

Supplier selection strategy – NPV comparison

Elena-Simona Ionel¹

Abstract

The supply chain has gained prominence in recent years, both in specialized literature and in economic practice, being defined and analysed as an operational component of the behaviour of economic actors, both those with global activities and those with localized activities. The main aspects related to this thematic area are associated with complex concepts that have a quantifiable economic impact in terms of money, time, quality, and competitiveness. Supplier selection has become a matter of strategic partnership within global supply chains enabling customer performance and competitiveness, thus increasing supply chain leaders' awareness to develop and implement complex tools and metrics for supplier comparison before business award, one of the representative being net present value comparison. Net Present Value is defined as the sum of the investment's expected cash inflows and outflows discounted back to their present value at a company-agreed risk-adjusted rate. This study is focused on showing how an assessment of comparative net present values can clarify a business case and improve the decision making process towards a particular supplier selection, together with meeting project budget, internal targets, financial risk assessment, and strategic planning.

Keywords: supply chain, risk management, risk mitigation strategies, supply base management, supplier selection, net present value

JEL Classifications: D81, F69, L52, N70, O19

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1. Introduction

Net Present Value (NPV) is used in capital budgeting and investment planning to analyse the profitability of a projected investment or project. However, it can also be applied to supplier selection. Supplier selection is the process by which firms identify, evaluate, and contract with suppliers. This process can be complex because firms often have to consider various factors such as cost, quality, reliability, and even the supplier's environmental performance.

When NPV is used in supplier selection, it serves as a decision-making tool to compare the financial return a company could expect from different suppliers. For this calculation, it is needed to identify all the costs associated with each supplier.

¹ PhD candidate, Bucharest University of Economic Studies, Bucharest, Romania,
elenasimona_ionel@yahoo.com

This includes not only the price of goods or services offered, but also other costs like delivery, the potential cost of quality issues, and even the risk of supply disruption. All benefits, such as discounts for larger orders or prompt payment, should also be taken into consideration for the calculation. The next step is to estimate the cash flows from each supplier by predicting how much money the supplier relationship will bring to the company, considering projected future sales and costs.

The essence of NPV calculation is based on the discount of the future cash flows, having in view the assumption that the same amount of money in the present is worth more than in the future. Therefore, in the calculation future cash flows are discounted back to their present value. In order to achieve this, a discount rate is required, which reflects the time value of money and the risk of the future cash flows, being unique to a certain company and aligned with the given economic conditions.

Review of the scientific literature

In the specialized literature, Popa (2017) highlights four main strategic options based on the objectives and specific aspects of commercial partnerships: consumer focus, human capital development, connectivity in terms of business information, and availability and quality of distribution/supply chains. The authors of the most relevant specialized studies have concluded that supply chains determine the price, quality, delivery time, and range of services provided to users for all goods or services intended to be made available at the highest level of competitiveness.

Hugos (2011) has identified and convincingly argued both the epistemological and praxiological aspects that influence the competitiveness of goods and the profitability of company activities, emphasizing the reference aspects for the dynamics and reverberations of supply chain management. It has become increasingly evident that the dynamics of the supply chain are becoming more complex, with products that need to be delivered at the specified time and to the designated destinations outlined in partnership documents, in strict accordance with customer requirements and with great attention to inventory levels, production costs, and transaction costs.

Focusing solely on optimizing production and marketing costs and minimizing inventory levels without giving sufficient attention to demand satisfaction or timely delivery can result in significant losses for a company. Companies rely on their supply chains to conduct their operations and achieve success. Therefore, those companies whose management teams professionally prioritize efficient supply chain management demonstrate that they have identified sources of competitive advantage and use them wisely to improve market positioning. Although the role of

the supply chain is operational, it also has a strategic component, as it provides decision-makers with the appropriate tools for the successful implementation of strategies.

In order to understand the defining aspects of the supply chain correctly, it is necessary to consider all stages of the process and the actors involved, directly or indirectly, in the endeavor to meet customer demand: suppliers, transporters, companies managing storage capacities, and last but not least, the customer themselves. In a research study, Vasiliu and Dobrea (2013) determine the extent to which supply chain management is utilized in Romania through the lens of two related hypotheses: the increasing importance of the logistics function and the role of supply chain management in improving firm performance, which creates a market differentiator in terms of responsiveness and efficiency. This supports the ideology of a holistic approach by coordinating production, inventory, location, and transportation among the participants in the supply chain.

The specificities of production processes, available industrial and commercial equipment, location, ancillary services, and information stock are other important variables that substantially contribute to the efficiency of a company's supply chain. The review of specialized literature in this field has shown that all the aforementioned factors have been influenced by the economic effects of the COVID-19 pandemic, particularly as a result of the restrictive measures adopted by most countries worldwide.

Staff absence, unplanned inventory variations, facility relocation actions, and increased transportation costs—these determinants of growing uncertainty—have led to continuous reshaping of the economic landscape, as demonstrated by Boitan, I.A., Câmpeanu, E.M., and Mališ, S.S. (2021). The challenges posed by the COVID-19 pandemic have disrupted the conduct of daily activities, straining procurement processes, negotiations, production planning, and logistics partnerships. Fear of the coronavirus, coupled with the impaired decision-making capacities of investors, are also determining factors in the dynamics of international markets, leading to a series of unprecedented actions in crisis management systems.

The actions implemented by companies post-COVID-19, as adaptive responses to the new situations generated by the pandemic, reveal two patterns directly associated with the maturity of their supply chains. Alicke, Barriball, and Trautwein (2021) note that companies with limited experience in risk management are predominantly focusing on digitization and increasing software investments. On the other hand, organizations with a higher maturity level are emphasizing the monitoring of supplier-related risks, sounding the alarm regarding the disruptions observed during the COVID-19 period at the production level, caused by second-

or third-tier sub-suppliers with unknown delivery timelines and risks that were not evaluated by the end customer.

Easy access to new technologies that automate and improve production cycle times, together with government support for industrialization, can lead to a partial shift of production from current markets closer to the end customer, thereby compressing the logistics chain and reducing its associated risks.

Although in 2022 the effects of COVID-19 had a reduced impact on people's mobility, and consumers indicated a high level of confidence until February 2022, the war in Ukraine hinders the favorable evolution of the economy, especially through high prices in the energy sector, through which domestic purchasing power is diminished. Economic activity is expected to be negatively affected by supply chain disruptions, reduced commercial activity, and a sudden increase in uncertainty, according to the Kiel Institute Economic Outlook Euro Area (2022).

Research methodology

The methodology used for this study is qualitative research, using document analysis, case studies, and comparative studies as available in the specialised literature.

This paper discusses the application of Net Present Value (NPV) in supplier selection within the field of supply chain and operations management. NPV, a widely used financial metric, enables companies to consider not only the immediate cost of engaging with a supplier, but also the long-term cash flows associated with that partnership. Factors such as the immediate costs of supplier switch, expected purchase and revenue costs over time, possible future costs related to delays or quality issues, and the time value of money are taken into account. The supplier with the highest NPV is theoretically the best choice that offers the most financial value. However, the abstract emphasizes the importance of also considering non-quantifiable factors like strategic fit, reliability, and potential for collaboration. NPV is a financial metric that is widely used in capital budgeting and investment planning. NPV analysis is a form of intrinsic valuation and is used extensively in finance and accounting to determine the value of a business, investment security, capital project, new venture, cost reduction program, and anything else that involves cash flow.

Results and discussion

The high inflation rate, country risk, and conservative behavior both in the area of business models between companies and in the final client-provider area, are additional indicators that increase pressure on the supply chain management system. Uncertainty and force majeure have become daily parameters in managing suppliers and have pushed the "business as usual" paradigm increasingly far from reality.

Failure to fulfill contractual obligations is reflected in financial documents, and, upon objective scrutiny, multiple misses attributed to COVID-19 can transform a strategic business partner into a difficult supplier, a supplier blocked for new business opportunities, or even lead to their elimination from ongoing projects.

The degree of uncertainty determines the degree of risk, so risk management during the pandemic period is augmented in terms of complexity, having a high impact on business performance, in such a dynamic and unpredictable economic environment - Brătianu, C., 2020. Creating a reliable crisis management model for supply chains, based on the information available from the COVID-19 pandemic, can improve the decision-making process and the management of similar situations at the company level, which is why I consider this topic to be of interest and particularly important in the current context.

Net Present Value (NPV) is a financial indicator often used in capital budgeting and investment planning, but it has also found its applications in supplier selection in the field of supply chain management. In the context of supplier selection, NPV could be used to assess the financial viability of engaging with a particular supplier over a specified period of time. Calculation is as following:

Cash Flow Estimation: Firstly, estimate the cash inflows and outflows that would be associated with each potential supplier. Cash inflows could be the revenue that you expect to generate from selling the products you are sourcing. Cash outflows would include the cost of purchasing from the supplier, any related transportation or storage costs, and perhaps even costs associated with quality issues or delays.

NPV Calculation: Next, calculate the NPV of these cash flows. The general formula for NPV is:

$$NPV = \sum [Cash\ inflow/outflow / (1 + discount\ rate)^n] - Initial\ investment$$

Where:

Cash inflow/outflow is the cash inflow/outflow from the supplier for a specific period.

The discount rate is the company's cost of capital or the required rate of return.

n is the period number.

Supplier Selection: Finally, compare the NPVs of the different suppliers. All else being equal, the supplier with the highest NPV would be considered the best choice because they represent the most financially viable option.

While NPV is a valuable tool, it should not be the sole criterion for supplier selection. Other factors such as supplier reliability, quality of the goods, delivery times, and strategic fit with the company should also be considered.

For example, a company is trying to select a supplier for a critical component in its manufacturing process. It has narrowed down the options to two suppliers. To make the final decision, the company decides to use NPV to evaluate the two options, considering a five-year contract period.

The factors that the company might consider for its NPV calculation could include:

Costs: This would include the cost of goods sold, transportation costs, warehousing costs, and any other costs associated with each supplier; **Revenues:** The company would consider the revenue expected from selling the finished goods manufactured using the components provided by the suppliers; **Risks:** The company would also factor in potential costs associated with risks such as delays, quality issues, or the need for rework. These are estimated based on historical data and risk assessment; **Discount Rate:** This is the company's cost of capital, which might be based on the interest rate it pays on its debt, for example.

After gathering all data, the company could calculate the NPV of the cash flows associated with each supplier for each year of the contract, and then sum those NPVs to get a total NPV for each supplier. The supplier associated with the highest NPV, all other things being equal, would be chosen.

However, it is important to note that the NPV calculation is only one part of the decision-making process. Other factors, such as the strategic importance of the supplier, the quality of their goods, and the strength of the relationship, should also be considered. A practical study would go much more in-depth, potentially using sophisticated statistical techniques to estimate future costs and revenues, and robust sensitivity analyses to understand the impact of changes in the input variables on the final decision.

Conclusions

The use of NPV in supplier selection within the supply chain context represents an advanced approach that allows organizations to make financially informed decisions. By considering not only immediate costs, but also projected long-term cash inflows and outflows associated with a supplier, organizations can evaluate the financial viability of a supplier over a specified time horizon. Incorporating elements such as direct costs, expected revenues, potential risks, and the time value of money, the NPV calculation provides a comprehensive perspective on the financial impact of choosing a particular supplier. The supplier associated with the highest NPV, all

other factors being equal, is generally considered the most advantageous choice from a financial perspective.

NPV analysis, similar to other supplier selection techniques, has its limitations and assumptions. It assumes that the firm has a fairly accurate idea of future cash flows and the appropriate discount rate, which can fluctuate over time. It also does not take into account non-quantifiable factors that might influence supplier selection, like the supplier reputation or cultural fit with the company. Therefore, while NPV can provide useful insight, it should not be the only tool used in supplier selection. It is essential to balance the quantitative insights provided by NPV with other qualitative factors, such as supplier reliability, the quality of their products, their strategic fit with the organization, and their potential for collaborative innovation.

In conclusion, the integration of NPV into supplier selection processes can enhance decision-making capabilities and contribute to improved supply chain performance. However, the successful application of this approach requires careful consideration of a range of financial and non-financial factors, as well as a robust understanding of both the organization's strategic objectives and the dynamics of its supply chain.

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