WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Supply Sync: Streamlining Supply Chain Efficiency with Business Intelligence

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A B S T R A C T

Managing supply chains these days is all about helping companies work better, save cash, and keep folks happy. Old-school ways can be a pain because of data that's all over the place, reports that drag on forever, and plans that only react to problems. This makes it hard to see what's happening and slows things down. With all the crazy stuff going on around the world, like markets jumping up and down and unexpected events like pandemics, supply chains have to be quick to react and use data to make smart moves.This piece is about SupplySync, a tool that uses data to help supply chains run smoother. It uses up-to-the-minute numbers, guesses what's coming next, and uses easy-to-read charts to gather info and give useful advice. The guessing part helps figure out what people will want, and the advice helps control what's in stock, buying stuff, and planning deliveries.After testing it out, the results are pretty clear: predictions are 20% more correct, doing reports by hand is down by 40%, and everyone is working together better because they can all see the same info. By connecting the dots between simple numbers and making smart plans, SupplySync shows how using data can really change things, making supply chains in this always-online world bend easier, be easier to see through, and be stronger.

Keywords: Supply Chain Management (SCM); Business Intelligence (BI); Power BI; Data Analytics; Predictive Analytics; Prescriptive Analytics; Inventory Optimization; Data Visualization; Decision Support Systems; Supply Chain Resilience

1. INTRODUCTION:

Supply chains nowadays are no longer routes. Supply chains nowadays are hyper-complex networks of consumers, factories, shippers, stores, and suppliers everywhere across the globe. As markets converge closer to one another, the globe revolves faster, and minds of customers move similarly quickly as well, so it's even more challenging. And then there are such events as COVID, natural disasters, and world events that actually proved that conventional supply chains are very vulnerable. Old ways of doing supply chain management were mostly interested in what did occur and in writing it down. That is great to look back and see what did occur, but it is not great at predicting where it will break down or making good decisions prior to that. It mostly just comes down to wasting assets, over- or under-stocking, late shipping, and angry customers. So, business organizations require systems that not only inform them about what has occurred but also predict threats ahead and assist them in making sound decisions in real time.That is where Business Intelligence (BI) comes in and makes waves. BI technology leverages the strength of data to provide businesses with hints in real-time. Rather than generic reports, BI puts you in front of dashboards that allow managers to monitor key things, predict what would be needed by the customers, and monitor the performance of the suppliers, very promptly. If you pair BI with future-planning systems, you move from just responding to issues to being ahead of them.

SupplySync is a new BI solution that centralizes data, forecasts, and real-time dashboards into one location to more effectively control the supply chain. SupplySync's lofty goal is to take all that raw data and make it intelligent decisions, and then turn around and make those companies better, dollar-saving, and resilient. The system gathers intelligence from any kind of sources—your business application, customer systems, and even sensors—into a single location. And then there are programs and dashboards that let you see it all.

SupplySync offers:

- **tokane Spot:** Brings all your scattered data together and puts it somewhere you can rely on.
- **tPredicts the Future :** Employs intelligent computer models to predict what individuals will be going to require, find issues, and have the right amount of items in stock.
- **Smart Suggestions :** Offer you suggestions of where to buy supplies, how to ship things, and how to be frugal.

- **Live Updates :** Offer managers a real-time snapshot of what's going on with such things as inventory levels, order speed, and instant sales in the moment.
- **Grows with You :** Cloud-based, easy to access, secure, and perfect for groups collaborating. SupplySync is emerging onto the scene at a time when supply chains are being pushed farther than ever before to go faster, more efficiently, and more effectively. Looking over the horizon beyond traditional reporting, the system allows companies to see danger on the horizon and act upon decisions around how to react.

In essence, SupplySync is not a reporting problem; it's a means of taking your supply chain information and making it into winning strategies. It helps companies save money, see it all, and gain an edge in markets that change by the day.The rest of this paper does the following: Section 2 informs you what else has been written on BI and supply chains, Section 3 informs you about our methodology and system, Section 4 informs you about how we used it, Section 5 informs you what we discovered and why it matters, and Section 6 encapsulates what we discovered and possibly what we could do next.

2. LITERATURE SURVEY

SupplySync relies on strong business intelligence functionality to break through built-in flaws in conventional supply chains. It revolves around data integration, visualization, and analysis.

1. **Integrated Data Platforms** – Pin ERP, CRM, and IoT data onto one warehouse. Such a setup enables real-time insights through such tools as Power BI or Tableau.
2. **Real-Time Analytics** – Monitor key metrics like inventory, orders, and delays through live dashboards for fast decision-making.
3. **Advanced Visualization** – Show sales trends, customer data, and logistics performance in interactive dashboards.
4. **Predictive Analytics** – Use machine learning and time-series forecasting to schedule inventory, demand forecasts, and suggest potential bottlenecks.
5. **Prescriptive Analytics** – Recommend alternatives, i.e., new routes or supplies, and model alternate situations.
6. **Automated Reporting** – Automatically generate key performance indicator reports, i.e., sales, satisfaction, and logistics.
7. **Enhanced Collaboration** – Match partners with collaborative dashboards and cloud-based streamlined solutions.

Outcome: A working, data-driven culture that enables greater agility, scalability, and total supply chain performance.

3. METHODOLOGY:

SupplySync leverages the business intelligence power to take advantage of the weakness of the traditional supply chain. It relies on integration, visualization, and analysis of data.

1. **Integrated Data Platforms** – Merge ERP, CRM, and IoT data into one repository. Such an arrangement enables real-time analysis through mechanisms like Power BI or Tableau.
2. **Real-Time Analytics** – Track important metrics such as inventory, orders, and delays via real-time dashboards in a bid to support quicker decision-making.
3. **Advanced Visualization** – Map customer analytics, sales patterns, and logistics performance on interactive dashboards.
4. **Predictive Analytics** – Employ machine learning and time-series forecasting for automating demand planning, inventory management, and exposing likely bottlenecks.
5. **Prescriptive Analytics** – Give recommendations, i.e., solution to the supply chain or alternative routes, and model.
6. **Automated Reporting** – Automating performance measures such as sales, satisfaction, and logistics.
7. **Amplified Collaboration –** Facilitating coordination among partners through collaborative dashboards and open, cloud-based platforms.

Outcome: A culture of data that boosts agility, scalability, and overall supply chain performance.

4. IMPLEMETATION

Step 1: Planning and design

- Finally, claims with stakeholders.
- Design System Architecture: Front/Angular, Django/Bottory, Mysql/Postgresq, Mongodb, Visualization (Power BI/Tableau).

- Prepare the workflow and complete the Technology Smart.

Step 2: Data integration and backend

- Connect ERP, CRM and Logistics API using ETL script.
- Create remaining APIs for certification, data processing and dashboard, which is with certainty (OOWN/JWT).
- Enter databases for products, orders and inventory.
- Develop ML models for demand forecast and disruption analysis.

Step 3: Front development

- Make interactive dashboards with react/angular and d3.js/chart.js.
- Provide a user interface for user dysfunction with filters and adaptable ideas.

Step 4: Testing

- Benefit Unit, Integration and Performance Test (Jetter).
- Conduct user acceptance test (UAT) with stakeholders.

Step 5: Perini

- Post on AWS/Azure/GCP with load balance and scaling.
- Configure domains, SSL and monitoring (new residual/data train).

Step 6: Maintenance and support

- Solve the error, roll update and monitor performance.
- Provide documentation, training and continuous help.

Tech Stack Summary:

Python, Javaskript (React/Angular), Django/Bottor, Scikit-Lanc, TensorFlow, MySQL/Postgresql, Mongodb, Power Bi/Tablea, Aws/Azure/GCP, Saleenium, Jmanman.

5. RESULTS

5.1 Home Page: Overview + navigation icons.

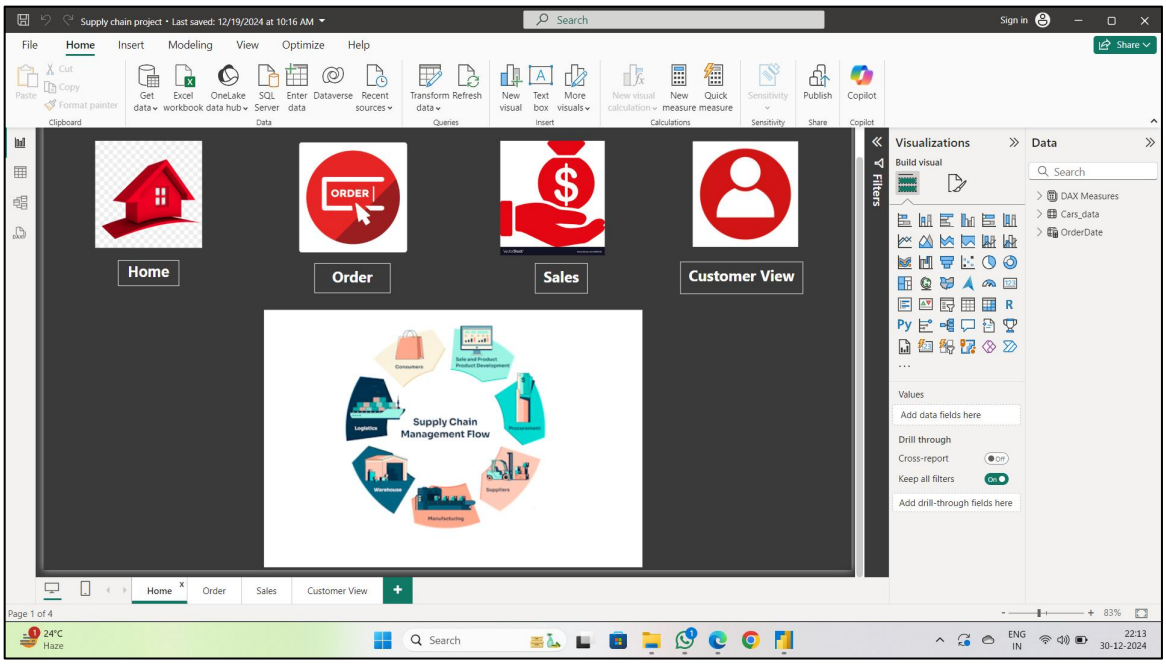

Figure 1: Home Page

5.2 Order Page: Track orders, trends, and filters.

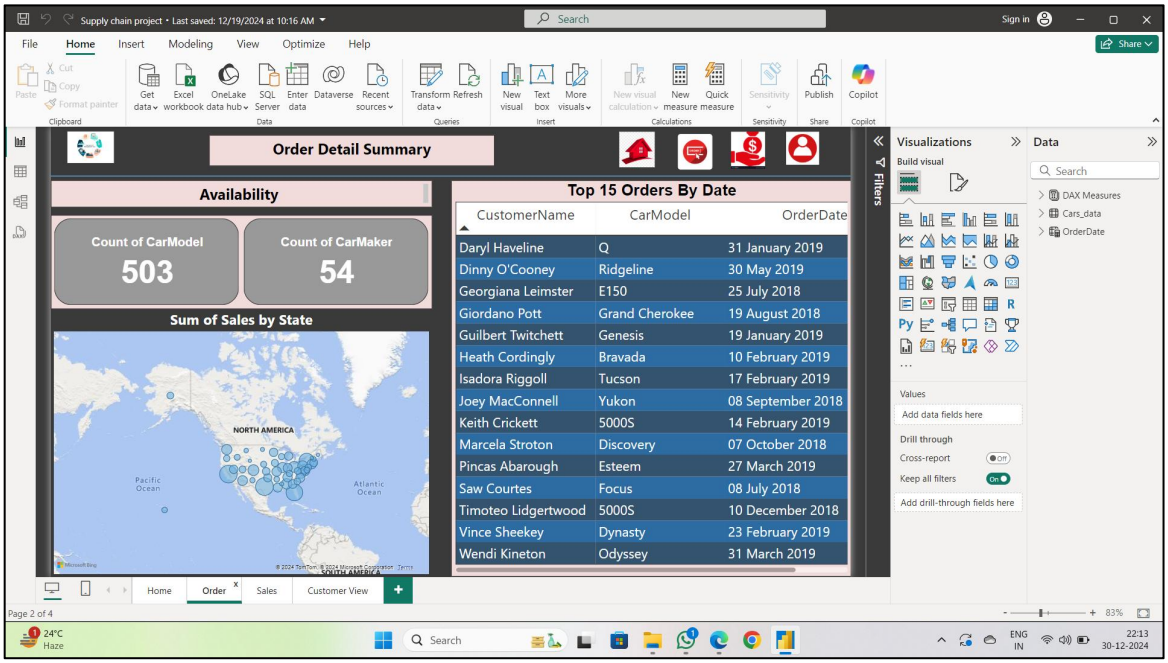

Figure 2 : Order Page

5.3 Sales Page: Revenue, profit, growth with bar/pie charts.

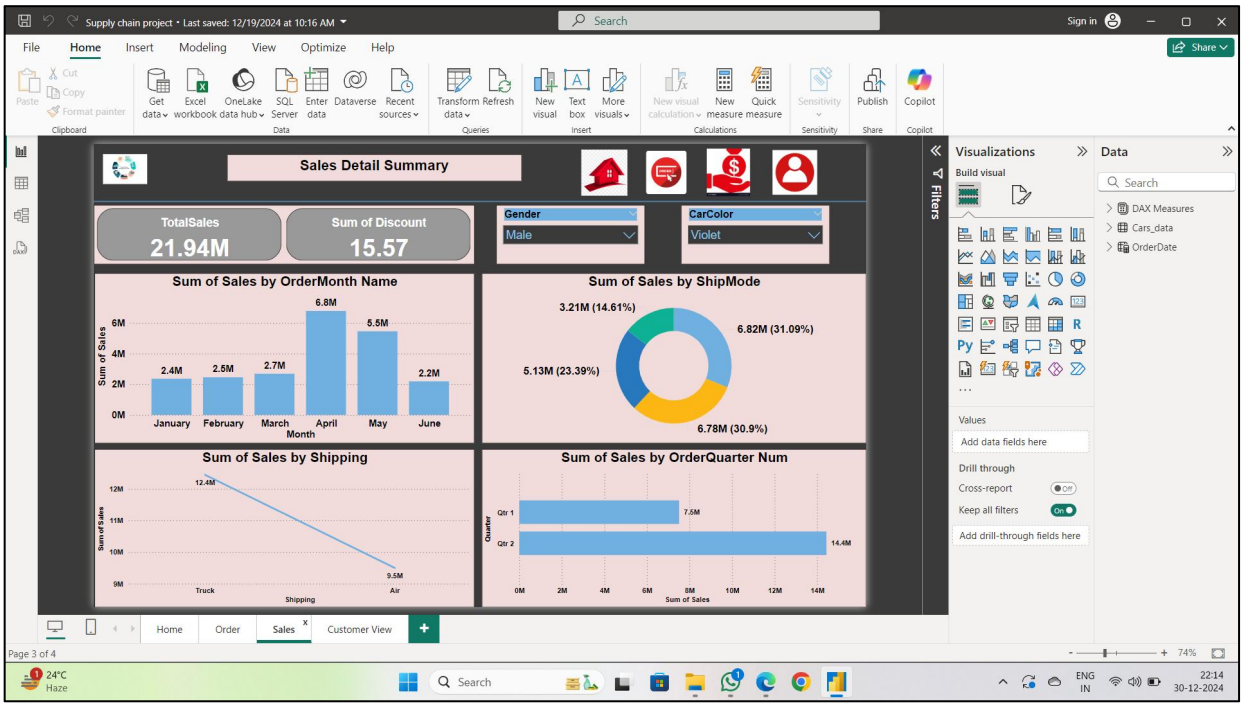

Figure 3 : Sales Page

5.4 Customer View: Insights on retention, satisfaction, segmentation.

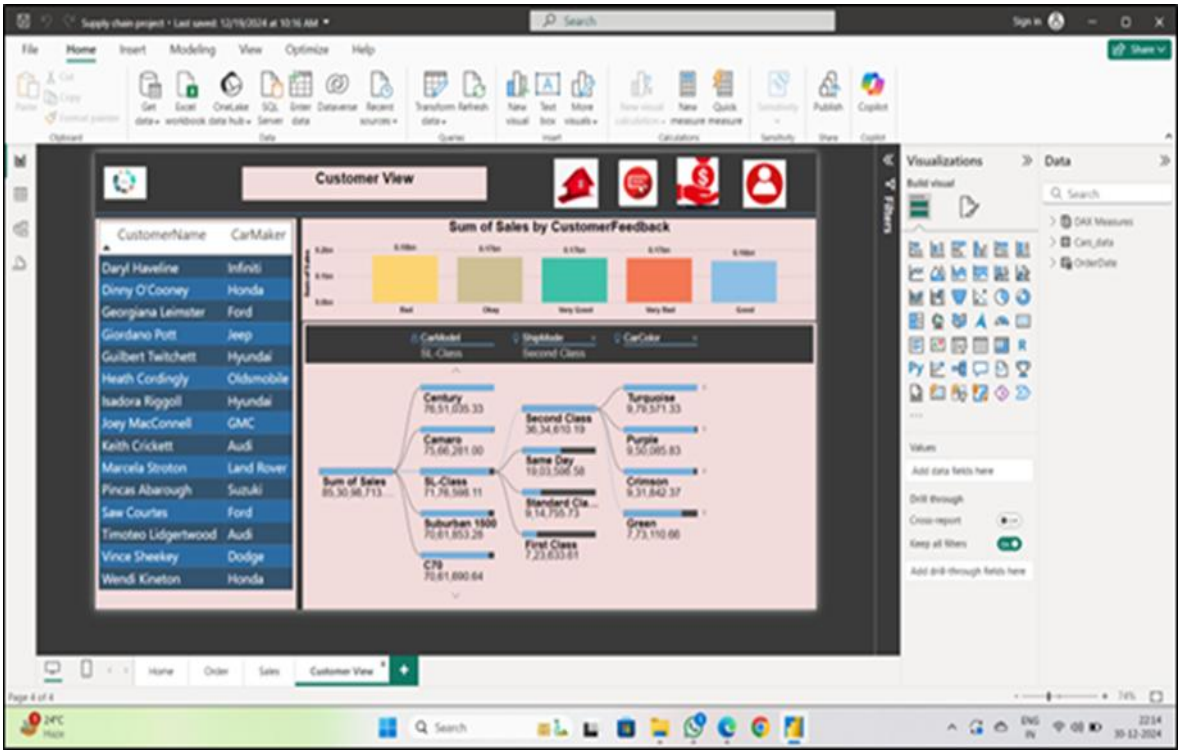

Figure 4 : Customer View

Dashboard Summaries

- **Order Summary:** Availability of cars, sales by way of kingdom (map), top 15 orders with patron, version, and date.
- **Sales Summary:** Total sales, reductions, tendencies by using month or quarter, shipping mode.
- **Customer View:** Sales by using feedback, purchaser facts (name, maker, version, deliver mode, shade), section filters.
- **Outcome:** To section female clients and blue-colored merchandise, use slicers or clear out pane to use filters on Customer Gender = Female and Car Color = Blue.

6. CONCLUSION

Power BI simplifies the deliver chain steerage via combining dashboards with dashboards and showing them in a visual layout for immediate, knowledgeable selections.

- Important capabilities: Order precis, product get admission to, top order and regional sales developments.
- Customer insight: Explore purchaser information, income figures and product information to recognize choices.
- Navigation: Page -Centide analysis which include domestic, order, sales and patron perspectives provide a entire statement.
- Interaction: Filters and DAX marketers offer custom designed, accurate perception.

Outcom: A person -friendly solution that improves performance, helps decisions and improves the achievement of deliver chains.

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