

Appendix C: Confidence Intervals for 2023 Extrapolation (Figure 10)

Data (EU Scoreboard, billion USD)

Year	Corporate R&D
2019	\$928B
2020	\$958B
2021	\$1,035B
2022	\$1,115B

Calculations

Annual growth rates:

- 2020: $(958 - 928) / 928 = 3.2\%$
- 2021: $(1,035 - 958) / 958 = 8.0\%$
- 2022: $(1,115 - 1,035) / 1,035 = 7.7\%$
- Mean CAGR (2019–2022) = 6.3%
- Standard deviation = 2.2 percentage points

2023 Projections

Scenario	CAGR	Projection
Optimistic (+2 σ)	10.7%	\$1,235B
Optimistic (+1 σ)	8.5%	\$1,210B
Baseline	6.3%	\$1,186B
Pessimistic (-1 σ)	4.1%	\$1,161B
Pessimistic (-2 σ)	1.9%	\$1,137B

95% Confidence Interval

95% CI = Baseline \pm 2 σ = \$1,186B \pm \$49B

95% CI = \$1,137B – \$1,235B

For global corporate R&D including non-Scoreboard companies, the 95% CI is approximately 1.68T–1.96T.

Data Status Classification

Status	Definition	Examples
Factual	Directly reported by source without modification	WIPO patent counts, EU Scoreboard R&D spending
Calculation	Author's arithmetic manipulation of factual data	Patent growth indices, CAGR calculations
Extrapolation	Projection beyond reported data using statistical methods	2023 R&D spending estimates
Synthesis	Qualitative integration of multiple sources	Figures 5, 8, 9 (illustrative only)