

# **Global Malnutrition trends: a Power BI analysis (1983-2019)**

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## **Introduction**

**Data Analytics with Power BI** involves using Microsoft Power BI, a business analytics tool, to process, analyze, visualize, and share data insights. Power BI connects to a wide range of data sources, transforms and models the data, and provides rich visualizations for decision-making. It helps individuals and organizations make data-driven decisions by offering powerful features for data analysis, reporting, and interactive dashboards.

## **Key Concepts of Data Analytics with Power BI**

1. **Power BI Overview:** Power BI is a suite of tools that enables data professionals and business users to extract insights from data through easy-to-use dashboards and reports. It has three main components:
  - **Power BI Desktop:** A free, downloadable application for building reports and visualizations.
  - **Power BI Service:** A cloud-based service for sharing and collaborating on reports and dashboards.
  - **Power BI Mobile:** A mobile app for accessing reports and dashboards on the go.

Power BI allows users to create reports, analyze data, and share insights across organizations.

2. **Power BI Components:**
  - **Power Query:** A tool for data ingestion and transformation. It allows users to extract data from different sources and clean/transform it before analysis.
  - **Power Pivot:** A tool for creating data models. It allows for relationships between tables, creating calculated columns, measures, and KPIs for in-depth analysis.

- **DAX (Data Analysis Expressions):** A formula language used in Power BI to create custom calculations, aggregations, and dynamic measures.
- **Power BI Visualizations:** Predefined and custom visual elements (charts, graphs, tables, etc.) used to display and interpret the data.

### 3. **Power BI Data Flow:**

- **Connect:** Import data from multiple sources, such as databases, Excel files, cloud services, APIs, or flat files.
- **Transform:** Clean, filter, and reshape the data to ensure it is in the right format for analysis. This can involve removing duplicates, handling null values, or aggregating data.
- **Model:** Build relationships between tables (data modeling), and define calculations, measures, and KPIs using DAX.
- **Visualize:** Create interactive reports and dashboards using charts, maps, tables, and other visual elements. The visualization process is highly customizable to meet the user's needs.
- **Publish:** Share reports and dashboards to the Power BI Service, where they can be accessed by stakeholders and embedded into websites or apps.

### 4. **Key Features and Tools in Power BI:**

- **Data Transformation & Cleaning:** Power BI provides robust tools (via Power Query) to clean and transform data before analysis. This includes merging datasets, filtering rows, and changing data types.
- **Data Modeling:** The ability to build data models using multiple tables and define relationships between them (1:1, 1:many). Measures and calculated columns help users extract meaningful insights.
- **DAX for Advanced Calculations:** DAX enables users to create complex calculations such as running totals, year-to-date totals, and custom aggregations. DAX is essential for advanced analytics and reporting.
- **Advanced Visualizations:** Power BI provides a rich set of visuals like bar charts, pie charts, line charts, scatter plots, maps, and more. Custom visualizations are also available through the marketplace.
- **Power BI Service & Collaboration:** Once reports are published to Power BI Service, they can be shared with others in your organization, embedded into websites or apps, and accessed from mobile devices.

- **Natural Language Queries:** Power BI includes a Q&A feature that allows users to ask questions using natural language (e.g., "What was the total sales in 2023?") and get answers in the form of visualizations.
5. **Data Sources:** Power BI supports a wide range of data sources, including:
- **Databases:** SQL Server, MySQL, Oracle, and other relational databases.
  - **Cloud-based sources:** Azure, Salesforce, Google Analytics, Dynamics 365.
  - **File-based sources:** Excel, CSV, XML, JSON.
  - **Web and APIs:** Direct API connections to external data.
  - **Other:** SharePoint, web scraping, OData feeds, and more.
6. **Power BI's Role in Data Analytics:**
- **Exploratory Analysis:** Allows users to quickly explore data with interactive visualizations to find patterns, trends, and outliers.
  - **Predictive Analytics:** Power BI can integrate with advanced analytics tools like Python or R to perform forecasting and predictive modeling.
  - **Real-Time Analytics:** Real-time dashboards can be created to display live data, making it easy to monitor business performance in real time.
  - **Business Intelligence (BI):** Power BI is a major tool for BI that provides users with insights, helps with decision-making, and drives business growth by translating data into actionable information.
7. **Security & Governance:**
- **Row-Level Security (RLS):** RLS allows you to restrict data access at the row level for different users. This ensures that only authorized users can see the data relevant to them.
  - **Data Privacy:** Power BI ensures that data privacy is respected by allowing you to configure privacy levels and access settings.
  - **Version Control & Auditing:** Power BI tracks changes to reports and dashboards, enabling teams to manage versions and audit usage.
8. **Power BI and Advanced Analytics:** Power BI also supports integration with more advanced tools like Python and R. Through these integrations, you can run advanced statistical models, machine learning algorithms, or complex data visualizations not natively available in Power BI.
- **Python Integration:** Run Python scripts directly within Power BI for more advanced analytics.

- **R Integration:** Like Python, R scripts can be run to generate plots and advanced statistical calculations within Power BI.
9. **Power BI as a Self-Service BI Tool:** Power BI is considered a self-service BI tool because it allows business users (with limited IT support) to create their reports and dashboards. The drag-and-drop interface and intuitive visualizations make it accessible for non-technical users, while its deep capabilities cater to data analysts and BI professionals.

### **Benefits of Using Power BI for Data Analytics**

- **Ease of Use:** The interface is intuitive and requires minimal programming or coding skills, making it accessible to business users.
- **Integration:** Power BI can connect to a wide variety of data sources, both cloud-based and on-premises.
- **Interactivity:** Reports and dashboards are interactive, meaning users can drill down, filter, and explore the data.
- **Customization:** Users can tailor reports and dashboards to meet their specific needs, creating custom visuals and calculations.
- **Collaboration:** It facilitates collaboration by allowing reports to be shared across teams, departments, or even with external partners.
- **Cost-Effective:** Power BI offers a free version (Power BI Desktop) and a cost-effective Pro version for businesses, with cloud-based sharing capabilities.

### **Applications of Power BI in Data Analytics**

- **Sales Analysis:** Track sales performance, analyze trends, and identify high-performing products or regions.
- **Financial Analysis:** Evaluate financial performance, track budgets, profit margins, and key financial metrics.
- **Customer Analytics:** Analyze customer behavior, segment customers, and track satisfaction levels to make better decisions.
- **Operational Reporting:** Monitor supply chain efficiency, production performance, and internal operations in real-time.
- **HR Analytics:** Track employee performance, turnover rates, and other HR metrics.

## **Steps for Getting Started with Data Analytics in Power BI:**

1. **Install Power BI Desktop:** Download and install the free Power BI Desktop application.
2. **Connect to Data:** Import data from your preferred data source(s).
3. **Transform & Clean Data:** Use Power Query to clean and prepare the data for analysis.
4. **Create Data Model:** Build relationships between tables and use DAX for calculations and aggregations.
5. **Design Visuals:** Drag and drop fields into Power BI's canvas to create charts and other visuals.
6. **Publish Reports:** Publish reports to the Power BI Service for sharing and collaboration.
7. **Share Insights:** Share reports or dashboards with stakeholders for business decision-making.

## **Conclusion:**

Power BI is a comprehensive, user-friendly tool for data analytics that allows users to gain deep insights into their data. Its powerful features like real-time analytics, rich visualizations, data modeling, and the ability to integrate advanced analytics through Python and R make it a go-to solution for organizations looking to transform raw data into actionable insights. With its focus on collaboration and sharing, Power BI enables teams to work together on data-driven decision-making

## **Here are some valuable resources for exploring Data Analytics with Power BI:**

1. [Microsoft Certified: Power BI Data Analyst Associate]- This certification provides meaningful business value through easy-to-comprehend data visualizations and enables others to perform self-service analytics. As a Power BI data analyst, you'll work closely with business stakeholders and collaborate with analytics engineers and data engineers to identify and acquire data.
2. [Microsoft Power BI Data Analyst Professional Certificate] (<https://www.coursera.org/professional-certificates/microsoft-power-bi-data-analyst>) - Microsoft Power BI is a leading data analytics, business intelligence, and reporting tool used by 97% of Fortune 500 companies. This professional training from Microsoft prepares you for a career in this high-growth field.
3. [Get started with Microsoft data analytics - Training](<https://learn.microsoft.com/en-us/training/paths/data-analytics-microsoft/>) - This learning path covers the life and journey of a data analyst, the skills, tasks, and processes they go through to tell a story with data, and how the suite of Power BI tools and services are used to create compelling reports.

4. [Perform advanced analytics in Power BI - Training](https://learn.microsoft.com/en-us/training/modules/perform-analytics-power-bi/) - Learn how to use Power BI to perform data analytical functions, identify outliers, group data, bin data for analysis, perform time series analysis, and work with advanced analytic features like Quick Insights, AI Insights, and the Analyze feature.
5. [Data Analysis and Visualization with Power BI - Coursera](https://www.coursera.org/learn/data-analysis-and-visualization-with-power-bi) - This Coursera course teaches you how to design, develop, and deploy business analytics dashboards using Microsoft Power BI. Data analysts help organizations gain valuable insights by working closely with others in the organization to reveal valuable information.

```
import pandas as pd
# Load the data
data = pd.read_csv('global_malnutrition_data.csv')
# Handle missing values
data.fillna(method='ffill', inplace=True)
# Normalize data if necessary
# Example: data['column'] = (data['column'] - data['column'].min()) / (data['column'].max() - data['column'].min())
# Save the cleaned data
data.to_csv('cleaned_global_malnutrition_data.csv', index=False)
# Load data
let
    Source = Csv.Document(File.Contents("cleaned_global_malnutrition_data.csv"),[Delimiter="," ,
Columns=5, Encoding=1252, QuoteStyle=QuoteStyle.None]),
    #"Promoted Headers" = Table.PromoteHeaders(Source, [PromoteAllScalars=true])
in
    #"Promoted Headers"
# Create Line Chart
# X-Axis: Year
# Y-Axis: Malnutrition Rate
# Create Bar Chart
# X-Axis: Region/Country
# Y-Axis: Malnutrition Rate
# Create Map Visualization
```

# Location: Region/Country

# Size: Malnutrition Rate