

AI Fitness Market Analysis

Power BI Business Intelligence
Project

Kevin Michael

Tools: Power BI · DAX · Public Datasets

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1. Introduction

This project presents a business intelligence analysis of the AI-driven fitness market using publicly available data sources. The objective of the project is to evaluate market demand, company growth performance, and real-world user engagement through data visualization and analytical modeling.

The fitness industry is increasingly integrating artificial intelligence to provide personalized training, coaching, and health insights. Understanding whether market demand, company performance, and user behavior support this shift is critical for data-driven decision-making. This project was developed as a portfolio case study to demonstrate end-to-end data analysis skills, including data preparation, modeling, visualization, and insight generation using Power BI.

The dashboard answers three key business questions:

- Is demand for AI-powered fitness solutions increasing?
 - How is a major fitness company performing financially and operationally?
 - How do users engage with fitness technology in real life?
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2. Data Sources

The analysis is based on three real and independent datasets, each representing a different business dimension.

2.1 Google Trends

Google Trends data was used to analyze search interest over time for fitness-related topics, including:

- Fitness apps
- Workout apps
- Calorie trackers
- AI fitness coaching

This dataset serves as a market demand signal, reflecting public interest and awareness rather than direct user counts.

2.2 Peloton Quarterly Data

Peloton's publicly available quarterly shareholder data was used to evaluate company growth and financial performance. The dataset includes:

- Revenue
- Connected subscribers
- App subscribers
- Churn metrics
- EBITDA
- Free cash flow

This dataset represents the business and financial perspective.

2.3 Fitbit Daily Activity Data

A public Fitbit dataset containing daily user activity was used to analyze user engagement behavior, including:

- Steps
- Calories burned
- Active days
- Activity patterns across weekdays and weekends

This dataset represents the end-user behavior perspective.

3. Data Preparation and Modeling

3.1 Data Cleaning and Transformation

Before analysis, all datasets were cleaned and standardized to ensure accuracy and consistency. The following steps were performed:

- Standardized date formats across all datasets
- Removed unused and duplicate fields
- Converted text-based numeric values (e.g., "<1") into usable numeric formats
- Corrected percentage formatting issues
- Created derived columns for:

- Day name
- Weekday vs weekend classification
- Engagement categories based on step thresholds

A centralized Date table was created to support time-based analysis and filtering across all dashboard pages.

3.2 Data Model Design

The data model was designed using a star-schema-inspired structure, with the Date table acting as a central dimension connected to the fact tables from Google Trends, Peloton, and Fitbit datasets.

Key design considerations:

- Clear relationships to avoid ambiguity
- Separation of fact and dimension tables
- Optimized model for performance and readability

This structure allows consistent filtering and comparison across multiple datasets and time periods.

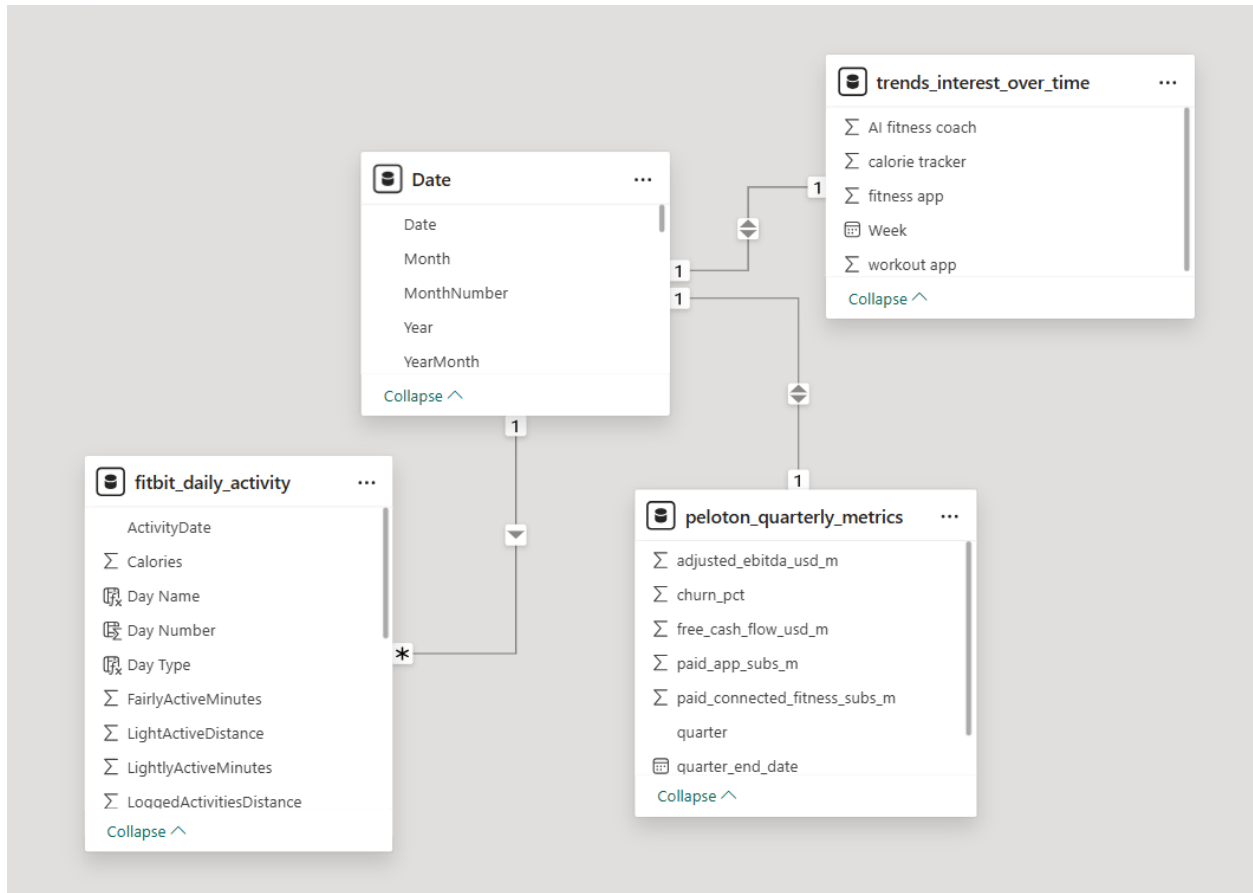


Figure 1 Power BI Data Model View

4. Measures and Calculations (DAX)

All business metrics were created using DAX measures rather than calculated columns, ensuring flexibility and correct aggregation behavior.

Measures were grouped into three logical categories:

- Market demand measures
 - Average search interest
 - Topic-level comparisons
 - AI demand index
- Company performance measures
 - Total revenue

- Subscriber counts
- Connected churn
- Free cash flow
- EBITDA
- User engagement measures
 - Average steps
 - Active days
 - Engaged days percentage
 - Activity segmentation

All measures were designed to be simple, readable, and business-oriented, focusing on interpretation rather than technical complexity.

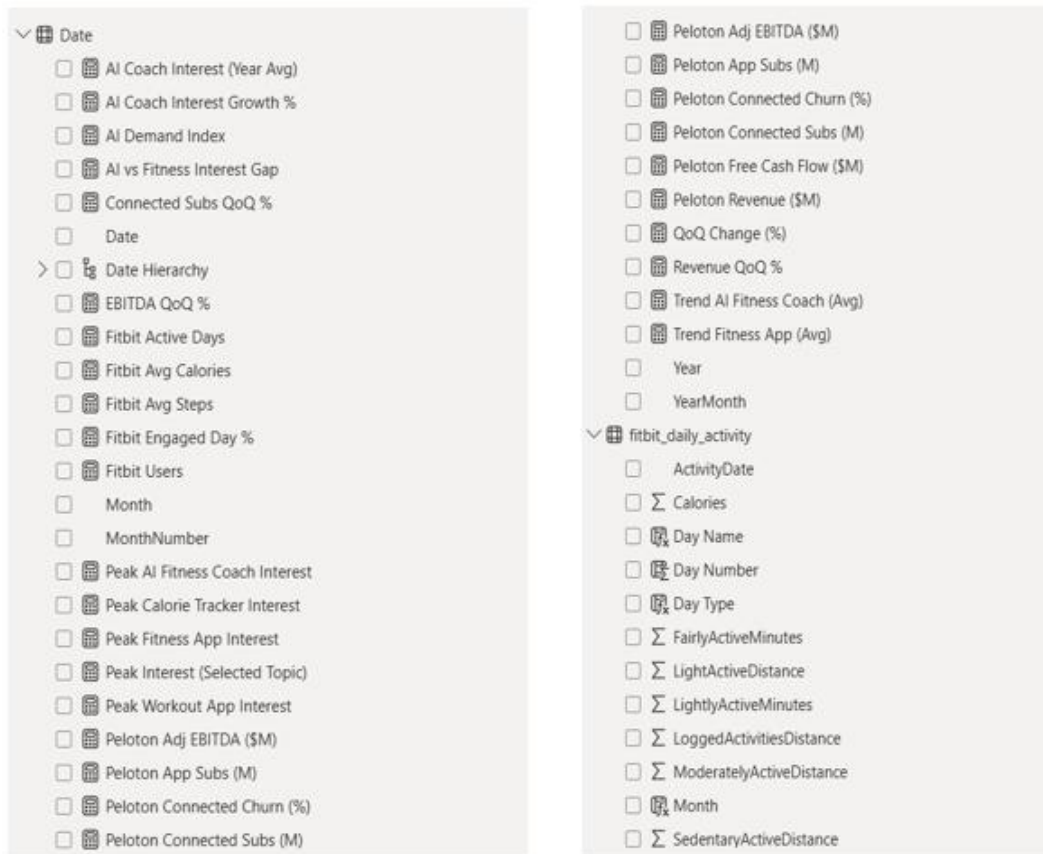


Figure 2 DAX Measures Used for KPI and Trend Calculations

5. Dashboard Design and Analysis

The Power BI dashboard consists of three analytical pages, each focusing on a distinct business perspective. A consistent dark theme was applied across all pages to maintain visual coherence and professional presentation.

5.1 Market Demand - Google Trends

This page analyzes search interest trends related to fitness and AI-powered fitness solutions. The dashboard includes:

- High-level KPI cards summarizing average interest and demand gaps
- Time-series trend analysis by topic
- Peak interest comparison across fitness categories

The analysis shows that interest in AI fitness coaching accelerates toward the later part of the year, while general fitness-related searches remain consistently strong.

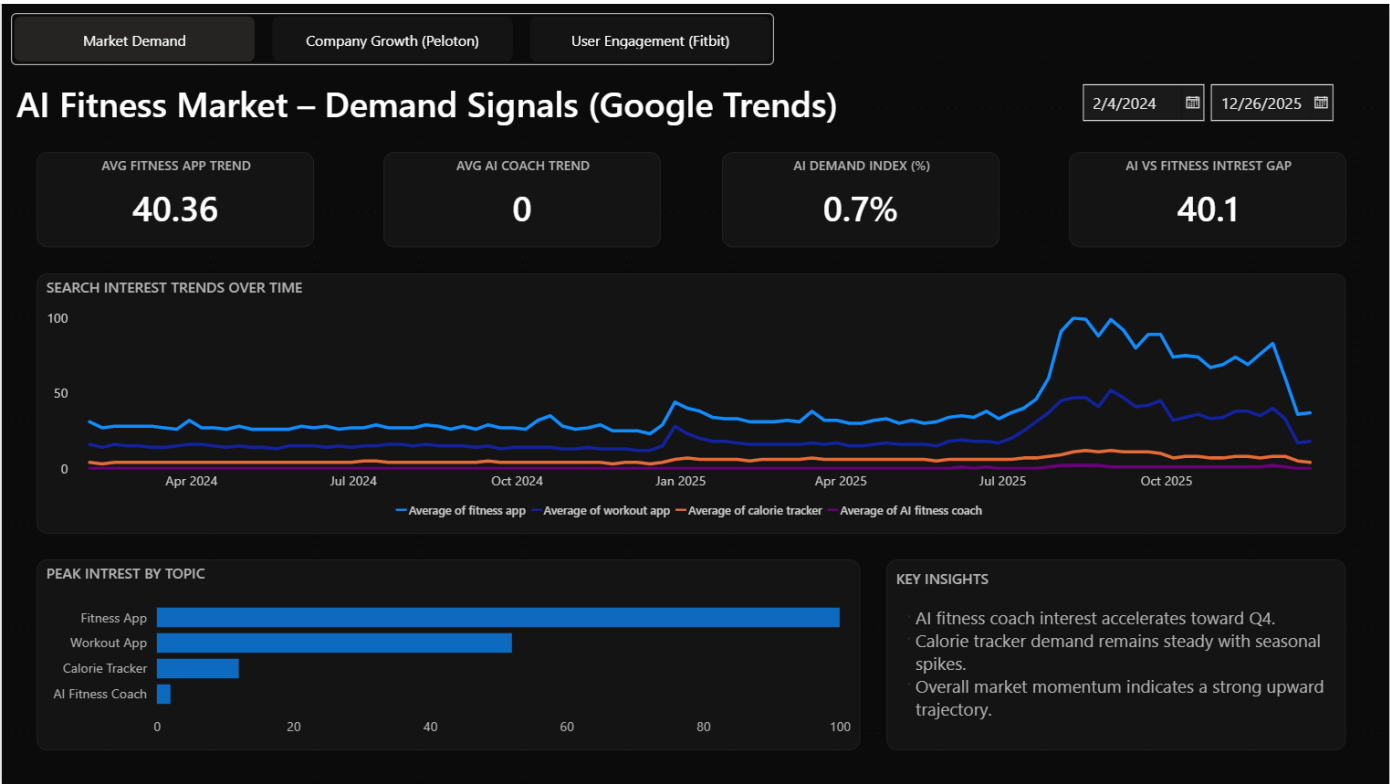


Figure 3 Market Demand Dashboard - Google Trends Analysis

5.2 Company Growth - Peloton

This page evaluates Peloton’s quarterly performance using financial and operational KPIs. Key elements include:

- Revenue trends
- Subscriber growth and decline
- Connected churn analysis
- Profitability and cash generation

The dashboard highlights pressure on subscriber numbers alongside improving cash flow metrics, illustrating the trade-off between growth and financial stabilization.

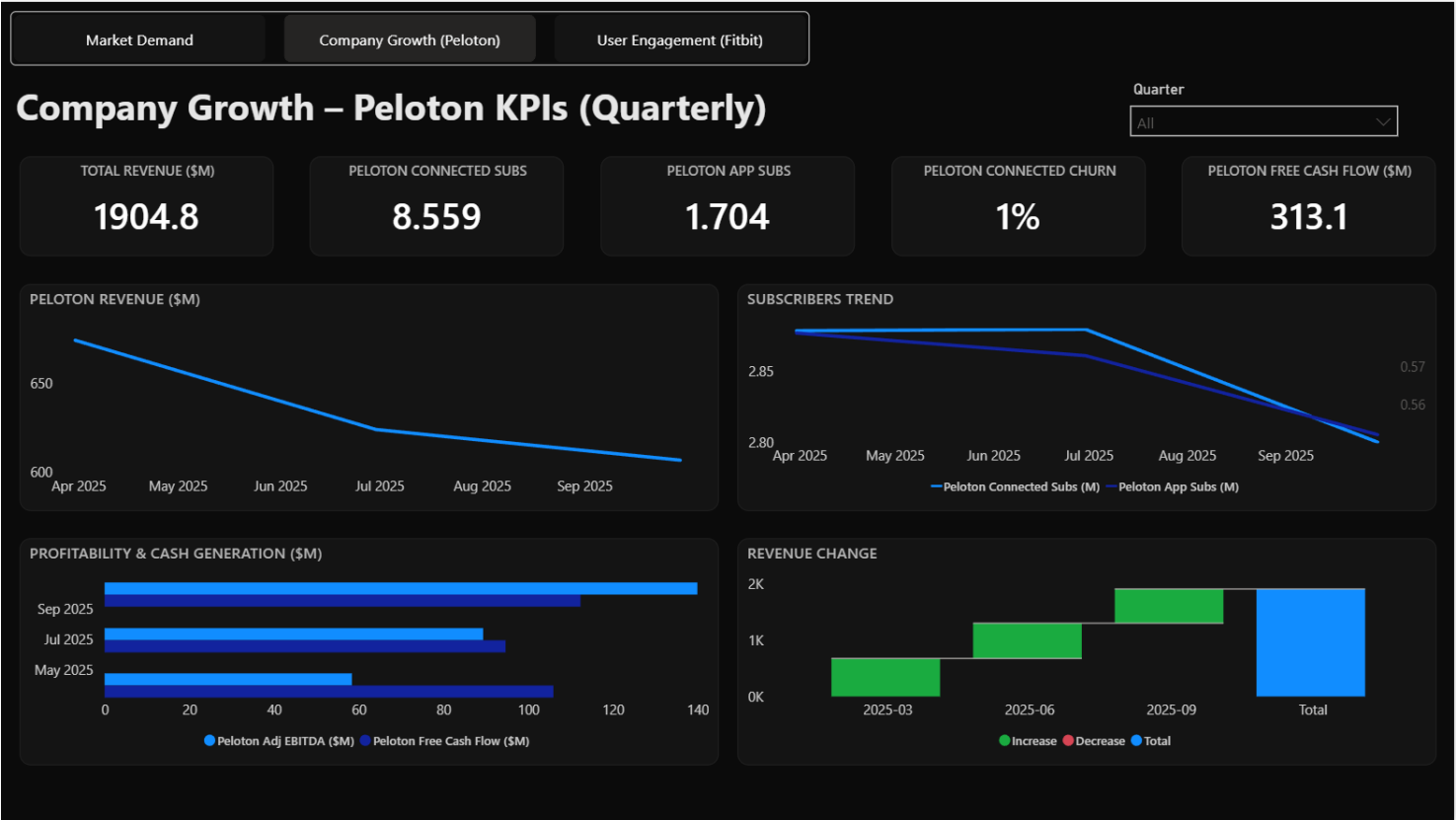


Figure 4 Company Growth Dashboard - Peloton KPIs

5.3 User Engagement - Fitbit

This page focuses on real user behavior, providing insight into how users interact with fitness technology on a daily basis. Visuals include:

- Activity distribution by weekday and weekend
- Relationship between steps and calories burned
- Monthly engaged vs low-activity day comparison

Results indicate that users are more active on weekdays and that higher step counts are strongly associated with increased calorie expenditure.

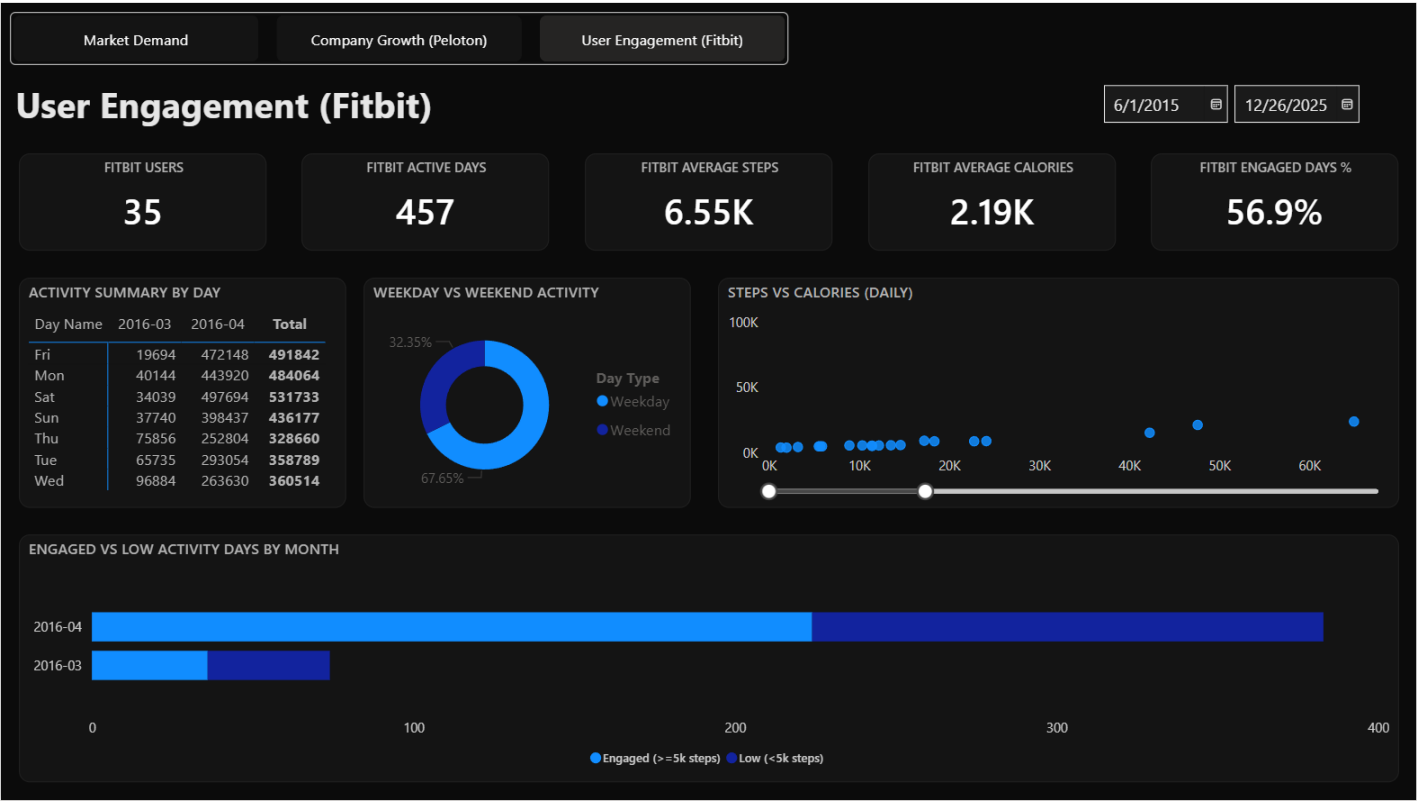


Figure 5 User Engagement Dashboard - Fitbit Activity Analysis

6. Key Business Insights

- Search interest in AI fitness coaching increases toward Q4, indicating seasonal demand patterns. This suggests an opportunity for companies to align AI feature launches, marketing campaigns, or subscription offers with peak interest periods.
 - General fitness app demand remains stable across the year, reflecting a mature but resilient market where differentiation through personalization and AI-driven features becomes increasingly important.
 - Company-level performance metrics indicate that financial sustainability is becoming as critical as subscriber growth, highlighting a shift from aggressive expansion toward operational efficiency.
 - User engagement patterns are strongly routine-driven, with higher activity observed on weekdays compared to weekends. This suggests that habit-forming features and weekday-focused engagement strategies may improve retention.
 - Higher step counts consistently correlate with increased calorie expenditure, validating the use of activity-based engagement metrics to measure user involvement and platform value.
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7. Business Recommendations

Based on the insights derived from the analysis, the following high-level recommendations are proposed:

- Fitness companies should prioritize AI-driven personalization features, particularly during periods of increased seasonal demand, to maximize user acquisition and engagement.
 - Retention strategies should focus on improving consistency in user activity, as engagement patterns indicate strong routine-based behavior.
 - Financial performance should be monitored alongside subscriber growth to ensure long-term sustainability, especially for companies operating hardware-based subscription models.
 - Combining behavioral engagement data with market demand signals can support more targeted product development and marketing strategies.
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8. Limitations

- Google Trends data represents relative interest rather than actual user volumes.
 - Peloton analysis is limited to a small number of quarters, which restricts long-term trend conclusions.
 - Fitbit data reflects a specific user sample and may not represent the entire fitness population.
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9. Conclusion

This project demonstrates how data from different perspectives-market demand, company performance, and user behavior-can be combined to provide a holistic business view. The analysis supports the conclusion that while the fitness market is stable, interest in AI-powered solutions is increasing, and user engagement patterns reinforce the importance of personalization and consistency.

Overall, the project showcases end-to-end business intelligence skills, including data preparation, modeling, DAX calculations, visualization, and insight communication using Power BI.