BUSINESS CASE & AI COMPETITION

LEGO CASE CHALLENGE

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BAN240NAA: Business Analytics Consulting Capstone Project

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1. Overview and Objective

This project seeks to investigate the historical progression of LEGO sets dating from 1970 to 2022, with the assistance of AI tools (ChatGPT) and with traditional tools (Python + Power BI). It will seek trends relating to the release of sets, complexity, value, and theme popularity unto the target demographic, with the aim to compare the clarity, speed, and insight from each approach.

2. Dataset Summary

- **Size:** 18,457 LEGO sets, 14 columns
- **Key Variables:** Year, Pieces, Theme, Price, Minifigs, Age Range
- **Missing Data:** Pieces (21%), Price (62%), Age (63%), Minifigs (55%)
- **Action Taken:** Missing values were selectively dropped or imputed using group medians.

3. Key Analysis Questions (6 Core Areas)

Question	Business Purpose
1. Sets Released per Year	Growth, portfolio expansion
2. Avg Pieces per Set Over Time	Set complexity trend
3. Avg Price per Piece Over Time	Value efficiency (price/piece)
4. Theme Popularity Over Time	Thematic evolution
5. Pieces vs. Price-per-Piece	Budget vs premium positioning
6. Max Recommended Min Age Range Over Time	Target demographic shift

4. Summary of Insights

- **Growth:** LEGO set output surged post-2000, nearing 1,000 sets/year by 2022.
- **Complexity:** The average number of pieces/sets has more than doubled since the 90s.
- **Cost Efficiency:** After 2000, the prices per piece basically remain constant; smaller sets, of course, give away a bad deal.
- **Themes:** Shift from classic (Town, Technic) to licensed themes (Star Wars, Friends)

- **Value segments:** Big sets are better priced per piece; smaller/licensed sets are at a premium.
- **Demographics:** The range moved from 5-7 in the early years to 12-18 and up for the modern era, indicating a shift toward teen/adult builders.

5. AI Tools vs Traditional Methods: Comparison

Aspect	AI Tools (ChatGPT)	Traditional Methods (Python + Power BI)
Accuracy & Depth of Insight	1. Good summaries with business context 2. Might miss small details or outliers	1. Precise, data-backed insights 2. Requires correct logic and interpretation
Time & Effort Required	1. Very fast with the right prompt 2. Limited by prompt clarity and data prep	1. Time-consuming (cleaning, coding, visuals) 2. Tailored and reliable output
Ease of Use & Accessibility	1. Easy to use, no coding, chat-based 2. Less flexible for edits or tweaks	1. Needs coding & BI tool skills 2. More control, shareable and customizable

6. Final Reflection

- ChatGPT helped quickly surface high-level insights, validate hypotheses, and generate narrative-ready summaries.
- Python + Power BI allowed for data cleaning, transformation, and detailed visualizations tailored to business questions.
- Combining both gave a robust hybrid approach: AI for initial direction, and traditional tools for depth and clarity.