Bass Model Diffusion Analysis Report: GE Profile Smart Indoor Smoker

1) Innovation Chosen

Product: Barbecue Without the Hassle — GE Profile Smart Indoor Smoker
Recognition: TIME Best Inventions of 2024
Link: [Insert link to the 2024 list item]

Description: A smart indoor smoker that enables wood-smoke cooking indoors with air filtration and app-based control. It targets home cooking enthusiasts seeking the flavor of traditional barbecue without outdoor space constraints.

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2) Similar Past Innovation & Justification

Analogue: Air Fryer

Justification:
- Both innovations bring specialized cooking methods into compact, countertop devices with smart controls.
- Air fryers popularized high-heat convection cooking to achieve “fried-like” textures using little oil. Similarly, the GE indoor smoker allows indoor wood-smoking with minimal user effort.
- Both products appeal to the “better-at-home cooking” trend, targeting convenience, healthier options, and culinary exploration.
- Market dynamics are similar: adoption is accelerated by imitation effects, social proof, online recipes, and influencer promotion.

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3) Historical Data (Look-Alike)

U.S. Air Fryer Retail Sales (USD millions), 2015–2019: - 2015: 106.3
- 2016: 212.6
- 2017: 265.8
- 2018: 332.2
- 2019: 412.1

ASP Benchmarks: - 2018–2019: ~$77.63–78.46
- 2015–2017: assumed $80

Source: Market.US, Air Fryer Statistics & Facts

Note: Revenue converted to units (millions) for Bass modeling using these ASPs. This allows the Bass model to analyze the actual adoption volume instead of sales revenue.

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4) Bass Model Parameter Estimation (Air Fryer, U.S.)

Discrete-Time Bass Equation:

$$S_t = \left(p + \frac{q}{M} Y_{t-1}\right)(M - Y_{t-1})$$

Estimated Parameters (via nonlinear least squares):
- **p (innovation coefficient):** 0.0484
- **q (imitation coefficient):** 0.5567
- **M (market potential):** 32.85 million units

Interpretation:
- High imitation effect indicates rapid adoption driven by social influence.
- Consistent with the fast diffusion patterns seen in small, convenient countertop appliances.

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5) Diffusion Prediction for the 2024 Innovation

- **Target Product:** GE Profile Smart Indoor Smoker
- **Parameters:** p = 0.0484, q = 0.5567 (transferred from air fryer analogue)
- **U.S. Market Potential (M_smoker):** 6.5 million units
- Based on ~132.2M U.S. households (2024)
- TAM assumes ~5% of households: apartments, multi-family dwellings, grill-constrained consumers, and BBQ enthusiasts
- **Seeded Early Adopters (2024):** 50k

Results (2024–2035):
- Cumulative adopters: ~6.48M by 2035
- Annual adoption peak: ~1.04–1.05M in 2028–2029
- Adoption declines after peak due to market saturation

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6) Scope Choice (Country-Specific: United States)

- **Decision:** U.S.-specific analysis rather than global diffusion.
- **Justification:**
- Historical analogue (air fryer) data is U.S.-specific and detailed, allowing a defensible parameter estimation.
- Reliable household counts, apartment and grill-ownership data, and appliance adoption benchmarks are available for the U.S.
- Market potential (M) can be conservatively estimated using demographic and household segmentation.
- Global diffusion would require varying p, q, M for different countries, introducing high uncertainty and reducing the reliability of predictions.

References/Data:
- U.S. household data: U.S. Census Bureau
- Grill ownership & appliance adoption: Market.US

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7) Estimated Adopters by Period

- **Annual adopters:** Ramp from ~0.50M in 2025 to ~1.05M by 2028–2029, then decline
- **Cumulative adopters:** Reach ~6.48M by 2035 (~full TAM)
- **Detailed values:** See `ge_indoor_smoker_bass_forecast_us_2024_2035.csv`

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8) Transparency: Assumptions & Limitations

- Revenue-to-units conversion assumes stable $80 ASP (2015–2017) and documented ASPs for 2018–2019.
- Parameter estimation uses only 5 annual points; M and q are less precisely identified than with longer time series. Values are consistent with small appliance diffusion patterns.
- TAM is conservative and U.S.-specific; update predictions if manufacturer shipment data or refined segment sizing becomes available.

Please find the visualisations below.