

Game Theory and Player Volatility

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Niall Fraser – Open Options Corporation

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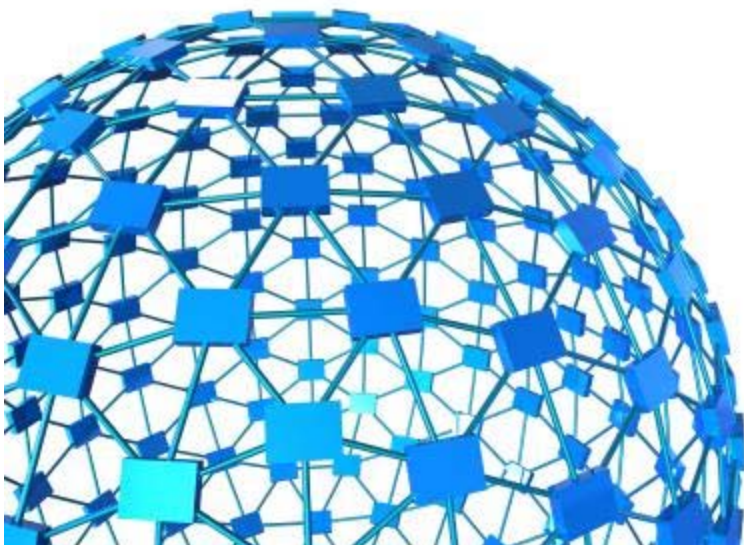
Player Volatility

- In the last half year or so, many companies have been avoiding making decisions because of economic, social and political volatility
- However, the economic downturn has also opened a window of opportunity for thoughtful firms to exploit uncertainty in several directions
- This can result in apparent *player volatility* - that is, key decision makers suddenly taking unexpected strategic moves.



Game Theory and Player Volatility

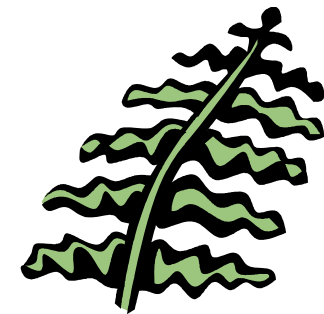
- Game Theory can be a powerful tool for dealing with player volatility
- It provides a mechanism for focusing on player interactions when these are a critical source of uncertainty
 - This presentation:
 - explores the forces behind player volatility in the current economic crisis, and
 - examines the case of IBM championing Linux in an environment of player volatility in 2001 - 2003



The Current Economic Crisis

- Some companies are suffering:

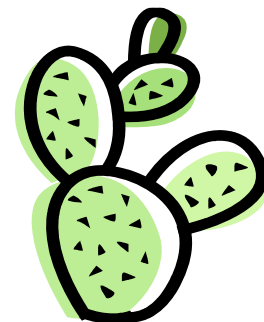
citibank



Ferns

- Some companies are prospering:

WAL★MART

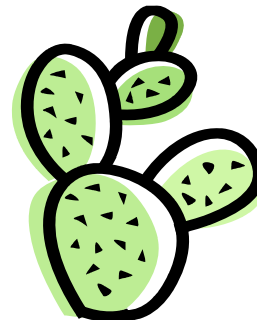
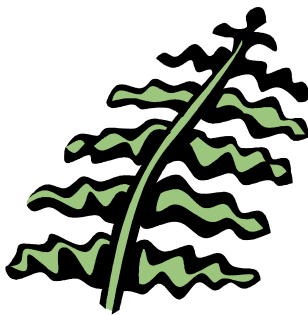


Cacti

The Path Ahead

Crisis = Danger + Opportunity

- Danger can be paralyzing. However, both Ferns and Cacti can exploit rare opportunities if they take advantage of the crisis at hand





The Opportunities for Ferns

- Companies who are suffering in the current economic crisis have rare opportunities
- They will either survive... or not
- But they are not in isolation. Everybody they deal with is affected by whether they succeed
- All relationships are open to change
- There is an unparalleled opportunity to **re-engineer the business.**

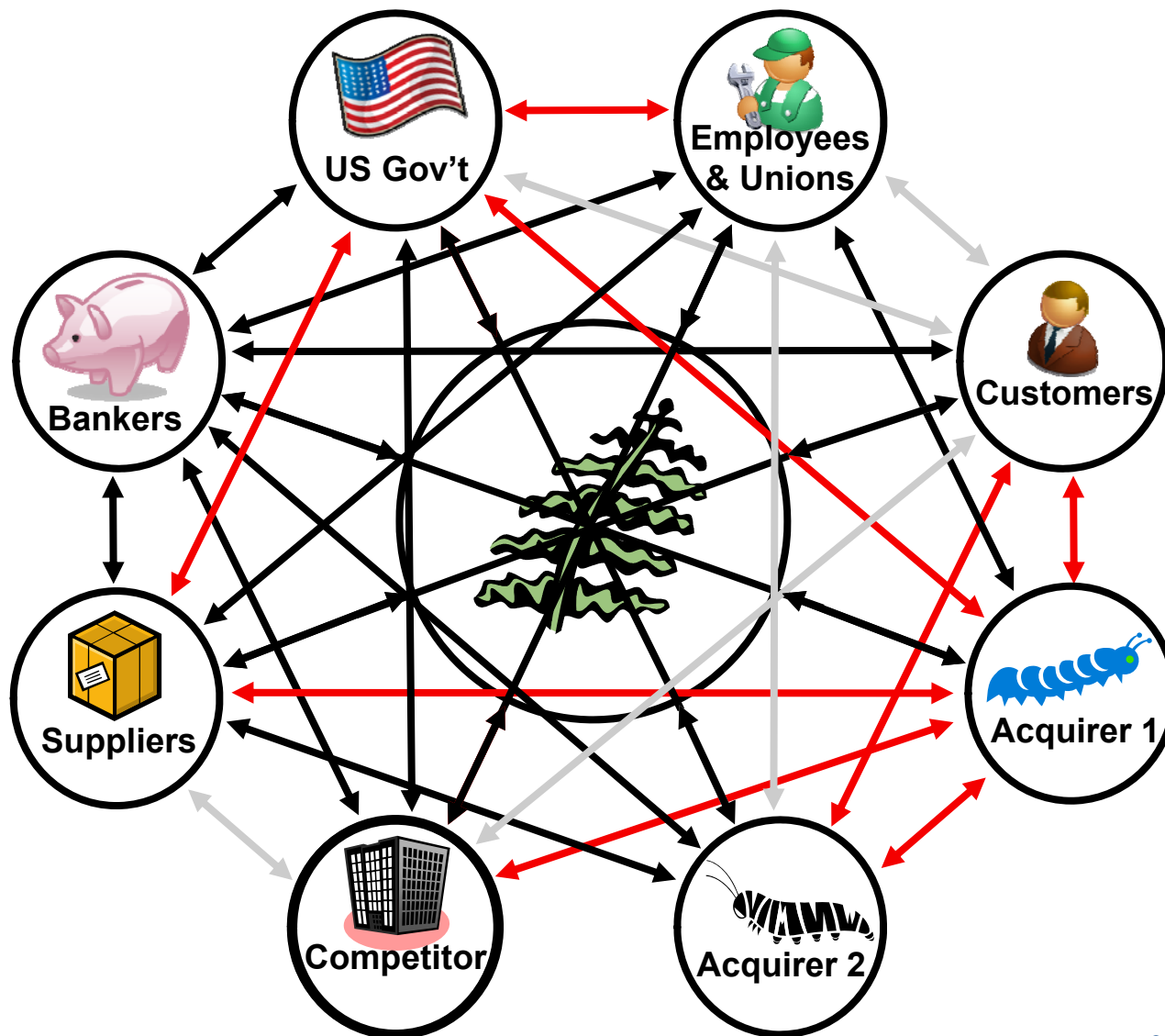
Opportunities for Ferns



Re-engineer
the Business!

from "The Five Competitive Forces That Shape Strategy" by
Michael E. Porter, *Harvard Business Review*, January 2008

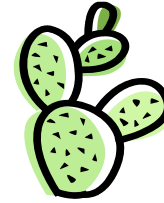
How quickly things get complicated



What should a fern do?



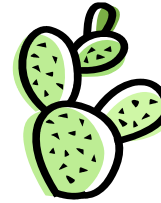
- Companies at risk in uncertain times have an unparalleled opportunity to re-engineer their business
- This is because if they fail, they take others down with them
 - Suppliers will lose a customer
 - Dealers will lose a supplier
 - Customers will have fewer choices
- This interdependence lets a company potentially restructure any existing relationship
 - Power can be shifted
 - Long term agreements can be renegotiated
 - New distribution channels can be put in place
- The opportunity is fleeting, however. A company must act when they are perceived as being fragile.



The Opportunities for Cacti

- Companies who are thriving in the current economic crisis have rare opportunities, too
- Rather than focusing on survival, they can focus on extending themselves
- They are not in isolation. They are in a matrix of other firms
- All relationships are open to change
- There is an unparalleled opportunity to **re-engineer the industry.**

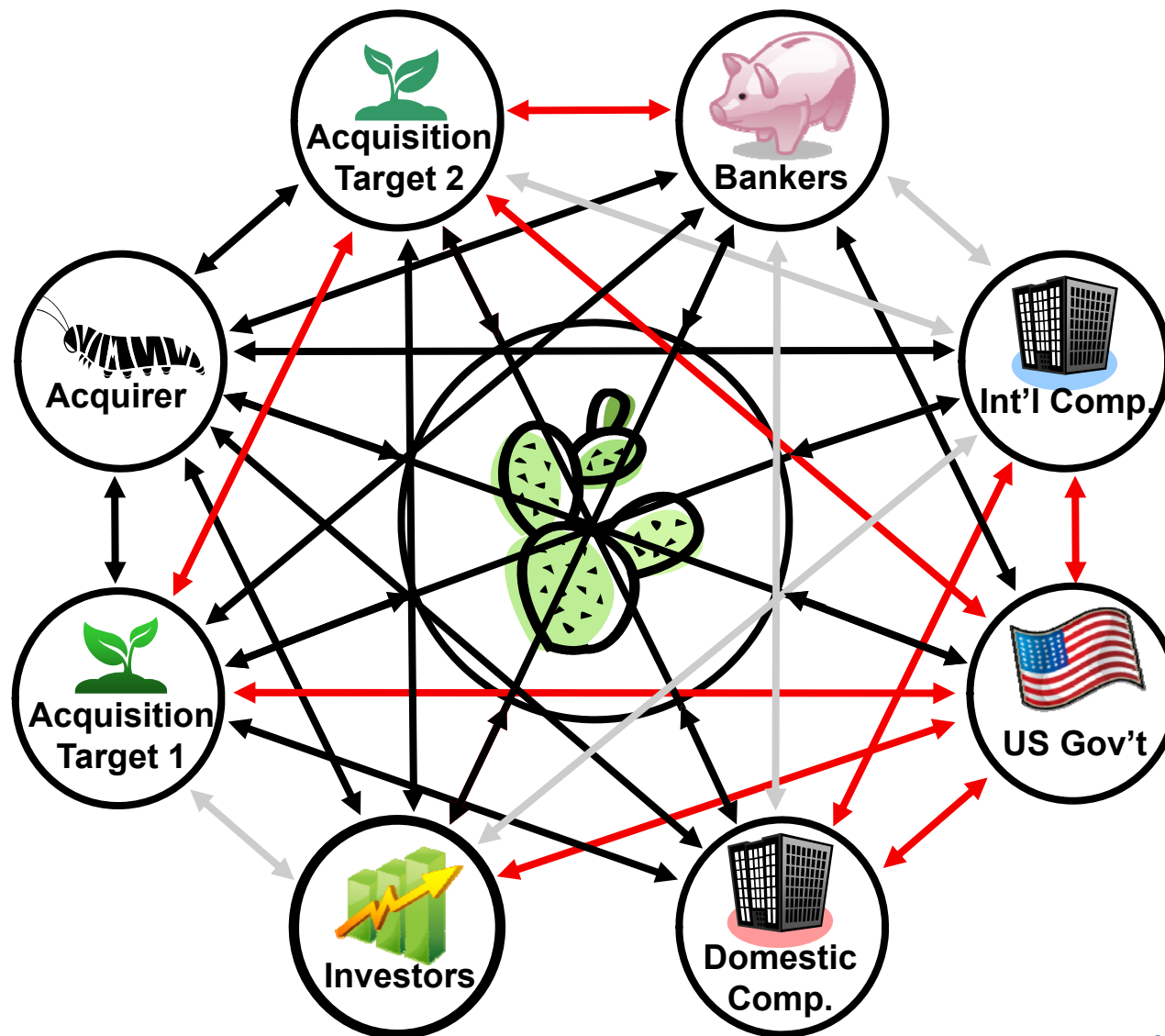
Opportunities for Cacti

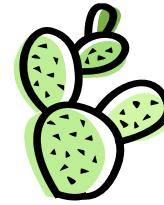


Re-engineer
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How quickly things get complicated





What should a cactus do?

- Companies that thrive in uncertain times have an unparalleled opportunity to re-engineer their industry:
- This is because others around them are weak, while they are strong:
 - Acquisitions may be available at bargain prices
 - They can enter new markets where existing competition has limited ability to respond
- They can reposition themselves for future growth
 - They can extend their power
 - Establish footholds in new markets
 - Strengthen their competitive position
- The opportunity is fleeting, however. They must act while other are weak.

Player Volatility in Uncertain Times

- The world is now less predictable in many ways
- In particular, all companies have an unusual window of opportunity to re-engineer their business or re-engineer their industry
- Old assumptions of player behavior cannot hold
- Game Theory can be a powerful tool for dealing with player volatility.



Example: IBM and Linux - 2001-2003

- IBM saw Linux as a technology in which they had to have a strong presence
- Linux could potentially break the Windows monopoly held by IBM's traditional opponent, Microsoft, and give IBM a tremendous long-term benefit
- There were significant problems:
 - lots of competition,
 - a rapidly evolving technology market,
 - a significantly different culture as compared with IBM's traditional businesses,
 - competing versions of similar technology, and
 - uncertainty as to whether Linux would actually ever be widely adopted.



IBM and Linux - Player Volatility

- The Linux market was so new and evolving so fast that IBM planned a sequence of game theory analyses over a several year span
- Each model had new players as new companies were formed or others dropped out
- However, at each stage key short-term guidance and long term principles were clearly evident
- Five full-scale analyses were done between October 2001 and May 2003 on IBM's strategy in the Linux market.



IBM and Linux - Preference Matrix

IBM	Preferences For							
	IBM	Competitors		Linux Companies		Buyers		Microsoft
		SUN	Others	Red Hat	Others	Major	Broad	
1) Champion one Linux	17	5	5	-16	17	11	11	16
2) Follow others Linux choice	-16	9	11	17	-16	7	7	-17
3) Adopt common Linux consensus standard	11	19	13	8	-9	-9	-9	9
4) Adopt proprietary technology	5 if -17	16	14	-9	-5	1	18	5
5) Abandon Linux	3	-17	17	7	12	18	1	-11
6) Become Linux distributor	1	-18	-16	12	-1	-5	-5	19
Other Competitors	-9	-11	7	-11	11 if -1	3	3	4
7) Champion one Linux	18	-15	-9	1	3	-12	-12	-3
8) Follow others Linux choice	-19	-13	-10	14	-7	-4	-4	-14
9) Inhibit Linux	2	-14	8	5	-10	-16	-17	-7
10) Becomes Linux distributor	-6	-3	6	18	-6	15	-10	18 if 17
Linux Companies	-4	-2	4	-4	-4	-10	-6	-1
11) Support standardization	8	-1	1	2	13	-6	-19	6
12) Broaden offerings	-12	-6	2	-6	14	-13	-13	13
Major Buyers	-7	4	3	-10	18	-19	-16	-15
13) Embrace multiple Linux's	-10	-7	12	-3	8	2	-15	10
14) Follow others Linux choice	-15	-8	18	15	2	8	2	2
15) Create integrated offering	13	-10	19	-13	15	14	8	8
16) Ignore Linux	14	-12	15	-19	-19	17	14	12
Broad Buyers								
17) Endorse one Linux choice								
Microsoft								
18) Embrace and extend Linux								
19) Fight Linux through legal means								

Players: who is involved
Options: what they can do

Preferences: what they want
Preference tree: list of options from most important to least important

IBM and Linux: Analysis

The analysis had two parts:

- **Tactical Analysis:** Players are characterized:
 - to understand their likely behavior
 - to recognize how to motivate them
- **Outcome Analysis:** Figuring out what can happen:
 - **Natural Outcome:** how things will play out if all of the players follow their natural interests
 - **Danger Outcome:** a bad situation that could result from a poorly chosen course of action
 - **Best Attainable or Target Outcome:** the best result that can be attained for the client.

Observation: IBM leading would be problematic

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9) Inhibit Linux	-4	13	13	-4	-1	-1	-1	-1
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16) Ignore Linux								
Broad Buyers								
17) Endorse one Linux choice								
Microsoft								
18) Embrace and extend Linux								
19) Fight Linux through								

1) IBM wants to lead Linux market (option 1) and have the Linux Co's support a single standard (option 11)

3) However, Red Hat will not support standardization

2) And the Major and Broad Buyers also strongly support these interests

4) And the Other Linux Co's will not support standardization if IBM is leading it

5) Despite IBM's interest in leading Linux towards a common new standard, the Linux market will not follow IBM's lead.

IBM and Linux - Key observations

- Microsoft had a significant inhibiting effect on the technology because of its power and clear intent to protect its position
- Cultural differences between IBM and the emerging Linux market were very important, and would make it difficult for IBM to directly support Linux
- Uncertainty about the ownership of the Linux intellectual property would slow the growth of the market
- The Buyers were key players in ensuring the adoption of Linux
- The triggers for a critical mass of acceptance of Linux were identifiable and observable.



IBM and Linux - What Happened

- The model clearly revealed that because of cultural differences, IBM should not strive to be a leader in this new technology
 - Contrary to its natural inclinations, it would have to “lead from behind”. This would permit the new leaders to grow the market to IBM’s benefit
- This key action was successful. IBM managed to be seen as a forward-thinking player in this market without alienating the new leaders
- The Linux Co’s and the Buyers embraced a common Linux standard reducing development costs for IBM
- Microsoft acted as predicted, with its stand-in SCO Group and others pursuing legal actions against Linux
- Critical mass acceptance of Linux was reached and it still dominates in several application areas
- IBM integrated the strategy throughout the enterprise and achieved a leading position in this market.



IBM and Linux - Client Comment

"What you don't realize [in many decisions] is how much time gets spent on debate that at the end of the day doesn't end up mattering that much. If you can narrow the debate down to the handful of things that really matter, you can dramatically speed up decision time

With the Open Options guys, we've gotten to the point where we can assemble a team and, in the course of three or four days, gather the data for the workshops, feed it in, and within a couple of weeks have good outputs and good answers and good insights."



Joel Cawley

VP of Corporate Strategy, IBM

Report on Business, Jan. 26, 2007

Summary

- Volatility in the economy can trigger unexpected volatile behavior by key decision makers:
 - “Ferns” can re-engineer their business
 - “Cacti” can re-engineer their industry
- However, player volatility can be seen anywhere there is an unstable business environment
 - Eg, IBM’s prospects in the early Linux market
- Game Theory can be a powerful tool for dealing with player volatility.





Open Options Corporation

www.openoptions.com

+1 519 884-5898 ext 28

Niall Fraser

nmf@openoptions.com