



# Building A Real-Time Dashboard For Asset Monitoring In Power Bi

<sup>1</sup>Hrushikesh Akhare, <sup>2</sup>Sampada Dravid, <sup>3</sup>Varun Dubey

<sup>1</sup>B-Tech Engineer, <sup>2</sup>PhD in Metallurgy and Material Science, <sup>3</sup>M-Tech Engineer,

<sup>1</sup>Dept. of Mechanical Engineering, BRAC's Vishwakarma Institute of Information Technology, Pune, India

<sup>2</sup>Dept. of Mechanical Engineering, BRAC's Vishwakarma Institute of Information Technology, Pune, India

<sup>3</sup>Roadway Solutions India Infra Ltd, Pune, India

**Abstract:** This review paper explores the process of building a real-time dashboard for asset monitoring in Power BI, a powerful business intelligence platform that offers a wide range of features for data visualization, reporting, and analytics. The paper highlights the key features and functionalities of Power BI that are relevant for real-time asset monitoring, including data import, data visualization, and customizable dashboards. The paper also discusses best practices for building a real-time dashboard for asset monitoring in Power BI, including data automation, custom visualizations, and real-time data monitoring. The review paper includes case studies and examples of real-time asset monitoring dashboards in Power BI, as well as future directions and recommendations for building effective real-time dashboards in Power BI. By providing a comprehensive overview of the process of building a real-time dashboard for asset monitoring in Power BI, this review paper aims to offer valuable insights and guidance for power system operators and managers looking to leverage real-time data for improved asset management and performance.

**Index Terms:** Real-Time Dashboard, Power Bi, asset monitoring, predictive analytics, data integration, Business Intelligence, Decision Support Systems.

## 1. INTRODUCTION

Building a real-time dashboard for asset monitoring in Power BI is a powerful way to track and manage critical parameters in various industries, such as retail, finance, and manufacturing. With Power BI, users can import data from various sources, including Excel, text/CSV, IBM DB2, MySQL, SQL Server database, JSON, Access database, and PDF[2]. Power BI dashboards offer a user-friendly interface that is easy to create, intuitive, and customizable, allowing users to analyse data, identify patterns, and extract insights that help them make informed decisions[2].

Creating a real-time dashboard for assets monitoring in Power BI involves several steps, including data import, data visualization, and dashboard creation. Users can import data manually or automatically using data automation platforms like Coupler.io, which allows data to be sent to Power BI repeatedly and on a schedule, ensuring that the data visualization always reflects the latest data in near-real time[1]. Once the data is imported, users can turn it from raw data to powerful, interactive visuals, such as area charts, bar and column charts, and tree maps, which help them quickly understand the data and make informed decisions[1][2].

Power BI also offers custom visualizations that can be created using third-party vendors or imported from custom visuals created by users[1]. These custom visualizations can help users represent their data in a more meaningful and intuitive way, providing them with a deeper understanding of their assets' performance.

Monitoring and managing assets in real-time is crucial for businesses to stay competitive and efficient. Power BI dashboards offer actionable insights to small business owners, ecommerce marketers, and executives into key metrics with a single-screen display, allowing them to monitor their assets' performance and make informed decisions quickly[3]. For example, financial performance dashboards can help firms providing accounting services for clients to deliver financial reporting on time, while logistics and supply chain dashboards can help businesses track the movement of goods and optimize their operations[3].

In addition to real-time monitoring, Power BI also offers data-level auditing capabilities, which help users perform near-real-time monitoring of a Power BI Premium capacity (P SKU) or Power BI Embedded (A SKU) capacity[4]. This feature includes data-level auditing for semantic models, which can become more complex and consume more memory over time, making it essential to monitor their usage and performance[4].

## 2. LITERATURE REVIEW

### 2.1. Power BI

Power BI is a business intelligence service developed by Microsoft that enables users to create visually rich and interactive dashboards and reports. It offers a range of applications, connectors, and services that assist in building, exchanging, and leveraging business insights efficiently[14]. Some key benefits of Power BI include its ability to integrate with existing applications, provide customized dashboards, and support advanced data services[15].

Power BI is known for its intuitive drag-and-drop functionality, which simplifies the process of building reports and dashboards, even for non-technical users[16]. It also offers advanced analytics features, such as predictive analytics, machine learning, and statistical modelling tools, which enable users to uncover hidden patterns, trends, and correlations within their data[16].

Power BI is particularly useful for real-time reporting and analysis, as it can handle vast amounts of data and seamlessly connect with various data sources, applications, and services, including Office 365, SQL Server, Salesforce, and Microsoft Dynamics 365[16]. It also supports a powerful natural language interface and the use of intuitive graphical designer tools, which eliminate the need for specialized technical support[15].

### 2.2. Benefits of Asset Monitoring

Real-time asset monitoring is crucial in various industries, such as construction, logistics, mining, healthcare, and manufacturing, to manage, protect, and track assets remotely. The benefits of real-time asset monitoring include:

- 1. Asset life extension:** IoT sensors track an asset's condition, location, and performance, allowing managers to detect issues and extend its lifespan[17].
- 2. Theft prevention:** High-value assets need to be monitored to prevent theft, and asset monitoring solutions enhance visibility by providing accurate location details[17].
- 3. Employee behaviour tracking:** Asset monitoring systems can track employee behavior such as travel times, geographic locations, and driving styles[17].
- 4. Asset handling control:** This feature ensures that employees follow proper protocols while handling high-value assets[17].
- 5. Maintenance scheduling and tracking:** Asset monitoring software can help schedule maintenance based on check-up times or send email or SMS notifications as reminders[17].
- 6. Asset failure prediction:** Timely preventive action can lower production and asset maintenance costs and improve asset performance[17].
- 7. Ticketing system:** Asset monitoring software can have ticketing capabilities to manage asset-related issues that are recorded, assigned to an appropriate technician, and resolved following a predefined action plan[17].

**8. Asset data analytics:** Managers can produce asset reports and analyze equipment performance to reduce unplanned downtime, optimize work and staff schedules, and more[17].

By employing real-time asset monitoring, businesses can optimize their asset usage, extend asset lifespan, prevent theft, and improve operational efficiency[18]. Additionally, real-time monitoring allows for proactive maintenance and predictive failure analysis, reducing unplanned downtime and increasing overall asset performance[18].

### 2.3. Predictive Analysis

Predictive analysis of breakdown of assets is a critical aspect of real-time asset monitoring, particularly in the context of building a real-time dashboard for asset monitoring in Power BI. Several studies and resources highlight the importance and benefits of predictive analytics in anticipating asset failures and optimizing maintenance practices.

Predictive maintenance (PdM) is a proactive approach that anticipates maintenance needs to avoid costs associated with unscheduled downtime. By connecting to devices and monitoring the data they produce, organizations can identify patterns and predict potential asset failures before they occur[19]. Leveraging predictive analytics in asset monitoring allows for the development of models that can predict the probability of failure within a specific timeframe, estimate the remaining useful life of assets, detect unusual asset behavior, and prioritize assets for servicing based on urgency[20].

The process of predictive maintenance involves instrumenting machines to provide data for building PdM solutions, which can run on the equipment itself, on edge devices in the manufacturing environment, or in the cloud[20]. Microsoft's infrastructure, including Azure, provides a robust platform for building and deploying predictive maintenance solutions, offering scalability, flexibility, and support for various machine learning tools like R and Python[20].

Predictive analytics solutions in asset monitoring require the collection and analysis of data from various sources, such as historians, manufacturing execution systems, and enterprise resource planning systems. The data is processed using machine learning tools to create models that can identify diverse types of asset issues and answer critical questions about asset performance and maintenance needs[20].

By implementing predictive analytics in asset monitoring, organizations can transition from reactive maintenance practices to proactive strategies that optimize asset utilization, minimize downtime, reduce maintenance costs, and enhance operational efficiency. The ability to predict asset failures and prioritize maintenance activities based on data-driven insights is a key advantage of leveraging predictive analysis in asset monitoring within Power BI dashboards.

### 2.4. Performance Dashboard

Power BI is a powerful BI platform that offers a range of features for developing performance dashboards. It provides visualization tools that enable decision-makers to view real-time results and analyze organizational performance[21]. Power BI's customizable dashboards allow for the integration of data from various sources, providing a unified view of performance metrics[21].

The use of performance dashboards in organizations has been shown to improve decision-making, enhance operational efficiency, and promote accountability[21]. A study by Wilbanks and Langford (2014) found that dashboards for data analytics in nursing improved the quality of care and patient outcomes[21]. Yigitbasioglu and Velcu (2012) also highlighted the importance of dashboards in performance management, emphasizing the need for research and design implications[21].

Power BI's integration with other Microsoft products, such as Azure and Excel, simplifies data consolidation and analysis, making it an ideal platform for developing performance dashboards[22]. Power BI's predictive

analytics capabilities also enable organizations to forecast and plan their maintenance activities more effectively[23].

Performance dashboards are a critical tool for organizations seeking to monitor and analyze their performance in real-time. Power BI, as a BI platform, offers a range of features for developing performance dashboards, including visualization tools, customizable dashboards, and predictive analytics capabilities. The use of performance dashboards has been shown to improve decision-making, enhance operational efficiency, and promote accountability in organizations.

## 2.5. Previous Research

Previous research on real-time dashboards for asset monitoring in Power BI has explored the benefits and challenges of implementing such systems. A study by Dynaway highlights the importance of asset management analytics in improving data-driven maintenance planning and identifying data discrepancies post-implementation[23]. The study emphasizes the need for real-time monitoring and predictive analytics to minimize downtime and ensure a safer work environment.

Another study by Vena Solutions focuses on the use of Power BI dashboards for financial reporting and analysis. The study emphasizes the importance of real-time data access and integration with existing systems and data sources to enable better planning and decision-making[24]. The study also highlights the need for customizable dashboards that can be tailored to specific user requirements and visualization options.

In the mining industry, Power BI has been found to offer significant benefits in real-time monitoring, predictive analytics, geographic visualization, data management, supply chain optimization, and environmental compliance[22]. The study emphasizes the importance of predictive analytics in minimizing downtime and ensuring a safer work environment.

Power BI has also been found to offer significant benefits in the manufacturing industry, including real-time monitoring, predictive analytics, inventory management, supply chain optimization, and financial analysis[25]. The study emphasizes the importance of real-time data access and integration with existing systems and data sources to enable better planning and decision-making.

A case study by Lan Huang highlights the importance of building a sales dashboard for a sales department using Power BI. The study emphasizes the need for real-time monitoring, data integration, and customizable dashboards to enable better decision-making and improve sales performance[26]. The study also highlights the importance of mobile accessibility and user-friendly interfaces.

Overall, previous research has emphasized the importance of real-time monitoring, predictive analytics, data integration, and customizable dashboards in building effective real-time dashboards for asset monitoring in Power BI. The studies have also highlighted the need for mobile accessibility, user-friendly interfaces, and geographic visualization to enable better decision-making and improve asset performance.

## 3. KEY COMPONENTS OF REAL-TIME DASHBOARDS

### Real-time Data Collection for Asset Monitoring in Power BI

Real-time data collection is the lifeblood of any effective real-time dashboard for asset monitoring in Power BI. It refers to the continuous process of acquiring and ingesting data streams from various sources that reflect the current state and health of physical assets. This data is then fed into Power BI for analysis and visualization within the dashboard. Here's a breakdown of the key aspects of real-time data collection for asset monitoring:



### 3.1. Data Sources

**3.1.1. Sensor Networks:** Embedded sensors in industrial equipment and infrastructure collect real-time data on various parameters like temperature, pressure, vibration, energy consumption, and physical location using GPS. This data can be used to monitor and optimize equipment performance, prevent downtime, reduce maintenance costs, and improve overall efficiency. With the help of advanced analytics and machine learning algorithms, the data collected by these sensors can be analyzed to identify patterns, predict failures, and suggest corrective actions. The use of embedded sensors is a key component of the Industrial Internet of Things (IIoT) and is helping to transform the way industries operate.

**3.1.2. Industrial Control Systems (ICS):** Many industrial facilities utilize ICS that monitor and manage critical processes. These systems often generate real-time data streams that provide valuable insights into asset performance and potential operational issues.

**3.1.3. Cloud APIs:** Equipment manufacturers are increasingly offering cloud-based APIs that provide real-time access to sensor data collected from their products. This can be a valuable source of data for Power BI dashboards, particularly for assets spread across geographically dispersed locations.

### 3.2. Data Acquisition Methods

**3.2.1. Streaming Protocols:** Real-time data is often transmitted through specialized protocols like OPC UA or MQTT, which are designed for efficient and reliable transfer of high-velocity data streams. Power BI may not natively support these protocols, so consider utilizing intermediary tools like Azure Stream Analytics to translate and pre-process the data before feeding it into the platform.

**3.2.2. APIs and Data Connectors:** Cloud APIs provided by equipment manufacturers or third-party data platforms can be accessed directly within Power BI using pre-built connectors or custom API calls. This enables seamless data retrieval and integration into the Power BI semantic model.

### 3.3. Considerations for Real-time Data Collection

**3.3.1. Data Volume and Velocity:** Real-time data streams can be voluminous, especially when dealing with numerous sensors or geographically dispersed assets. It's crucial to have a robust data collection infrastructure that can handle the high velocity and volume of data efficiently. Consider utilizing cloud-based data storage solutions like Azure Data Lake Storage to accommodate the ongoing influx of data.

**3.3.2. Data Security:** Since real-time data often reflects the operational state of critical assets, security is paramount. Implement robust security protocols to safeguard data transmission and storage. This may involve encryption, access controls, and regular security audits to ensure the integrity and confidentiality of the collected data.

By establishing a reliable and secure real-time data collection process, you lay the foundation for a powerful real-time asset monitoring dashboard in Power BI. This continuous flow of fresh data empowers you to gain valuable insights into asset health, identify potential issues early on, and make data-driven decisions to optimize asset performance and prevent costly downtime.

## 4. CHALLENGES IN BUILDING REAL-TIME DASHBOARDS

Building a real-time dashboard for asset monitoring in Power BI requires overcoming several challenges to ensure effective data collection, processing, visualization, and analysis. Some of the key challenges include:

**4.1. Real-time data processing:** Real-time dashboards require real-time data processing engines to filter, join, aggregate, and transform data streams as they arrive. This can be achieved using real-time databases like Click

House, Apache Druid, and Apache Pinot, stream processing engines like Apache Flink, or analytics engines like Apache Spark[5].

**4.2. Data visualization:** Classic business intelligence tools like Looker, Power BI, and Tableau may not be suitable for real-time visualization, especially when embedding the dashboard directly into a web application. In such cases, modern JavaScript frameworks like React or Next.js can be used to build visualizations in the product[5].

**4.3. Data security and privacy:** Ensuring data security and privacy is crucial for real-time dashboards, as they handle sensitive information. This involves encrypting, anonymizing, and securing real-time data, monitoring any breaches or violations, informing users of practices, obtaining their consent and feedback, and designing data visualization and communication strategies[6].

**4.4. Data quality and governance:** Ensuring data quality and implementing data governance and quality standards is essential for real-time dashboards. This involves using data integration and aggregation tools, applying data security and privacy measures, and maintaining consistency in design[6].

**4.5. User experience and accessibility:** Designing a user-friendly dashboard with relevant visuals is crucial for aligning real-time data with goals and audience. This includes crafting a narrative with data, maintaining consistency in design, optimizing performance, and embracing user feedback to enhance the dashboard continuously[7].

By addressing these challenges, organizations can build effective real-time dashboards for asset monitoring in Power BI, which can provide valuable insights, improve decision-making, and enhance operational efficiency.

## 5. METHODOLOGY

**5.1. Data acquisition and integration:** The first step is to acquire and integrate data from various sources, such as IoT devices, sensors, and databases. Power BI supports a wide range of data sources, including Excel spreadsheets, CSV files, Q-data feeds, online services, and data on the cloud[27]. It is essential to ensure that the data is structured, semi-structured, or unstructured, depending on the business type[27].

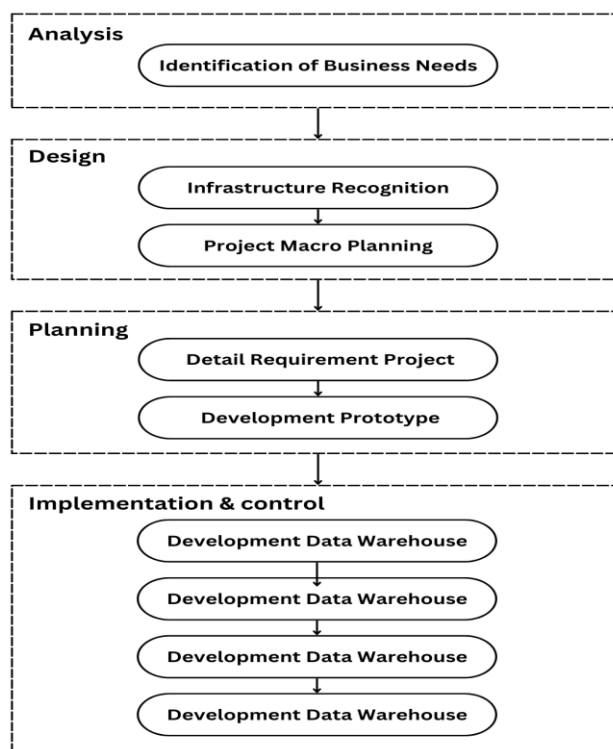


Figure 1. Development Steps

**5.2. Data processing and analytics:** After acquiring the data, the next step is to process and analyze it. Power BI provides tools like Power Query and Power Editor, which can be used for data transformation and cleaning, removing duplicates, filtering data, handling missing values, and aggregating data[28]. Additionally, Power BI leverages AI and machine learning to automate tasks such as data profiling, identifying anomalies, and forecasting future trends[28].

**5.3. Visualization and user interface:** The final step is to visualize the data and create a user-friendly interface. Power BI offers a range of visualization options, including bar and column charts, line charts, area charts, combo charts, scatter charts, and more[29]. The new on-object user interface in Power BI allows users to add visuals by clicking on the visualization pane, using the right-click context menu, or employing the traditional method of selecting the desired fields[29]. Power BI also provides formatting options for visuals, such as adjusting line color, formatting values, or removing parts of the visual[29].

## 6. CASE STUDIES AND APPLICATIONS

Several industries and sectors have successfully implemented real-time dashboards for assets monitoring using Power BI. Here are some case studies and applications for the construction sector, specifically for highway construction companies:

### 6.1. mJobTime Construction Analytics

mJobTime is a construction project management software that offers real-time data analytics capabilities. By integrating Power BI, mJobTime provides robust analytics capabilities that enable efficient data access and analysis. The platform offers pre-designed dashboards and customizable configurations tailored to specific business requirements. These dashboards prioritize individual projects, providing comprehensive details and feedback on specific projects, labor, trend details, budget overviews, and more[8].

### 6.2. Digital Construction Skills

A construction company, Heron Bros, implemented the SustainIQ digital tool to track and report ESG (environment, social, and governance) and sustainability performance data in real-time. The dashboard allows the company to establish a baseline, benchmark performance across all projects, and report on progress towards targets. This case study demonstrates how Power BI can be used to extract and analyze data from other digital tools, such as Field View, to facilitate data analysis and improve decision-making[9].

### 6.3. Rayven Real-Time Asset Monitoring Solution

Rayven offers a real-time asset monitoring solution that helps organizations track and improve the performance, utilization, and health of their assets. This solution can be customized to meet the needs of various sectors, including construction. By leveraging Power BI, Rayven provides easy-to-create, custom dashboards that update automatically, enabling near-live viewing and analysis of asset performance[10].

These case studies and applications showcase the effectiveness of Power BI in real-time asset monitoring, particularly in the construction sector. By implementing these solutions, construction companies can gain valuable insights into their projects, make informed decisions, and optimize their operations.

## 7. BENEFITS OF REAL-TIME ASSET MONITORING DASHBOARDS

The benefits of real-time asset monitoring dashboards, particularly in the context of building a real-time dashboard for assets monitoring in Power BI, include:

**7.1. Enhanced Decision-Making:** Real-time asset monitoring dashboards provide immediate access to critical data, enabling stakeholders to make informed decisions promptly based on up-to-date information[11].

**7.2. Improved Operational Efficiency:** By monitoring assets in real-time, organizations can optimize operational processes, identify inefficiencies, and streamline workflows to enhance overall efficiency and productivity[12].

**7.3. Proactive Maintenance:** Real-time asset monitoring dashboards facilitate proactive maintenance by detecting performance anomalies, predicting potential issues, and scheduling maintenance activities in advance to prevent costly downtime and equipment failures[12][11].

**7.4. Optimized Production Operations:** Power BI dashboards offer rich analytics capabilities that help optimize production operations by minimizing changeover times, balancing workloads, streamlining processes, and driving continuous improvement in manufacturing processes[12].

**7.5. Cost Reduction:** Real-time asset monitoring dashboards can help reduce operational costs by improving inventory efficiency, minimizing rework, optimizing maintenance schedules, and enhancing overall asset reliability[12][11].

**7.6. Data-Driven Growth:** By leveraging real-time data insights from Power BI dashboards, organizations can drive growth and innovation by identifying trends, patterns, and opportunities for improvement in asset management and operational processes[12].

**7.7. Improved Customer Satisfaction:** Monitoring quality trends in real-time allows manufacturers to ensure higher product reliability, reduce rework and warranty claims, and ultimately enhance customer satisfaction by delivering high-quality products consistently[12].

**7.8. Scalability and Performance:** Real-time asset monitoring dashboards in Power BI offer scalability to accommodate growing data volumes and performance to handle real-time data processing efficiently, ensuring smooth operations even as data complexity increases[13].

By leveraging the benefits of real-time asset monitoring dashboards in Power BI, organizations can gain a competitive edge, optimize their operations, reduce costs, improve decision-making, and drive continuous improvement in asset management practices.

## 8. FUTURE TRENDS AND DIRECTIONS

**8.1. Cloud-based solutions and scalability:** As the volume of data generated by IoT devices and other sources continues to grow, cloud-based solutions will become increasingly important for scalability and efficient data management. Power BI offers cloud-based services that enable real-time data processing and analysis at scale, making it an ideal choice for managing large volumes of data from multiple sources.

**8.2. Predictive analytics and maintenance:** The integration of predictive analytics capabilities into real-time dashboards will enable organizations to anticipate potential issues and schedule maintenance proactively, reducing downtime and improving asset management efficiency. Power BI offers predictive analytics features that can be integrated into real-time dashboards, allowing organizations to predict future trends and patterns in asset performance and optimize maintenance schedules accordingly.

**8.3. Edge computing for real-time data processing:** Edge computing enables real-time data processing at the source, reducing latency and ensuring that critical data is available in near-real time. This technology is particularly useful for industries where real-time data processing is crucial, such as manufacturing, transportation, and healthcare. Power BI can be integrated with edge computing platforms, such as Azure IoT Edge, to enable real-time data processing and analysis at the edge.

By incorporating these future trends and directions into the review paper, you can provide a comprehensive overview of the current state and potential developments in real-time asset monitoring dashboard solutions using Power BI.



## 9. CONCLUSION

In conclusion, building a real-time dashboard for assets monitoring in Power BI offers numerous benefits for organizations seeking to optimize their asset management practices. By leveraging Power BI's real-time data processing and visualization capabilities, organizations can gain valuable insights into their assets' performance, identify trends and patterns, and make informed decisions to improve operational efficiency, reduce costs, and enhance customer satisfaction.

Real-time dashboards in Power BI can be customized to meet the unique needs of different industries and applications, including manufacturing, transportation, healthcare, and construction. By integrating real-time data from various sources, such as IoT devices, sensors, and databases, organizations can gain a comprehensive view of their assets' performance and identify opportunities for improvement.

To build an effective real-time dashboard for asset monitoring in Power BI, organizations must consider key components such as real-time data processing, data visualization, customization, accessibility, data security, integration with other tools, real-time reporting and alerts, predictive analytics, and user-friendly interfaces. By addressing the challenges associated with real-time data processing, data visualization, and data security, organizations can build a robust and effective real-time dashboard that meets their needs.

The future trends and directions for real-time asset monitoring dashboards in Power BI include cloud-based solutions, predictive analytics, and edge computing. By incorporating these technologies into their real-time dashboards, organizations can gain a competitive edge, optimize their operations, reduce costs, and drive continuous improvement in asset management practices.

In summary, building a real-time dashboard for assets monitoring in Power BI is a powerful tool for organizations seeking to optimize their asset management practices. By leveraging Power BI's real-time data processing and visualization capabilities, organizations can gain valuable insights into their assets' performance, identify trends and patterns, and make informed decisions to improve operational efficiency, reduce costs, and enhance customer satisfaction.

## 10. REFERENCES

1. Olga Cheban (2023). A Guide to Power BI Visuals and to How to Use Them. <https://blog.coupler.io/power-bi-visuals/>
2. SPEC INDIA (2022). Top 15 Power BI Dashboard Examples For Better Insights. <https://www.spec-india.com/blog/power-bi-dashboard-examples>
3. Analytics (2023). Top 9 Best Power BI Dashboard Examples. <https://www.imensosoftware.com/blog/top-9-best-power-bi-dashboard-examples/%20>
4. Peter Myers, Eva Lucas, Mohit Patel, Kurt, David Iseminger (2023). [Power BI implementation planning: Data-level auditing.](https://rb.gy/7bz17n) <https://rb.gy/7bz17n>
5. Cameron Archer(2023). Real-time dashboards: Are they worth it? <https://www.tinybird.co/blog-posts/real-time-dashboards-are-they-worth-it>
6. Mohamad Khouja, Tejas Parikh, Priyanka G. (2024). What are the benefits and challenges of using real-time data in your dashboard? <https://www.linkedin.com/advice/0/what-benefits-challenges-using-real-time-data-your>
7. Creating Interactive Dashboards in Power BI: Tips and Best Practices. <https://www.linkedin.com/pulse/creating-interactive-dashboards-power-bi-tips-best-practices-2f>
8. Unveil Valuable Insights to Effectively Manage Your Projects With Construction Analytics <https://mjobtime.com/mjobtime/construction-project-management-software/analytics/>
9. DIGITAL CONSTRUCTION CASE STUDIES E-BOOK <https://www.citb.co.uk/media/mdobnqrs/dcs-case-study-ebook.pdf>
10. Monitor the performance, maintenance needs + output of anything, simply. <https://www.rayven.io/iot-solutions/real-time-asset-monitoring>
11. Frédéric Charest (2023). What are the benefits of Power BI? <https://www.gestisoft.com/en/blog/what-are-the-benefits-of-power-bi>

12. Monitor and Analyze Production Data in Real-Time with Power BI. <https://www.beyondkey.com/blog/power-bi-manufacturing-dashboard/>
13. Christian Ofori-Boateng (2023). Power BI: What It's Used For & How It Benefits Businesses. <https://go.christiansteven.com/bi-blog/power-bi-what-its-used-for-how-it-benefits-businesses>
14. 15 Power BI Projects Examples and Ideas for Practice. <https://www.projectpro.io/article/power-bi-microsoft-projects-examples-and-ideas-for-practice/533>
15. Jignesh Shah (2018). 8 Major benefits of Microsoft Power BI you must know. <https://www.saviantconsulting.com/blog/8-major-benefits-of-microsoft-power-BI.aspx>
16. Tech Talk (2024). How Power BI Consultants Can Help Address Reporting Challenges. <https://www.damcogroup.com/blogs/power-bi-consultants-help-address-reporting-challenges>
17. Umesh Chandra. Asset Monitoring: Understanding the What, Why, and How. <https://www.etelligens.com/blog/asset-monitoring/>
18. 8 Main Benefits of Asset Monitoring Solutions. <https://gocodes.com/asset-monitoring-solutions-benefits/>
19. Top 4 Benefits of Predictive Asset Analytics for Utilities. <https://www.saviantconsulting.com/blog/4-benefits-predictive-asset-analytics.aspx>
20. Introduction to predictive maintenance in manufacturing. <https://learn.microsoft.com/en-us/azure/architecture/industries/manufacturing/predictive-maintenance-overview>
21. Célia Talma Gonçalves, Maria José Angélico Gonçalves, and Maria Inês Campante (2023). Developing Integrated Performance Dashboards Visualisations Using Power BI as a Platform. <https://www.mdpi.com/2078-2489/14/11/614>
22. Joel Jolly (2024). Empowering the Mining Industry with Business Insights: 8 ways Power BI can benefit. <https://saxon.ai/blogs/empowering-the-mining-industry-with-business-insights-8-ways-power-bi-can-benefit/>
23. Measure and drive your maintenance performance. <https://www.dynaway.com/solutions/asset-management-analytics>
24. Rishi Grover (2023). Power BI Dashboards for Finance: Key Use Cases and Examples. <https://www.venasolutions.com/blog/power-bi-dashboards-examples>
25. Rishabh (2023). How Power BI for the Manufacturing Industry Unlocks Data-Driven Success? <https://www.rishabhsoft.com/blog/power-bi-for-manufacturing-industry>
26. Lan Huang (2019). Building A Sales Dashboard for A Sales Department by using Power Bi. [https://www.theseus.fi/bitstream/handle/10024/161599/Huang\\_Lan.pdf?isAllowed=y&sequence=2](https://www.theseus.fi/bitstream/handle/10024/161599/Huang_Lan.pdf?isAllowed=y&sequence=2)
27. Suman (2024). What is Power BI Desktop? <https://intellipaat.com/blog/power-bi-desktop/>
28. Inbuilt Data (2023).Data Analytics with Power BI | Advanced Analytics and Cutting-Edge Insights. <https://www.linkedin.com/pulse/data-analytics-power-bi-advanced-cutting-edge-insights-inbuiltdata-wzkhf/>
29. Boniface Muchendu (2023). New Power BI On-Object User Interface: A Detailed Overview. <https://databear.com/new-power-bi-on-object-user-interface-a-detailed-overview/>