Systematic Innovation, Complex Systems & Capability **Maturity:** not getting so far

ahead of the parade no-one knows you're in the parade anymore IEEE, Nottingham 23 January 2019

961

Kobus Cilliers

Δ] for Business & Management Darrell mann Darrell Mann

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Greater Operational Excellence = Worse Innovation Capability

Tomorrow's disruption does not come from today's competitors

Random Innovation



Economist.com



Innovation Performance



Indexed R&D/Sales Ratio

Innovation?



US Patent 3,216,423

98% of attempted 'innovations' fail





Spot The Innovation How many innovations?

Explain your reasoning.































Spot The Innovation

How many innovations? Explain your reasoning.





MILLIONS of systems HUNDREDS of different problems **TENS of successful solutions**



Five Pillars of Structured Innovation





Worsening Feature		Worsening		Design				Production					Supply				Support					Customer			Systems							Intangibles						Mea	sure	Harr	m			
			Design Capability/ Spec/ Means	Design Cost	Design Time	Des ku	Production	Capability/ Spec/ Means Production	Cost	Time	Productor Risk Production	Supply Capability/ Stect Means	Sipply Cost	sipply Thre	Sipply Risk	Supply Interboss	Sipport Capability/ Spec/ Meals	apportcost	apportTime	Sipport Risk	Sipport Interfaces	C istomer Revenue	Market Demand	C istomer Feedback	C Istomer Loyalty	AmountOf Information	omm mitatto 1 F tow	Corvertience deptebility/	versatlitý System	Complexity	Complexity ension/Stres	Stability/ Res lite roz	Arbiony	Belonging	Competence	Sense Of Progress	Positive Intargibies	Negative Intangibles	Trist	Eigagem eit Meailig	Ability To Measure	Accenter of Accenters	Harm Th Factors Affecting System	Generated
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	5	Design Interfaces	24 25	10 35	24 5 1	25	5 17	17 10 5	27 23	13	3 10 30 13 6 13 3 25	3 13 6	10 4	13 10	35 40	6 13	35 21	38 13	10 21	13 40	6 28	7 40	19 2	25 35	2 24	25 6	35 25	15 37 40	1 10	7 25	14 37 18 4 35 10	25 4	25 23	31 35 4	13	24 17	36 35	140	3 24 10	1 3 23 2	19 25	15 24	35 24 2	26 2
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	17	Support Cost	15 35 25 28	1 10	7 15 35	7 6	5 7 1	13 10 2 17 2 15	35 3	13	3 35 23 10	23 2	5 35	25 27	19 10	5 10	2 25	10 33	5 4	31 25	25 37	24 25	5 15	13 28	17 36	28 4 17 37	25 1	1 12 15	35 35	25 25	15 35 24	1 35	17 3	33 2 1	0 5	19 1	4 10	22 19	3 9 2	4 8 2 7	13 3	40 15	1 35 2	2 24
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	26	Communication Flow	6 25 29 31	37 6 18 13	6 7 30 19 40 31	4 6	5 2 35 1	6 2 27 3 25 6	37 2 24 38	37 2	25 38 3 28 26 10 37 32	5 25 2 23 10	35 6	6 25 35 10	6 13 7 2	2 25	10 28 37 3	25 5 4 32	6 31 2 25	15 31 6 2	10 2 15 25	7 30	17 26	13 2 7 24	32 31 3 13	2 37 4 15		25 1 40 19 29 6	25 12 37 4 3	25 25 29 7 3	19 7 13 24 36 4	32 40	7 13 24 14	953 24193	4 20	23 12 19 30	38 1 12 18	31 3 13 24	31 10 3	4 9 9 23	28 1 27 10	35 40 17 37	6 30 1 36 8 4	28 4 7
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	30	Control Complexity	7 19	37 19	25 6 37	40 28	8 3 2 5 37	25 28 25	10 3	7	25 2 40 26	6 37 25	22 5	37 2	28 10	22 28	10 25	19 7	15 35	1 34	30 19	7 37	5 15	25 18	12 19	25 37	19 37	25 24 7	29 7	13	10 24	37 25	23 25	2 13 1	27	1 13	9 3 38 40	4 26 8 7	13 40 5	12 32 1	3 14 27	25 37	22 25 1	15 13
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	36	Sense Of Progress	9 15 2 10	2 25	21 14 23	27 24	4 23	2 15 19	26 1	35 25	27 17 30 3	3 35 25	26 1 17 3	26 17	23 2	19 8 19 40	24 7 25 24	26 35	13 21	5 35	23 5 24 15	3 17	27 35	25 17	24 13	2 37 28 37	3 10 7 21	24 13 7	19 2 4 24 26	40 37	25 8 2	7 16	23 8	9 23 7 35 2	4 3	37 18	13 38 9 19	17 21	36 10 2	8 1 13 1 8 1 5 13	37 7	2 15	32 14 2 24 25 1	4 2
	37	Positive Intangibles	15 24 15 4	13 3 5 18	17 26 23 19 14 10	38 2 31 2	4 7 2	28 2 1 3 10 35	37 10 5 15 21	13 2	22 32 19 1 1 24 2 40	15 26	13 23	9 7 1 13	24 26 10 26	22 39 15 40	2 8	26 7 9 15	35 24 24 38	14 3	2 18 40 25	13 7 22 7	36 10 13 24	35 15 21 35	21 13 19 40	7 32 3 17	24 35 25 21	22 24 1	37 24 14 24	3 24 25 25	14 28 1 1 22 2	28 22	28 13 19 23	1 13 1 1 13 1	8 15 7 24	21 23	28 34	24 1 15 18	19 7 9	29 8 10	2 18	10 35 28 40	35 9 2	1 35
	38	Negative Intangibles	15 3	22 2	1 15 24	23 13	3 10 2	24 35 3	15 21	22	31 3 2 23	3 13 25 1 20	1 21	78	10 2	13 28	5 13	25 40	35 13	31 17	7 21	6 12	13 25	20 3	3 23	28 24	31 3	24 22 7	1 40	19 10	15 39 3	32 13	15 1	23 32 2	34	1 13	40 24	22 2	1 10 2	3 9 17 2	5 13 4	24 40	3 23 3	35 17
	39	Trust	24 23	22 5	21 3 40	1 3	13 1	19 2 17	31 21 36 2	24	36 13 12 5 24 13 23 3	24 26	32 12	10 40	11 7	40 15	10 13 12 24	24 3	40 13	7 32	3 24 23 40	28 40	3 7	21 28	23 4 13 17	13 28	17 15	25 5 3 18 13 24	13 26 35 25	2 24 23 37	32 33 40 36 13 10	9 21 24 7	1 28	24 30 2	4 19	26 12 23 24	7 10	23 1	34	3 35 22 1 24 19 2	5 17	40 37	34 2 32 7 2	9 1
	40	Engagement	24 38 17 2	7 25 13 19	3 26 36 40 20 23	4 10	0 36 4 23 3	1 27 26	5 7 15	13	32 8 10 40 13 12	0 15 5	19 13 1 26	35 7 2 13	32 2 23 24	21 5 22 34	1 26	40 25 19 3	19 2 38 13	24 32 7 12	23 15 8 10	17 7 22 26	7 27	13 19 24 3	15 6 23 10	12 27 35 37	3 31 19 35	2 25 31 17 40 3	23 3 1	26 25 29 10	40 2 24	22 1 32 39	24 3 22 10	38 1 2 7 23 3	6 2 5 40	1 13 7 12	4 25 28 5	31 2 19 24	10 32 3 7	40 2 13 4	1 5 28	19 37 12 7	25 32 10 22 2 3	3 34
	41	Meaning	7 1 25 13	22 3 5	15 13 40 20 7 13	19 3 36 36	3 9 6 17 1	1 24 23 15 13 25	2 10	13 5	12 40 31 1 3 23 24 7	17 9 7 5 25	2 40 25 19	21 24 7 10	5 13 38 19	24 10 3 23	15 7 10 13	2 12 28 25	13 1 24 8	5 9 32 25	18 7 13 15	2 17 13 10	22 5 17 24	35 24 3 9	1 32 25 13	10 35 7 24	28 19 4 14	15 13 13 12 35 35	25 1 23 7	26 2 : 19 13	23 22 2 2 2 39 40	25 5 32 13	15 6 13 40	17 9 5 23 28 2	26 4 10	7 24 1 35	12 5 29 18	35 2 21 32	32 23 2 9 24 2	15	40 24 12 19	5 37 14 35	32 6 1 12 19 2	7 13 24 2
Measure	42	Ability To Measure	24 6 15 4	5 28 10 17	7 35 28 1 13 26	24 3 2 35	3 9 5 28 ²	40 26 10 13 4 3	32 35 34 25	2 15	2 10 3 40 39 32 12 9	0 10 24 13 5	13 26 2 4	17 10 7 27	9 18 40 13	7 17 21 22	15 1 24 37	7 25 10 13	26 24 1 40	5 22 4 17	2 35 32 27	15 7 26 13	71 2736	5 19 40 13	22 17 1 40	24 35 10 13	38 7 24 4	1 26 15 21 25 4	35 3 36 26	24 25 13 13	2 19 2 4 17 22	5 11 21 31	13 12 1 6	40 26 3 10 30 3	2 10 2 13	21 24 22 2	24 28 7 10	1 31 35 26 ;	40 6 2 28 32 1	1 9 17 13 3 4 28 4		15 23 36 32	35 19 2 1 27 3	24 31 7
	43	Measurement Accuracy	17 28 24 40	7 1 10 25	40 24 24 25 2 10	4 10 40 2) 25 2 24 1	2 24 26 10 4 13	5 2 5 40 20	28 9	37 25 25 19 2 40 10 37	9 35 2 7 32 37	3 25 24 7	37 5 35 2	40 10 15 26	17 4 9 40	2 25 6 36	37 3 9 25	25 7 24 35	7 15 14 2	352 515	7 35 10 25	25 21 24 7	32 12 8 24	25 24 7 9	24 37 4 15	38 17 6 25	15 10 37 5 22 13	39 40 7 4	29 25 29	1 31 23 1 7 8	3 15 26 10	7 25 4 12	27 2 2 17 15 1	528 01	5 25 3 24	24 10 38 18	26 2 31 37	24 31 1 12 25 1	0 21 2 7 4 7 20	9526 8819		3 15 1 24 28 3	17 2 31 24
Harm	44	Harmful Factors Affecting System	2 25 10 35	35 34 3 7	26 2 15 35 24 2	35 3 33 35	26 2 5 28 3	24 22 2 35 2 5	15 35 34 13	4	35 25 3 24 2 23 35 13	13 17 29 2	35 2 19 7	29 2 10	2 13 12 23	3 35 13 24	34 40 35 3	1 35 22 25	35 15 1 10	25 35 13 3	11 24 35 5	39 3 5 17	24 7 15	40 32 2 10	1 35 23 18	7 13 10 2	6 30 13 36	2 25 35 15 13 25	23 22 7 29	19 3 40 22	15 11 32 25 25 30	35 24 30 18	3 28 19 13	7 31 3 10 4 2	23 4 40	19 40 1 37	21 7 3 24	2 13 24 32	38 24 2 5 23 5	13 1 1 9 36 3	24 17 2 28 2	3 9 37 5	1	15 4 24 13
	45	System Generated Harmful Factors	25 23 2 37	35 5 8 26	2 15 2 40 19 35	9 3 15 37	35 3 7 40 1	35 22 1 18 39 27	35 35 10 22	10 24	25 24 3 30 10 7 35 24	0 10 1 4 34 35	10 35 2 12	25 10 29 13	23 15 19 2	2 30 40 22	40 3 35 14	5 13 34 19	35 34 25 7	25 4 35 3	25 13 17 10	10 22 6 35	35 13 17 2	1 12 32 15	13 10 7 15	10 5 37 22	7 1 4 35	3 13 3 34 15 15	6 13 10 35	7 25 31 13	15 37 25 23 12 8	35 40 27 2	24 2 7 8	7 10 3 24 13 1	2 35 34	19 25 1 13	38 4 13 10	2 15 31 13	13 24 2 34 30 7	1 10 5 34 32 13 3	13 27 6 28	40 19 14 37	35 4 24 13	





All the insights in one place

98% of QFD-sparked innovation attempts fail 98% of Lean-sparked innovation attempts fail 98% of 6Sigma-sparked innovation attempts fail 98% of Design-Thinking innovation attempts fail 98% of JTBD-sparked innovation attempts fail 98% of OBI-sparked innovation attempts fail 98% of WOIS-sparked innovation attempts fail 98% of Blue-Ocean innovation attempts fail 98% of i4i-sparked innovation attempts fail 98% of Agile-sparked innovation attempts fail 98% of Scrum-sparked innovation attempts fail 99.5% of Open Innovation attempts fail







For every complex problem there is an answer that is clear, simple, and wrong. *H. L. Mencken*



Complicated versus Complex

COMPLICATED



"The" root cause

Known rules of behaviour

"If we keep doing what we've always done, we'll keep getting the same result"

COMPLEX



"conspiracy of causes"

NO safe rules of behaviour

"If we keep doing what we've always done, we *might* get the same result"



CAUSE and EFFECT relationships are often highly tenuous...

...which means you can't 'exclude the trivial' because it could turn out to be the thing that triggers a non-linear shift "fly as close to your neighbours as possible"

Cynefin



"get away from the falcon" 衫

For every complex problem there are thousands of clear, simple, wrong answers.



For every complex problem there is a clear, simple, right one.

If we understand and affect the first principles.



TIME





TIME





TIME

















Innovation Capability Maturity Model

Some Organisations Do Get It Right...

The Steve Jobs Effect/'insanely great'

'Beat Sony'/Institutionalised Innovation Tools

40% product turn every 3 years

Skunkworks

'50% of innovations from the consumer'

Average 40 suggestions/employee/yr 90+% implementation rate

Employees spend 30% of time on 'non'Google'

'Self-organising' teams

INTERFACE

SEEDING

CHAMPIONING

MANAGING

STRATEGISING

VENTURING

INTERFACE – ICMM Level 1

INTERFACE: ICMM Level 2

"Business"

"Tech/Ops"

"Efficiency Engine"

Learning & Innovation

INTERFACE: ICMM Level 4

INTERFACE: ICMM Level 5

"Efficiency Engine"

Everything's working Feels good Clear rules Clear Direction ('Progress')

Knowledge exists

Routine Manage-able Controllable

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Learning & Innovation

Nothing seems to work Uncomfortable/horrible Confusion Find 'new rules' Challenge assumptions Knowledge has to be found

Creativity

Not manage-able

'Out of control'

INTERFACE & SPACE

Relation To Innovation Tools....

Blue Ocean

5S

USP

MCDA

Return

With

Elixir

Ordinary

World

OLV

PEST

Analysis

Affinity

Diagrams

Biomimetics

VSN

Resurrection

Kansei

NLP

Typical	The successful innovator is most likely to be the sort of covert, troop-rallying, lower/mid-level									
Roles	manager rebel prepared to 'ask for forgiveness rather than permission'. Level 1 innovation									
	successes are most likely to be 'pirates', 'privateers' and people with the passion to do what									
	they see is right despite the system									
Typical	Number of suggestions submitted.									
Success Metrics	Number of suggestions where feedback has been provided ('management is listening!').									
	Number of successfully implemented ideas.									
	Money saved.									
	ROI (bearing in mind there was very likely no allowable 'cost' to creating the solution)									
Typical Levers	External grant funding.									
	'Sabbatical' time.									
	Extra-curricular group meetings.									
Hero's Journey Ordeals	How to create a track record of success stories with no formal budget or time.									
	How to refuse to work on 'no-win' projects.									
Hype Cycle Ch' cs	Peak: Management expresses an interest in (technical) innovation (and probably does a big									
	launch initiative to 'kick start')									
	Trough: things go badly wrong when technical throws their solution over the wall to the									
	marketers & business side of the organization.									
Management Texts	Orbiting The Giant Hairball, Cubicle Commando.									
	Rules For Renegades, The Art Of War.									
	How To Win Friends And Influence People, Seven Habits Of Highly Effective People.									
	Shibumi Strategy, Chutzpah, How To Measure Anything.									
Innovation Tools,	Function Analysis/Value-Stream-Mapping									
Methods	Kepner-Tregoe.									
	DFMA/Trimming									
	Six Thinking Hats									
	Perception Mapping									
	9-Windows									
	Why-What' s-Stopping?									
	Subversion Analysis/AFD	1000								
	SCAMPER/Inventive Principles	Systems								
	5S/8D/Quality Circles	_								

The Science Of Successful Step Change

SYSTEM Systematic Innovation DNA Business Leaders (Software) Innovation **Templeton Three** To Profession: Journeys: Level1 - Level Matrix 2010

Innovation Capability Maturity Model: An Introduction

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