

Improving an organization's financial performance through the successful use of Economic Value Added (EVA) in supply chain management

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Abstract

This paper aims to explore the utilisation of Economic Value Added (EVA) in supply chain management as a measure of a company's financial performance. It presents a classification scheme, identifies gaps in existing literature, suggests directions for future research, and proposes hypotheses to be tested. EVA quantifies the value created by a firm beyond the cost of capital, offering insights into resource utilisation and profit generation. Within the supply chain context, EVA analysis aids companies in assessing efficiency across inventory management, logistics, and production processes, thereby enhancing operational effectiveness. Moreover, it facilitates value chain optimisation by identifying areas for additional value creation, such as streamlining distribution channels and enhancing supplier relationships. The methodology employed in this study includes a comprehensive review of academic literature, industry reports, and expert questionnaires within the field of supply chain management and financial performance evaluation. Additionally, the study utilises qualitative analysis to test hypotheses regarding the relationship between EVA utilisation and various performance metrics within the supply chain context.

The paper asserts that EVA serves as a valuable tool for investment decision-making, providing a framework for evaluating investments by comparing expected returns to the cost of capital. This is particularly pertinent for supply chain companies facing significant investment decisions in infrastructure, technology, or expansion projects.

Overall, the paper highlights the importance of EVA in assessing financial performance, identifying improvement opportunities, and making strategic decisions to enhance shareholder value within the supply chain context. Through empirical testing of hypotheses, this study aims to contribute to a deeper understanding of the role of EVA in supply chain management and its impact on overall company performance.

Keywords

Company performances, supply chain, leadership, Economic Value Added, inventory management, operational effectiveness

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Introduction

EVA constitutes nowadays one of the most important and widely spread management techniques, assuming that the Economic Value Added (defined as the change in the Net Operating Profit After Taxes minus the change in the Cost of the Capital used to generate it), is the best shareholder wealth measure, and thus, must be the key variable used by managers in the decision-making process. The most valuable way to achieve this goal is usually to link part of managerial compensation to firm's EVA.

Based on this relevant scientific method Biddle et al., (1997), Chen and Dodd (2001), Clinton and Chen (1998), and its correlation with Market Value as highlighted by Fernandez, (2019) Kramer and Peters, (2001), Riceman et al., (2000) obtained interesting results.



In Supply Chain Management (SCM) literature, the focus has traditionally been on the costs associated with Supply Chain (SC) activities, overlooking the cash flow dynamics within SCs. However, recent studies have started to investigate cash flow within SCs alongside activity costs. These studies examine various sources of uncertainty, with demand uncertainty being the most commonly studied. Yet, there is significant research on economic uncertainty, which encompasses uncertainties in microeconomic, macroeconomic, financial, and market conditions. Economic uncertainty significantly affects both SC profitability and cash flow. For example, rising short-term and long-term interest rates increase the cost of debt for SC members, leading to reduced SC profitability. From a cash flow perspective, this raises the opportunity cost of holding cash for SC members and reduces cash availability as investor confidence in the stock market declines. Hence, integrating economic uncertainty into SC planning and finance models provides a more accurate indication of profit and cash flow dynamics within an SC.

1. Review of the scientific literature

The concept of EVA was first used and clarified in 1991 by Bennet (2013) and is known as the metric that consolidates income efficiency and asset management into one net profit score. Stewart (1991) introduced EVA and market value added measures, extolling their advantages. Since then, extensive research has delved into various facets of EVA.

Sharma and Kumar (2010) performed a comprehensive literature review on this topic and show EVA can be used to assess performance at all levels within a company: individual programs, reporting units, reporting segments and corporate landscape. Essentially, this technique is a beneficial tool to calculate the economic value generated by a firm over a specific timeframe, serving as a pivotal metric to inform managerial decision-making, as emphasized by Bromwich and Walker (1998) and Chen and Dodd (1997).

Financial performance measurement is considered as a benchmark by Alvioni and Prabawa (2024) as the company management will continuously assess the finance and non-finance performance of the company and create appropriate policy to address their needs and expectations. Badakhshan and Ball (2023) highlights that literature on SC management is not considering in sufficient detail all the cost associated to performing operations and is in some cases not measuring the cash flows incurred.

EVA concept offers an alternative approach to performance measurement based on value, serving as a gauge of the economic value generated by a company through its economic governance activities or strategies, especially in the intensified market competition and increased scarcity of resources, Zhang and Huang (2023). EVA enables company decision-makers to incentivize activities that enhance value while eliminating those that diminish or detract from overall company value. Another perspective of creating EVA as a measurement is determined by Baseri, and Atefat (2012) who consider that the need of overcoming its disadvantage of not allowing the comparison of companies with different sizes is balanced by its ability to be used as a reflection in standardized form of the capital level in general in two companies.

Susmonowati (2018) highlights that EVA serves as a method for evaluating company performance by fairly considering the expectations of funders or investors. It represents the profit remaining after deducting the cost of capital invested to generate that profit. If a positive EVA value indicates that the company's management has successfully created value, a negative EVA value signifies a lack of economic value added to the company.

EVA, quantifying the financial gap between a company's return on capital and the cost of capital, could be considered as a valuable communication tool for managers to drive company performance and connect with capital markets. EVA accurately calculates a company's True Economic Profit for a given year, which differs significantly from accounting profit as shown by Young et al., (2000). EVA is defined as the difference between the company's Net Operating Profit After Tax (NOPAT) and the cost of capital. The cost of capital is determined by multiplying the company's invested capital by the weighted average cost of capital (WACC).

As traditional accounting measures like Return on Equity (ROE) and Earnings Per Share (EPS) often fail to capture shareholder value, EVA has gained popularity worldwide as a superior performance measure aligned with maximizing shareholder value. Despite its theoretical significance, studies differ on EVA's superiority.

In the past years, numerous articles have explored EVA, yet ongoing debate persists, especially in developed countries. Worthington and West's (2001) review found mixed empirical evidence on EVA's effectiveness, suggesting the need for longer-term research. Similarly, Pal and Sura (2007) analyzed the relationship between EVA and stock returns but overlooked broader EVA research issues.



Companies that implement Economic Value Added (EVA) tend to exhibit above-average profitability compared to their peers both before and after adopting EVA, according to Ferguson et al., (2005) Additionally, EVA adopters experience increased profitability relative to their peers after adopting EVA. Moreover, firms utilizing EVA tend to have a higher percentage of institutional ownership and a lower percentage of insider ownership compared to non-adopters, as noted by Lovata and Costigan (2002). Grant (1996) conducted a survey examining the relationship between EVA and firm value, finding a significant impact of EVA on firm value. EVA, REVA (Refined Economic Value Added), and MVA (Market Value Added) are identified as superior measures of firm value by Anand et al., (1999). Pohlen and Coleman (2005) argue that SC performance should translate the nonfinancial performance to financial terms and indicators to show the shareholder's value, moreover as the supply chain is affecting more than costs and this needs to be clearly visible to the management board, suppliers and customers, business partners and shareholders.

Biddle et al., (1997) study provides significant insights into the changes made by EVA adopters, analyzing the resultant performance of firms using EVA and other residual income techniques. The study indicates that EVA adopters tend to divest more assets and undertake fewer new investments. Biddle et al., (1998) conclude that managers respond positively to EVA incentives, although there is currently insufficient evidence to support claims that EVA is more closely associated with firm value than net income.

Ellinger et al., (2012) emphasize the importance of aligning supply chain performance metrics with financial indicators to identify areas needing adjustment for a company's financial goals. SCM not only reduces costs but also significantly contributes to shareholder value by increasing revenue through efficient delivery and optimizing logistics, thereby reducing operating costs and working capital. Supply chain leaders must translate decisions into financial metrics valued by executives and investors, highlighting the strong link between corporate and supply chain performance, crucial for satisfying customers and shareholders.

Tortella and Brusco (2003) analyze the evolution of profitability, investment and cash flow before and after implementation of EVA, showing that companies that have a poor financial performance for a long period of time and implement EVA will improve their financial performance on long term after EVA adoption, having an impact on both investment and cash flow.

2. Research methodology

The methodology employed in this study includes a comprehensive review of academic literature and industry reports. Additionally, the study utilises quantitative analysis to test hypotheses regarding the relationship between EVA utilisation and various performance metrics within the supply chain context.

The authors asserts that EVA serves as a valuable tool for investment decision-making, providing a framework for evaluating investments by comparing expected returns to the cost of capital. This is particularly pertinent for supply chain companies facing significant investment decisions in infrastructure, technology, or expansion projects.

3. Results and discussion

Economic Value Added (EVA) is important for several reasons:

- 1. Focus on Value Creation: EVA shifts the focus from traditional accounting profits to the creation of shareholder value. By considering the cost of capital, it provides a more accurate measure of how effectively a company utilises its resources to generate profits.
- 2. Alignment of Incentives: EVA aligns the interests of shareholders and management by tying executive compensation to value creation. This encourages management to make decisions that maximize long-term shareholder wealth rather than short-term profits.
- 3. Performance Measurement: EVA serves as a comprehensive performance metric that considers both profitability and capital efficiency. It provides a single measure that can be used to evaluate the financial performance of a company and compare it to industry peers.
- 4. Capital Allocation: EVA helps companies make better capital allocation decisions by providing a framework for evaluating investment opportunities. It enables management to prioritize projects that generate returns above the cost of capital, thereby maximizing shareholder value.



- 5. Strategic Planning: EVA analysis can inform strategic planning by identifying areas of the business where value creation can be enhanced. It helps companies identify opportunities for cost reduction, revenue growth, and operational improvements.
- 6. Shareholder Communication: EVA provides a clear and transparent measure of financial performance that can be easily communicated to shareholders and investors. It helps management articulate their strategy for value creation and demonstrate accountability for financial results.

Overall, EVA is important because it provides a holistic view of a company's financial performance, encourages value-maximizing behaviour, and facilitates better decision-making.

$$EVA = NOPAT - (Capital \ x \ Cost \ of \ Capital)$$
(1)

where:

EVA = Economic Value Added NOPAT = Net Operating Profit After Tax

NOPAT (Net Operating Profit After Tax) is the company's operating profit after taxes. It is calculated as:

$$NOPAT = Operating Income x (1 - Tax rate)$$

(2)

Capital represents the total capital employed by the company, which includes both equity and debt. It can be calculated as the sum of equity and interest-bearing debt, or as the average total assets minus current liabilities.

Cost of Capital is the weighted average cost of the company's capital, representing the return investors require for investing in the company. It is calculated as the weighted average cost of equity and debt.

This formula measures how much value a company generates from its operating activities after deducting the cost of capital used to generate those profits.

In purchasing, the cost of capital refers to the opportunity cost of using funds to finance procurement activities. It represents the return that investors could expect to receive by investing their money elsewhere with similar risk. The cost of capital can be calculated using the weighted average cost of capital (WACC) formula, which considers the cost of both debt and equity financing. The cost of capital in purchasing can be calculated:

Cost of Debt (kd): This represents the interest rate the company pays on its debt. It can be calculated by dividing the interest expense by the total amount of debt. Alternatively, if the company has issued bonds, the yield to maturity of those bonds can be used as the cost of debt.

Cost of Equity (ke): This represents the return required by equity investors to compensate them for the risk of investing in the company's stock. It can be calculated using the capital asset pricing model (CAPM) or other methods such as the dividend discount model (DDM) or the earnings capitalization model (ECM).

Weight of Debt (wd): This represents the proportion of the company's capital structure that is financed by debt. It can be calculated by dividing the market value of debt by the total market value of the company's capital structure.

Weight of Equity (we): This represents the proportion of the company's capital structure that is financed by equity. It can be calculated by dividing the market value of equity by the total market value of the company's capital structure.

Once you have calculated the cost of debt, cost of equity, and the respective weights, you can use the following formula to calculate the weighted average cost of capital (WACC):

$$WACC = (wd \ x \ kd) + (we \ x \ ke)$$

(3)

where:

WACC = Weighted Average Cost of Capital



wd = Weight of Debt kd = Cost of Debt we = Weight of Equity ke = Cost of Equity

The WACC represents the average cost of the company's capital and serves as the discount rate used to evaluate investment opportunities in purchasing and other areas of the business.

The calculation of EVA, as outlined by Young & O'Byrne, involves several components:

NOPAT: Net Operating Profit After Tax, which represents the profit from ongoing operations after tax and before financing costs and non-cash expenses such as depreciation. NOPAT is the profit available to provide cash returns to capital providers.

NOPAT calculation formula:

NOPAT = EBITDA - depreciation cost and amortisation cost - tax (4)

where:

NOPAT = Net Operating Profit After Tax EBITDA = Earnings Before Interest, Taxes, Depreciation and Amortization

where:

D & A= Depreciation and amortization

Other practical formula for EVA calculation is the below:

$$EVA = ATOI - (WACC \ x \ AOI)$$

(6)

(5)

where:

EVA = Economic Value Added ATOI= After tax Operating Income = DivOp, net of tax WACC= Weighted Average Cost of Capital AOI=Average Operating Investment

Operating Investment is total assets less non-interest-bearing liabilities.

WACC x AOI represents Capital Change.

Table no. 1. Assumptions Year 1

| | DivOp | Ave.Operating Invest. | Tax Rate | WACC |
|--------|-------------|----------------------------------|----------|------|
| Year 1 | € 1,000,000 | € 30,000,000 | 25% | 15% |
| | Sour | ce: Authors creation, April 2024 | | |

Table no. 2. EVA calculation Year 1

| | | | Year | 1 |
|---|----------------|--------------------------|------|-------------|
| + | ATOI | (DivOp x (1-0.25)) | € | 7,500,000 |
| - | Capital Charge | (Ave. Op Invest. X 0.15) | € | (4,500,000) |
| = | EVA | | € | 3,000,000 |

Source: Authors creation, April 2024



Table no. 3. Assumptions Year 1 and Year 2

| | DivOp | Ave.Operating Invest. | Tax Rate | WACC |
|--------|--------------|-----------------------|----------|------|
| Year 1 | € 1,000,000 | € 30,000,000 | 25% | 15% |
| Year 2 | € 12,000,000 | € 50,000,000 | 25% | 15% |

Source: Authors creation, April 2024

Table no. 4. EVA calculation Year 1 and Year 2

| | | | Year | 1 | Year | r 2 |
|---|----------------|--------------------------|------|-------------|------|-------------|
| + | ATOI | (DivOp x (1-0.25)) | € | 7,500,000 | € | 9,000,000 |
| - | Capital Charge | (Ave. Op Invest. X 0.15) | € | (4,500,000) | € | (7,500,000) |
| = | EVA | | € | 3,000,000 | € | 1,500,000 |

Source: Authors creation, April 2024

Based on the analysis performed we find that even with an increase in Operating Income after Tax, if we have a higher Capital charge the value of EVA is decreasing for Year 2, leading to lower company performance. Eva is driving shareholder value, having a direct link to stock price.

This approach provides a comprehensive measure of a company's true economic profit, distinct from traditional accounting profit measures.

To gauge the impact of economic uncertainty on SC profitability, it is essential to use indicators that account for the cost of capital employed by an SC. EVA is a metric that subtracts the cost of capital employed by an SC from its income to offer a more realistic representation of SC profitability. Furthermore, existing literature has overlooked cash holding costs as an element in SC total cost. By integrating cash holding costs into SC total cost, we can minimize the opportunity cost of holding cash by reducing the level of cash held by SC members. Using EVA in different departments of the company can give visibility to common costs and benefits that various corporate functions or regional units can summarize to gather financial measures in a collaborative form, thus increasing the effectiveness needed to be achieved by functional managers that have a broader overview of the company financial metrics and increases their general overview of the company performance as shown by Glassman (1997).

The current status of cost management in operational efficiency highlights several challenges:

- 1. Excessive reduction: Companies may excessively cut expenses, such as layoffs and production equipment, leading to insufficient resources and reduced productivity.
- 2. Quality decline: Cost management efforts may compromise the quality of raw materials or neglect product quality control, impacting customer satisfaction and market competitiveness.
- 3. Dispersion of executive energy: Excessive focus on cost management can divert executive attention from strategic planning and business development, hindering long-term sustainable growth.
- 4. Decreased employee morale: Large-scale layoffs or benefit reductions may lower employee morale, affecting motivation and teamwork.
- 5. Limited innovation ability: Overemphasis on cost management may stifle innovation due to constrained resources and funding, hampering long-term competitiveness.

Similarly, the current status of cost management in performance evaluation presents the following issues:

- 1. Short-term emphasis: Some cost management measures prioritize short-term benefits, neglecting long-term business growth and sustainability.
- 2. Focus on numerical indicators: While cost management relies on numerical indicators like cost reduction percentages, it may overlook other crucial performance indicators such as customer satisfaction and product quality.
- 3. Impact on innovation motivation: Overemphasis on cost control may discourage innovation investment, hindering innovation performance.
- 4. Neglecting quality and value: Cost management may prioritize cost reduction over product quality and customer value, leading to inaccurate performance evaluations.

To address these challenges, enterprises should adopt comprehensive performance evaluation methods that consider both cost management and other performance indicators like customer satisfaction and innovation ability. Integrating cost management and operational efficiency is vital, as efficient operational processes can reduce costs, improve resource utilization, and enhance competitiveness. Cost management and operational efficiency are interdependent, forming a virtuous cycle that promotes sustainable enterprise development. Moreover, cost management plays a crucial role in performance evaluation by providing indicators



for evaluating performance and guiding organizational effectiveness. By aligning cost management with performance evaluation, organizations can achieve their goals efficiently within limited resources.

There is a significant difference between Economic Profit and Accounting Profit. Accounting profit such as Divisional Operational Income (DivOp), Earnings Before Interest and Taxes (EBIT), Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA), Net Income capture Income Statement performance, while Economic Profit, EVA is a performance measure that combines both Income Statement and Balance Sheet Efficiency, it captures both explicit costs traced directly to the business and the implicit costs required by equity and debt investors. Maulana, Rohyana and Juwita (2023) demonstrate in their study that for a period of time, EVA followed the net profit decrease, while lower values of EVA failed to meet the creditors and board expectations, an increased EVA year over year could determine financial performance improvement and increase the confidence levels of the investors and creditors.



Figure no. 1. EVA driving Shareholder Value Source: Authors creation, April 2024

Market Value Added (MVA) is the amount that enterprise value exceeds operating income, showing the real value proposition. Changes in MVA are best explained by changes in EVA, when EVA grows, MVA increases, when MVA increases, the stock prices increase. EVA is allowing companies to understand tradeoffs between income statement profitability and balance sheet capital intensity, being the true Economic Profit. Eva is the only ratio statistic where bigger is always better and its improvements are driven by maximizing the profit margin, minimizing the working capital, where inventory reduction is critical, and efficiently deploy new equipment.

| Stage | 2023 Actuals | 2024 Budget | Variance |
|---------------------|--------------|-------------|----------|
| Sales | 3555 | 3234 | -321 |
| AOI | 291 | 249 | -42 |
| AOI% | 8.19% | 7.70% | 13.08% |
| EVA | -60 | -105 | -45 |
| Accounts Receivable | 429 | 423 | 6 |
| Inventory | 360 | 330 | 30 |
| Capital Investment | 195 | 276 | -81 |
| Accounts Payable | 495 | 495 | - |
| Net working Capital | 489 | 534 | -45 |

Table no. 5. Adjusted Sales & Adjusted Operating Income & EVA - Budget 2024 vs 2023 actual

Source: Authors creation, April 2024

Even with year over year sales decrease we notice EVA has a higher value in 2023 meaning additional value was created for the shareholders. Key methods identified to manage sales decline are customer reimbursements for supplier increases, effective cost controls and creating a culture of cost reductions. For working capital key important factors are on time accounts receivable, inventory optimization and capital spending efficiency.

Weaver (2001) presents EVA as the liaison between three types of returns a company is monitoring constantly: shareholder returns, accounting returns and economic returns, becoming a singular focus for all



decisions, establishing a clear and accountable link between strategy planning, capital investment as economic return, operating decision as accounting return and shareholder value as shareholder return.

Abbreviations and acronyms

AOI - Average Operating Investment ATOI - After tax Operating Income D & A - Depreciation and amortization DivOp – Divisional Operational Income EBIT - Earnings Before Interest and Taxes EBITDA - Earnings Before Interest, Taxes, Depreciation and Amortization EPS – Earnings Per Share EVA – Economic Added Value Kd – Cost of Debt Ke - Cost of Equity MVA - Market Value Added NOPAT - Net Operating Profit After Tax REVA - Refined Economic Value Added ROE – Return on Equity SCM – Supply Chain Management SC – Supply Chain WACC -Weighted Average Cost of Capital wd -Weight of Debt kd -Cost of Debt -Weight of Equity we

Conclusions

EVA has emerged as a vital performance measurement and management tool globally, particularly in advanced economies where it's integrated into corporate strategies. However, debates persist regarding its superiority over traditional metrics, and the clarity of country-specific evidence compared to other residual income measures remains uncertain.

In the broader literature, there has been a notable surge in EVA research over the past decade, notably from 2000 to 2008. Empirical research methodologies have dominated, constituting 71 percent of all methodologies employed, alongside conceptual, descriptive, and exploratory cross-sectional approaches.

From our analysis, several areas emerge warranting further investigation. These include implementation challenges, the impact of accounting adjustments, empirical evidence from developed economies, the strategic implications of EVA, its correlation with discounting techniques like Net Present Value (NPV) and Internal Rate of Return (IRR), and the measurement of managerial performance using EVA.

Moreover, existing empirical studies on EVA have often utilized relatively short-term data. Future research should extend the analysis over longer periods to comprehensively evaluate the concept's validity. Therefore, efforts should be directed towards broadening the applicability and understanding of this valuable concept.

Overall, the paper highlights the importance of EVA in assessing financial performance, identifying improvement opportunities, and making strategic decisions to enhance shareholder value within the supply chain context. Through empirical testing of hypotheses, this study aims to contribute to a deeper understanding of the role of EVA in supply chain management and its impact on overall company performance.

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