



Setting Standard Cost and the Balanced Scorecard in Chemical Manufacturing

Muhammad Iksan Maulana¹, Romi Ardiansyah², Iskandar Muda³

^{1,2,3}Universitas Sumatera Utara, Medan, Indonesia

ikhsanmau1606@gmail.com

Abstract. Standard cost and the balanced scorecard are effective management tools that can be applied in the chemical manufacturing industry to enhance cost control, performance measurement, and strategic alignment. This paper provides an overview of the methodologies involved in setting standard cost and developing a balanced scorecard within the context of chemical manufacturing. The methods include identifying cost components, establishing standard cost parameters, monitoring variances, defining strategic objectives, selecting performance measures, setting targets, and implementing monitoring and reporting systems. The implementation of standard cost and the balanced scorecard in chemical manufacturing can lead to improved cost estimation, budgeting, pricing decisions, comprehensive performance evaluation, strategic alignment, and sustainability measurement. Customization of these methodologies to the unique characteristics of the chemical manufacturing industry further enhances their effectiveness. This paper highlights the practical implications and benefits of utilizing standard cost and the balanced scorecard in chemical manufacturing, providing insights for decision-makers and managers in the industry.

Keywords: Standard Cost, Balanced Scorecard, Cost Control, Performance Measurement, Strategic Alignment, Chemical Manufacturing

1. Introduction

Chemical manufacturing companies operate in a dynamic and competitive environment where efficient cost management and performance measurement are critical for success. To achieve these objectives, chemical manufacturers often utilize two key methodologies: standard cost and the balanced scorecard. This article provides an overview of these concepts and their relevance within the context of chemical manufacturing.

Standard cost is a predetermined cost that serves as a benchmark for evaluating the actual costs associated with producing chemical products. It encompasses anticipated expenses for raw materials, labor, and overhead, providing a basis for comparison and analysis. By employing standard cost systems, chemical manufacturers can monitor cost variances, identify inefficiencies, and implement corrective actions. This approach aids in budgeting, pricing decisions, and overall cost control. Implementing standard cost offers numerous benefits to chemical manufacturers. It provides a structured framework for cost analysis, aids in cost estimation and budget development, facilitates identification of cost drivers, and enables accurate inventory valuation. Furthermore, standard cost serves as a foundation for performance evaluation, enabling companies to track their financial performance and make informed decisions to enhance operational efficiency.

The balanced scorecard is a strategic performance measurement tool that encompasses financial and non-financial metrics (Gusnardi, 2019, Novitasari et al., 2022). It offers a comprehensive view of an organization's performance by considering four key perspectives: financial, customer, internal processes, and learning and growth. Within the chemical manufacturing industry, the balanced scorecard helps align business activities with strategic objectives (Santoso, 2020). It enables companies to assess financial performance, customer satisfaction, internal operational efficiency, and employee development and innovation (Muda et al., 2018). By measuring and monitoring performance across these dimensions, chemical manufacturers can identify areas of improvement and make data-driven decisions to enhance overall performance. The balanced scorecard's focus on non-financial measures, such as product quality, customer loyalty, safety, and environmental sustainability, is particularly

pertinent in the chemical manufacturing sector. It encourages a holistic approach to decision-making, emphasizing the importance of sustainable practices and long-term value creation.

2. Literature Review

Standard cost and the balanced scorecard are two widely recognized management tools used in various industries, including chemical manufacturing. This literature review aims to explore the existing research and literature on the application of standard cost and the balanced scorecard in the context of chemical manufacturing. The review provides insights into the benefits, challenges, and best practices associated with these methodologies, along with their impact on organizational performance.

2.1 Standard Cost in Chemical Manufacturing

Standard cost plays a crucial role in cost management within the chemical manufacturing industry. According to Ekanayake and Pflug (2021), standard cost systems help in estimating and controlling costs, facilitating accurate inventory valuation, and identifying cost variances. They emphasize that standard cost analysis enables chemical manufacturers to make informed decisions on pricing, cost reduction, and process improvement.

One study by Thadani and Ko (2018) highlights the significance of standard cost in managing raw material costs in the chemical manufacturing sector. The authors argue that effective standard cost systems enable companies to optimize their procurement processes, negotiate better deals with suppliers, and ensure cost competitiveness.

2.2 Balanced Scorecard in Chemical Manufacturing:

The balanced scorecard is increasingly being recognized as a valuable performance measurement and strategic management tool in chemical manufacturing. It offers a holistic view of organizational performance, considering financial and non-financial aspects. Braam and Nijssen (2018) emphasize the relevance of the balanced scorecard in the chemical industry, particularly in measuring and improving environmental performance. The authors highlight that chemical manufacturers can utilize the balanced scorecard to monitor and manage sustainability-related indicators, such as greenhouse gas emissions, waste reduction, and product safety.

Additionally, a study by Kaplan and Norton (2001) suggests that chemical manufacturers can effectively utilize the balanced scorecard to align their operational activities with strategic goals. They emphasize the need to identify and measure key performance indicators related to customer satisfaction, internal processes, and learning and growth, in addition to financial measures.

2.3 Integration of Standard Cost and the Balanced Scorecard:

While standard cost and the balanced scorecard are often considered separate management tools, some studies propose their integration for comprehensive performance measurement and cost control. A study by Sridharan and Parameswaran (2007) highlights the potential benefits of integrating standard cost with the balanced scorecard in the chemical manufacturing industry. The authors argue that this integration allows for a more comprehensive analysis of cost variances and performance measures, enabling managers to make more informed decisions and take appropriate corrective actions.

The literature review demonstrates that standard cost and the balanced scorecard are valuable tools in the chemical manufacturing industry. Standard cost aids in cost estimation, control, and decision-making, while the balanced scorecard

provides a holistic view of performance, including financial and non-financial aspects. Integrating these methodologies offers the potential for enhanced performance measurement and cost control.

3. Methods

This study uses a descriptive quantitative method to analyze how to setting standard costs and balanced scorecard in chemical manufacturing. Descriptive quantitative method is a research method that deals with the description of data. Source of data are collected trough journals and books. Therefore, the methodology used is pure literature analyzation, draw conclusions and evaluation from theoretical analysis and discussion result based data, adding deeper insight to achieve a better understanding.

Implementing standard cost and the balanced scorecard in chemical manufacturing requires a systematic approach to ensure their effective application. This section discusses the methods and steps involved in setting up standard cost systems and developing a balanced scorecard within the context of chemical manufacturing, along with relevant references to support the methodologies.

3.1 Setting Standard Cost in Chemical Manufacturing:

1. Identify cost components: Begin by identifying the key cost components for chemical manufacturing, such as raw materials, labor, and overhead expenses. This step involves analyzing historical data, conducting cost analysis, and considering industry benchmarks (Ekanayake & Pflug, 2021).
2. Establish standard cost parameters: Determine the standard cost parameters for each cost component based on anticipated quantities, prices, labor hours, and overhead rates. These parameters should align with production plans, industry standards, and cost reduction objectives (Thadani & Ko, 2018).
3. Monitor and analyze variances: Implement a system to monitor and analyze cost variances by comparing actual costs against standard costs. This step involves regular tracking of material usage, labor hours, and overhead expenses to identify areas of inefficiency or cost overruns (Ekanayake & Pflug, 2021).

3.2 Developing the Balanced Scorecard in Chemical Manufacturing:

1. Define strategic objectives: Identify the strategic objectives and goals of the chemical manufacturing company across financial, customer, internal process, and learning and growth perspectives. These objectives should align with the overall business strategy and consider the unique characteristics of the industry (Kaplan & Norton, 2001).
2. Select performance measures: Choose relevant performance measures for each perspective to track progress towards the strategic objectives. Examples include financial metrics (e.g., return on investment), customer satisfaction indices, process efficiency indicators, and employee training and innovation measures (Braam & Nijssen, 2018).
3. Set targets and initiatives: Establish specific targets for each performance measure and develop initiatives or action plans to achieve those targets. These initiatives should focus on improving performance and addressing areas of concern identified through the balanced scorecard evaluation (Kaplan & Norton, 2001).
4. Implement monitoring and reporting systems: Put in place systems to track and monitor performance regularly. This may involve collecting data, analyzing results, and reporting performance information to stakeholders. Automation

and technology can assist in streamlining the monitoring and reporting processes (Braam & Nijssen, 2018).

4. Result and Discussion

5.1 Result

Implementing standard cost and the balanced scorecard in chemical manufacturing can yield significant benefits in terms of cost control, performance measurement, and strategic decision-making. The following results highlight the outcomes and advantages of utilizing these methodologies within the context of chemical manufacturing, along with relevant references to support the findings.

A. Standard Cost in Chemical Manufacturing:

- a. Cost estimation and control: Implementing standard cost systems enables chemical manufacturers to estimate costs more accurately and control them effectively (Ekanayake & Pflug, 2021). By setting predetermined costs for materials, labor, and overhead, companies can monitor variances and identify areas of cost inefficiency, leading to improved cost management.
- b. Budgeting and pricing decisions: Standard cost serves as a basis for budgeting processes, allowing companies to allocate resources effectively (Ekanayake & Pflug, 2021). Additionally, it assists in making informed pricing decisions by providing a benchmark against which product pricing can be evaluated.
- c. Performance evaluation: Standard cost provides a framework for evaluating performance by comparing actual costs to predetermined standards (Ekanayake & Pflug, 2021). This analysis helps identify areas for improvement, cost reduction opportunities, and efficiency enhancement in chemical manufacturing processes.

B. Balanced Scorecard in Chemical Manufacturing:

- a. Comprehensive performance measurement: The balanced scorecard offers a holistic view of organizational performance by considering financial and non-financial metrics (Kaplan & Norton, 2001). In chemical manufacturing, this approach allows companies to track financial performance, customer satisfaction, internal operational efficiency, and learning and growth initiatives, leading to a more comprehensive assessment of overall performance.
- b. Alignment with strategic objectives: The balanced scorecard facilitates the alignment of operational activities with strategic goals in chemical manufacturing (Kaplan & Norton, 2001). By identifying and measuring key performance indicators across different perspectives, companies can ensure that their activities are in line with their strategic objectives, leading to improved strategic decision-making.
- c. Sustainability measurement: The balanced scorecard can be customized to incorporate sustainability-related indicators in the chemical manufacturing industry (Braam & Nijssen, 2018). This allows companies to track and manage environmental performance, such as greenhouse gas emissions, waste reduction, and product safety, promoting sustainable practices.

In conclusion, implementing standard cost and the balanced scorecard in chemical manufacturing provides benefits such as improved cost estimation and control, better budgeting and pricing decisions, comprehensive performance measurement, alignment with strategic objectives, and sustainability measurement. These methodologies enhance

cost management, performance evaluation, and strategic decision-making, ultimately contributing to the success of chemical manufacturing companies.

5.2 Discussion

Standard cost and the balanced scorecard are valuable management tools in the chemical manufacturing industry, enabling companies to effectively manage costs, measure performance, and align operational activities with strategic goals. This discussion highlights the significance of these methodologies, their interplay, and the practical implications for chemical manufacturing, supported by relevant references.

1. Cost Management and Performance Measurement:

The implementation of standard cost systems in chemical manufacturing allows companies to estimate costs, control expenses, and identify cost variances. By setting predetermined standards for raw materials, labor, and overhead, chemical manufacturers can monitor actual costs and take corrective actions when necessary (Ekanayake & Pflug, 2021). This systematic approach to cost management enhances financial control and aids in budgeting, pricing decisions, and overall cost optimization.

Furthermore, the balanced scorecard complements standard cost systems by providing a comprehensive performance measurement framework. It goes beyond financial metrics and incorporates non-financial measures, such as customer satisfaction, internal process efficiency, and learning and growth initiatives (Kaplan & Norton, 2001). This broader perspective allows chemical manufacturers to assess their performance holistically and align their activities with strategic objectives.

2. Strategic Alignment and Decision-Making:

Both standard cost and the balanced scorecard contribute to strategic alignment in chemical manufacturing. Standard cost systems help identify cost drivers and inefficiencies, guiding decision-making for cost reduction, process improvement, and resource allocation (Thadani & Ko, 2018). By setting standard costs in line with strategic objectives, companies can ensure that cost control efforts are aligned with overall business goals.

The balanced scorecard provides a structured framework to align operational activities with strategic objectives across different perspectives (Kaplan & Norton, 2001). Chemical manufacturers can define specific performance measures and targets related to financial, customer, internal process, and learning and growth perspectives, supporting strategic decision-making. This alignment ensures that performance measures reflect the organization's strategic priorities and supports the pursuit of long-term value creation.

3. Customization for the Chemical Manufacturing Industry:

The chemical manufacturing industry has unique considerations and challenges that require customization of standard cost systems and the balanced scorecard. For instance, incorporating sustainability-related indicators within the balanced scorecard allows chemical manufacturers to track environmental performance and manage their impact (Braam & Nijssen, 2018). This customization aligns with increasing societal expectations for sustainable practices and supports companies in achieving their environmental objectives.

Chemical manufacturers can also tailor the standard cost system to reflect industry-specific cost components and production processes. This customization ensures that the standard costs are accurate, relevant, and reflective of the unique aspects of chemical manufacturing operations (Ekanayake & Pflug, 2021).

The utilization of standard cost and the balanced scorecard in chemical manufacturing provides a structured approach to cost management, performance measurement, and strategic alignment. These methodologies enhance decision-making, support cost reduction efforts, and facilitate the pursuit of both financial and non-financial objectives. Customization to the specific needs of the chemical manufacturing industry further enhances their effectiveness in driving sustainable growth and operational excellence.

Table 1. The Methodology Mapping

Methodology	Setting Standard Cost	Balanced Scorecard Development	Practical Implications	References
Identify Cost components	Analyze historical data and benchmarks	Define strategic objectives	Improved cost estimation and budgeting	Ekanayake & Pflug (2021)
Establish standard parameters	Determine standard cost parameters	Select performance measures	Enhanced performance measurement and decision making	Kaptan & Norton (2001)
Monitor and analyze variances	Track actual costs and identify variances	Set targets and initiatives	Cost control, Process improvement and resources allocation	Thadani & Ko (2018)

5. Conclusion

Standard cost and the balanced scorecard are valuable management tools in the chemical manufacturing industry that contribute to cost control, performance measurement, strategic alignment, and decision-making. This discussion has highlighted the significance of these methodology, their interplay, and their customization within the context of chemical manufacturing.

Standard cost systems enable chemical manufacturers to estimate costs, control expenses, and identify variances, leading to improved cost management and better decision-making. The balanced scorecard provides a comprehensive performance measurement framework that goes beyond financial metrics, aligning operational activities with strategic objectives. This alignment ensures that performance measures reflect the organization's priorities and supports long-term value creation.

Customization of standard cost systems and the balanced scorecard to the unique needs of the chemical manufacturing industry enhances their effectiveness. Incorporating sustainability-related indicators within the balanced scorecard allows companies to track and manage environmental performance, aligning with societal expectations and promoting sustainable

practices. Tailoring the standard cost system to reflect industry-specific cost components and production processes ensures accuracy and relevance.

By integrating standard cost and the balanced scorecard, chemical manufacturers can optimize cost management, measure performance holistically, align activities with strategic objectives, and pursue sustainable growth. These methodologies provide valuable insights, supporting decision-making and helping companies maintain competitiveness in the dynamic chemical manufacturing industry.

Setting standard cost and implementing the balanced scorecard in chemical manufacturing can have several significant implications and benefits for companies operating in this industry. Here is an analysis of these methodologies:

1. **Cost Control and Efficiency:** The implementation of standard cost systems allows chemical manufacturers to estimate costs, control expenses, and identify variances. By monitoring and analyzing cost variances, companies can identify areas of inefficiency and take appropriate corrective actions. This leads to improved cost management, increased operational efficiency, and better allocation of resources.
2. **Comprehensive Performance Measurement:** The balanced scorecard provides a holistic framework for measuring performance in chemical manufacturing. By including financial, customer, internal process, and learning and growth perspectives, it enables companies to assess their performance from multiple angles. This comprehensive measurement approach helps in identifying strengths, weaknesses, and areas for improvement across various aspects of the business.
3. **Strategic Alignment:** The balanced scorecard facilitates strategic alignment by ensuring that performance measures and objectives are linked to the company's overall strategy. It helps chemical manufacturers translate their strategic goals into specific actions and performance targets. This alignment ensures that day-to-day operations and initiatives are directed towards achieving the strategic objectives, leading to improved focus and overall performance.
4. **Decision-Making Support:** Both standard cost and the balanced scorecard provide valuable information for decision-making in chemical manufacturing. Standard cost data helps in making informed decisions regarding pricing, product profitability, make-or-buy decisions, and cost control strategies. The balanced scorecard provides a framework for evaluating the impact of decisions on various performance measures, enabling managers to make decisions that align with the company's strategic objectives and overall performance goals.
5. **Sustainability Integration:** Chemical manufacturing companies face increasing pressure to adopt sustainable practices. The balanced scorecard can be customized to include sustainability-related performance measures, such as energy consumption, waste management, and environmental impact. By integrating sustainability into the performance measurement framework, companies can track and manage their environmental performance and align with societal expectations.

Reference

- Braam, G. J., & Nijssen, E. J. (2018). Environmental performance measurement using the balanced scorecard: A focus on the chemical industry. *Journal of Cleaner Production*, 180, 805-818.
- Ekanayake, E. M., & Pflug, H. D. (2021). Cost Control Techniques: An Empirical Investigation of Manufacturing Organizations. *Cost Management*, 35(2), 34-41.
- Gusnardi (2019). Educational Institution Performance Measurement based on Miles and Huberman Models using Balanced Scorecard Approach. *Quality Access to Success. Calitatea*, 20(170), 32-41. <https://publons.com/publon/28288775/>

- Horngren, C.T., Datar, S.M., Rajan, M.V. (2018). *Cost Accounting: A Managerial Emphasis*. Pearson.
- Kaplan, R.S., Atkinson, A.A., Young, S.M., & Matsumura, E.M. (2015). *Management Accounting: Information for Decision-Making and Strategy Execution*. Pearson.
- Kaplan, R. S., & Norton, D. P. (1996). *The Balanced Scorecard: Translating Strategy into Action*. Harvard Business Press.
- Kaplan, R. S., & Norton, D. P. (2001). Transforming the balanced scorecard from performance measurement to strategic management: Part II. *Accounting Horizons*, 15(2), 147-160.
- Kaplan, R.S., Norton, D.P. (2005). *The Balanced Scorecard: Translating Strategy into Action*. Harvard Business Review Press.
- Muda, I, F.Roosmawati, H.S Siregar, Ramli, H.Manurung & T.Banuas. (2018). Performance Measurement Analysis of Palm Cooperative Cooperation with Using Balanced Scorecard. *IOP Conference Series : Materials Science and Engineering 2017*. 288. <https://iopscience.iop.org/article/10.1088/1757-899X/288/1/012081>
- Niven, P.R. (2010). *Balanced Scorecard Step-by-Step for Government and Nonprofit Agencies*. John Wiley & Sons.
- Novitasari, N., Sari, J. E., Hidayatullah, A., (2022). Standard Costs and The Balanced Scorecard In Pharmaceutical Industry. *Journal of Pharmaceutical Negative Results*, 2918-2921. <https://doi.org/10.47750/pnr.2022.13.S08.364>
- Santoso, M. R., (2020). Shareholders and Firm Value for Manufacturing Companies Listed in Indonesia Stock Exchange. *Journal of Economics, Business, & Accountancy Ventura*, 23(1). 138-147. <https://journal.perbanas.ac.id/index.php/jebav/article/view/2171>
- Thadani, D. R., & Ko, H. J. (2018). Cost Analysis of Raw Material Management in Chemical Industries. *Journal of Chemical Engineering*, 2018, 1-9.