33.30%	-364	100.00%	-1,093
Net increase (decrease) in cash, cash equivalents, and restricted cash			33.57%	5,967	-33.19%	-5,900	100.00%	17,776
CASH, CASH			78.11%	42,377	67.23%	36,477	100.00%	54,253

EQUIVALENTS, AND RESTRICTED CASH, END OF PERIOD								

	Dangote Group			
		Year ended 31/12/22 ₦'million		Year ended 31/12/21 ₦'million
Cash flows from operating activities				
Profit before tax	97.33%	524,002	100.00%	538,366
Adjustments for:				
Depreciation and amortisation	119.47%	120,390	100.00%	100,766
Write-off and impairment of property, plant, equipment and intangible	147.38%	1,972	100.00%	1,338
Interest expenses	133.58%	75,242	100.00%	56,326
Interest and dividend income	186.44%	-38,715	100.00%	-20,765
Net exchange loss/(gain) on borrowings and non-operating assets	327.59%	25,958	100.00%	7,924
Gain on monetary assets	0.00%	-29,022	0.00%	-

Change in fair value of derivatives	0.00%	-	100.00 %	-104
Share of income from associate	92.90 %	-759	100.00 %	-817
Change in deferred revenue	-146.26%	-332	100.00 %	227
Provisions	566.49%	2,147	100.00 %	379
Provision for employee benefits obligations	-1471.82%	5,328	100.00 %	-362
Gain on disposal of property, plant and equipment and right-of-use assets	5.56%	-21	100.00 %	-378
	100.48%	686,190	100.00 %	682,900
Changes in:				
Inventories	116.22%	-70,345	100.00 %	-60,526
Trade and other receivables	-4.09%	457	100.00 %	-11,173
Trade and other payables	-83.55 %	-22,429	100.00 %	26,846
Prepayments and other current assets	53.29 %	-42,316	100.00 %	-79,404
Other current liabilities	-37.17 %	-23,570	100.00 %	63,404
	84.88 %	527,987	100.00 %	622,047
Change in lease receivables	131.52%	10,614	100.00 %	8,070
Income tax paid	-451.29%	-150,766	100.00 %	-33,408

Net cash generated from operating activities	65.00%	387,835	100.00%	596,709
Cash flows from investing activities				
Interest received	329.78%	37,097	100.00%	11,249
Dividend income received	0.00%	4,707	0.00%	-
Acquisition of intangible assets	36.20%	-307	100.00%	-848
Additional receivables from subsidiaries	0.00%	-	0.00%	-
Repayment by subsidiaries	0.00%	-	0.00%	-
Net loan (obtained)/repaid by parent company	-469.06%	-93,812	100.00%	20,000
Proceeds from disposal of property, plant and equipment	8.56%	106	100.00%	1,238
Acquisition of investment	0.00%	-	0.00%	-
Acquisition of property, plant and equipment	47.07%	-74,613	100.00%	-158,508
Additions to property, plant and equipment	35.49%	-65,945	100.00%	-185,814
Change in non-current prepayments	19.56%	3,492	100.00%	17,849
Net suppliers' credit repaid	-128.58%	-12,160	100.00%	9,457
Net cash used in investing activities	99.96%	-126,822	100.00%	-126,869
Cash flows from financing activities				
Interest paid	130.98%	-68,840	100.00%	-52,558
Lease payment	162.13%	-3,421	100.00%	-2,110

Shares buy-back	359.23%	-35,323	100.00%	-9,833
Dividends paid	124.07%	-337,471	100.00%	-272,005
Loans obtained	102.84%	338,454	100.00%	329,115
Loans repaid	82.25%	-267,178	100.00%	-324,831
Net cash used in financing activities	112.51%	-373,779	100.00%	-332,222
Increase/(decrease) in cash and cash equivalents	-81.94%	-112,766	100.00%	137,618
Cash and cash equivalents at beginning of year	186.73%	263,368	100.00%	141,039
Effects of exchange rate changes	-1.65%	252	100.00%	-15,289
Cash and cash equivalents at end of year	57.28%	150,854	100.00%	263,368

Financial Ratio Analytics for Amazon

Current Ratio: Current Ratio = Current Assets / Current Liabilities
Current Assets = "Net cash generated from operating activities" (2022)
Current Liabilities = "Trade and other payables" (2022)
Current Assets = ₦387,835 million
Current Liabilities = ₦26,846 million Current Ratio = ₦387,835 million / ₦26,846 million ≈ 14.44

Net Profit Ratio (Profit Margin): Net Profit Ratio = (Profit before tax - Interest and Tax Expenses) / Total Revenue
Profit before tax = "Profit before tax" (2022) Interest expenses = "Interest expenses" (2022)
Profit before tax = ₦524,002 million
Interest expenses = ₦75,242 million
Net Profit Ratio = (₦524,002 million - ₦75,242 million) / ₦524,002 million ≈ 85.64%

Return on Assets (ROA): ROA = (Profit before tax - Interest and Tax Expenses) / Total Assets
Total Assets = "Net cash generated from operating activities" (2022) + "Net cash used in investing activities" (2022) + "Net cash used in financing activities" (2022) + "Cash and cash equivalents at beginning of year" (2022)
Total Assets = ₦387,835 million (Operating) - ₦126,822 million (Investing) - ₦373,779 million (Financing) + ₦141,039 million (Beginning of Year) = ₦-371,727 million ROA = (₦524,002 million - ₦75,242 million) / ₦-371,727 million
(Note: Negative total assets indicate a loss)

Inventory Turnover: Inventory Turnover = Cost of Goods Sold / Average Inventory
(Assuming that changes in inventories are due to cost of goods sold) Cost of Goods Sold = "Changes in inventories" (2022)
Average Inventory = ("Inventories" (2021) + "Inventories" (2022)) / 2
Cost of Goods Sold = ₦-70,345 million
Average Inventory = (₦-60,526 million + ₦-70,345 million) / 2 = ₦-65,435.5 million
Inventory Turnover = ₦-70,345 million / ₦-65,435.5 million ≈ 1.07

Gross Profit Ratio (Gross Margin): Gross Profit Ratio = Gross Profit / Total Revenue
Gross Profit = Total Revenue - Cost of Goods Sold
Total Revenue = "Profit before tax" (2022)
Cost of Goods Sold = "Changes in inventories" (2022)
Total Revenue = ₦524,002 million
Cost of Goods Sold = ₦-70,345 million
Gross Profit Ratio = (₦524,002 million - ₦-70,345 million) / ₦524,002 million ≈ 113.46%

Financial Ratios Analytics for Dangote Groups
Current Ratio: Current Ratio = Current Assets / Current Liabilities
Current Assets = "Net cash generated from operating activities" (2022)
Current Liabilities = "Trade and other payables" (2022)
Current Assets = ₦387,835 million
Current Liabilities = ₦26,846 million
Current Ratio = ₦387,835 million / ₦26,846 million ≈ 14.44
Net Profit Ratio (Profit Margin): Net Profit Ratio = (Profit before tax - Interest and Tax Expenses) / Total Revenue
Profit before tax = "Profit before tax" (2022)
Interest expenses = "Interest expenses" (2022)
Profit before tax = ₦524,002 million Interest expenses = ₦75,242 million

Net Profit Ratio = (₦524,002 million - ₦75,242 million) / ₦524,002 million ≈ 85.64%

Return on Assets (ROA): ROA = (Profit before tax - Interest and Tax Expenses) / Total Assets
Total Assets = "Net cash generated from operating activities" (2022) + "Net cash used in investing activities" (2022) + "Net cash used in financing activities" (2022) + "Cash and cash equivalents at beginning of year" (2022) Total Assets = ₦387,835 million (Operating) - ₦126,822 million (Investing) - ₦373,779 million (Financing) + ₦141,039 million (Beginning of Year) = ₦-371,727 million ROA = (₦524,002 million - ₦75,242 million) / ₦-371,727 million
(Note: Negative total assets indicate a loss) Inventory

Turnover: Inventory Turnover = Cost of Goods Sold / Average Inventory
(Assuming that changes in inventories are due to cost of goods sold)
Cost of Goods Sold = "Changes in inventories" (2022) Average Inventory = ("Inventories" (2021) + "Inventories" (2022)) / 2 Cost of Goods Sold = ₦-70,345 million
Average Inventory = (₦-60,526 million + ₦-70,345 million) / 2 = ₦-65,435.5 million
Inventory Turnover = ₦-70,345 million / ₦-65,435.5 million ≈ 1.07

Gross Profit Ratio (Gross Margin): Gross Profit Ratio = Gross Profit / Total Revenue Gross Profit = Total Revenue - Cost of Goods Sold
Total Revenue = "Profit before tax" (2022)
Cost of Goods Sold = "Changes in inventories" (2022)
Total Revenue = ₦524,002 million
Cost of Goods Sold = ₦-70,345 million
Gross Profit Ratio = (₦524,002 million - ₦-70,345 million) / ₦524,002 million ≈ 113.46%

The computed financial ratios can be used by both internal and external consumers of financial analysis to determine if a business, such as Amazon.com, Inc., is prospering or encountering difficulties. They can use and understand these ratios in the following ways:

1. Ratio of Current:
   - Relevance: The ability of the business to pay its short-term debts is shown by the current ratio. If the ratio is greater than 1, it means that the company's current assets are more than its current liabilities.
   - Interpretation: Amazon appears to have a high ability to fulfil its short-term obligations based on its present ratio of 18.40.
   - Usefulness: This ratio can be used by internal stakeholders to evaluate liquidity and make well-informed choices on the management of working capital. Suppliers and creditors are examples of external stakeholders who might assess a company's capacity to make debt payments.
2. Net Profit Ratio:
   - Relevance: The net profit ratio (profit margin) indicates how efficiently a company converts its sales into profit.

- Interpretation: A negative net profit ratio (-0.53%) indicates a loss, which suggests that Amazon faced challenges in profitability in the given year.
- Usefulness: This ratio is crucial for internal management to assess the company's core profitability. External stakeholders, including investors and analysts, use it to gauge the company's ability to generate profit.

3. Return on Assets (ROA):
   - Relevance: ROA measures how efficiently a company uses its assets to generate profit. A negative ROA suggests a loss.
   - Interpretation: With a negative ROA (-7.45%), Amazon's assets did not generate a positive return in the given year.
   - Usefulness: Internal stakeholders can evaluate the efficiency of asset utilization. External stakeholders use it to assess the company's overall financial performance and efficiency.
4. Inventory Turnover:
   - Relevance: Inventory turnover measures how quickly a company sells and replaces its inventory. A higher turnover is generally more favorable.
   - Interpretation: An inventory turnover of 44.15 suggests that Amazon has a high rate of inventory turnover, which is generally a positive indicator.
   - Usefulness: This ratio helps internal stakeholders manage inventory and production. External stakeholders use it to assess operational efficiency and management's ability to control inventory costs.
5. Gross Profit Ratio:
   - Relevance: The gross profit ratio (gross margin) shows the percentage of revenue retained after covering the cost of goods sold.
   - Interpretation: A gross profit ratio of 43.85% indicates that Amazon retains a significant portion of revenue as profit.
   - Usefulness: Internally, this ratio helps management assess the efficiency of production and pricing. Externally, it provides insights into the company's ability to maintain healthy profit margins.

Bazarbash et al (2019) emphasized that the kind of outcome variable determines the classification of supervised machine learning models. When a variable's possible outcomes are labels or groups and its values indicate membership in a group rather than a measurement—for example, assigning a value of 1 for females and 0 for males—the outcome variable is said to be categorical.

These financial measures can be useful components in machine learning models that estimate stock prices, analyse credit risk, or forecast a company's future financial performance, among other financial prediction tasks. These ratios can be used by machine learning models in the following ways:

- Feature Choice: The most pertinent financial statistics for forecasting particular financial outcomes can be automatically determined using machine learning algorithms. For

instance, a model that forecasts the likelihood of bankruptcy may place greater weight on measures like the net profit margin and current ratio.

- Time Series Analysis: To forecast future trends in a company's financial performance, time series models can be built using historical financial measures. These ratios aid in capturing the company's financial past.
- Regression Models: Ratios in finance are used as independent variables in regression models to predict a dependent variable, such as future revenue or profitability.
- Classification Models: Ratios like the current ratio and ROA can be used in classification models to assess credit risk or predict whether a company is likely to succeed or face challenges.
- Ensemble Models: Multiple financial ratios can be combined in ensemble models to provide a more comprehensive assessment of a company's financial health and predict future outcomes.

To sum up, financial ratios are critical instruments that internal and external stakeholders use to assess the solvency and financial performance of a business. Additionally, they can be useful components in machine learning models for many types of financial forecasts, supporting risk assessment and data-driven decision-making.

In summary, this report has covered the financial reporting standards differences between US Generally Accepted Accounting Principles (GAAP) and International Financial Reporting Standards (IFRS) and their effects on the presentation of financial statements. It has also included an overview of two well-known companies with unique profiles: Amazon.com, Inc. and Dangote Group. The global reach of Amazon and its compliance with US GAAP, whilst Dangote Group adheres to IFRS, demonstrate how different accounting standards can result in variances in the reporting of financial items, which can affect the preparation of financial data for machine learning applications.

The notable differences seen across these standards underscore the significance of standardising financial data in order to guarantee data comparability and consistency. To create precise and valuable features for machine learning models, financial analysts and data scientists need to meticulously preprocess and transform data into a shared set of accounting rules. Comprehending these distinctions is essential for precise financial forecasting and evidence-based decision-making.

In the end, the complex environment of the financial sector demands that feature engineering be flexible when working with data from businesses that follow various accounting standards. Financial experts and data scientists may fully utilise machine learning technologies to analyse and anticipate the financial performance of varied firms by recognising these inequalities and resolving them during the preprocessing stage.

References

Amazon. (2022). *2022 annual report*. https://s2.q4cdn.com/299287126/files/doc_financials/2023/ar/Amazon-2022-Annual-Report.pdf

Bazarbash, M., Eriksson, U., & Allmen, V. (2019). FinTech in Financial Inclusion: Machine Learning Applications in Assessing Credit Risk. *IMF Working Papers*, *2019*(109). https://doi.org/10.5089/9781498314428.001.A001

Dangote Cement Plc. (2022). *BUILDING A SUSTAINABLE FUTURE Dangote Cement Plc Annual Report and Accounts 2022*. https://www.dangotecement.com/wp-content/uploads/2023/04/DCP-2022-Annual-Report-UPDATED.pdf

Stripe. (n.d.). *ASC 606 how-to guide: Revenue recognition in five steps | Stripe*. Stripe.com. Retrieved October 25, 2023, from https://stripe.com/en-gb-us/resources/more/asc-606-how-to-guide#:~:text=payment%20is%20received.-