

BUSINESS MEMORANDUM

TO: Mary Challenge, CEO, Challenged Kitchen Co.

FROM: Consulting Team

DATE: February 16, 2025

SUBJECT: Make vs. Buy Decision — New Product Line

EXECUTIVE SUMMARY

We recommend in-house production. The four-year NPV is \$1,304,949 versus \$1,089,212 for outsourcing — a \$215,737 advantage. The \$400,000 equipment investment pays back within Year 1, with break-even at 3,030 units against projected demand of 14,000. Beyond the numbers, in-house production keeps quality control and production scheduling inside the company, which matters for a branded kitchen product line.

COMPANY BACKGROUND

Challenged Kitchen Co. was founded by Mary Challenge while completing her MBA in Boston. The company built its initial customer base through home kitchen accessory sales via Massachusetts Community Media (MassAccess), then expanded into manufacturing and sales of signature kitchen accessories and small appliances after graduation.

PROBLEM STATEMENT

Challenged Kitchen Co. must choose between two production strategies for a new product line. The decision locks in unit economics for four years.

Option A — In-House Production

- Initial equipment investment: \$400,000
- Variable production cost: \$7 per unit
- Depreciation: straight-line over 4 years (\$100,000/year)
- Full control over production quality, scheduling, and IP

Option B — Outsourcing

- No initial capital required
- Fixed cost: \$18 per unit, guaranteed for 4 years
- Lower operational complexity, higher supplier dependency

Key Parameters

Selling price	\$40 per unit (fixed, 4 years)
Year 1 demand	14,000 units (mean)

Annual growth rate	20% (Years 2–4)
Tax rate	21%
Discount rate	7%

FINANCIAL ANALYSIS

Year 1 Income Statements

Line Item	In-House	Outsourcing
Units Sold	14,000	14,000
Revenue	\$560,000	\$560,000
Production Costs	\$(98,000)	\$(252,000)
Gross Profit	\$462,000	\$308,000
Depreciation	\$(100,000)	—
EBIT	\$362,000	\$308,000
Tax (21%)	\$(76,020)	\$(64,680)
Net Income	\$285,980	\$243,320
Add Back Depreciation	\$100,000	—
Cash Flow	\$385,980	\$243,320

Four-Year Cash Flows

Year	Year 1	Year 2	Year 3	Year 4
Units	14,000	16,800	20,160	24,192
In-House CF	\$385,980	\$458,976	\$546,571	\$651,685
Outsource CF	\$243,320	\$291,984	\$350,381	\$420,457

Four-Year NPV Comparison

Option	NPV (7% discount rate)
In-House Production	\$1,304,949
Outsourcing	\$1,089,212
Advantage to In-House	\$215,737

Break-Even Analysis

The correct break-even calculation divides annual depreciation (the only fixed cost in the in-house model) by the contribution margin per unit:

$$\text{Break-even} = \text{Annual Depreciation} \div \text{Contribution Margin} = \$100,000 \div \$33 = 3,030 \text{ units per year}$$

Year 1 projected demand is 14,000 units. That leaves a margin of safety of 10,970 units — 78% above break-even. The investment pays back in Year 1 under virtually any realistic demand scenario.

MONTE CARLO SIMULATION

To stress-test the base-case recommendation, we ran 1,000 iterations varying two inputs: Year 1 demand (mean 14,000, SD 1,000) and annual growth rate (mean 20%, SD 3%).

Metric	Result
In-house preferred	100% of 1,000 iterations
In-house NPV range	\$878,690 to \$1,746,763
Outsource NPV range	\$805,039 to \$1,383,754
Consistent NPV advantage	\$154,000 to \$220,000 per run
Break-even achieved in Year 1	100% of iterations
95% CI — In-house NPV	\$1,100,000 to \$1,520,000

In-house never lost. The \$11/unit cost advantage (\$7 vs. \$18) compounds with the 20% annual growth rate — by Year 4, that gap is producing on 24,192 units. No combination of demand and growth assumptions in our simulation reversed the result.

STRATEGIC ANALYSIS

The financial case alone is sufficient. But the in-house option also aligns better with Challenged Kitchen's long-term interests as a branded manufacturer. The \$11/unit cost advantage creates room to compete on price or invest in quality — neither is possible when margin is locked at \$22/unit by an outsourcing contract.

In-House Advantages

- \$11/unit lower variable cost, growing in value as volume scales to 24,192 by Year 4
- Quality control stays internal — important for consumer kitchen products where returns damage brand reputation
- Production scheduling flexibility: can respond to demand spikes without renegotiating supplier terms
- Process knowledge and IP remain proprietary

Operational Considerations

The main risks are front-loaded. Equipment installation and staff training happen in the first 90 days, which is also when the fixed cost commitment becomes real. After that, the cost structure improves each year as fixed costs spread across a larger volume. The key operational requirements to manage:

- Equipment maintenance schedule and reliability plan
- Staff training during ramp-up (Days 1–60)
- Inventory management and production scheduling systems

RISK ASSESSMENT

The Monte Carlo results show demand variability has limited impact on the recommendation — in-house won across the full simulated range. The real risks are execution risks, not financial ones.

In-House Risks

- Equipment failure during ramp-up — mitigate with maintenance contracts and spare parts inventory
- Volume shortfall below 3,030 units — unlikely given 14,000 projected and 78% margin of safety, but worth monitoring in Year 1
- Fixed cost exposure if the product line is discontinued before Year 4

Outsourcing Risks

- No cost reduction path — \$18/unit is fixed, so margin shrinks relative to in-house as in-house volume grows
- Quality and delivery depend on supplier reliability outside the company's control
- Price renegotiation risk after the 4-year contract expires

95% Confidence Interval — In-House NPV

- Lower bound: \$1,100,000
- Upper bound: \$1,520,000

The lower bound still exceeds outsourcing's mean NPV of \$1,089,212. Even in a poor scenario, in-house wins.

RECOMMENDATION

Proceed with in-house production.

The NPV advantage is \$215,737. Break-even is at 3,030 units against Year 1 demand of 14,000. The simulation returned 100% preference for in-house across 1,000 scenarios. And the strategic

case — cost control, quality ownership, process flexibility — adds to a financial argument that is already clear.

The \$400,000 upfront investment is the only material counter-argument. It is offset within Year 1 and generates compounding returns as volume grows.

IMPLEMENTATION PLAN

Phase	Actions
Phase 1 (Days 1–30)	Form team · Finalize equipment specs · Begin facility planning · Initiate hiring
Phase 2 (Days 31–60)	Install equipment · Train staff · Develop quality systems · Establish procedures
Phase 3 (Days 61–90)	Production trials · Control systems · Full-scale operations · Performance monitoring

Financial Requirements

- Equipment: \$400,000
- Contingency (10%): \$40,000
- Working capital: to be determined by inventory policy

CONCLUSION

In-house production is the stronger choice on every financial measure. The \$400,000 equipment investment pays back within Year 1 — break-even is 3,030 units against projected demand of 14,000. Over four years, the NPV advantage is \$215,737. The Monte Carlo simulation tested 1,000 demand and growth scenarios; in-house won every one. The cost structure (\$7/unit versus \$18/unit) only improves as volume scales with 20% annual growth.

Respectfully submitted,

Consulting Team

APPENDICES

- A. Detailed Financial Models
- B. Monte Carlo Simulation Detailed Results
- C. Implementation Timeline
- D. Risk Assessment Matrix
- E. Equipment Specifications
- F. Staffing Requirements