

Strategic Decision Making in the 3D Printing Industry - A Robust Decision Making (RDM) analysis

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Why 3D Printing

Supporting **Strategic Business Decisions** with DMDU methods

- DMDU provides guidance for decision making in many contexts, but. . .
- There is scant guidance on how to apply it for business decisions;
- Strategic Decision making Literature still ignores its contributions;
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Key Features of 3D printing

- 3D printing may

Why 3D Printing?

3D Printing is an emergent technology, but decision makers face uncertainty.

Positive Evidence: - 3D printing Industry has seen two digits growth consistently in the last few years; - 3D printing is already reshaping supply chains across industries (e.g.: prothesis, aerospace, etc.);

Negative Evidence: - Major players have been observing declining profitability (e.g.: Stratasys, 3D Systems); - Estimates of 3D printing growth diverge;

Where to start in DMDU?

Shaping events in the 3D Printing Industry

- Patent Dynamics & Patent Expiration (e.g. FDM Patent);
- Fierce Competition;
- After the 3D printing Bubble, major players refocused their operations on industrial-grade printers;

XLRM

Model

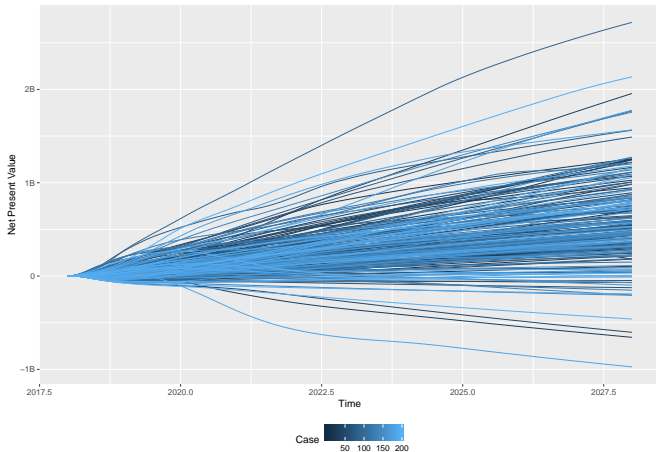
Case Generation

Design of Experiments

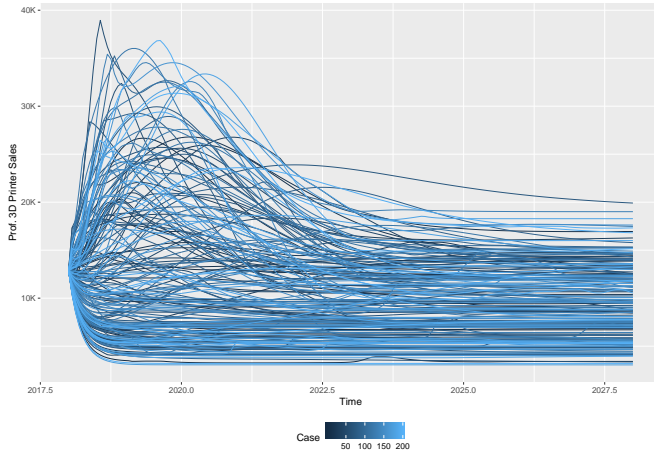
- Full factorial design of these variables, resulting in 54 strategies:

Variable	Meaning	Levels
S_1	Market & Pricing Strategy. Defines whether the player pursue an aggressive marketing strategy to gain market share (by cutting prices and accepting excess capacity), or pursue a conservative strategy,	Aggressive (1); Conservative (2)
S_1^{max} or S_1^{min}	Desired Market Share. For a Conservative Strategy, the player adopts the S_1^{max} , and for	20%; 30%; 40%

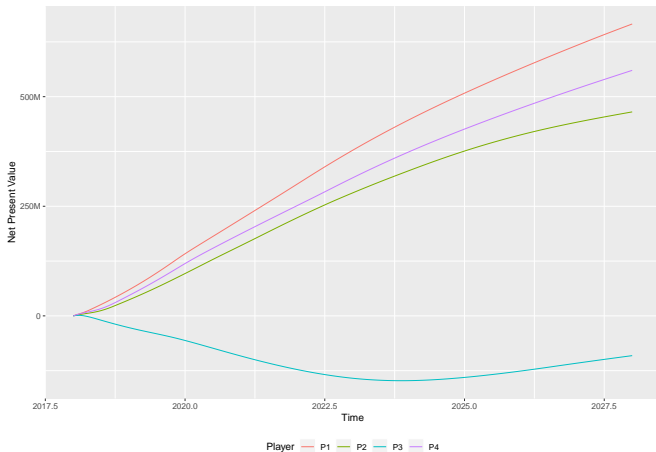
Candidate Strategy NPV across scenarios



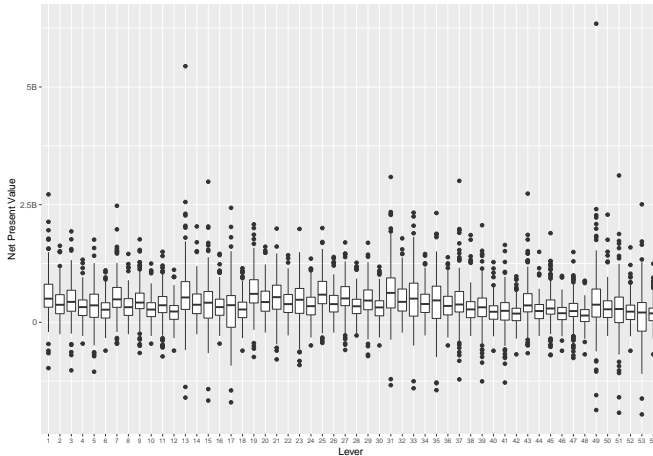
Global Demand across scenarios



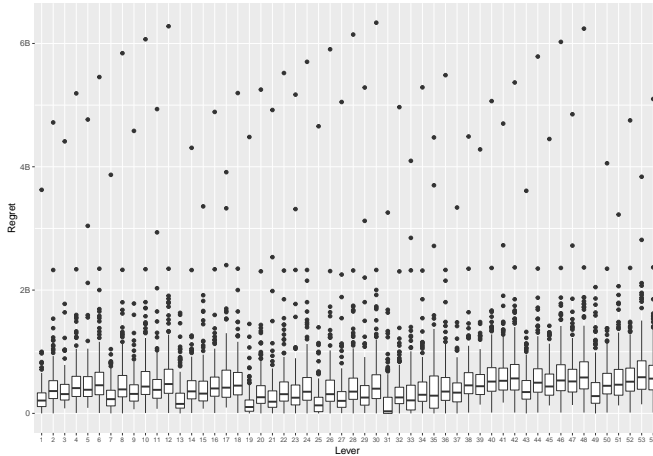
4 Players Net Present Value in a given scenario



Net Present Value across strategies and Scenarios



Regret across strategies and Scenarios



Ranking Strategies by Regret

Scenario Discovery

Tradeoffs

Second Iteration

Final Thoughts

Slide with Plot