

Business Case for BI-Driven Customer Personalization in E-commerce

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1.0 Introduction/Background

The e-commerce industry has grown rapidly over the last decade, mainly due to increased internet access, mobile usage, and changing customer expectations. Online retail continues to expand each year, with customers now expecting faster delivery, smoother digital experiences, and more personalized interactions (van Gelder, 2025). Companies like Amazon and Walmart have set strong benchmarks by using data and business intelligence (BI) to improve both operations and customer experience.

Even with this growth, many e-commerce companies are not fully using the data they already have. Information is often spread across multiple systems such as websites, mobile apps, and logistics platforms. Because of this, it becomes harder to get a complete view of customers or make quick, informed decisions.

This business case looks at that gap and focuses on how BI can help turn available data into useful insights. By doing this, companies can better understand their customers, improve personalization, and make more effective decisions.

2.0 Business Objective

The main objective of this project is to improve customer experience and increase revenue by leveraging business intelligence for better personalization and data integration within the e-commerce industry.

To achieve this, the project focuses on several key goals. First, it aims to enhance customer targeting by using data to better understand preferences and behavior. Second, it seeks to increase conversion rates through personalized product recommendations and marketing strategies. Third, it focuses on improving operational efficiency by enabling better demand forecasting and inventory planning. Finally, it supports faster and more informed decision-making by providing real-time insights to business teams.

By implementing BI tools and analytics, organizations can move beyond basic reporting and start using data strategically. This aligns with the broader industry shift toward becoming more customer-centric and competitive in a digital environment (IBM, 2023). Ultimately, the objective is to create a more responsive and data-driven business model that can adapt quickly to changing customer needs.

3.0 Current Situation and Statement of Problem/Opportunity

Currently, many e-commerce companies collect significant amounts of data but face challenges in using it effectively. Data is often stored in separate systems such as customer platforms, sales databases, and supply chain tools. This lack of integration creates silos, making it difficult to gain a complete view of customer behavior and business performance.

Because of this, companies miss opportunities to personalize customer experiences, optimize pricing strategies, and improve inventory management. Decision-making is often slower or based on incomplete information, which can reduce efficiency and limit growth. The core problem is the lack of integrated business intelligence systems that can convert raw data into actionable insights.

To address this issue, the proposed solution is to implement a BI framework that integrates data sources and enables advanced analytics. This includes tools such as dashboards, customer segmentation models, and recommendation

systems. These capabilities will allow businesses to better understand their customers and respond more effectively to market trends.

This situation also presents a strong opportunity. Companies that successfully adopt BI can improve customer satisfaction, increase sales, and gain a competitive advantage over others that rely on disconnected systems or basic analytics (McKinsey & Company, 2022). By closing the gap between data and decision-making, organizations can significantly enhance both performance and customer experience.

4.0 Critical Assumptions and Constraints

This project is built on several key assumptions. First, it is assumed that the organization has an existing data infrastructure, including a CRM, website, and transaction platforms, and that executive leadership has the organizational commitment and financial readiness necessary to support this initiative (Sherman, 2014). Furthermore, these existing data sources and infrastructure are accessible and can be integrated. The last assumption is that the project will be delivered in phases over an 18–24-month period, allowing the organization to see incremental value and progress towards the full implementation of the project while managing scope and risk.

In terms of boundaries, or constraints, the key constraint is that the budget is not unlimited, and investments must be sequenced over the phases. Additionally, internal technical capacity will need to be considered given that data preparation typically accounts for 60–75% of total project effort, and depending on the organization's size and technical capacity, consultants or external labor may be needed (Sherman, 2014). Some additional constraints also relate to the data architecture, such as how many data sources exist and need to be integrated, which requires significant planning and governance. Lastly, how our data management and usage within the context of this BI project complies with privacy regulations such as GDPR and CCPA (Sherman, 2014).

5.0 Analysis of Options and Recommendations

The first option centers on a "buy" framework, where the data lives in a cloud-based data warehouse such as Snowflake, analytics and dashboards are delivered through a BI tool such as Power BI, the infrastructure is fully cloud-hosted, and the solution is configured and managed by the vendor with minimal in-house development. This approach offers the fastest deployment timeline, lower upfront costs through a subscription model, and reduced technical complexity since vendors manage infrastructure and updates (Vaillants, 2025). Real-world e-commerce implementations of cloud BI have demonstrated significant reductions in time-to-insight within months of deployment, directly addressing the gap between fragmented data and actionable decision-making (Vaillants, 2025). However, off-the-shelf tools still require a solid data architecture design to deliver meaningful value, and without internal BI expertise or proper integration planning across multiple e-commerce data sources, this option can lead to more issues and complexity (Sherman, 2014).

The second option involves a "build" approach, where the data lives in a fully custom-designed data environment built on platforms such as Databricks; analytics and dashboards are developed entirely by the internal team; the infrastructure can be cloud-hosted or on-premise depending on organizational needs; and the solution is designed, built, and managed entirely in-house. While this approach offers the greatest degree of control and customization for addressing complex data integration across e-commerce sources, it carries the highest cost and longest timeline of the three options. Data preparation alone accounts for 60 to 75 percent of total BI project effort, and a fully custom build can range from tens of thousands to millions of dollars while demanding ongoing maintenance investment (Sherman, 2014; Acceldata, 2025). Most internal builds of this scope risk exceeding both timeline and budget, particularly for organizations without a mature internal data engineering team (Skarica, 2025). For these reasons, this option is not recommended.

The third and recommended option utilizes a "hybrid" model, where the data lives in a cloud-based data warehouse such as Snowflake, analytics and dashboards are delivered through a BI tool such as Power BI, the infrastructure is fully cloud-hosted, and the data architecture is designed and implemented by external BI consultants. This approach directly addresses the core limitation of Option 1, which assumes internal teams have the expertise to architect and integrate multiple e-commerce data sources independently, while avoiding the high cost and risk of a fully custom in-house build. Organizations partnering with specialized BI consulting firms achieve ROI 2.3 times faster than those building internal capabilities from scratch (Addend Analytics, 2025), and a hybrid approach has been identified as the preferred path for organizations seeking cloud agility alongside a well-governed data environment (Vaillant's, 2025). This recommendation further aligns with established BI implementation guidance, which calls for augmenting internal staff with consultants to mitigate risks associated with new technologies and complex data integration efforts (Sherman, 2014). While consulting fees make this option more expensive upfront than Option 1, it offers the strongest balance of speed, expertise, risk mitigation, and long-term value for the e-commerce personalization initiative outlined in this business case.

6.0 Budget Estimate and Financial Analysis

The recommended solution is a hybrid cloud deployment supported by external consulting, because it offers a practical balance of implementation speed, technical expertise, scalability, and risk reduction. Microsoft's current Power BI licenses are \$14 per user per month, and Microsoft Fabric uses a capacity-based pricing model, which supports using an estimated cloud platform cost (Microsoft, 2024).

Cost Component	Description	Estimated Cost (Year 1)
BI Licenses	Power BI Pro/PPU licenses	\$12,000
Cloud Data Platform	Microsoft Fabric/Azure capacity, compute and storage	\$45,000
Data Integration & ETL	API connectors, ingestion pipelines, and transformation tools	\$35,000
Data Architecture & Setup	Data warehouse / lakehouse design, modeling and implementation	\$30,000
External Consulting Services	BI consultants for architecture, integration, dashboards, and personalized logic	\$85,000
Security & Governance	Access controls, privacy controls, audit logging, and governance setup	\$18,000
Training & Change Management	User training, support materials and change adoption activities	\$15,000
Testing & Quality Assurance	User acceptance testing, validation, and performance testing	\$10,000
Contingency	Buffer for scope changes or implementation overruns	\$25,000
Estimated Total		\$275,000

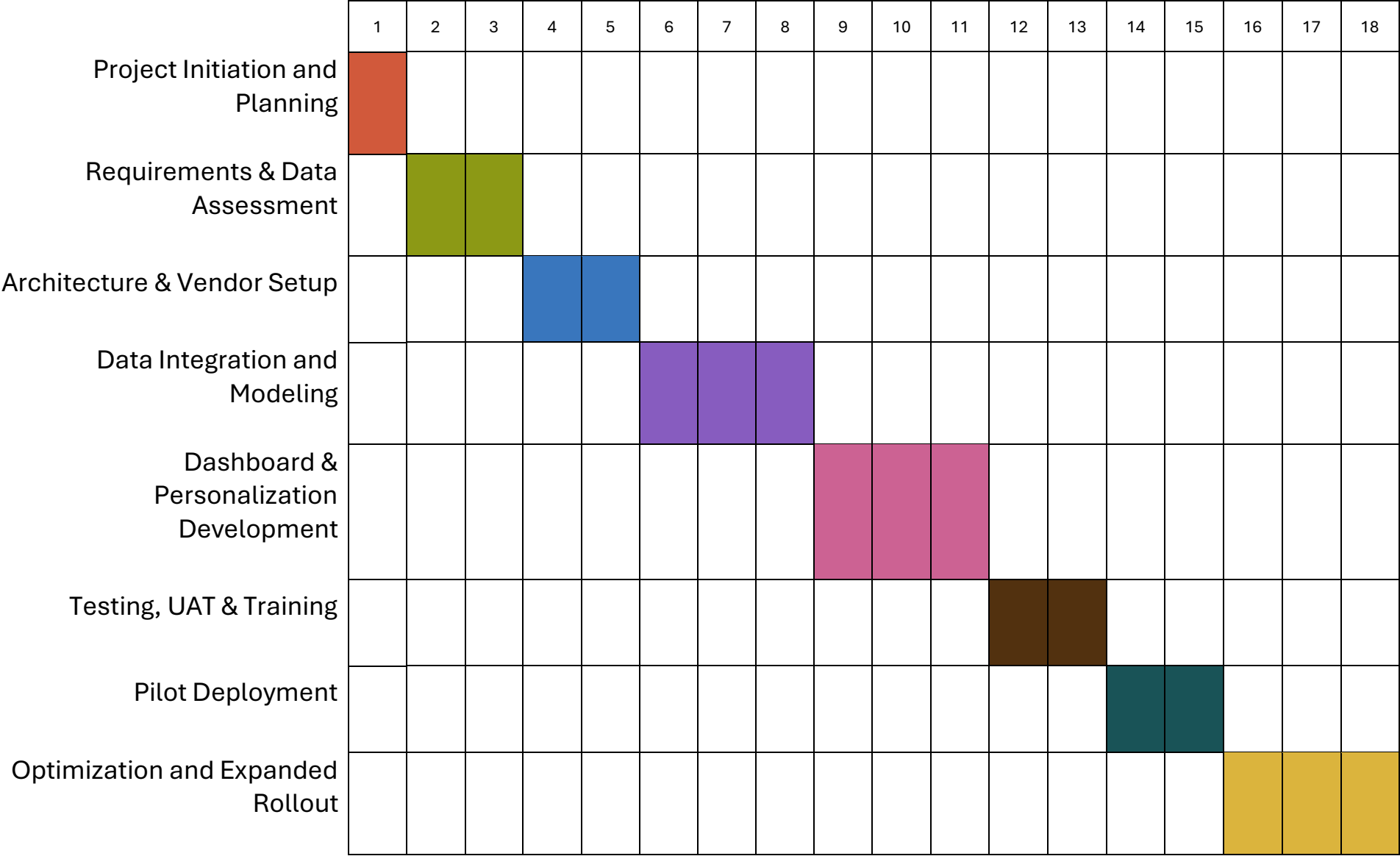
This investment is expected to create value through increased conversion rates, stronger customer retention, better demand forecasting, and faster decision-making. McKinsey notes that personalization initiatives can generate a 1%-2% increase in sales and improve margins by 1%-3%, meaning that a modest performance lift could create good returns for an e-commerce organization (McKinsey & Company, 2021).

7.0 Schedule Estimate

For this project, an agile approach is recommended because BI and personalization initiatives benefit from iterative development, phased releases, and continuous stakeholder feedback. Rather than waiting until the very end for a full rollout, the organization can deliver a pilot, gather feedback, and improve the system over time (Project Management Institute, 2008).

Phase	Duration	Major Deliverables
Project Initiation and Planning	Month 1	Scope definition, stakeholder alignment, project charter, KPI definitions
Requirements & Data Assessment	Months 2-3	Current state analysis, source system review
Architecture & Vendor Setup	Months 4-5	Cloud environment setup, tool selection confirmation, governance planning
Data Integration and Modeling	Months 6-8	Data ingestion pipelines, ETL processes, warehouse/lakehouse setup
Dashboard & Personalization Development	Months 9-11	BI dashboards, segmentation models, recommendation prototypes
Testing, UAT & Training	Months 12-13	System testing, user acceptance testing, training materials, revisions
Pilot Deployment	Months 14-15	Initial rollout to selected teams, KPI monitoring, user feedback
Optimization and Expanded Rollout	Months 16-18	Enhancements, additional integrations, broader deployment

Gantt Chart Schedule Estimate



8.0 Potential Risks

A major risk is poor data quality or fragmented data sources since e-commerce data often comes from various sources like websites, apps, CRM systems, marketing tools, and logistics platforms. Inconsistencies across these platforms may reduce the accuracy of insights.

Another key risk is privacy and regulatory exposure, especially because the project relies on customer-level data. If personal data is mismanaged, the organization would face compliance issues, reputational damage, and loss or loss of customer trust. These risks can be mitigated by implementing strong data governance practices, validating data before use, assigning clear data ownership, applying role-based access controls, and involving compliance and legal teams early. NIST's privacy and risk management support this approach, and GDPR principles reinforce the need for lawful, limited, and transparent use of data (National Institute of Standards and Technology, 2020).

Additionally, there is a risk associated with implementation and user adoption. The project may face cost overruns or delays if the scope expands too quickly, if integration is more complex than expected, or if internal teams are not ready to adopt the new BI tools. There is also a risk that the personalization models will not deliver expected value immediately, particularly if the organization lacks sufficient historical data. These risks can be reduced by using a phased rollout, beginning with a pilot, setting realistic success metrics, reserving contingency funds, and providing training and change management support through the implementation (National Institute of Standards and Technology, 2018).

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