

Role of Data Visualization in Finance

Presentation of Scholarly Article

IFSC 54503 Data Visualization
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Agenda

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3. Importance of visualization in Finance
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5. Technical and Analytical Applications
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7. Balance and Cashflow
8. Executive compensation and Ownership
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11. Conclusion



Article

Name : Role of Data Visualization in Finance

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Source :

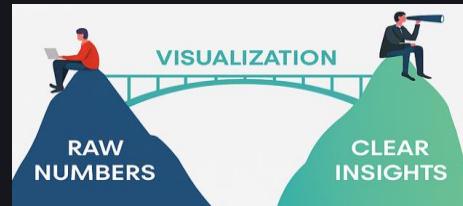
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Abstract and Research Gap

- Finance lags behind other fields in adopting visualization tools.
- Financial data is complex and often inaccessible to non-experts.
- Research gap: Limited studies on visualization in 10-Ks & proxy statements.
- Study aim: Demonstrate how visuals (charts, dashboards) improve comprehension.
- Value: Saves time, improves accessibility, attracts wider stakeholder engagement.



Walmart Inc. Form 10-K For the Fiscal Year Ended January 31, 2023		
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Walmart Inc. Consolidated Cash Flow Statement						
	US\$ in millions	32 months ended:	Jan 31, 2023	Jan 31, 2022	Jan 31, 2021	Jan 31, 2020
Operating net income		\$1,299	\$1,065	\$1,152	\$1,087	\$10,678
Depreciation and amortization		(1,065)	10,618	(1,152)	10,678	10,579
Net unrealized and realized gains and losses		1,603	2,440	(8,089)	(1,048)	3,116
Losses from discontinued operations		—	—	—	—	—
Acquisition premium costs		—	—	—	—	—
Interest expense		449	(755)	3,911	8,203	(499)
Interest income		—	2,410	—	—	1,318
Loss on extinguishment of debt		1,919	3,652	3,521	2,981	3,210
Other operating activities		(249)	(1,064)	(1,642)	1,414	(1,043)
Revolutions, net		(538)	(11,764)	(2,098)	(400)	(3,311)
Investing activities		(1,475)	5,320	6,989	(274)	3,831
Accounts payable		5,293	5,304	6,923	388	4,086
Accrued expenses and other current liabilities		(137)	99	(186)	(93)	79
Changes in certain assets and liabilities, net of effects of acquisitions and dispositions		2,513	(6,997)	7,972	(397)	299
Altogether, net cash provided by operating activities		1,747	20,843	20,074	20,084	20,529
Net cash used in investing activities		28,843	24,143	20,674	20,255	20,337
Payments for property and equipment		(1,902)	(3,160)	(10,025)	(10,702)	(10,679)
Proceeds from disposal of property and equipment		170	368	215	321	379
Proceeds from disposal of certain assets, net of divested cash		—	—	85	83	1,107
Proceeds from divestiture of certain assets, net of cash acquired		(240)	(359)	(180)	(56)	(14,606)
Other investing activities		(277)	(179)	(72)	(72)	1,107
Net change in cash investing activities		(19,723)	(6,635)	(10,073)	(9,348)	(24,048)
Net change in cash from financing activities		5,041	6,544	(5,241)	(4,694)	1,072
Proceeds from long-term debt		(2,689)	(1,010)	(5,982)	(1,907)	(3,784)
Repayments of long-term debt		—	(23,379)	—	—	—
Proceeds from short-term debt		14,113	(4,122)	8,413	9,644	36,464
Purchases of Company stock		19,920	(9,797)	(2,625)	(5,717)	(7,416)
Repurchase of treasury stock		(4,748)	(618)	(5,551)	(8,812)	—
Purchase of noncontrolling interest		6	2,29	—	2	—
Sale of subsidiary stock		6	—	—	—	—
Other financing activities		(2,138)	(1,155)	(1,794)	(969)	(929)
Net cash used in financing activities		(17,099)	(23,698)	(16,417)	(14,699)	(2,537)
Effect of exchange rates on cash, cash equivalents and restricted cash		(73)	(140)	235	(69)	(436)
Net increase (decrease) in cash, cash equivalents and restricted cash		(5,993)	(4,692)	16,121	1,759	742
Change in cash and cash equivalents before cash used for capital expenditures		—	—	—	—	—
Cash used for capital expenditures and restricted cash at beginning of year		—	—	—	—	—
Cash used for capital expenditures and restricted cash at end of year		14,834	17,768	9,535	7,756	7,014
Cash, cash equivalents and restricted cash at end of year		14,834	14,834	17,768	9,535	7,014

Source: <https://www.stock-analysis-on.net/NYSE/Company/Walmart-Inc/Financial-Statement/Statement-of-Cash-Flows/>



Importance of Data Visualization

- ✓ Regulatory Encouragement: SEC promotes graphical disclosures in 10-Ks to improve clarity.
- 👤 Bridging Experts & Non-Experts: Makes financial data accessible to shareholders, employees, and the public.
- 🔍 Trend & Risk Detection: Identifies anomalies, correlations, and emerging risks quickly.
- ⌚ Efficiency & Speed: Saves time by turning raw numbers into actionable insights.
- 📊 Forecasting & Scenario Planning: Visual models improve accuracy of financial projections.
- 💡 Decision-Making Power: Enables real-time, data-driven decisions in dynamic markets.



Risk Management & Visualization

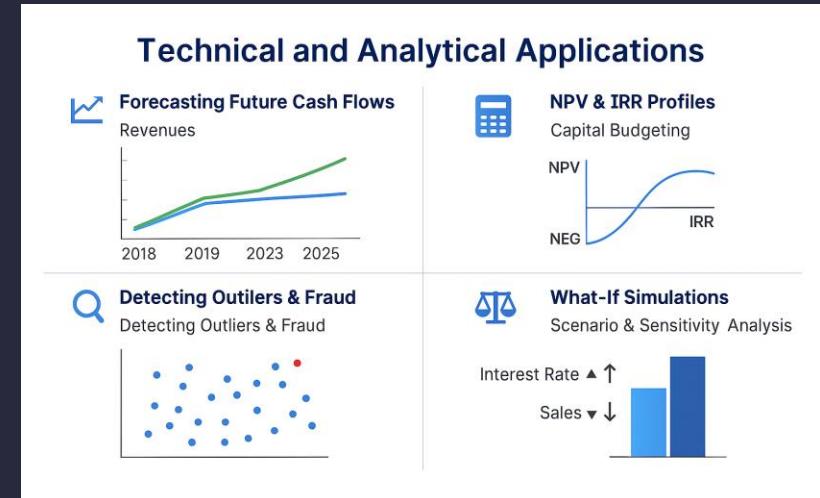
- 🔥 Risk Identification: Heatmaps & tree maps highlight areas of high exposure.
- 💻 Banking Applications: Dashboards assess loan approval risks in real time
- 📊 Portfolio Management: Visual benchmarking compares performance across portfolios.
- 🌐 Multi-level Analysis: Risk can be viewed at market, portfolio, or single-asset level.
- ⚖️ Decision Support: Helps allocate resources to prioritized risk mitigation strategies.

Key takeaway : Enables faster response to emerging threats.



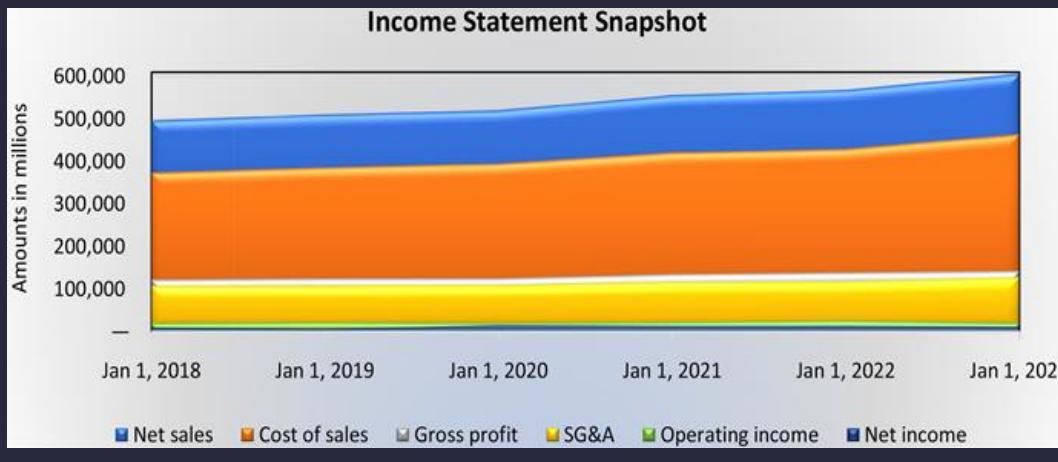
Technical and Analytical Applications

- Forecasting Models: Visual tools help project future cash flows, revenues, and expenses.
- Capital Budgeting: NPV and IRR profiles visualized for quick project evaluation.
- Anomaly Detection: Charts and dashboards flag unusual transactions or outliers.
- Scenario & Sensitivity Analysis: Visual simulations show impact of changing assumptions.
- Benchmarking: Compare portfolio or firm performance against peers or indices.
- Key Insight: Visualization enhances accuracy, transparency, and speed in financial analysis
- Visualization are widely used in stock charts analysis



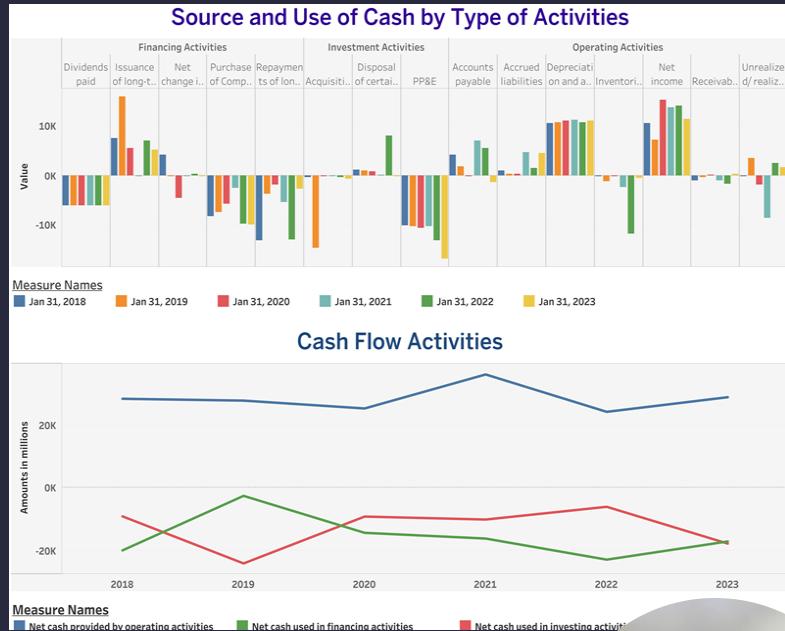
Walmart Case Study (Income Statement Trends)

- 📈 Consistent Sales Growth: Net sales rose steadily from 2018 to 2023.
- 🌐 Pandemic Resilience: Sales and profits increased even during COVID-19 disruptions.
- 💰 Stable Cost Structure: Cost of sales tracked closely with revenue, maintaining margins.
- 📊 SG&A Expenses: Noticeable increase in 2023, pressuring operating income.
- ✓ Profitability: Net income grew overall, with only a slight dip in 2023.
- 🔍 Key Insight: Visualization highlights resilience and cost management but also flags rising expenses.



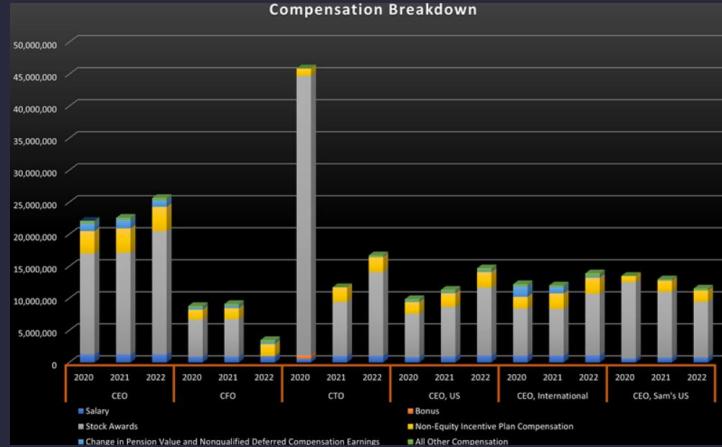
Balance and Cash Flow

- Strong Asset Base: Long-term assets consistently exceeded liabilities.
- Low Long-Term Debt: Debt levels remained manageable relative to assets.
- Working Capital: Cash balances roughly matched accounts payable—healthy liquidity.
- Cash Flow Strength: Operating cash flows consistently positive, funding investments & debt repayment.
- Key Insight: Walmart's balance sheet shows resilience and strong liquidity management.



Executive Compensation and Ownership

- 💼 Performance-Linked Pay: Majority of executive compensation tied to stock performance.
- 📈 Alignment with Shareholders: Executives benefit when company performs well.
- 👤 Insider Ownership: Directors & executives hold ~47% of shares.
- 🏢 Institutional Investors: Significant stake held by funds and asset managers
- 🌐 Public Shareholders: Remaining shares widely distributed.
- 💡 Key Insight: High insider ownership aligns management with shareholder interests.



Merits of the Article

- Fills Research Gap: Addresses lack of studies on visualization in finance, especially in 10-Ks & proxy statements.
- Practical Case Study: Uses Walmart's financials (2018–2023) to demonstrate real-world application.
- Accessibility: Highlights how visuals make financial data understandable for non-experts.
- Comprehensive Coverage: Discusses visualization in reporting, risk management, forecasting, and executive compensation.
- Action-Oriented: Provides clear recommendations for firms and regulators.



Areas of Improvement

- Limited Scope: Focuses mainly on Walmart; broader industry comparisons would strengthen findings.
- Visualization Depth: Relies on basic charts; could explore advanced tools (interactive dashboards, AI-driven visuals).
- Visualization Depth: More depth analysis on how visualization can be applied to fraud detection and suspicious activities
- Global Perspective: Primarily U.S.-focused; international examples would add value.
- User Testing: Lacks empirical evidence on how non-experts interpret visuals compared to raw data.
- Future Research: Could explore real-time visualization in financial decision-making.



Conclusion

To conclude I would say that financial data visualization transforms complex disclosures into accessible insights. By applying tools like heatmaps, dashboards, and ratio charts, firms can enhance transparency, improve decision-making and align stakeholders.

Walmart's case study illustrates both the merits and limitations, highlighting visualization's growing role in modern financial reporting and governance.

