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

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25 de setembro de 2018

Why 3D Printing

Key Features of 3D printing

- 3D printing may

Why 3D Printing?

3D Printing is an emergint 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;

3D Printing Prospected Effects - Why do we Care?

Shaping events in the 3D Printing Industry

- Patent Dynamics

Patent Dynamics and Expiration

The FDM patent expiration in 2007

Strategies Played by Key Players

Leading 3D printing players (e.g. 3D Systems and Stratasys) historically have been adopting a closed-source strategy. However, the key event leading to 3D printing growth was patent expiration.

Dynamyc Hipothesis 1: Holding Patents m

A fourth level

Slide with Bullets

XLRM

Model

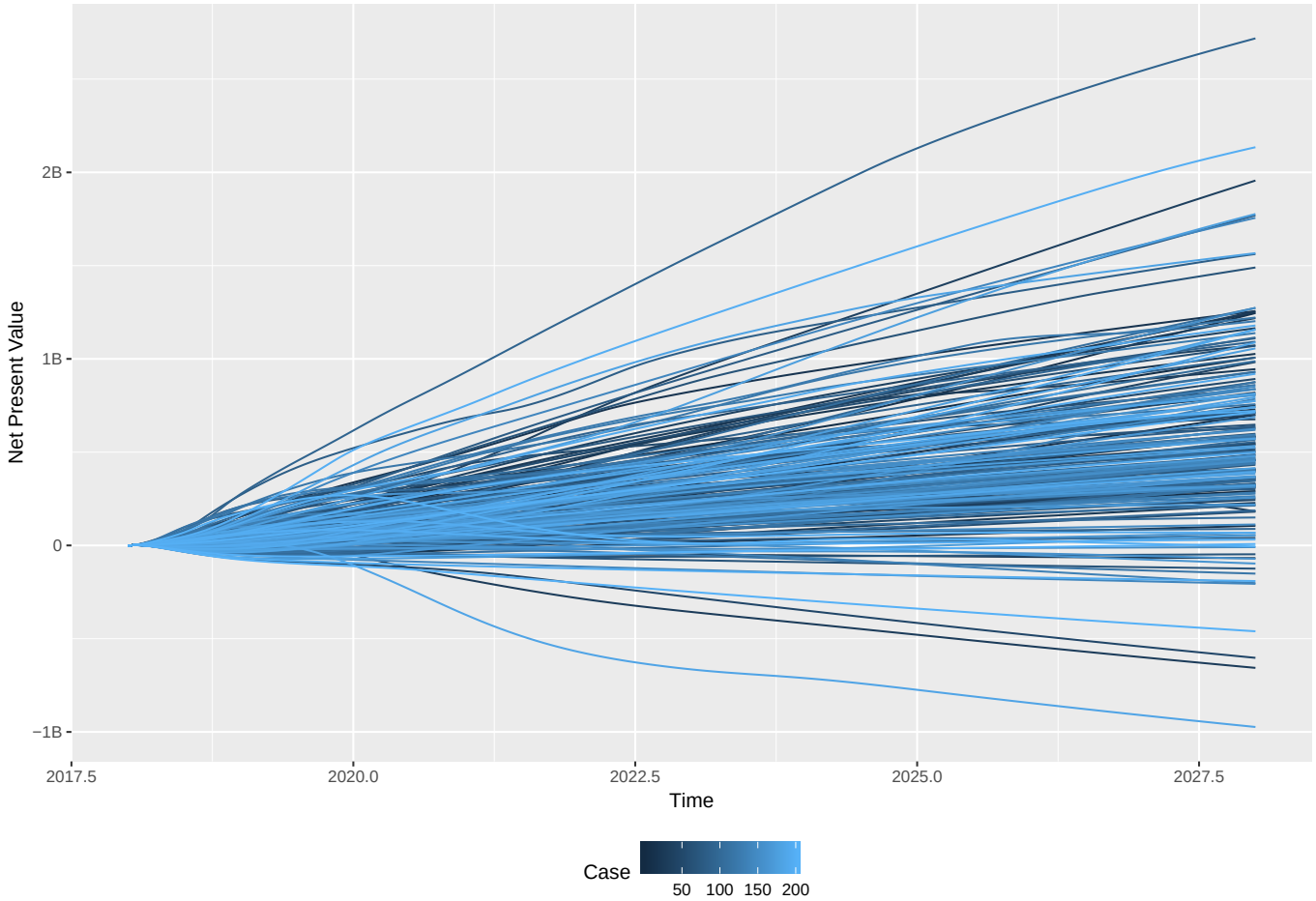
Case Generation

Design of Experiments

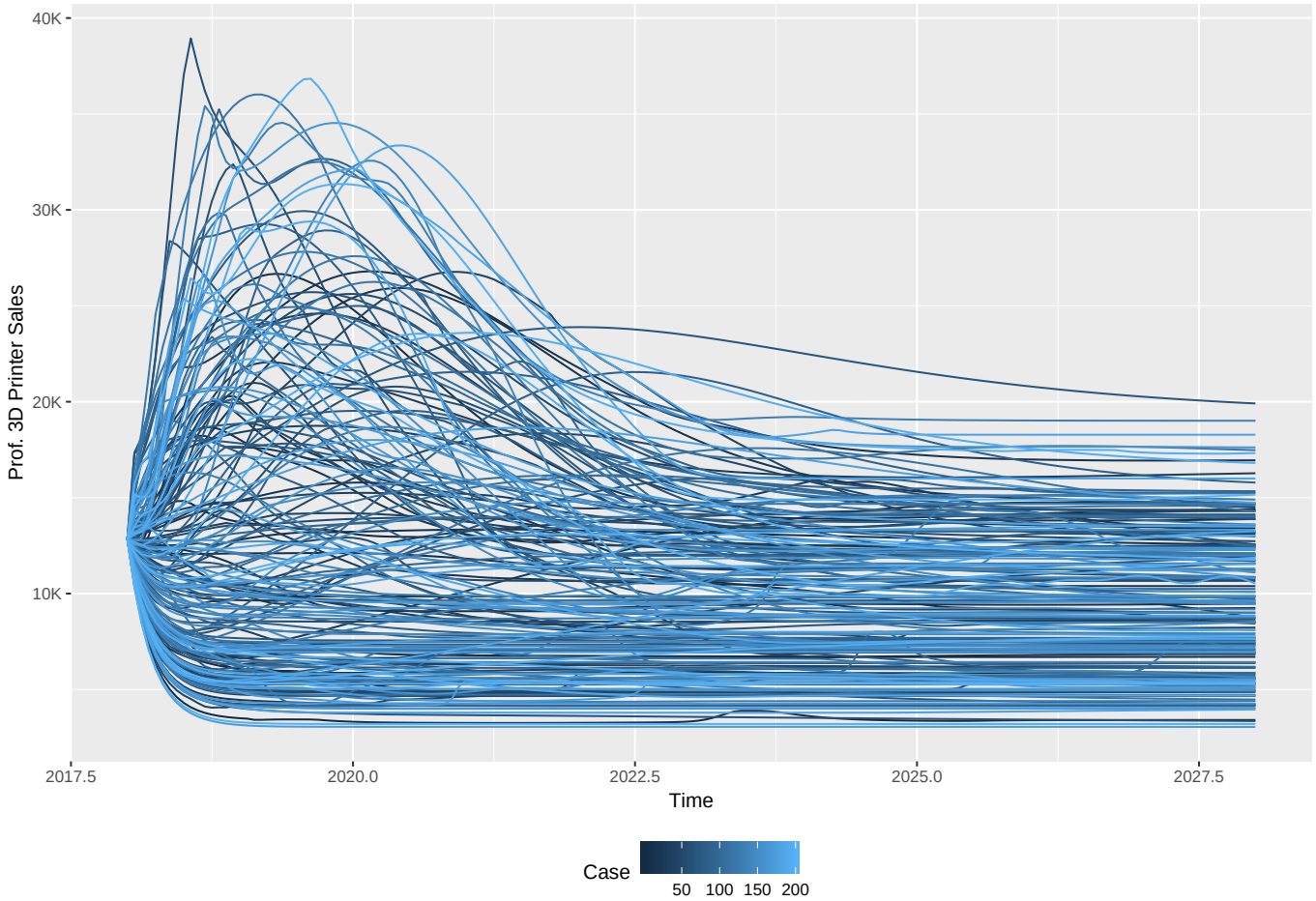
- Full factorial design of these variables, resulting in 54 strategies:

Variable	Meaning	Levels
S_1	Market & Pricing Strategy. Defines wether the player pursue an agressive marketing strategy to gain market share (by cutting prices and accepting excess capacity), or pursue a conservative strategy,	Agressive (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%

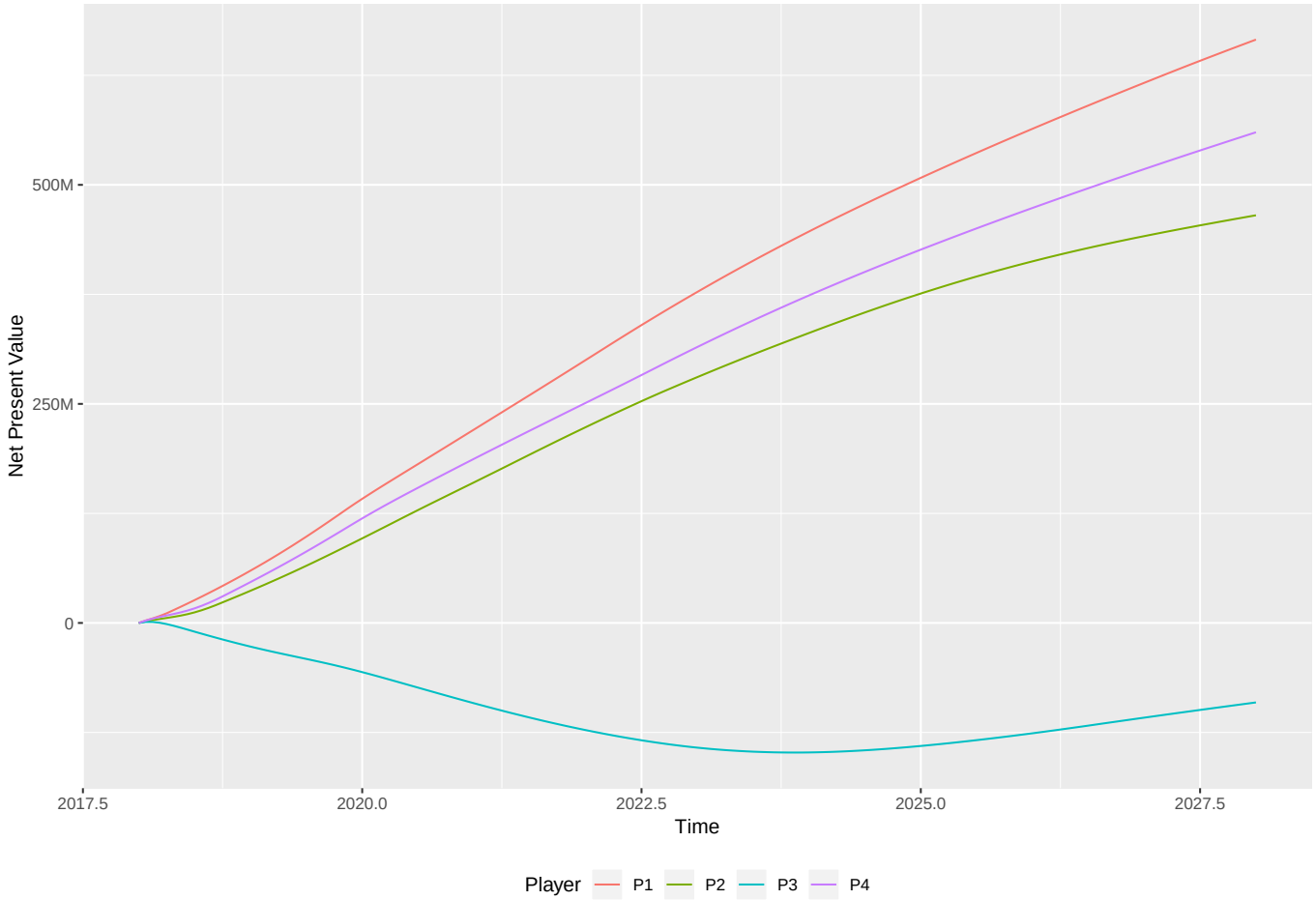
Candidate Strategy NPV across scenarios



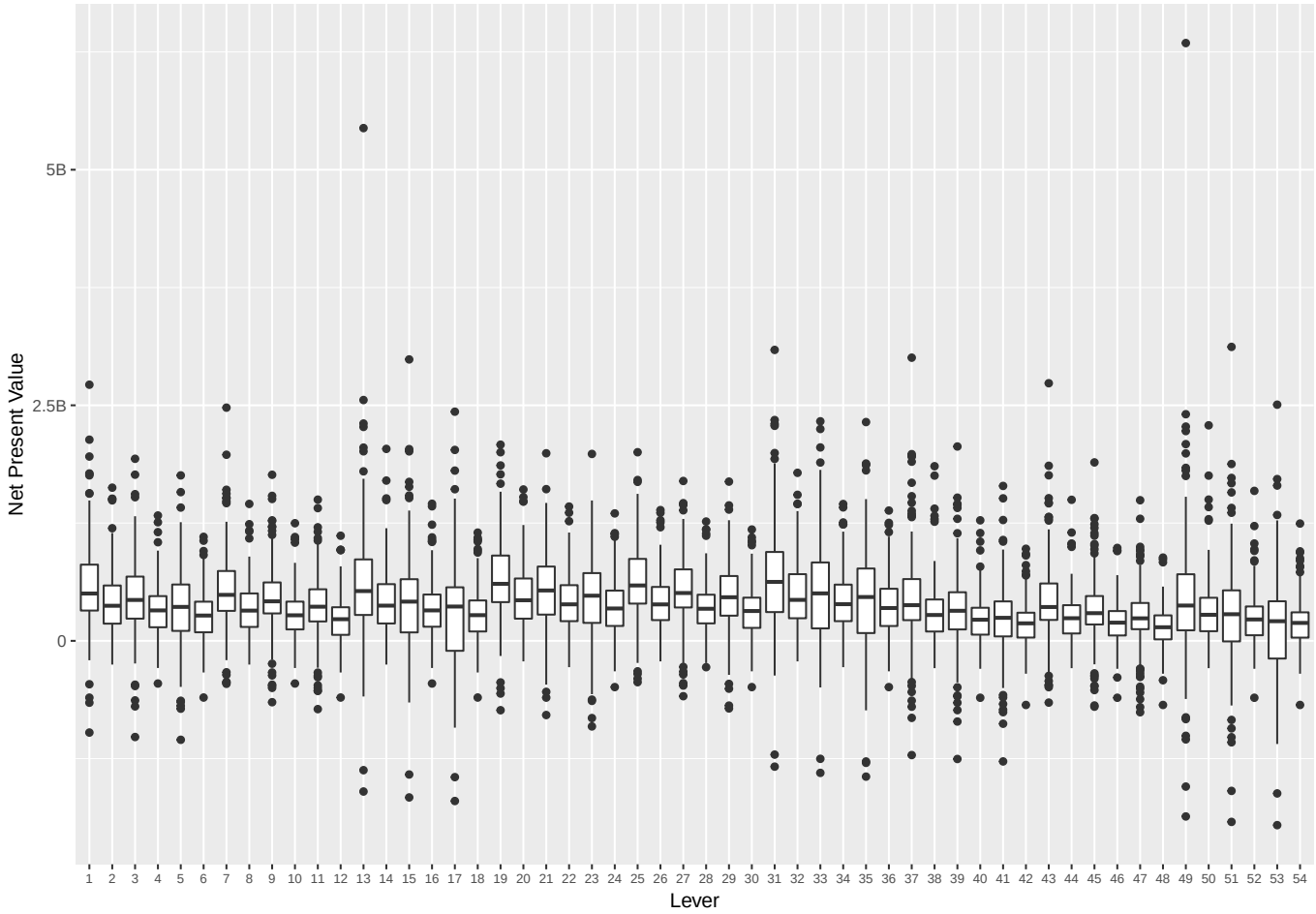
Global Demand across scenarios



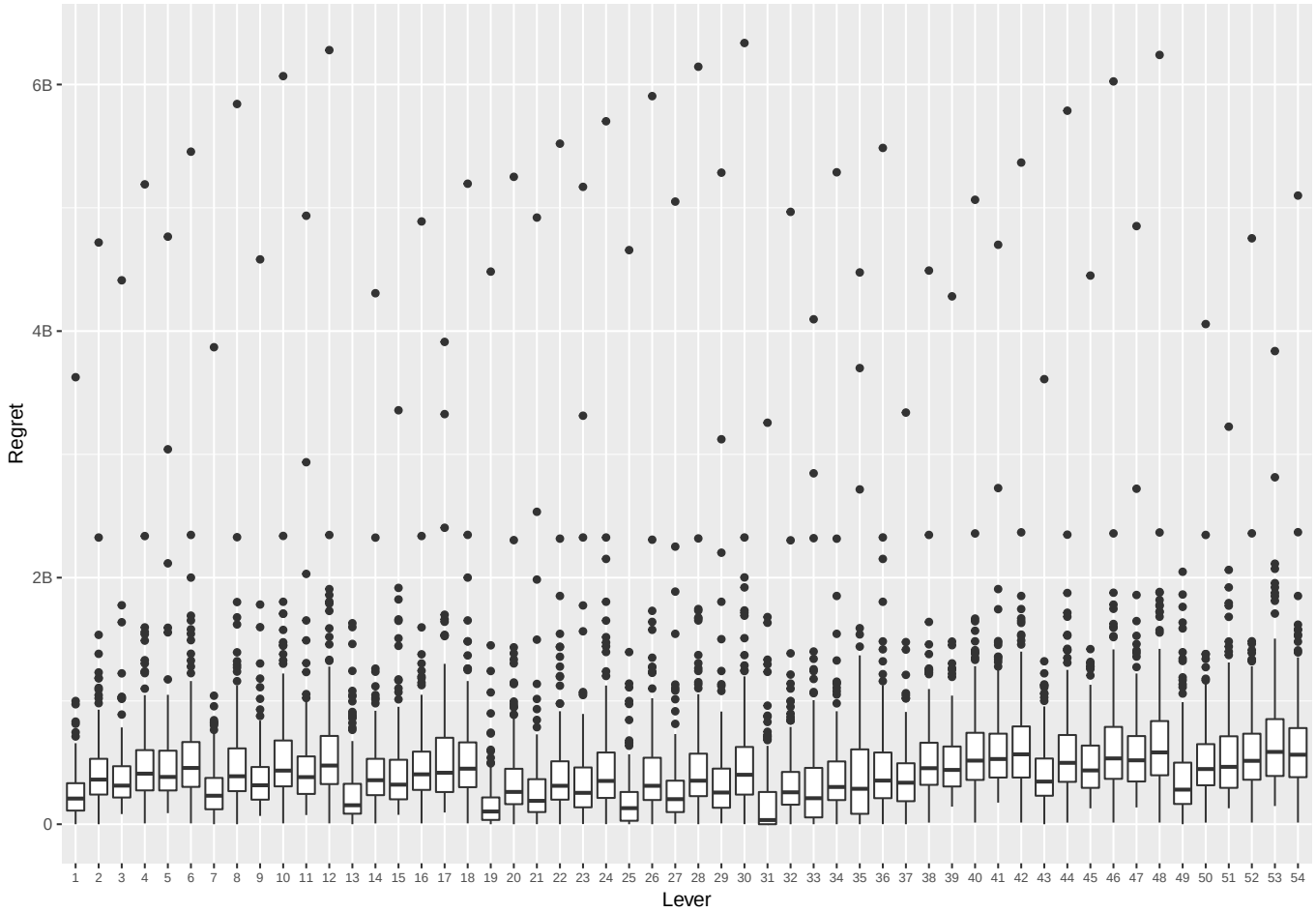
Market Share of the 4 Players in a given scenario



Net Present Value across strategies and Scenarios



Regret across strategies and Scenarios



Ranking Strategies by Regret

Lever	Capac. Strategy	Desired Mkt Share	R&D Inv.	Open Source R&D
19	0.3	0.05	0.0	217247495
31	0.4	0.05	0.0	261350277
25	0.2	0.05	0.0	261414542
13	0.4	0.10	0.0	327653642
1	0.3	0.10	0.0	332802086
27	0.2	0.05	0.5	353242981
21	0.3	0.05	0.5	365209080
7	0.2	0.10	0.0	375355405
32	0.4	0.05	0.0	424089389
20	0.3	0.05	0.0	449632071

Scenario Discovery

Tradeoffs

Second Iteration

Final Thoughts

Slide with Plot