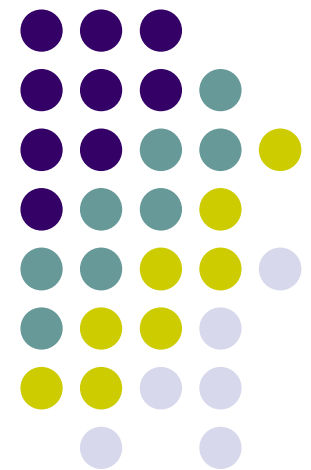


Observations on Corporate Venture Capital du jour

Preliminary findings from the
NIST CVC study

Ian C. MacMillan
The Wharton School
Cambridge, November 2006



The trigger for the talk: NIST funded study of CVCs



Some preliminary findings

Some observations on those findings

Some guidelines/suggestions from you

Preliminary finding: Fourth Wave of CVC clearly underway

Wave 1 -- late 1960s

Wave 2 – early 1980s

Wave 3 -- 1990s

Wave 4 -- post-2000

Patterns:

- Globalization
- Outsourcing of innovation
- Open source innovation - De-centralized, distributed innovation

Preliminary finding: Investments by type differ between IVC and CVC

IVCs don't invest as much in **seeds** as CVCs do

- Fruit-fly death rates

- Defensive CVC investments protect firm from disruption (more later)

IVCs don't invest in **process technologies** as much as CVCs do

- Sale of processes difficult

- Sale of processes appropriable

- Corporate Investor captures process benefits

IVCs don't invest as much in **platforms** as CVCs do: SizaTola

- Sale of platform difficult

- To generate revenues, need to wait for developed applications

- Corporate investor can build the platform and generate applications

Observation: Where and how the CVC investment patterns make a difference



- **Investments in seeds** if successful provide new product/service classes with large-scale diffusion benefits
- **Investments in processes** provide entrée to major productivity/quality/yield gains with large-scale diffusion benefits
- **Investments in platforms** provide entrée to proliferating applications with large-scale diffusion benefits

All the above encourage public policy allocations to CVC

Preliminary finding: the mission-performance debate continues



Continued tension between strategic versus financial mission

Pure strategic removes the profit discipline.

Pure financial imposes short term delivery pressures

Continued concern with level of desired performance expectations

Low expectations can erode stockholder wealth

High expectations can “null the set”

Observation: Stock market reaction to combined mission/performance



ROIC Objective	Strategic mission	Financial mission
Less than firm Cost of capital	Wealth-wasting Fuggedaboutit	
Between firm's cost of capital and IVC's ROIC	Strategic sweet spot, but what strategic role?	So you are out of internal growth opportunities?
Approaching IVC's ROIC	Hard financial measures will derail strategic mission	I'll go with the pro's!



Observation: Why CVC at all?

Part of a broader, more provocative question:
Why R&D at all?

Relative P/E = P/E firm/ Average P/E of S&P 500

Rel P/E < 1: Market is discounting your P/E –
they can do better elsewhere.

Two thirds of the top twenty R&D spenders had less than average relative P/E ratios.

CONAME	Avg Of R&D 1999-2003	Median Relative PE June 1999-May 2004
FORD MOTOR CO	7300	0.35
GENERAL MOTORS CORP	6220	0.32
PFIZER INC	5883	1.69
INTL BUSINESS MACHINES	4674	0.84
MOTOROLA INC	4040	1.36
MICROSOFT CORP	4018	1.27
INTEL CORP	3984	1.40
JOHNSON & JOHNSON	3805	0.94
CISCO SYSTEMS INC	3513	1.56
LUCENT TECHNOLOGIES INC	3427	-0.02
HEWLETT-PACKARD CO	3103	1.00
BRISTOL MYERS SQUIBB	2681	0.95
MERCK & CO	2575	0.70
LILLY (ELI) & CO	2162	0.99
DU PONT (E I) DE NEMOURS	1967	1.09
GENERAL ELECTRIC CO	1966	0.92
WYETH	1894	0.43
ABBOTT LABORATORIES	1791	0.92
DELPHI CORP	1770	0.30
SUN MICROSYSTEMS INC	1759	0.47
CORRELATION	0.07	
Explanation of variance	0.01	

One half of the top 20 R&D/Sales spenders had less than average relative P/E ratios

1999-2003	average R&D	average R&D/sales	average P/E ratio
AMGEN INC	1498	0.315	1.23
LILLY (ELI) & CO	2092	0.192	0.93
CISCO SYSTEMS INC	3197	0.190	1.72
PFIZER INC 1	5283	0.178	1.80
TEXAS INSTRUMENTS INC	1555	0.167	1.43
APPLIED MATERIALS INC	937	0.166	1.67
MICROSOFT CORP	3765	0.160	1.38
SCHERING-PLOUGH	1290	0.140	0.85
BRISTOL MYERS SQUIBB	2497	0.133	0.98
INTEL CORP	3766	0.131	1.15
WYETH	1854	0.131	0.74
MOTOROLA INC	3877	0.129	0.93
MONSANTO CO	636	0.128	1.19
SUN MICROSYSTEMS INC	1635	0.125	0.83
MEDTRONIC INC	573	0.120	1.74
CORNING INC	514	0.110	0.74
JOHNSON & JOHNSON	3576	0.110	0.93
ABBOTT LABORATORIES	1696	0.109	0.87
EMC CORP/MA	688	0.108	1.80
ORACLE CORP	874	0.107	0.98
Correlation	0.25		

R&D/Sales of Top 20 Relative P/E ratio firms did not correlate with relative P/E

CONAME	Average Relative PE	Avg Of RD/Sales
	1999-2004	1999-2003
EBAY INC	3.80	10%
YAHOO INC	2.97	14%
NETWORK APPLIANCE INC	2.38	13%
APARTMENT INVT &MGMT -CL A	2.16	0%
MERCURY INTERACTIVE CORP	2.11	11%
UNIVISION COMMUNICATIONS INC	2.07	0%
JABIL CIRCUIT INC	1.70	0%
MONSTER WORLDWIDE INC	1.55	0%
EMC CORP/MA	1.59	11%
BIOGEN IDEC INC	1.52	58%
SCHWAB (CHARLES) CORP	1.51	0%
SCHLUMBERGER LTD	1.49	5%
QUALCOMM INC	1.46	13%
PERKINELMER INC	1.45	7%
ANALOG DEVICES	1.42	20%
SIEBEL SYSTEMS INC	1.33	15%
APPLIED MATERIALS INC	1.53	17%
HALLIBURTON CO	1.13	2%
INTL PAPER CO	1.24	0%
MEDTRONIC INC	1.31	11%
Correlation	0.02	

Observation: Is CVC any different?

Customer as compass

OR

Some other systemic compass for

Portfolio design

Portfolio performance expectations

Portfolio of strategic roles

Capabilities (Ability to deliver)		
	Current Capabilities	Extend Capabilities
Customers		
Current Segments	Access profitability enhancing capabilities	Access product extending capabilities
Extend segments	Access market extending capabilities	DEFENSIVE: Access disruptive capabilities OFFENSIVE: Opportunistic investment

Capabilities (Ability to deliver)		
	Current Capabilities	Extend Capabilities
Customers		
Current Segments	Access enhancing capabilities Male air warrior carry-on: Kevlar	Access product extending capabilities
Extend segments	Access market extending capabilities	DEFENSIVE: Access disruptive capabilities OFFENSIVE: Opportunistic investment

Capabilities (Ability to deliver)

	Current Capabilities	Extend Capabilities
Customers		
Current Segments	<p>Access enhancing capabilities</p> <p>Male air warrior carry-on: Kevlar</p>	<p>Access product extending capabilities</p> <p>Male air warrior briefcase: Zippers - NASA</p> <p>Laptop sling – Scuba suits</p>
Extend segments	<p>Access market extending capabilities</p>	<p>DEFENSIVE:</p> <p>Access disruptive capabilities</p> <p>OFFENSIVE:</p> <p>Opportunistic investment</p>

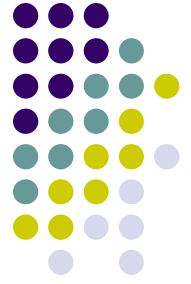
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Extend segments	<p>Access market extending capabilities Female air warrior carry-on: Roller wheels: Rollerblade Handles: Boeing anodized Aluminum</p>	<p>DEFENSIVE: Access disruptive capabilities OFFENSIVE: Opportunistic investment</p>

Capabilities (Ability to deliver)		
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Current Segments	<p>Access enhancing capabilities Male air warrior carry-on: Kevlar</p>	<p>Access product extending capabilities Male air warrior briefcase: Zippers - NASA Laptop sling – Scuba suits</p>
Extend segments	<p>Access market extending capabilities Female air warrior carry-on: Roller wheels: Rollerblade Handles: Boeing anodized Aluminum</p>	<p>DEFENSIVE: Access disruptive capabilities Spider silk OFFENSIVE: Opportunistic investment Electric adaptors Poweradaptors</p>

Portfolio mix and performance expectations

Capabilities (Ability to deliver)		
	Current Capabilities	Extend Capabilities
Customers		
Current Segments	Low uncertainty Make the numbers 10% of portfolio?	High capability uncertainty Make the 20% range 35% of portfolio?
Extend segments	High market uncertainty Make the 30% range 25% of portfolio?	High market/high capability uncertainty Build option value Defensive: 20% of portfolio? Offensive: 10% of portfolio?

Preliminary finding: Continued variability of metrics



Input/activity as metrics:

Number of meetings/ number of plans reviewed/number of due diligence/number of deals are not outcomes, they are inputs.

Outcome metrics:

Acquisition by Business Unit? By other firms? JV?

Technology gain?

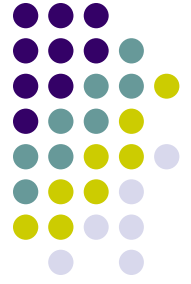
When are outcome metrics measured?

Observation: Traditional DCF/NPV analysis is not suited to high-uncertainty situations.



Better methods for planning and evaluating highly uncertain investments.

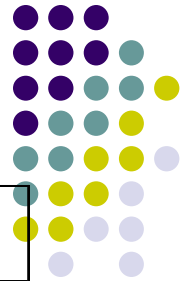
- Discovery Driven Planning (DDP) to plan and execute
- Option valuator to estimate total project value (NPV plus Option value)



DDP: Key disciplines

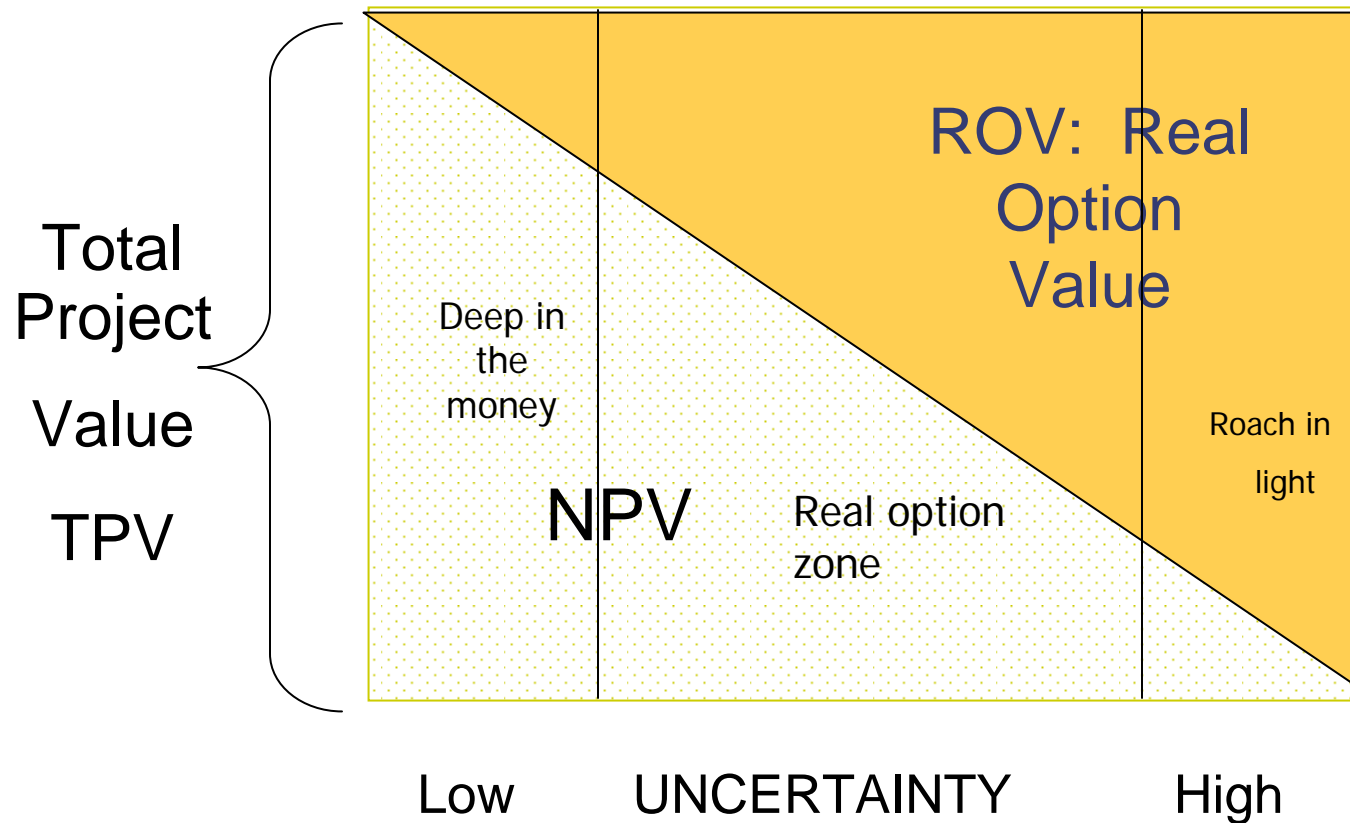
- Acknowledge competitive market metrics
- Specify required deliverables
- Identify and document assumptions
- Identify major CheckPoints
- Test assumptions at CheckPoints, ahead of investment

Typical CheckPoint/Assumption table

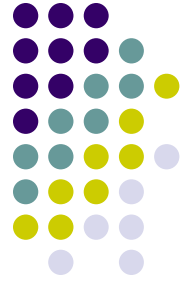


CheckPoint number	CheckPoint event	Assumptions tested	Cost
1	Market study	All	\$3K
2	Industry analysis	All	\$10K
3	Feasibility study	All	\$25K
4	Product samples	1, 3, 4, 5	\$6K
5	Focus groups studies	1, 3, 4	\$14K
6	Advertising study	2	\$25K
7	Human resource and manpower study	7, 8, 12, 13, 14	\$25K
8	Market research: Conjoint analyses	1, 3,	\$25K
9	Trials with Beta users	1, 2, 3, 4, 5	\$50K
10	Focus group discussions with beta users	1, 3, 4,	\$25K
11	Pilot plant	9, 10, 11, 15, 16, 17	\$100K
12	Pilot marketing campaign	1, 3, 4, 6, 7, 8, 17	\$80K
13	Plant design and site acquisition	18, 20, 21	\$4M
14	Pilot sales recruitment and training	1, 4, 5, 6	\$75K
15	Plant construction launch line 1	9, 10, 11, 20, 21	\$3M
16	Manufacturing recruitment and training	12, 13, 14, 15, 16, 17	\$200K
17	Plant commissioning	9, 11, 12, 15, 16, 17, 18, 20	\$150K
18	Sales recruitment and training	1, 3, 4, 5, 6, 7, 8	\$250K
19	Product launch	All	\$750 K
20	Full-scale plant construction launch	All	

Total project value = NPV + Real option value



Possible Outcome metric



- Cumulative Total Project Value of portfolio

A sample of users - people in:



- Intel, HP, Microsoft, Seagate
- Air Products, DuPont
- Citibank, American Reinsurance, Chubb
- Aramark

- Swiss Re
- Michelin
- Nokia
- Philips
- Shell
- Matsushita
- LG Chem

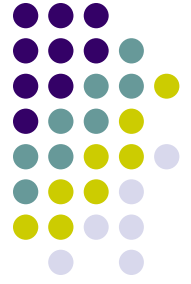
Preliminary finding: Confusion about Governance and Organizational structure issues continues



Many models, no obvious solution

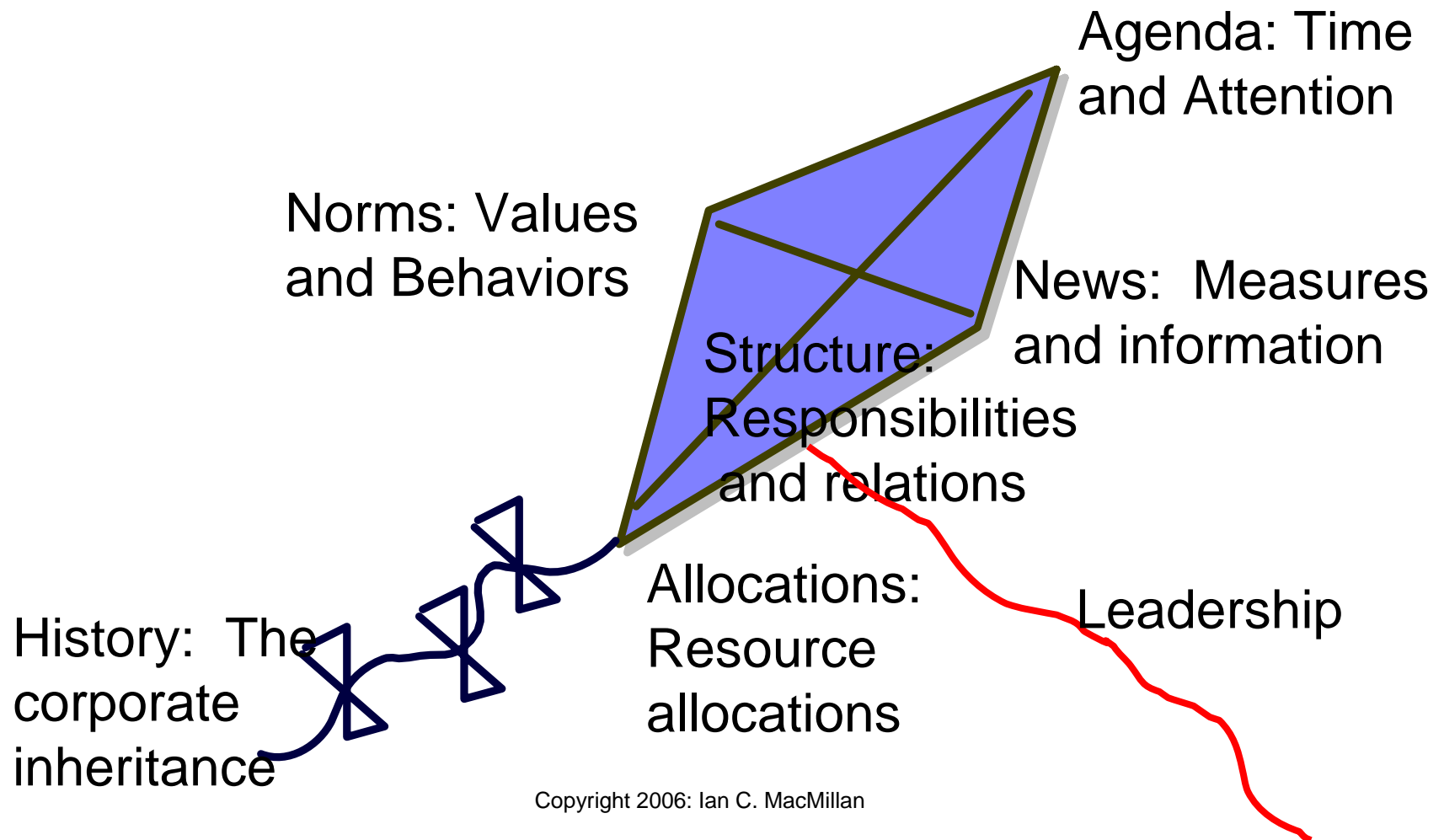
- Decision-making-- Investment Boards/Direct reports/CVC decision
- Types of funding-- dedicated versus evergreen?
- Management of Portfolio
 - a. Business unit as observer versus board seats?
 - B. Business unit involvement/control/responsibilities?
- Personnel
 - a. Full time versus secondment?
 - b. Compensation compared to Business Unit staff?
- Relationships with IVCs?

Observation: Integrative rather than elemental analysis might work better



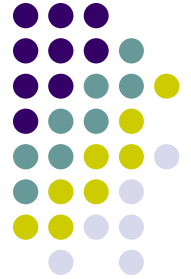
Comprehensive alignment among elements
is as important as each individual element
Analysis of alignment pulls elements together

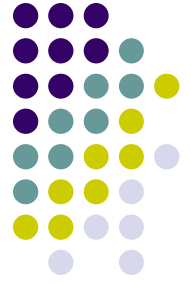
Comprehensive Alignment Tool: KITE analysis



More on KITE

“MarketBusters,” Chapters 7 and 8
Harvard Business School Press, 2005





Desire for relevant outputs

“Necessary nose counting” - Updates of Industry demographics

Benchmarking

Pattern affirmation/Validation

Probing current conventional wisdom

Redirection

Non-intuitive insights

Inform CVCs (Rent generation)

Inform public policy

Conclusion – boy do we need your help!



- What questions vex you?

Val Livada
Andrew Wang
Peter Holden
Ed Roberts
Pompous self