FACULTY OF COMPUTING

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SECP3744 – ENTERPRISE SYSTEMS DESIGN AND MODELING (WBL)

SECTION 1

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ASSIGNMENT 1 – TECHNICAL REPORT

TITLE:

BUSINESS INTELLIGENCE (BI) DASHBOARDS AND VISUAL ANALYTICS IN ERP SYSTEMS

GROUP 8

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EXECUTIVE SUMMARY

In this technical report we are going to present the impact and benefits of using Business Intelligence (BI) dashboards and visual analytics in Enterprise Resource Planning (ERP) systems. ERP is a software application that integrates activities across an organization such as information from finance, HR, manufacturing, supply chain and sales with the potential to help companies improve their critical business processes. In this era of data growth, companies use BI dashboards and visual analytics to simplify complex data into clear, interactive visualizations that drive people's decisions. With BI dashboards, managers can track KPIs and analyse business performance in real time whereas visual analytics uses graphs and charts to help individuals identify trends and patterns.When used BI dashboard and visual analytics together, they make data easier to find, see, and apply to develop a business.

This report also discusses major challenges such as how to combine data from different sources and keep systems consistent. More and more businesses are using Cloud BI solutions to deal with these problems. Several recommendations are proposed in this report including building a unified data warehouse, applying ETL processes, establishing clear KPIs, demonstrating people how to use data, and putting in place strong data governance to make sure that insights are reliable and decisions are made effectively.

INTRODUCTION

Nowadays, modern organizations, especially global corporations like Huawei and Petronas use Enterprise Resource Planning (ERP) systems as their foundation. In order to increase business processes efficiency, the ERP system integrates multiple business procedures, including sales, finance, and customer service into a single integrated system. However, companies feel challenged to gain valuable insights from the data when the amount of data is increasing fast. In order to solve this issue, organizations tend to use Business Intelligence (BI) dashboards and visual analytics to turn complex data into interactive graphical solutions that support company decision-making.

Visual analytics provide the ability to turn raw data into useful information using graphical representations such as charts and histograms, while BI dashboards allow companies to track their business and key operational metrics using user-friendly dashboards. Together, they use business information from ERP systems to assist business decision-making. This report aims to find out how BI dashboards and visual analytics improve the ERP systems functionalities, highlight their advantages and challenges, and give some implementation suggestions.

BACKGROUND

The integration of Business Intelligence (BI) dashboards and visual analytics with Enterprise Resource Planning (ERP) systems has changed from reporting to real time decision making. ERP systems help companies to integrate main business functions such as finance,

accounting, manufacturing and supply chain functions into one database. At the time of big data, companies have collected huge volumes of data and BI as well as visual analytics is becoming more popular using systems in order to extract useful insight.According to Lloyd (2023), BI is integrated with ERP systems to establish a strong relationship that adds value to business data and helps organizations to make better decisions. This configuration gives a clear view of the performance of the company by centralizing all business data in a single database. The information is available to stakeholders in the organization and facilitates easier communication, trust and teamwork between departments.

In this data-driven world, being able to digest information fast and clearly is crucial. Visual analytics provide ways for the organizations to see, explore and understand advanced data by simple and interactive methods through applied data analysis and visual tools. By integrating analytics and visualization, companies can identify hidden patterns, analyze performance as it happens and turn raw data into sophisticated insights. New technologies such as artificial intelligence (AI) and machine learning have revolutionized BI in recent years. These technologies are efficient at processing data and can identify patterns that people might overlook, which has greatly sped up the process and improved the quality of BI systems.

There are some challenges of BI dashboards and visual analytics. One of them is integration of data from different systems that use different formats. Because data is growing so quickly, businesses are having to bring information across many different databases and business apps that may run both on-premises or in the cloud. Consequently, the use of Cloud Business Intelligence (Cloud BI) has increased over the years. With Cloud BI, businesses can gather, process, and analyse data without having to use physical servers. Since everything is stored and managed in the cloud, users can access and handle information easily from anywhere and at any time.

ANALYSIS AND DISCUSSION

Discussion on functionalities, case examples, advantages, and challenges of business intelligence (BI) dashboards and visual analytics are done in this part.

BUSINESS INTELLIGENCE (BI) DASHBOARDS

Business Intelligence dashboard is a solution for collecting and analyzing data. It monitors and communicates the KPIs and other important indicators.It represents information as images, such as charts, graphs and maps. This is invaluable in helping people in the organization grasp information, share it widely and work more effectively as a team.
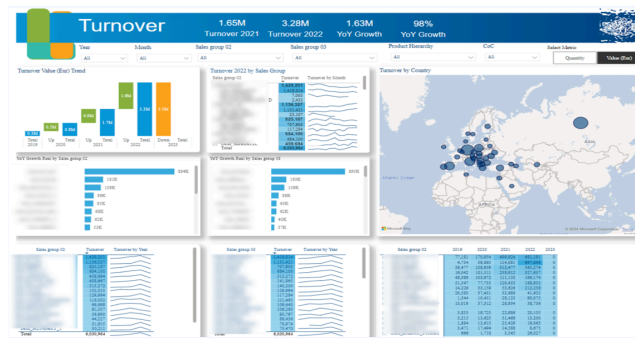
Figure 1 Sales Performance Dashboard

Figure 1 depicts the Sales Performance Dashboard. Using the BI dashboard, management can monitor sales revenue, customer and product performance in real time. This helps to determine the best selling products, highlighting the trends, and comparison of sales by region. This enables companies to make rapid, smart adjustments aimed at driving profit.
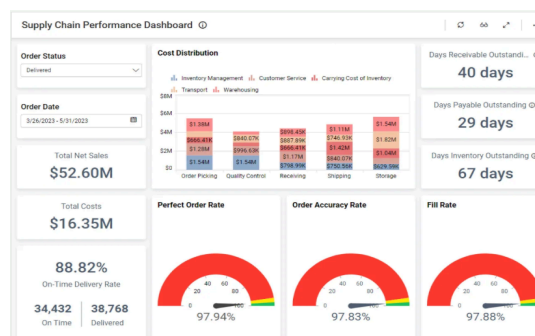

Figure 2 Supply Chain Performance Dashboard

Figure 2 shows the Supply Chain Performance Dashboard. The dashboard helps supply chain managers to observe customer satisfaction and find ways to improve performance. There is important logistics information on the left side of the dashboard, such as total net sales, total costs, and on-time delivery rates. You can see financial information like days receivable, days payable, and inventory outstanding. There are visualizations for the fill rate, the perfect order rate, and the order accuracy. This allows supply chain managers to monitor the dashboard data to make sure the supply chain is running smoothly ,identify problems and fix them in real time.

Managers can easily get business information with BI dashboards because they can interpret the data more effectively. BI dashboards help managers spot important insights quickly. Data visualizations such as charts and graphs make it easier to identify trends and patterns that are hard to see in raw data like tables or numbers. Managers can easily keep an eye on and analyse trends, sales data, and customer information to make better decisions and run their businesses more smoothly.

One significant issue with BI dashboards is integrating data from different sources of systems. This occurs when systems are unable to communicate information effectively with one another. When data is kept in many locations, it becomes difficult to integrate and

maintain consistency throughout the company. The most common way a company can do this is to deploy a data warehouse as a central location for BI data. This improves access data and ensures consistent data management. Other agile approaches for example, using data virtualization software or BI tools themselves to integrate data without loading it into a data warehouse.

VISUAL ANALYTICS

Nowadays, visual analytics is a common approach that assists organizations in making smart business decisions. To extract useful insights from the data, integration between machine learning and data visualization are needed. Without visual analytics, corporations need to view a large amount of complex statistics to monitor their businesses. But now with the help of visual analytics, it converts these complicated data into clear visual representations such as heatmaps and charts that can be directly integrated into the ERP system. These visual aids help users a lot in discovering data patterns, identifying trends, and detecting outliers in the ERP systems data.

There are more than one tool when discussing visual analytics. Some famous ones include Tableau, Python, and different machine learning techniques like classification and clustering. In short, visual analytics involve only four steps which are Data Preparation, Visual Exploration, Data Analysis, and Interpretation and Communication. First at all, the data will be extracted from ERP systems and cleaned, then the cleaned data was visualized into graphical representations such as scatter plot and histogram. Once visualized, data will be analyzed using machine learning techniques. Lastly, the insight analyzed will be converted into executive decisions.

Figure 3 Visual Analytics in Manufacturing

Figure 3 shows an example of visual analytics in the manufacturing sector. The visual representations help manufacturers to understand their production processes and overall performance better by enabling real-time monitoring on production output, equipment downtime and inventory levels. This helps manufacturers to identify limitations in their processes, improve efficiency, and make smarter decisions, thus reducing costs and guarantee products are delivered on time.

The advantages of visual analytics are very significant. First of all, it greatly simplifies the entire data analysis process, which results in increased efficiency. This also results in better insights with only a small amount of money and time. Next, departmental collaboration was promoted. When people from different departments come together as a team, better decisions will definitely be made for sure. However, everything has an opposite. Apart from these benefits, visual analytics must have its own challenges too. One of them is that the installation fees can be unaffordable. Moreover, having qualified analysts in the team is a must for the organizations. This aims to ensure data is analyzed correctly so that the business insights are trustable.

RECOMMENDATIONS

There are a few things can do to make Business Intelligence (BI) dashboards work better in Enterprise Resource Planning (ERP) systems. First, companies should create a unified data warehouse to store information from many ERP systems and external databases. This helps eliminate data silos and make sure that information about the organization is consistent, correct, and easy to find in real time across departments. Companies should also employ ETL (Extract, Transform, Load) methods to collect, clean, and integrate data easily from different departments. This will make BI reports better and make it less likely that the analysis will include inaccuracies. Lastly, businesses should set key performance indicators (KPIs) that match with their business goals. Power BI KPI dashboard provides a clear and objective way to track performance, identify areas for improvement, and align efforts with strategic objectives. So that companies may focus on what is important and make sure they spend their resources wisely and productively.

Now discussing visual analytics. Visual analytics also have some useful tips during implementation. Beginning with the first recommendation, it is about having a clear defined purpose and audience for the dashboard. Before designing the dashboard using visual analytics, the designer must clearly know who will be the user of the dashboard and what are the insights that user wishes to get from the dashboard, so that designer can choose the relevant data for visual analysis and help prevent confusion. The second suggestion is related to user interaction with visual analytic dashboard. Allowing users to use interactive features like filtering functions in the dashboard enables users to explore data in ERP systems. This method can help users discover deeper business insights. The last tip is to select suitable visual representations for different types of data as it affects the transformation of data into business insights.

CONCLUSION

To sum up everything, BI dashboards and visual analytics are essential for improving the efficiency and decision-making quality of ERP systems. They allow companies to monitor KPIs, identify patterns, and transform raw data into valuable insights. From this report, the main lessons include the value of centralized data management, ETL processes, and KPIs setting for BI dashboards. Apart from that, the report also mentions the importance of having

clearly defined purpose and audience, user interaction with dashboard, and use of suitable visual representations for visual analytics. Looking ahead, integrating AI-powered analytics and predictive analytics could further enhance the functionalities of ERP systems.

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APPENDIX

📃 Logbook / Process Record

Date	Activity / Progress	Keywords / Prompts Used	References / Sources	Verification / Notes
09 Oct 2025	Selected topic and discussed project scope with groupmate. Analyse the project title and rubric	"BI dashboards in ERP systems", "Visual analytics in enterprise resource planning"	N/A	N/A
10 Oct 2025	Searched for information about BI dashboards and visual analytics in ERP systems	"Introduction about Business Intelligence dashboards in ERP systems", "Introduction about visual analytics in ERP systems"	1. What is ERP? The Essential Guide SAP. (n.d.). SAP. https://www.sap.com/products/erp/what-is-erp.html 2. JulCsc. (n.d.). Intro to dashboards for Power BI designers - Power BI. Microsoft Learn. https://learn.microsoft.com/en-us/power-bi/create-reports/service-dashboards#advantages-of-dashboards	

Date	Activity	Search terms/Keywords	References	Notes
10 Oct 2025	Searched for background writing on BI dashboards	"Background of Business Intelligence dashboards and visual analytics in ERP systems", "Challenges of BI dashboards and visual analytics"," What is visual analytics, why it is important, and how it is used."	1. Bullis, J. (2025, September 12). 22 ERP systems and software examples. Cube Software. https://www.cubesoftware.com/blog/erp-system-examples 2.Visual analytics: What it is, why it's important, and how it's used. Discover the Domo Data Experience Platform. (n.d.). https://www.domo.com/learn/article/visual-analytics 3. Lawton, G. (2024, December 6). Top 12 business intelligence challenges to manage: TechTarget. Search Business Analytics. https://www.techtarget.com/searchbusinessanalytics/tip/Top-11-business-intelligence-challenges-and-how-to-overcome-them 4.CloudZero, & Slingerland, C. (2024, October 16). 15 Cloud Business Intelligence Tools: Organized by category. CloudZero. https://www.cloudzero.com/blog/cloud-business-intelligence-tools/	Checked abstracts and citation count on Google Scholar
11 Oct 2025	Write analysis and discussion on BI dashboard and visual analytics functionalities, case examples, advantages, and challenges.	"How the BI dashboard and visual analytics works or functions", "Case example of BI dashboard and visual analytics","Write adcantage and challenges of visual analytics in 2 paragraph"	1. Business Intelligence Dashboard: Definition & examples. Qlik. (n.d.). https://www.qlik.com/us/dashboard-examples/bi-dashboard 2.admin2. (2025, June 25). 11 power bi sales dashboards every sales team needs. Vidi Corp. https://vidi-corp.com/power-bi-sales-dashboards/ 3.Supply Chain Performance: Dashboard examples. Bold BI. (2025, October 9). https://www.boldbi.com/resources/dashboard-examples/supply-chain/performance-dashboard/ 4.Team, P. by: Y. (2025, September 30). 15 benefits of BI dashboards that make work easier. Yellowfin BI. https://www.yellowfinbi.com/blog/bi-dashboards-business-benefits 5.Lawton, G. (2024, December 6). Top 12 business intelligence challenges to manage: TechTarget. Search Business Analytics. https://www.techtarget.com/searchbusinessanalytics/tip/Top-11-business-intelligence-challenges-and-how-to-overcome-them 6. Mishra, C. (2025, October 10). What is Visual Analytics and its benefits? SCIKIQ Blog. https://scikiq.com/blog/what-is-visual-analytics/	Write report based on the key point on ChatGpt and Google website
			7. Pavlovych, A., & Pavlovych, A. (2024, December 5). 10 BI Dashboard Best Practices. PLANEKS. https://www.planeks.net/bi-dashboard-best-practices/ 8. What is Visual Analytics: A Comprehensive Overview. (2024, December 1). FineBI. https://intl.finebi.com/blog/visual-analytics 9. Visual analytics: What it is, why it's important, and how it's used. Discover the Domo Data Experience Platform. (n.d.). https://www.domo.com/learn/article/visual-analytics	

Date	Task	Prompt	Source/Reference	Outcome
12 Oct 2025	Completed recommendation section for BI dashboard and visual analytics improvement.	Provide practical or strategic suggestions based on our analysis. Explain how organizations or practitioners can apply our findings.	1. Business intelligence dashboards: Expert tips. Certified Salesforce Consultants Marketing Cloud Decision Foundry. (n.d.). https://www.decisionfoundry.com/business-intelligence/articles/unlocking-business-intelligence-dashboards-expert-tips/ 2.admin2. (2025, August 20). 22 power Bi Kpi dashboard examples: Professional templates. Vidi Corp. https://vidi-corp.com/power-bi-kpi-dashboard-examples/ 3. Business Analytics Institute. (2025, June 10). Visual Analytics: Best practices for effective dashboards. https://businessanalyticsinstitute.com/visual-analytics-best-practices-for-effective-dashboards/	Write report based on the key point on ChatGpt and Google website

13 Oct 2025	Use ChatGPT to summarise the Conclusion part	"summarise the report"	N/A	Obtained brief summary about BI dashboards and visual analytics
14 Oct 2025	Write executive summary	N/A	N/A	Highlighting the paper's purpose, key findings or arguments, and main conclusions or recommendations based on understanding of the report
16 Oct 2025	Finalized report formatting, edited grammar.List citation and appendix clearly	"Grammar check for this report"	N/A	Verified together with teammate

| 20 Oct 2025 | Uploaded final version to GitHub and prepared appendix screenshot. | "Check the logic of the report based on the rubric.Are this report fullfill the report guildance and what need to be improve" | N/A | Verified together with teammate |

✅ Summary of Research Progress

- Introduction: **Done**
- Background and Literature Review: **Done**
- Analysis and Discussion: **Done**
- Conclusion: **Done**
- Executive Summary: **Done**
- References: **Google website(APA 7th Edition)**
- AI Tool Used: **ChatGPT (for understanding topics, summarization, drafting and grammar check only)**