

Economics 354

Innovation Simulation Final Summary

Spring 2021

Group A

Cost Factors

Speed		Temp		Input		Form		Catalyst		Vessel	
Very Slow	-24.0	Frigid	5.3	Smithium	86.2	Fine Powder	16.8	None	34.6	Spherical	8.8
Slow	-18.4	Cool	-2.4	Ricardium	-3.3	Coarse Powder	-41.4	Reedium	97.4	Cylindrical	56.2
Moderate	45.8	Medium	8.2	Malthusium	118.3	Granules	-0.3	Vollium	-14.1	Conical	-73.7
Quick	-27.8	Warm	17.4	Keynesium	17.7	Slurry	-20.9			Cubic	-73.2
Fastest	-29.8	Hot	-5.4	Schumpeterium	127.1					Oval	-36.2
		Sizzling	-55.8							Pyramidal	1.2

Best technology:

{Fastest, Sizzling, Ricardium, Coarse Powder, Vollium Eliate, Conical} would appear to be the best technology and would have been if there had been no idiosyncratic, technology-specific factor. This technology had an initial cost of \$296 and was discovered in period 17 by Rob Caustin. It turned out that because of the individual random cost component, the best was actually {Very Slow, Sizzling, Ricardium, Coarse Powder, Vollium Eliate, Cubic} with an initial cost of \$295. Caustin discovered this in period 19.

A total of 117 technologies were learned by at least one player.

Events

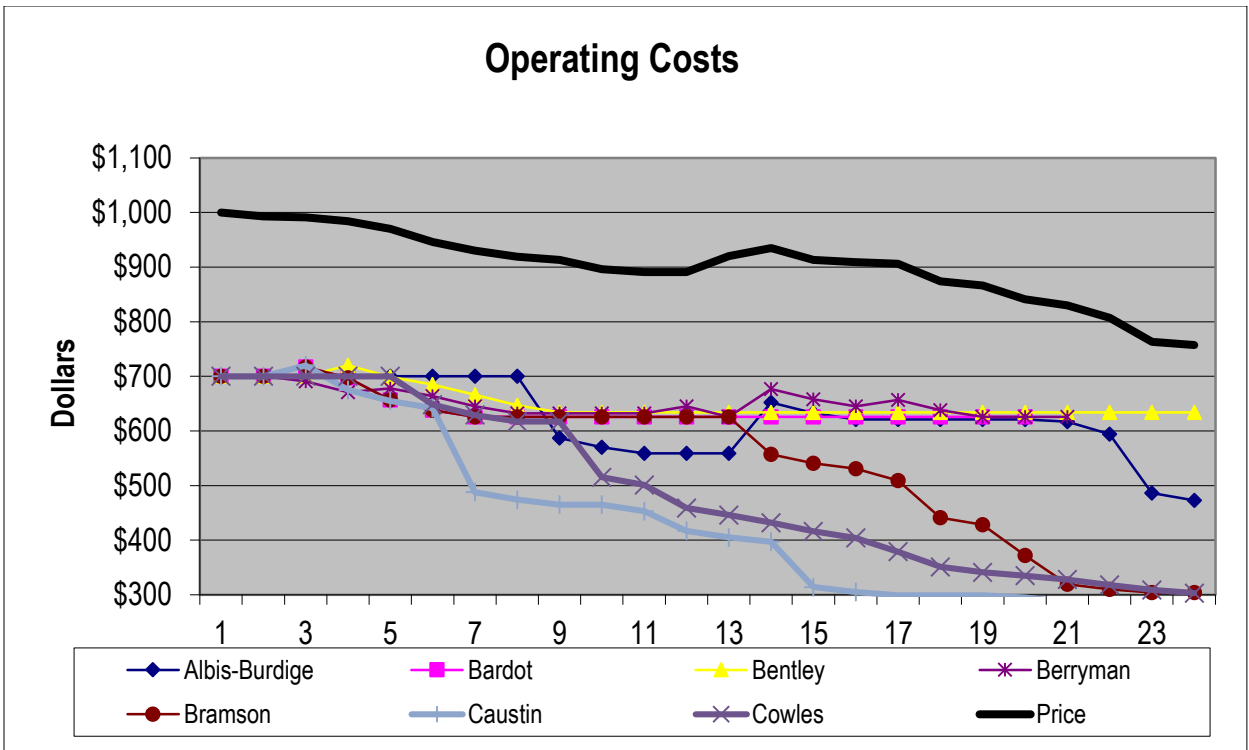
Smithium was discovered to have caused cancer in aadvarks and its use in widget production was taxed at an increasing rate (\$25, \$50, \$75, \$100) per widget starting in period 13.

There were no incidents of espionage.

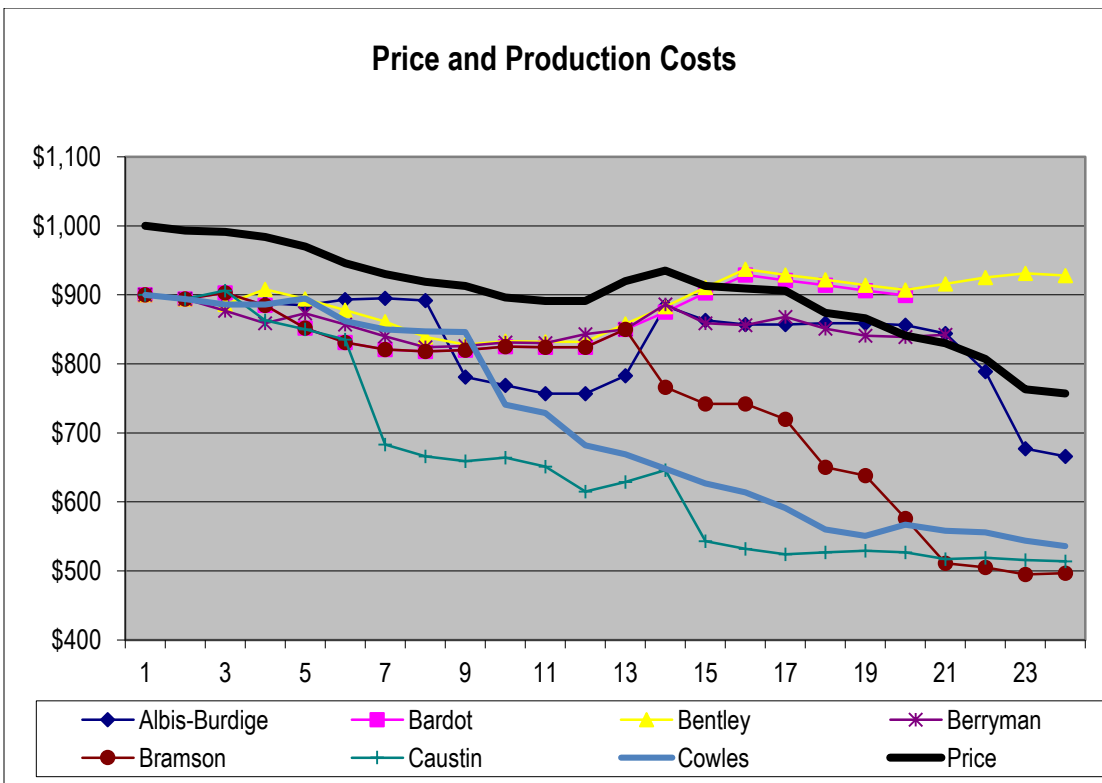
This was the first group *ever* to go down to three active producers, though it quite soon returned to four. (Price is based on a markup above the average of the 3rd through 5th lowest costs, so #3 must be *way* ahead of #4 and #5 for this to happen. It did in period 20 when Bramson lowered costs dramatically. Albis-Burdige dropped out, but had sufficient cash to find an improved technology and return to production in period 22.

Bentley attempted the novel strategy of not sending in a spreadsheet starting in period 7. It worked for a while, but the smithium tax raised his costs and knocked him out of production in period 15.

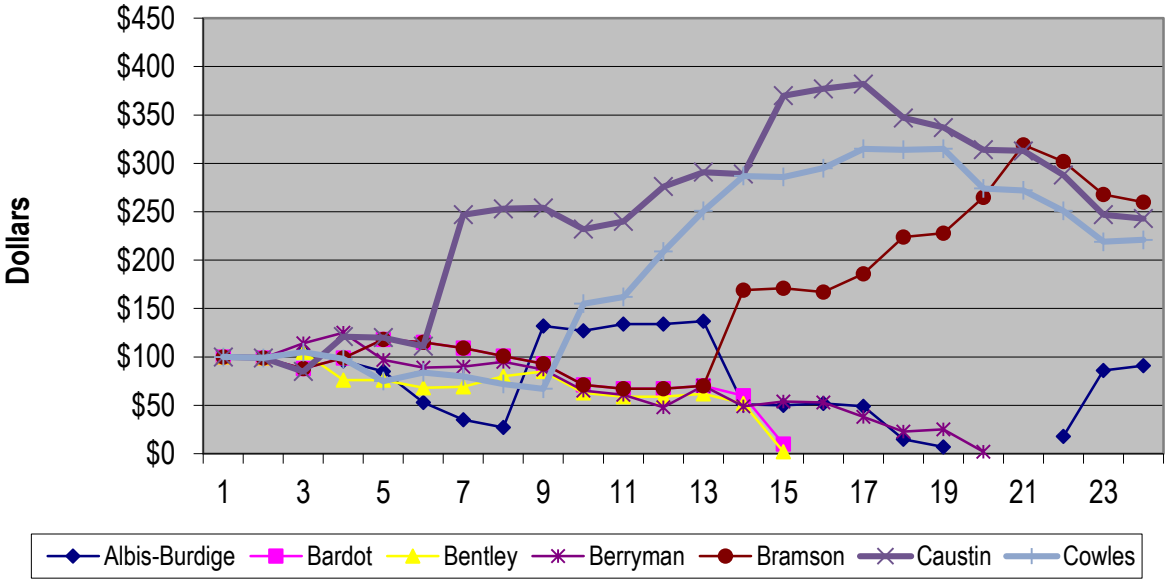
Operating Costs



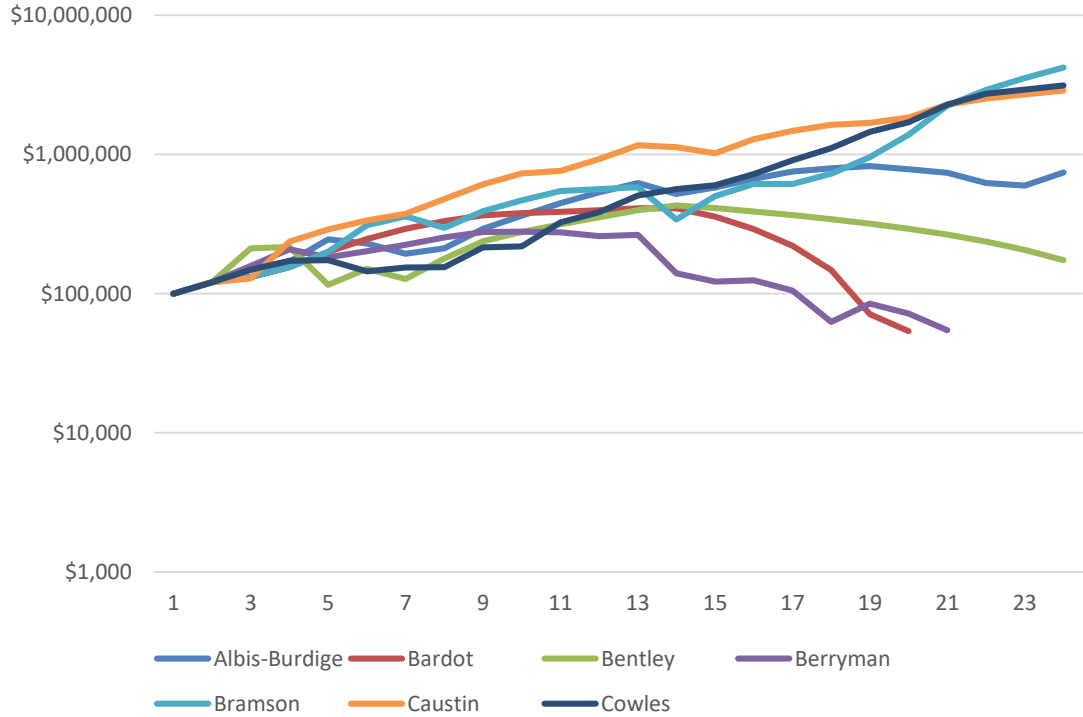
Price and Production Costs

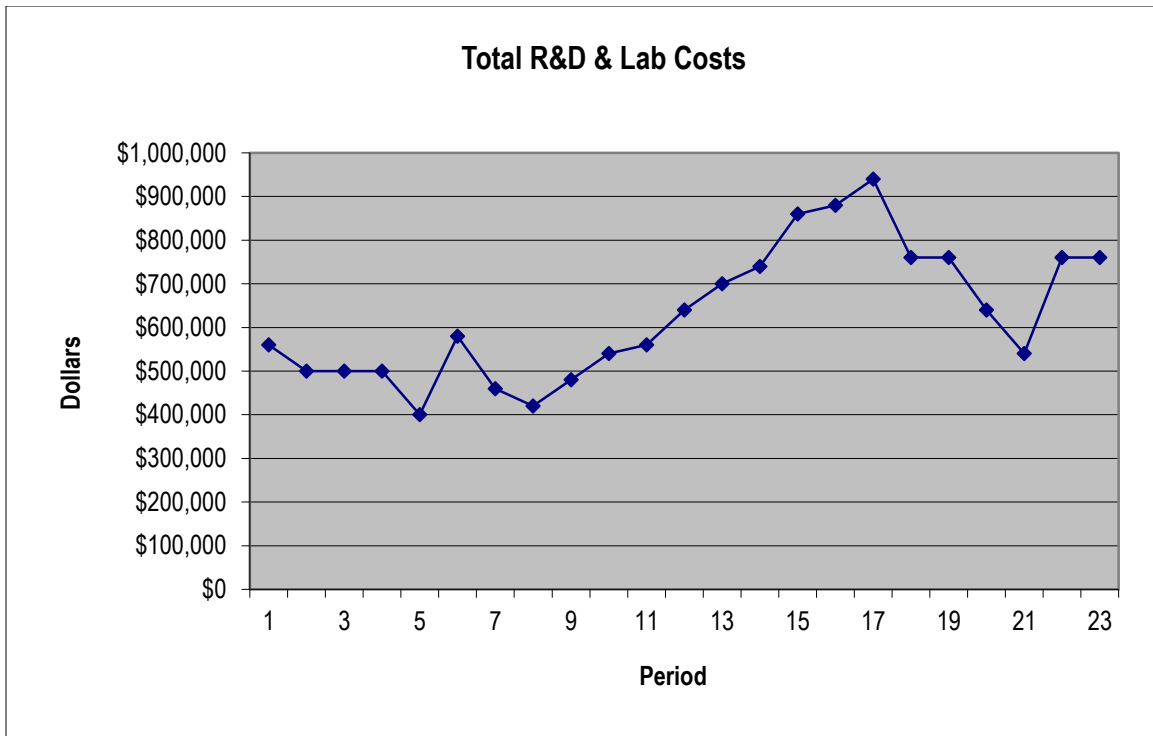


Operating Profit per Widget



Available Cash





Simulation Final Totals

	Albis-Burdige	Bardot	Bentley	Berryman	Bramson	Caustin	Cowles
Prod Revenue	\$28,718,735	\$10,315,459	\$10,541,101	\$15,729,172	\$32,690,183	\$32,690,183	\$32,690,183
Oper Cost	\$19,491,164	\$3,272,456	\$3,272,456	\$4,901,765	\$18,036,506	\$14,675,191	\$16,448,586
Mat Cost	\$6,739,424	\$1,336,081	\$1,110,439	\$1,527,274	\$7,464,935	\$8,268,395	\$8,322,873
Prod Prof	\$2,488,147	\$5,706,922	\$6,158,206	\$9,300,133	\$7,188,742	\$9,746,597	\$7,918,724
R&D Exp	\$1,360,000	\$1,460,000	\$1,080,000	\$1,420,000	\$1,840,000	\$3,500,000	\$3,820,000
Inst Exp	\$300,000	\$0	\$100,000	\$0	\$600,000	\$300,000	\$400,000
Other Exp	\$100,000	\$0	\$100,000	\$0	\$200,000	\$2,900,000	\$300,000
License Rev	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Final Cash	\$740,972		\$174,155		\$4,195,792	\$2,868,277	\$3,126,660
# of Tech	12	14	5	14	18	34	37
Best Tech	\$486	\$628	\$666	\$588	\$319	\$295	\$318
Patents held	0	0	2	2	1	0	0

Group B

Cost Factors

Speed		Temp		Input		Form		Catalyst		Vessel	
Very Slow	-1.4	Frigid	22.9	Smithium	91.9	Fine Powder	30.4	None	18.7	Spherical	-60.4
Slow	7.1	Cool	46.1	Ricardium	-5.8	Course Powder	1.1	Reedium	-12.3	Cylindrical	0.0
Moderate	-54.7	Medium	28.0	Malthusium	-48.7	Granules	-11.5	Vollium	-30.5	Conical	-15.0
Quick	41.0	Warm	24.3	Keynesium	-90.2	Slurry	-4.6			Cubic	106.1
Fastest	35.4	Hot	-10.4	Schumpeterium	33.7					Oval	-21.5
		Sizzling	29.9							Pyramidal	4.7

Best technology:

{Moderate, Hot, Keynesium, Granules, Vollium Eliate, Spherical} appears to be the best technology based on the sum of the individual effects. This technology had an initial cost of \$311 and was discovered by Asa Ferguson in period 15. The actual best technology after idiosyncratic effects was {Moderate, Sizzling, Keynesium, Granules, Vollium Eliate, Spherical} with initial cost of \$297, which was discovered by Ferguson in period 17.

A total of 109 distinct technologies were collectively known by the seven players.

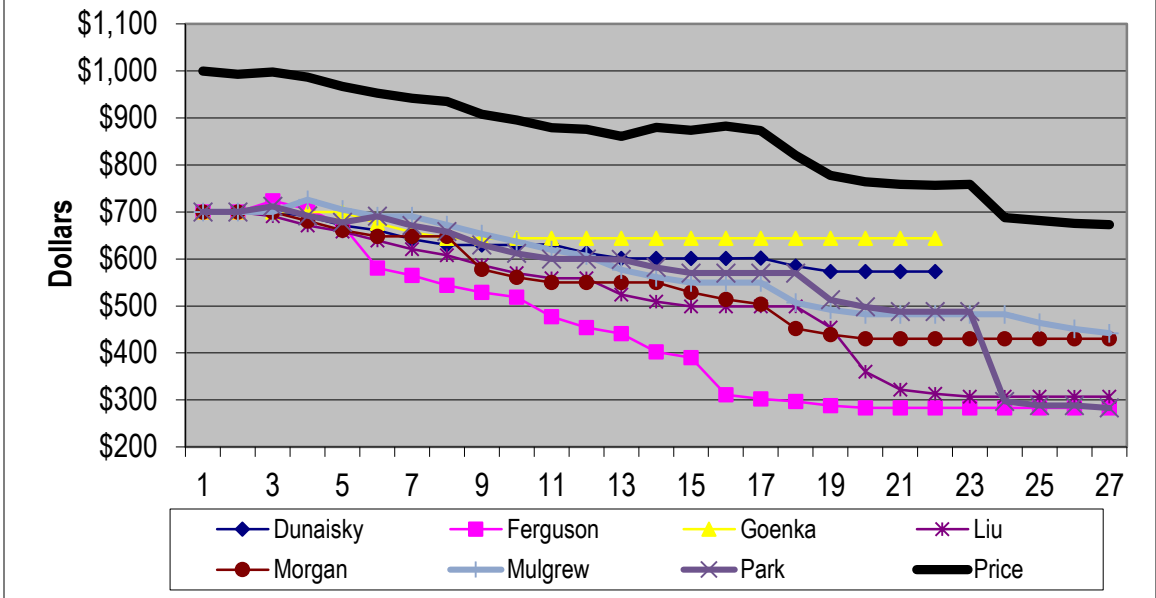
Events:

The price of schumpeterium began rising in period 14 due to political unrest in Schumpeteria. But the end, only Mulgrew was still using it.

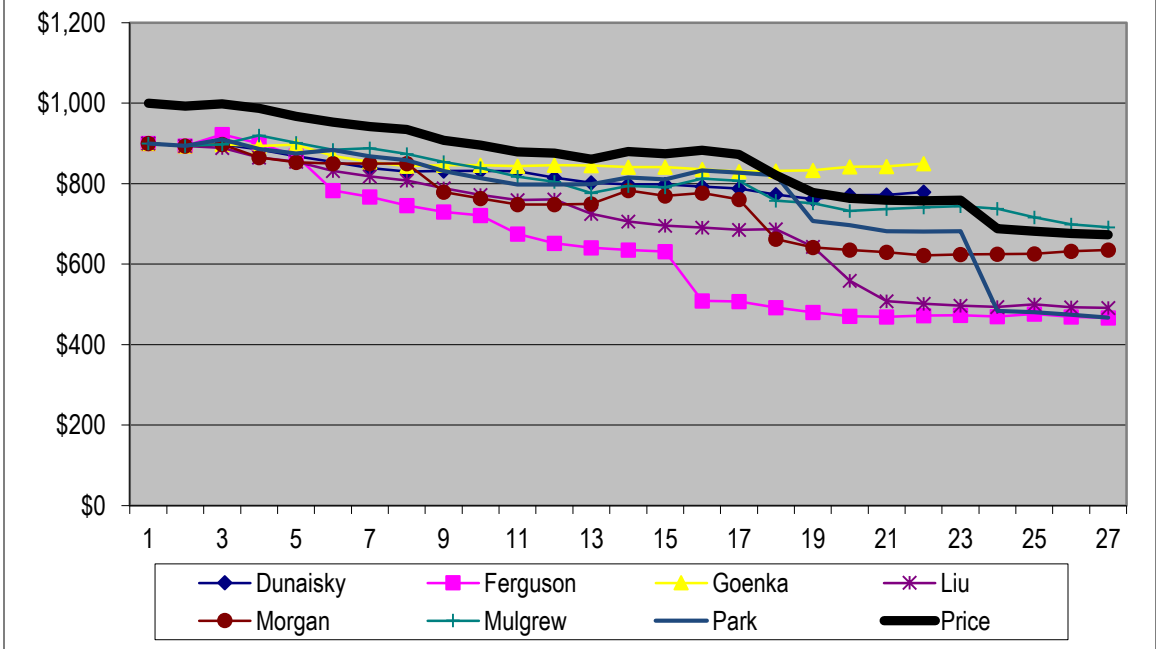
Dunaisky learned an excellent technology (\$376 initial cost) in period 19 that would have kept him in production, but lacked the funds to install it and could not raise funds because his plant shut down.

There were two attempts at espionage, one unsuccessful and one successful.

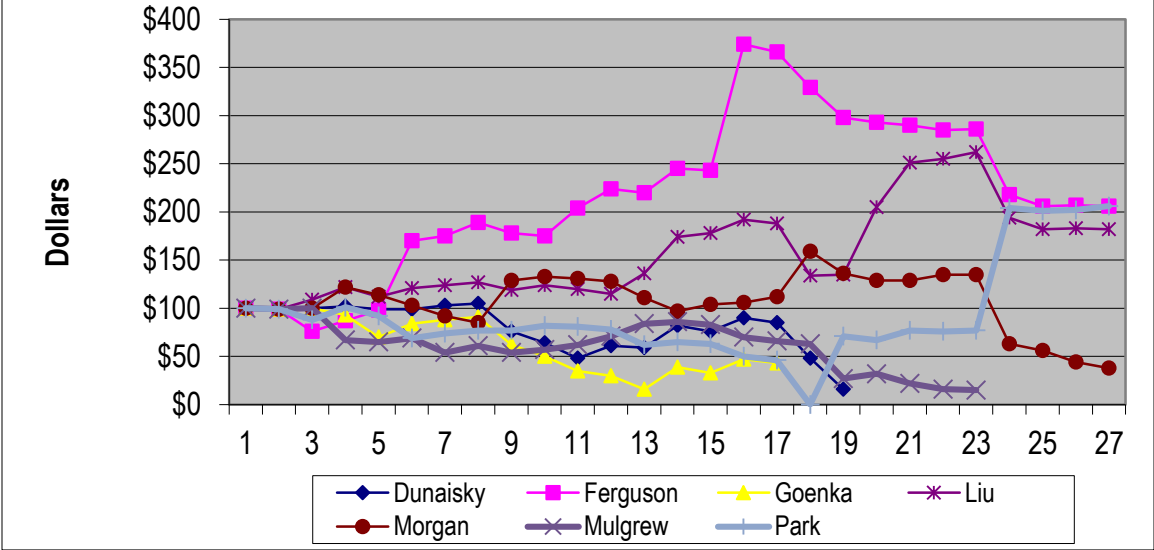
Operating Costs



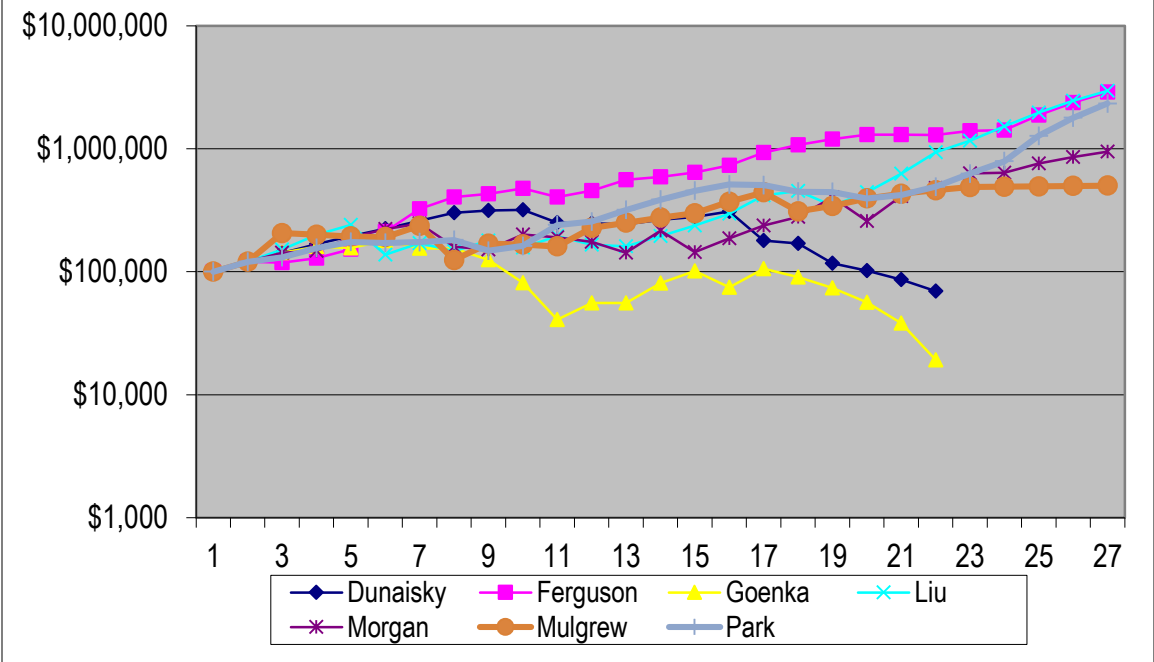
Price and Production Costs

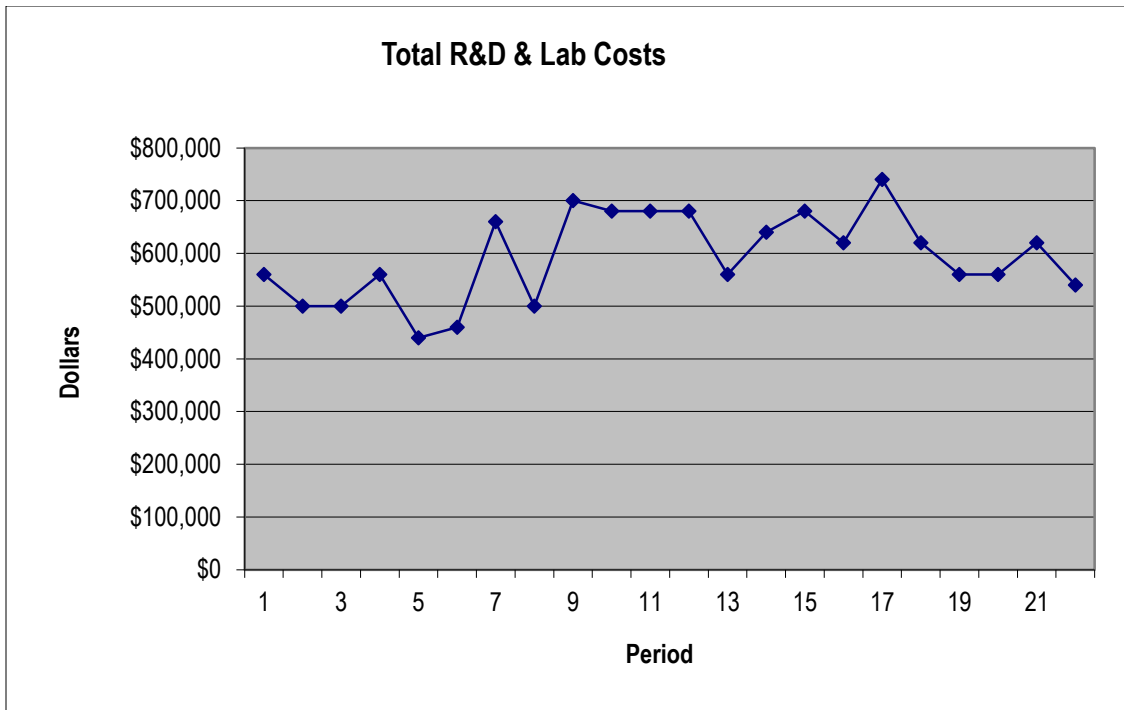


Operating Profit



Cash Available





Experiment Final Totals

	Dunaisky	Ferguson	Goenka	Liu	Morgan	Mulgrew	Park
Prod Revenue	\$19,098,296	\$30,656,989	\$16,860,179	\$30,656,989	\$30,656,989	\$24,374,969	\$30,656,989
Oper Cost	\$13,327,736	\$15,000,214	\$12,112,318	\$17,235,390	\$19,206,592	\$16,417,984	\$19,212,048
Mat Cost	\$4,135,803	\$7,315,591	\$3,607,601	\$7,194,858	\$7,644,850	\$6,345,849	\$7,556,699
Prod Prof	\$1,634,757	\$8,341,184	\$1,140,260	\$6,226,741	\$3,805,547	\$1,611,136	\$3,888,242
R&D Exp	\$1,500,000	\$3,940,000	\$1,020,000	\$2,960,000	\$2,060,000	\$1,080,000	\$1,260,000
Inst Exp	\$200,000	\$450,000	\$50,000	\$400,000	\$400,000	\$300,000	\$200,000
Other Exp	\$0	\$1,600,000	\$100,000	\$300,000	\$550,000	\$0	\$5,794,442
License Rev	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Final Cash		\$1,420,351		\$1,521,516	\$639,627	\$491,089	\$792,310
# of Tech	13	37	6	29	19	8	10
Best Tech	\$376	\$297	\$631	\$322	\$452	\$464	\$297
Patents held	6	0	0	3	2	2	0

Group C

Cost Factors

Speed		Temp		Input		Form		Catalyst		Vessel	
Very Slow	10.9	Frigid	-45.0	Smithium	42.3	Fine Powder	4.3	None	-7.1	Spherical	24.3
Slow	20.2	Cool	-22.2	Ricardium	28.6	Coarse Powder	-1.9	Reedium	20.3	Cylindrical	79.3
Moderate	-17.4	Medium	28.3	Malthusium	-88.5	Granules	36.9	Vollium	-29.6	Conical	56.7
Quick	-25.7	Warm	-25.3	Keynesium	-30.1	Slurry	-27.4			Cubic	17.9
Fastest	-0.9	Hot	2.4	Schumpeterium	-54.7					Oval	-25.4
		Sizzling	41.2	Romerium	-143.7					Pyramidal	-67.3

Best technology:

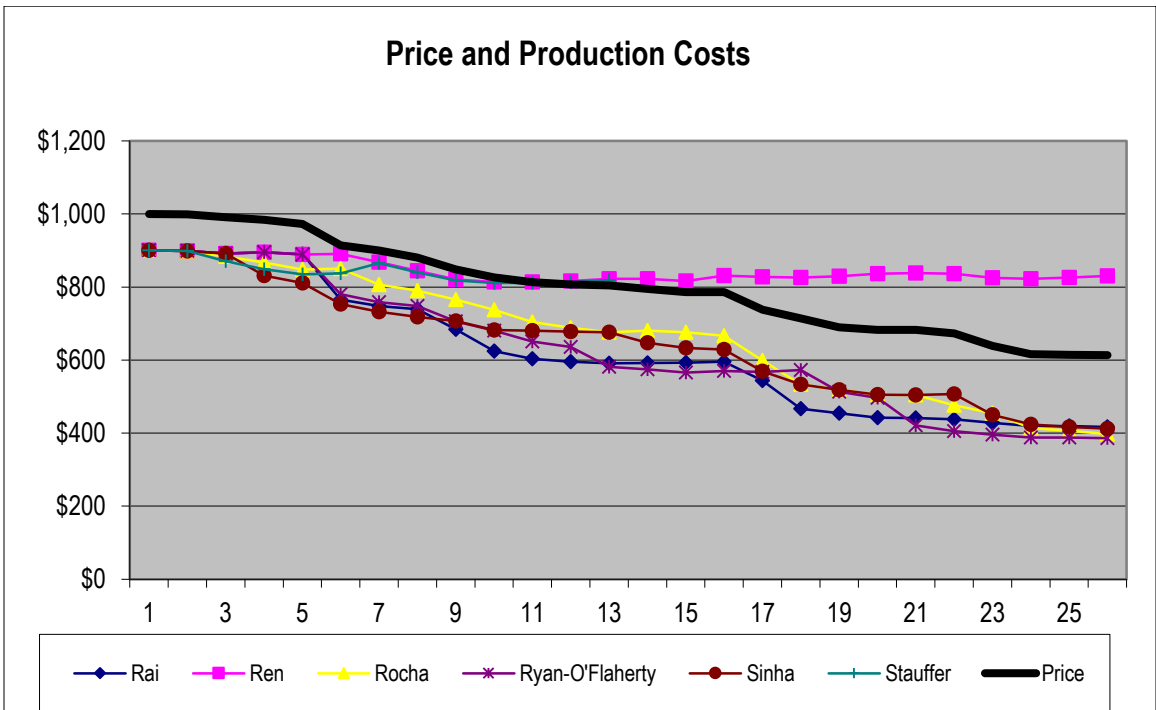
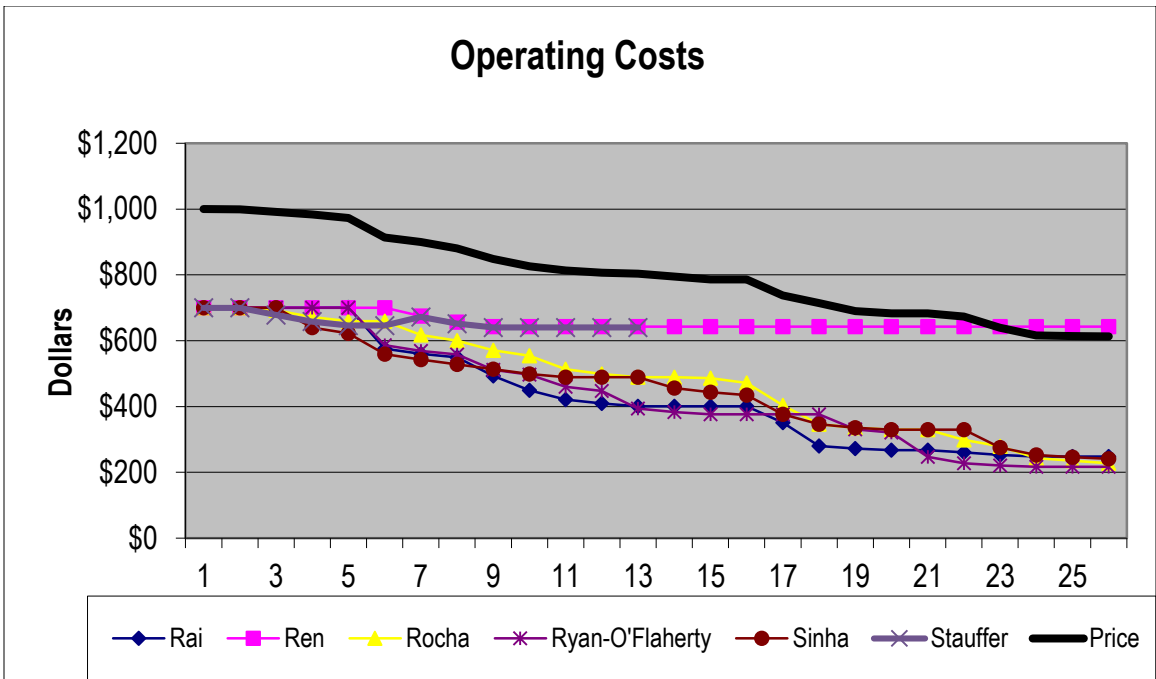
{Quick, Frigid, Romerium, Slurry, Vollium Eliate, Pyramidal} appears to be the best technology based on the sum of the individual effects. This technology had an initial cost of \$228 and was discovered by Liam Ryan-O'Flaherty in period 21. It was indeed the best technology even after adding in idiosyncratic effects.

Events:

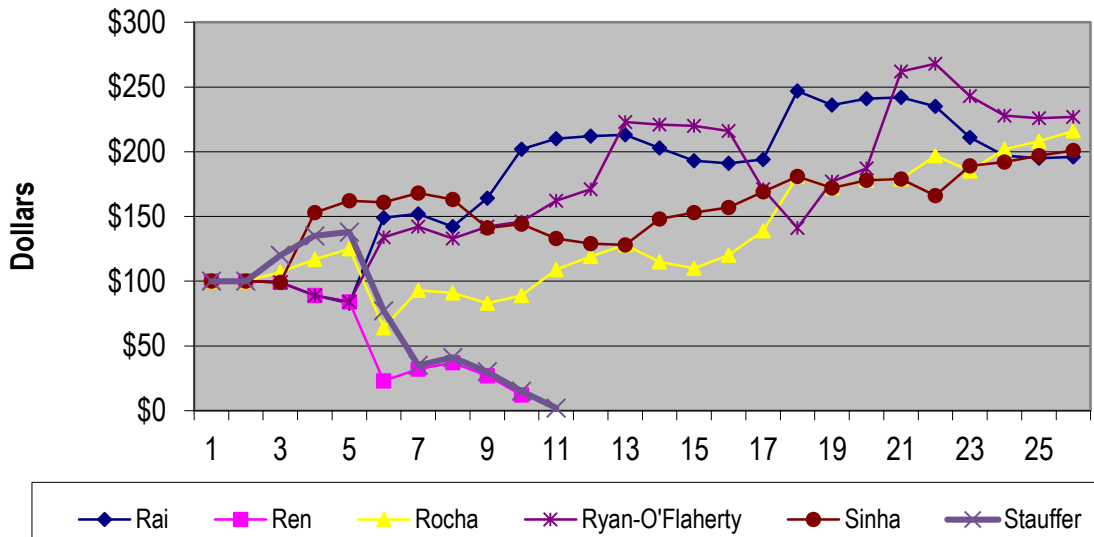
Romerium was added as a material in period 15. It had much lower costs than the other materials.

Ren survived in the game until the end, despite essentially closing down in period 11. By decommissioning his lab, he was able to accrue interest without incurring any cost and eventually restart research, though he was not able to lower costs sufficiently to resume production.

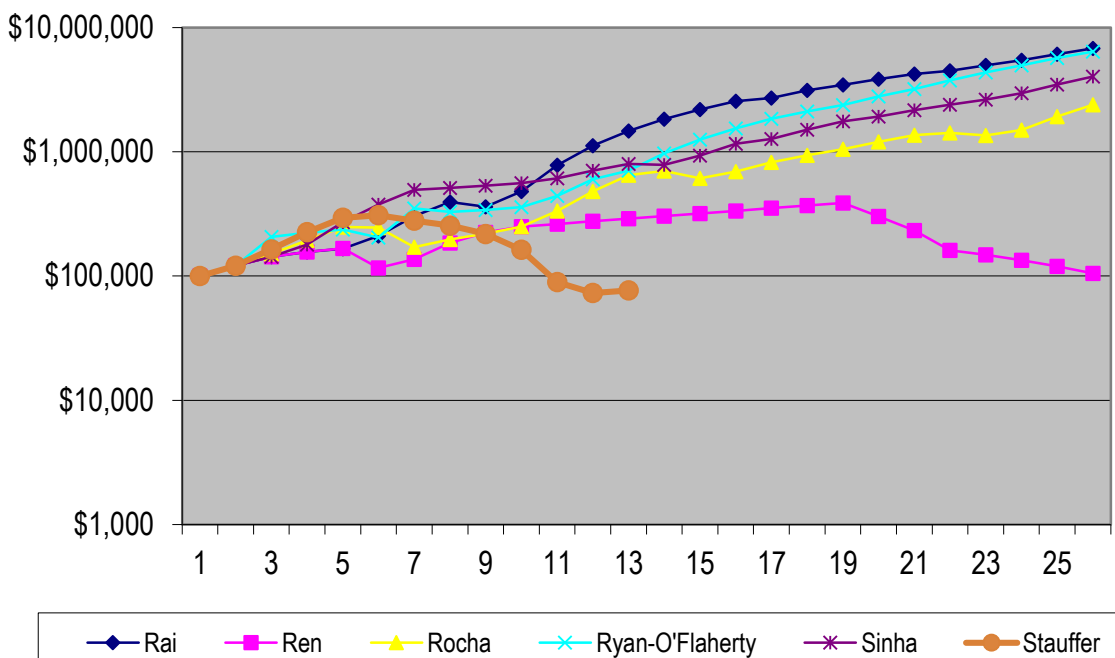
All four remaining producers ended up with similarly low costs, showing considerable convergence in technologies.

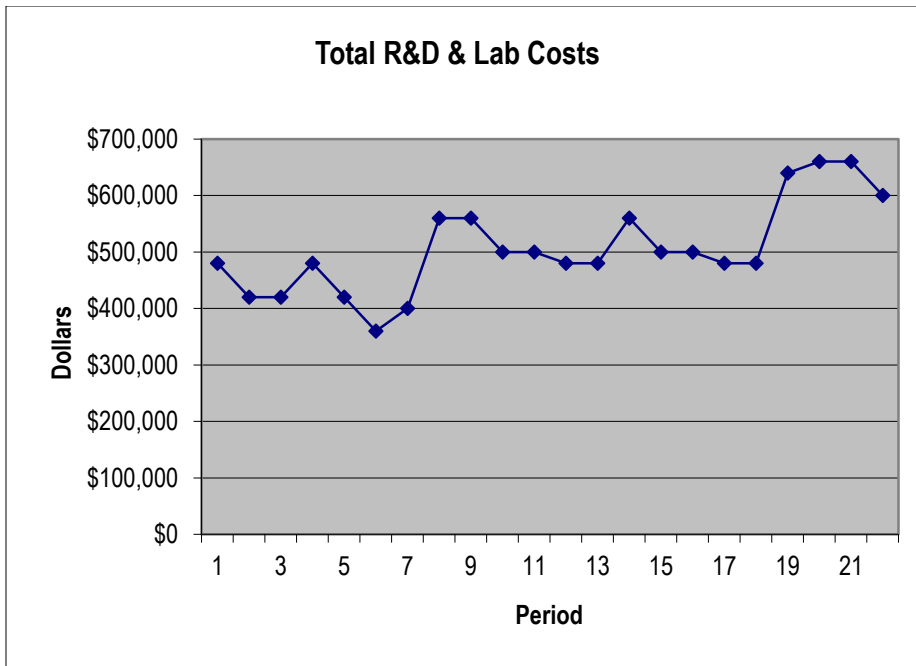


Operating Profit per Widget



Cash Available





Experiment Final Totals

	Rai	Ren	Rocha	Ryan-O'Flaherty	Sinha	Stauffer
Prod Revenue	\$32,844,023	\$9,913,996	\$32,844,023	\$32,844,023	\$32,844,023	\$11,071,708
Oper Cost	\$16,617,146	\$7,269,482	\$18,455,012	\$16,739,534	\$17,840,680	\$7,987,116
Mat Cost	\$7,918,675	\$2,021,058	\$7,947,743	\$7,962,719	\$7,945,238	\$2,261,507
Prod Prof	\$8,308,202	\$623,456	\$6,441,268	\$8,141,770	\$7,058,105	\$823,085
R&D Exp	\$2,180,000	\$680,000	\$3,360,000	\$2,440,000	\$2,820,000	\$820,000
Inst Exp	\$700,000	\$0	\$650,000	\$550,000	\$550,000	\$0
Other Exp	\$600,000	\$100,000	\$300,000	\$100,000	\$500,000	\$0
License Rev	\$0	\$50,000	\$0	\$0	\$0	\$0
Final Cash	\$6,802,832	\$104,911	\$2,385,676	\$6,397,382	\$4,029,103	\$0
# of Tech	19	6	27	25	24	9
Best Tech	\$261	\$546	\$235	\$228	\$253	\$563
Patents held	8	0	1	1	4	2

Group D

Cost Factors

Speed		Temp		Input		Form		Catalyst		Vessel	
Very Slow	-39.1	Frigid	44.2	Smithium	-13.1	Fine Powder	-1.0	None	12.9	Spherical	30.6
Slow	37.3	Cool	-46.1	Ricardium	99.4	Coarse Powder	31.0	Reedium	9.5	Cylindrical	8.7
Moderate	-12.4	Medium	2.0	Malthusium	62.0	Granules	-32.2	Vollium	-32.8	Conical	11.2
Quick	25.7	Warm	1.3	Keynesium	-63.0	Slurry	-21.2			Cubic	-26.6
Fastest	23.0	Hot	9.4	Schumpeterium	-42.2					Oval	-48.9
		Sizzling	-26.0							Pyramidal	10.5

Best technology:

{Very Slow, Cool, Keynesium, Granules, Vollium Eliate, Oval} appears to be the best technology based on the sum of the individual effects. Its cost was \$422 and it was discovered by Zonya Tanada in period 24, the final period of the simulation. This technology had a rather high idiosyncratic cost component, so the actual best technology was {Very Slow, Cool, Keynesium, Granules, Vollium Eliate, Cubic}, which had an initial cost of \$415 and was not discovered.

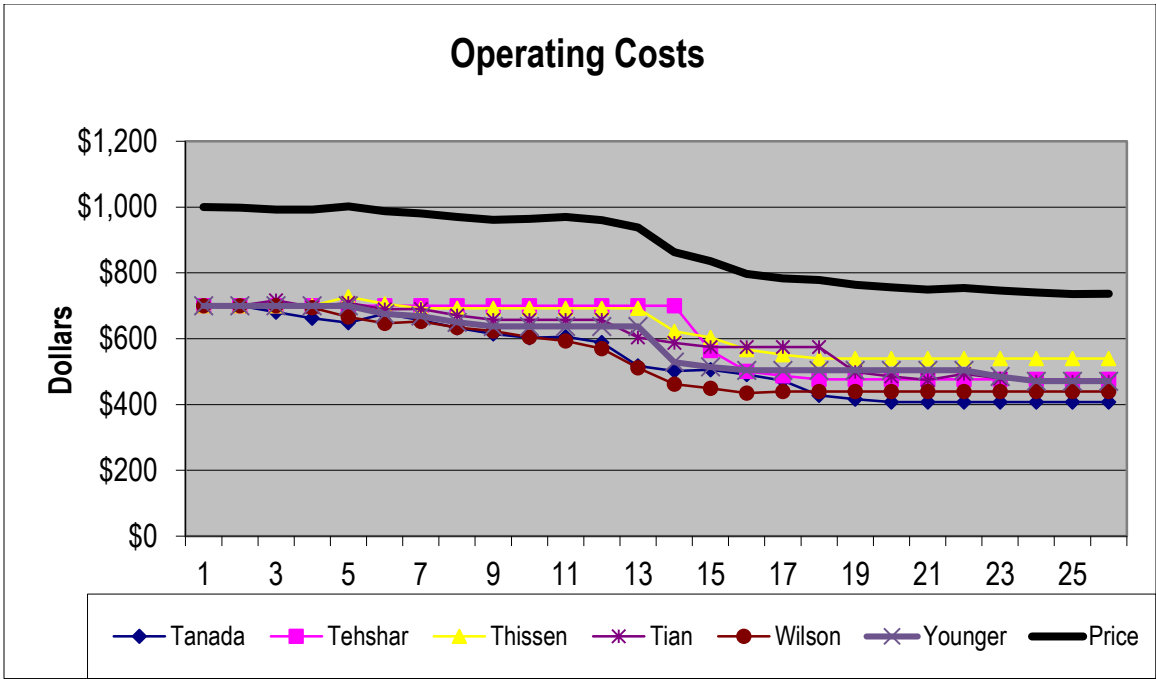
89 total technologies were discovered by at least one player.

Events:

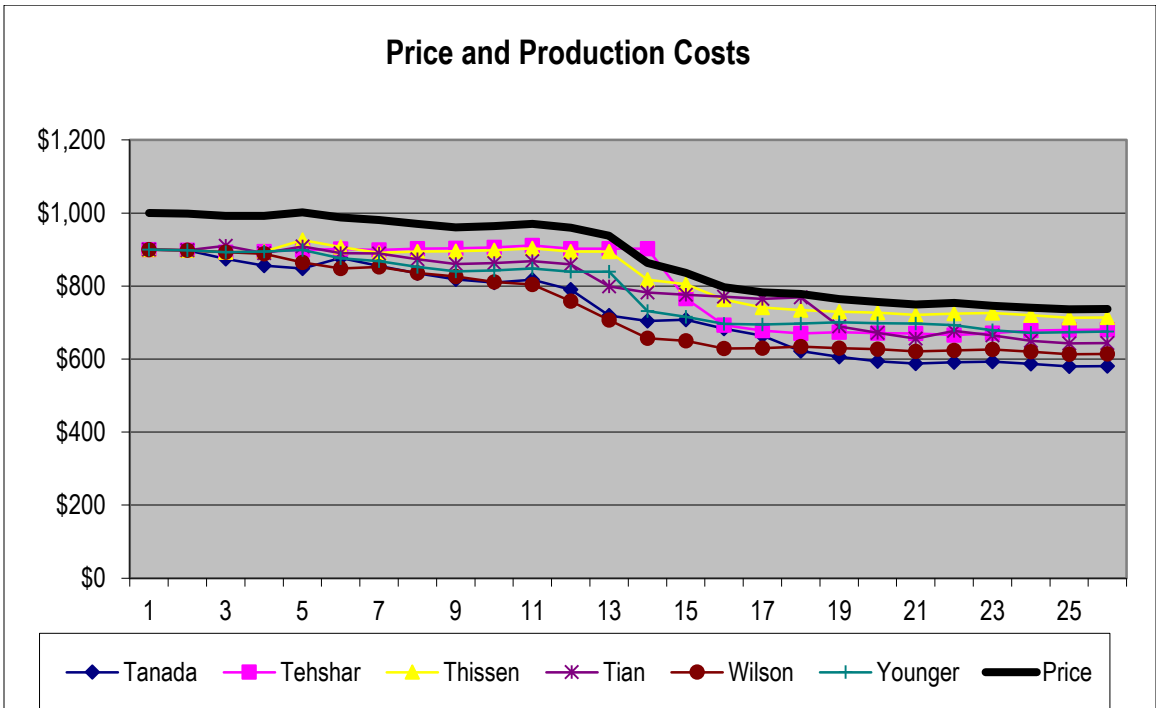
This group simulation was remarkable because very little happened! This group also had the highest minimum cost of the four groups, so it was not possible to achieve operating costs below \$400, let alone below \$300 as occurred in the other groups.

Costs fell quite uniformly across the six participants so that all six were still producing at the end, although Tehshar closed down for one period before lowering costs and re-opening.

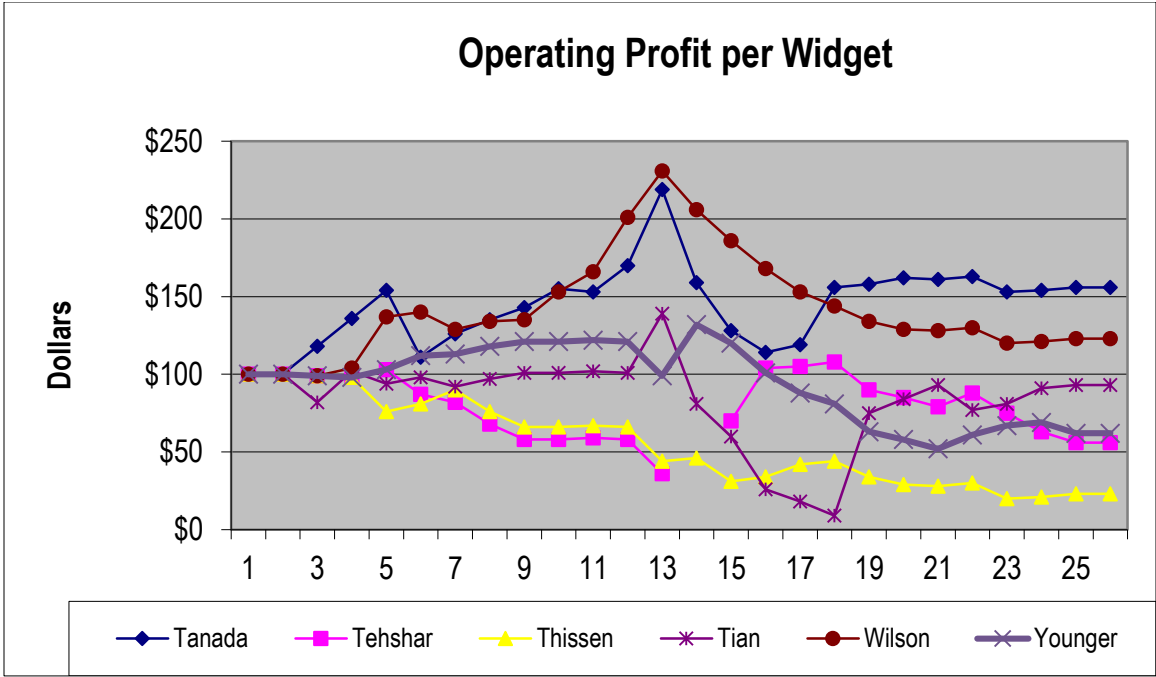
Operating Costs



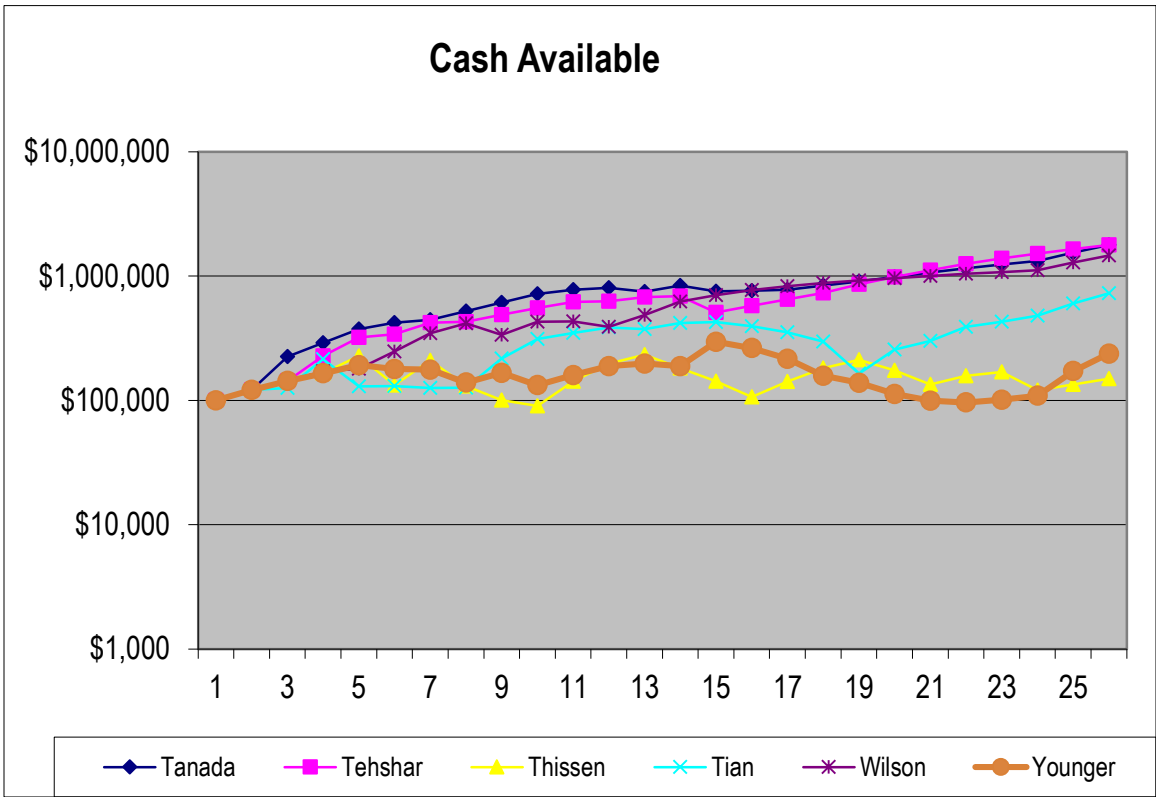
Price and Production Costs

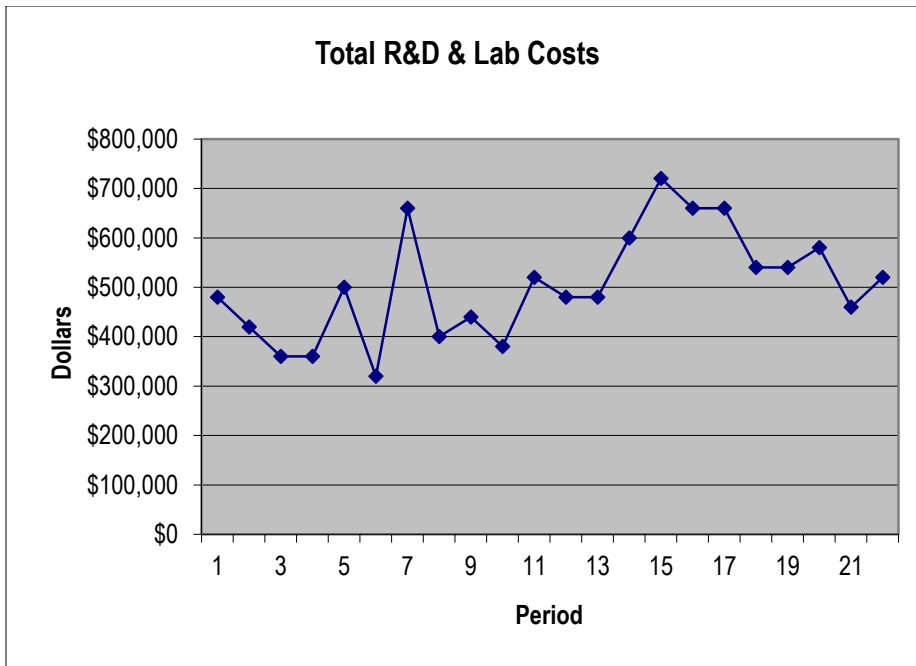


Operating Profit per Widget



Cash Available





Experiment Final Totals

	Tanada	Tehshar	Thissen	Tian	Wilson	Younger
Prod Revenue	\$26,726,625	\$25,549,493	\$26,726,625	\$26,726,625	\$26,726,625	\$26,726,625
Oper Cost	\$16,180,122	\$17,300,639	\$19,140,122	\$18,139,698	\$16,350,331	\$17,696,628
Mat Cost	\$5,992,980	\$5,928,311	\$5,985,863	\$5,978,429	\$5,962,503	\$6,203,839
Prod Prof	\$4,553,523	\$2,320,543	\$1,600,640	\$2,608,498	\$4,413,791	\$2,826,158
R&D Exp	\$2,860,000	\$1,060,000	\$1,340,000	\$1,600,000	\$3,000,000	\$2,280,000
Inst Exp	\$300,000	\$200,000	\$100,000	\$300,000	\$300,000	\$50,000
Other Exp	\$140,000	\$0	\$100,000	\$100,000	\$100,000	\$250,000
License Rev	\$0	\$50,000	\$0	\$0	\$0	\$0
Final Cash	\$1,780,191	\$1,776,677	\$149,205	\$726,977	\$1,462,879	\$237,765
# of Tech	24	9	11	14	24	18
Best Tech	\$422	\$501	\$556	\$493	\$462	\$485
Patents held	2	1	1	3	2	2