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Great Mistakes In Technology Commercialisation – A 20 Year Retrospective

Dr Kevin Parker, Founder & Director, KKI Associates

Wednesday, 22 February 2023



A Word From Today's Chairman

Professor Michael Mainelli

Chairman
Z/Yen Group





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Today's Agenda



- 16:00 – 16:05 Chairman's Introduction
- 16:05 – 16:25 Keynote Presentation – Dr Kevin Parker
- 16:25 – 16:45 Question & Answer



Today's Speaker

Dr Kevin Parker
Founder & Director
KKI Associates





In 1990-2 Kevin investigated the failure factors in around 50 technology driven business diversification projects that started at BP Research in the 1980s. These projects included computer hardware and software, new materials, catalysts, energy storage, and engineering (pretty well everything except pharmaceuticals). Of those 50 projects, how many failed because the science/technology didn't work?

- 0-1
- 2-5
- 5-10
- 10-30
- Over 30



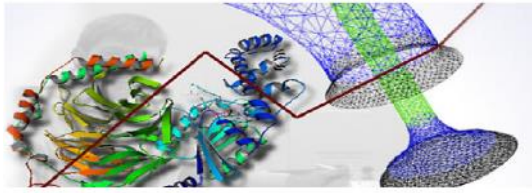
At BP Kevin had an interesting job selling oil (specialty production fluids and lubricants) to customers in the Middle East and beyond. What was the ratio of his salary, to his travel and overhead budget, and to the gross profit he generated for the company?

- 1 (salary): 0.5 (overheads); 50 (gross profit)
- 1 (salary): 1 (overheads); 50 (gross profit)
- 1 (salary): 2 (overheads); 50 (gross profit)
- 1 (salary): 5 (overheads); 50 (gross profit)
- 1 (salary): 10 (overheads); 50 (gross profit)



Universities, and Business Schools around the World run classes, modules, courses, and degrees in technology entrepreneurship. On average, how many people do you think they have to train to get one successful (defined as someone that takes a start-up through to exit) entrepreneur?

- 10
- 50
- 100
- 150
- 250



Great Mistakes in Technology Commercialisation – a Retrospective

Article

PDF Available

Great mistakes in technology commercialization

November 2001 · Strategic Change 10(7):383 - 390

DOI: [10.1002/jsc.560](https://doi.org/10.1002/jsc.560)

Authors:



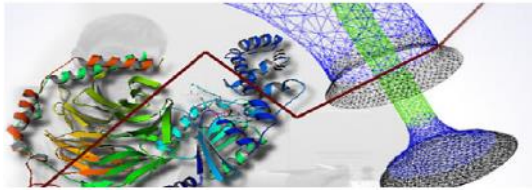
Kevin Parker
KKI Associates Ltd



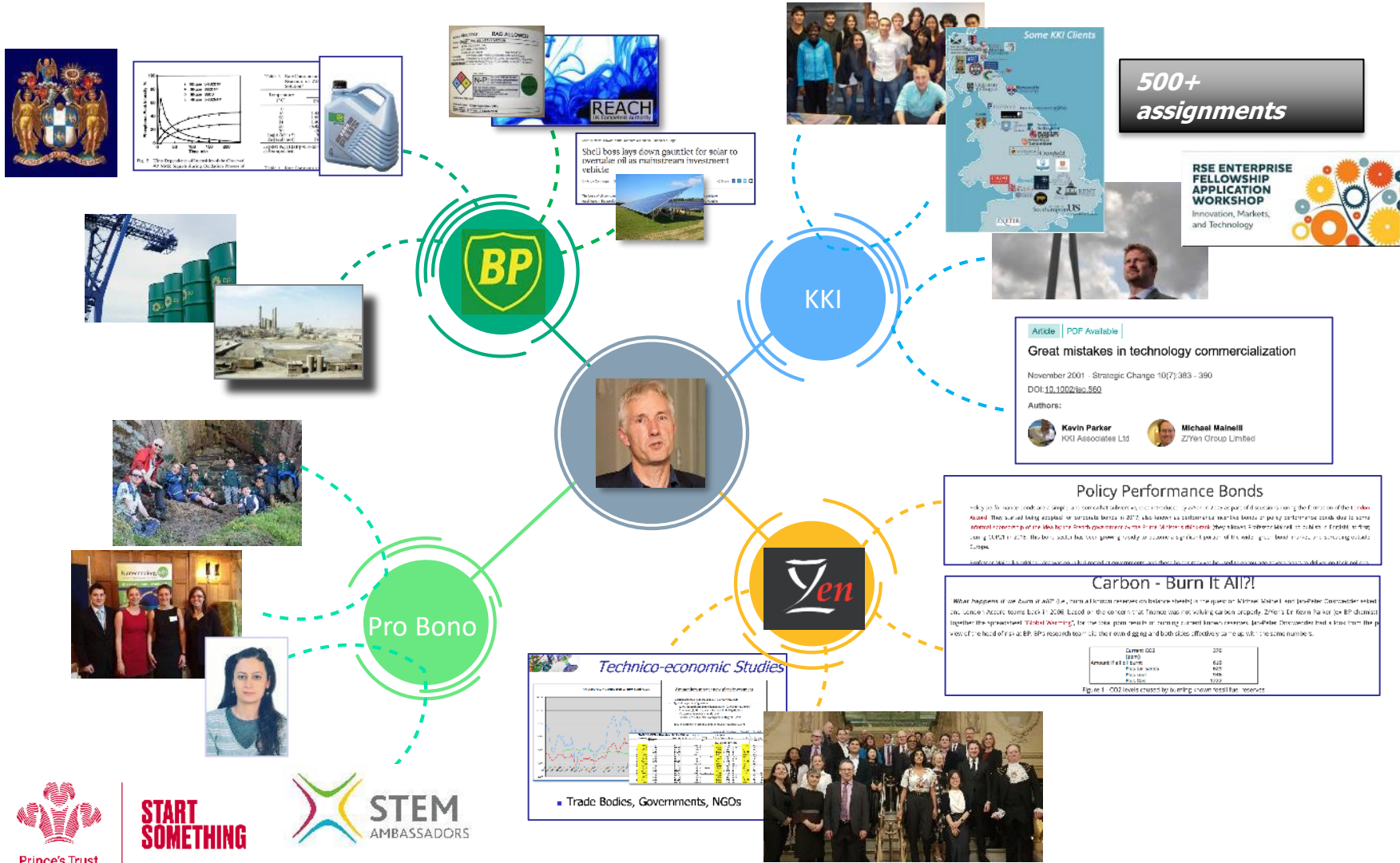
Michael Mainelli
Z/Yen Group Limited

Z/Yen Webinar Feb 2023

Kevin Parker, KKI Associates, Michael Mainelli, Z/Yen Group

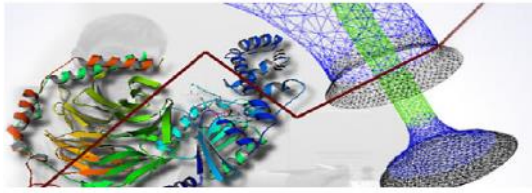


My Career In One Picture



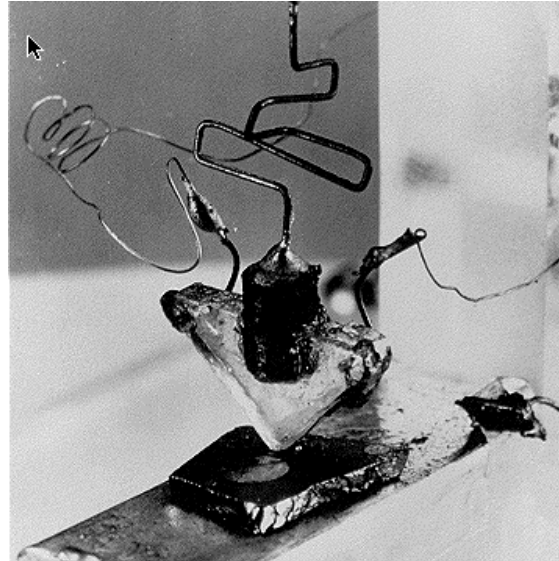
START SOMETHING



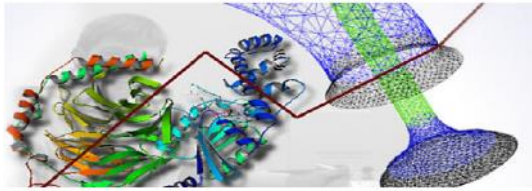


Example: invention vs innovation

The story of the transistor

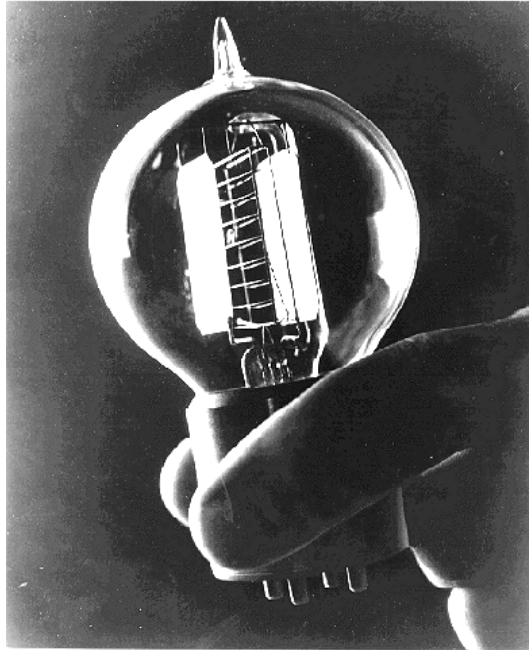


- invented by Bell Laboratories for use in Telecoms
- licensed to Texas Instruments - built a mains powered radio without much commercial success
- but a man in Japan had a better idea

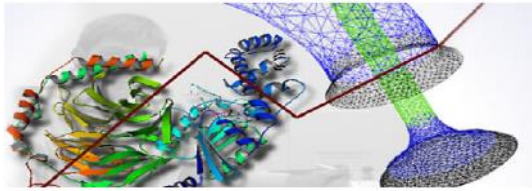


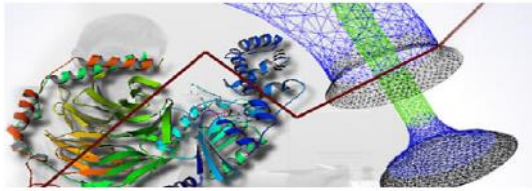
This is what it replaced.....

From Computer Desktop Encyclopedia
Reproduced with permission.
© 1996 AT&T



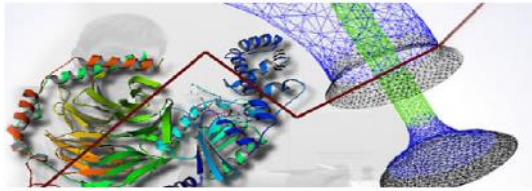
- Thermionic valve, and the home (valve) radio
- The transistor is smaller, lighter, more robust, and consumes less current than a valve
- An American company used the transistor...





Transistors and the Computer Revolution

If you ask someone who lived during the late 1950s or 1960s what they associated with the transistor, there is a good chance they'll say "transistor radio." And with good reason. The transistor radio revolutionized the way people listened to music, because it made radios smaller and portable



The Advertising Industry distinguishes

What and how a product is made - its features
from what it does for the customers - its benefits



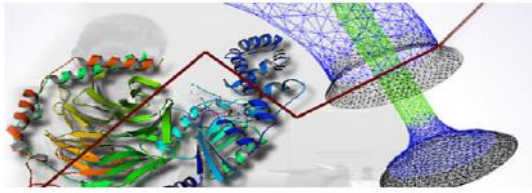
- 'My PC has a 2Ghz chip'
 - 'I can run Death Star 3 on that'

- 'My car has 7 seats'
 - 'I can take the kids and all their friends and all their toys'

- 'My radio uses transistors instead of thermionic valves'
 - 'Um, yes and so what?'

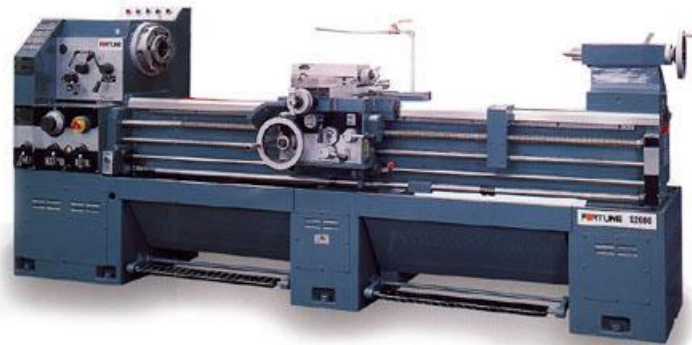
- 'My radio is portable and affordable'
 - 'I don't have to listen to Dad's choice of music all the time!'
 - (Benefit 1 – completely new possibilities)

You advertise the benefits, not the features!



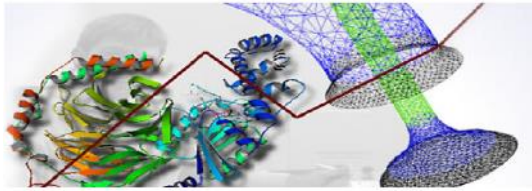
Great Mistakes # 1- no user benefit

- Technology must provide some benefit to the end-user
- We tend to confuse this with the features of the technology



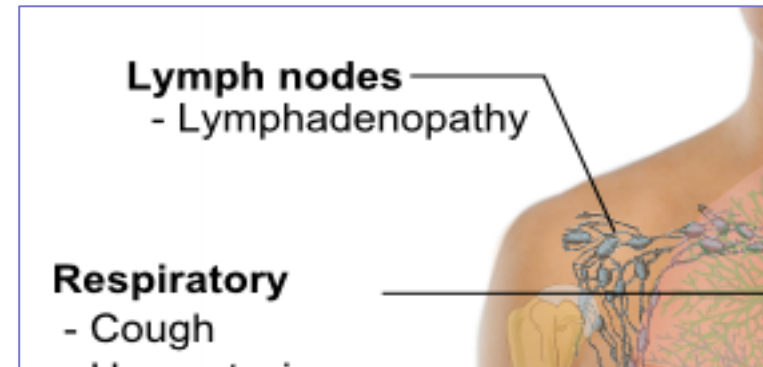
SUPER 2000 SERIES

- Consider the following statements:
 - 'Our lathe uses hydraulic actuation, producing a surface roughness of less than 10 microns'
 - 'Our lathe saves one extra stage of rework at the cylinder boring centre at the Jaguar engine plant'
 - 'This could save Jaguar £2.5m pa' (Benefit 2 – saving money)

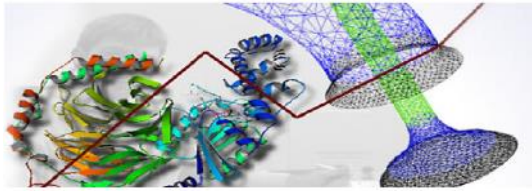


Cancer Diagnosis

- Positron Emission Tomography allows imaging of tumours
- Has potential to replace diagnostic surgery for some cancer patients - secondaries from breast cancer
 - Saves unnecessary surgery, patient infection, painful recovery
 - 30-50% of diagnostic surgery proves to have been unnecessary
 - Current cost of diagnostic surgery around £5k per operation
 - 45,000 patients a year get breast cancer in UK alone



- Benefit type 3 – making life much easier (for patients and doctors!)

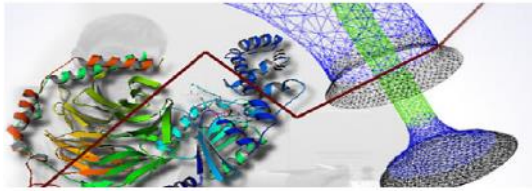


New Insight: 'Intangible' Benefit Type 4



We are interested in things which make us feel better about ourselves, or change the way we think about ourselves

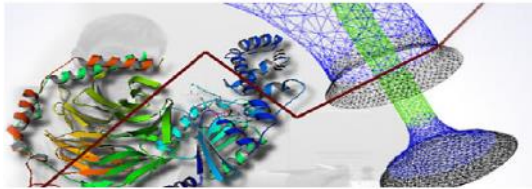
Not just consumer goods, anything which helps our mental health!



Great Mistake # 2

'Top-down' Market Analysis

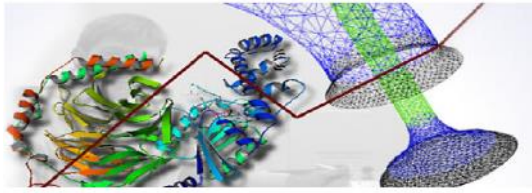
- Estimates of overall market size are usually wrong and always misleading
- Beware of statements like 'the market is x and we will get 10%' or 'the market is growing hugely and we must get in on it'
- The act of purchase is a consensual transaction between individual buyer and individual seller..
- What you need to know is 'how many customers will benefit from my product, how many can afford it, and how many can I get to in my first year?'
- 'Top-down' analysis leads to inaccurate forecasting, the wrong technical targets, and speculative bubbles...



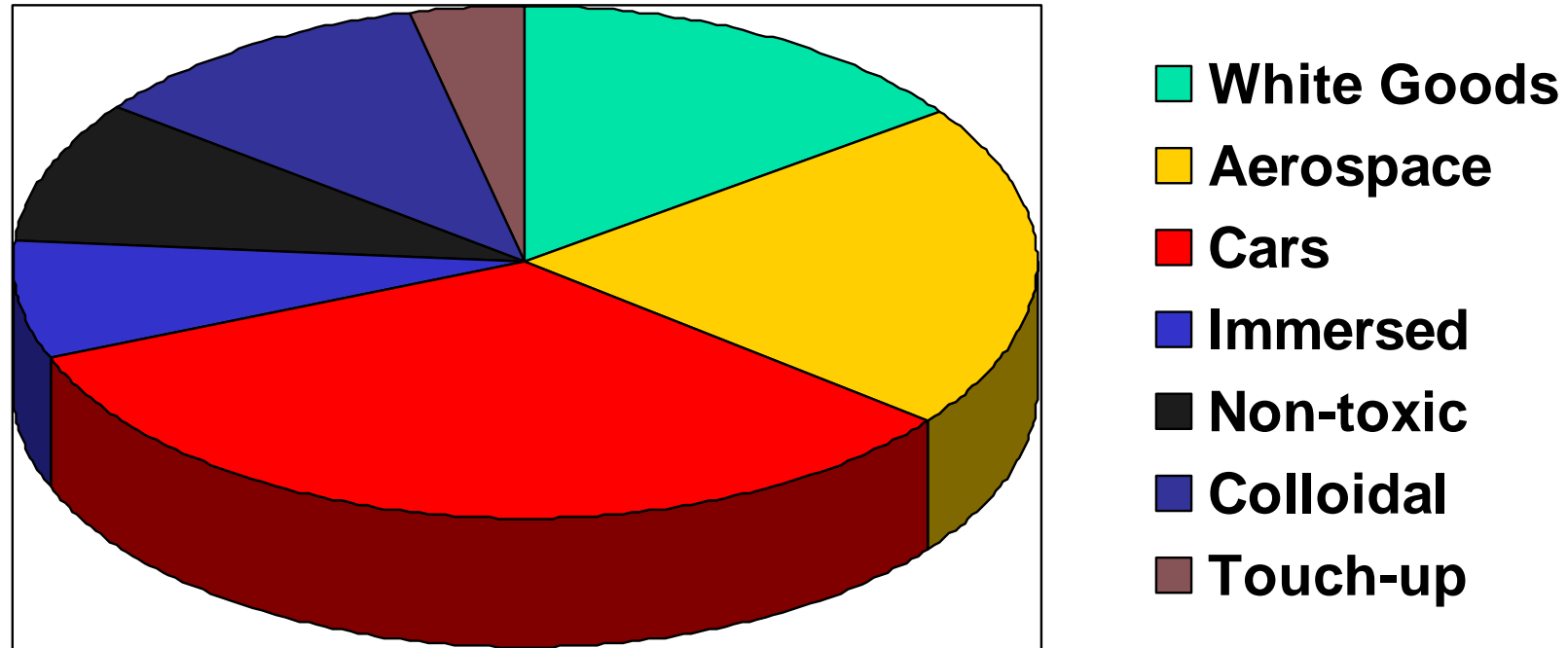
Segmentation in anticorrosive pigments...



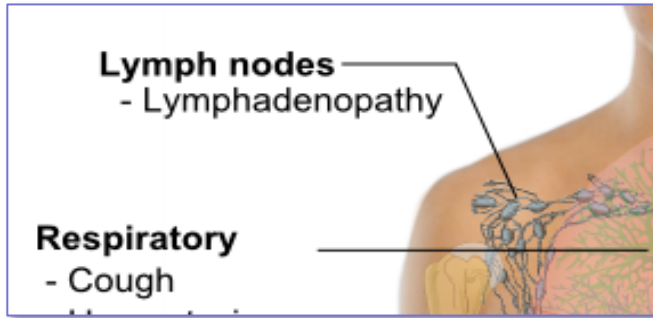
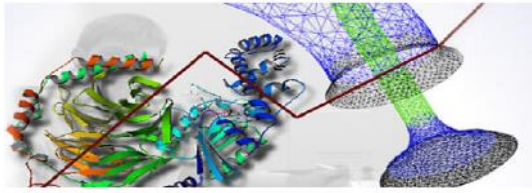
Bridges, Cars, Airplanes, White Goods, Subsea, touch-up



The market for paint pigment...

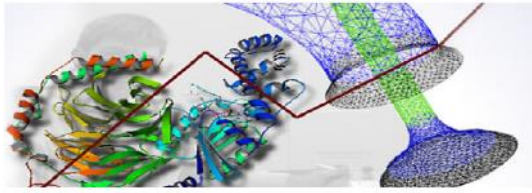


Types of anti-corrosive pigment



New Insight

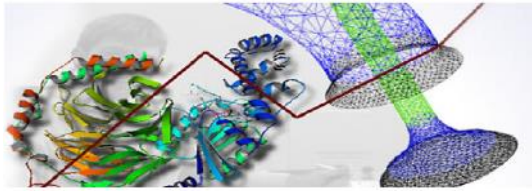
- Very early market testing is required
 - 'As an Oncologist, if we could invent this, would it be useful to you?'
- Has to be done by technical inventors/specialists not by market research companies
 - 'Tell us what technical targets we need to meet to be taken seriously?'
 - *'Sure, you need to be able to detect tumours 1mm across with a 99% success rate and less than 1 in 1000 false negatives'*



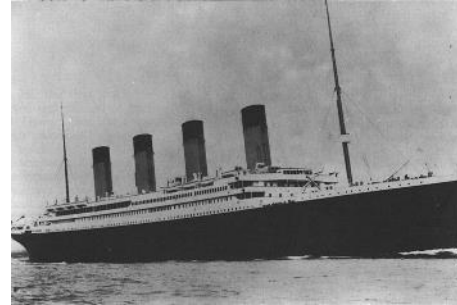
Great Mistake # 3 -The Chicken-Gun Test



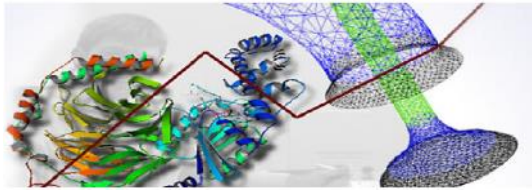
- Rolls-Royce went bankrupt in 1970 after RB211 failed bird strike tests
- Test involves firing (dead) chickens from a special gun into the engine
- THE ESSENTIAL PRACTICAL TEST FOR USER OPERABILITY
- All development projects feature a chicken-gun test
- Must be identified and addressed early in development



New Insight: It's still happening...

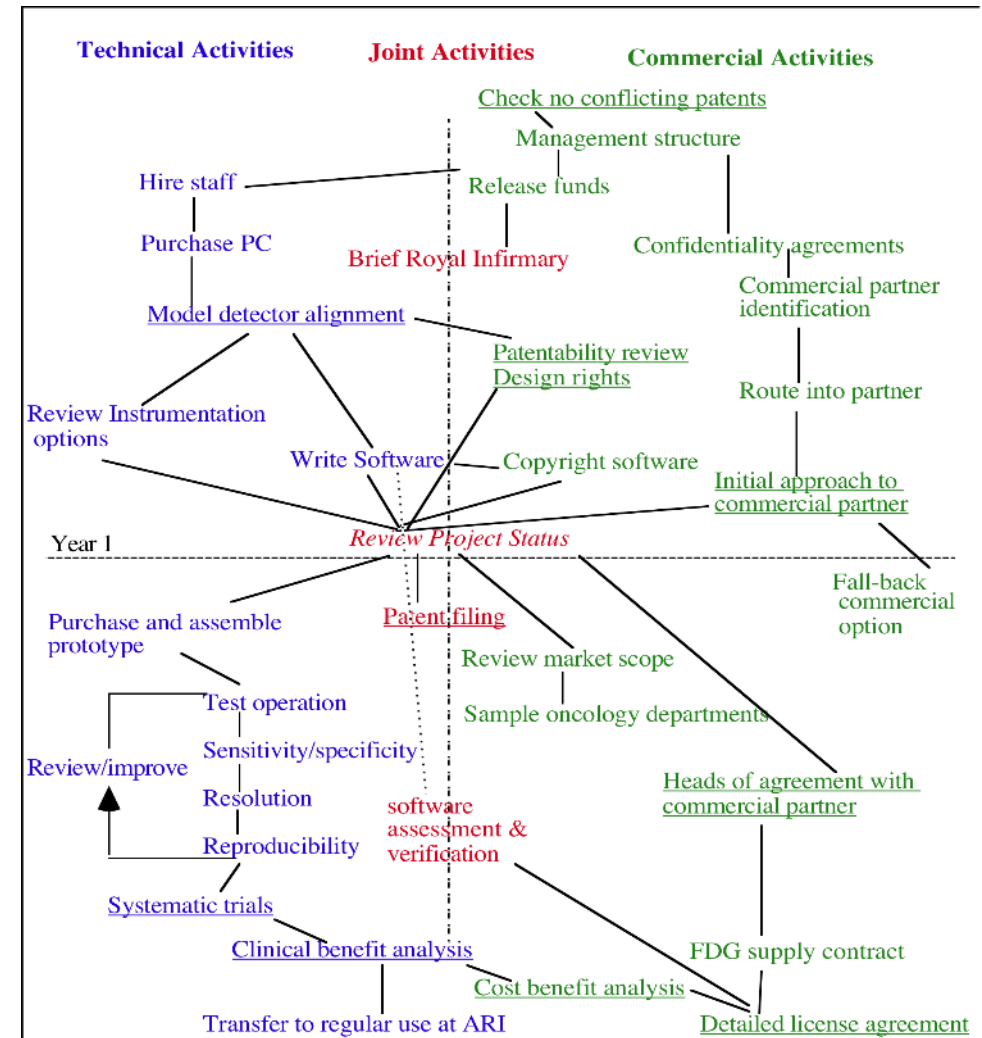


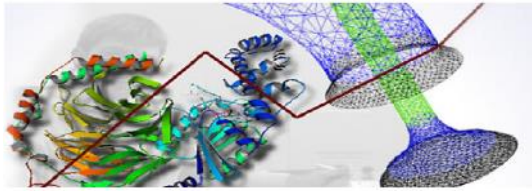
- RMS Titanic/Space Shuttle Fuel Tank Seals
- Washing machine circuit boards (and other things that vibrate)
- Golf course sprinklers and lightning strikes
- The polythene plant and the wellington boot
- Composites that don't show damage
- Things that smell!
- Digital – User Interface Issues, platform interoperability



Great Mistake # 4

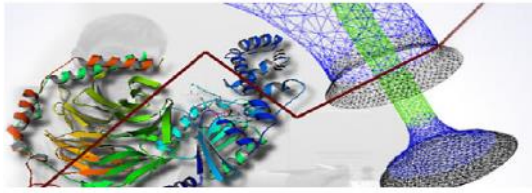
Commercialisation Projects are Complex





Great Mistake # 4 - Bad/zero Project Management

- Z/Yen & Gov Agency project: delayed for 18 months various interested parties discussed location, equity, etc
 - While customers were saying 'we want this'!
- Each 6 months delay takes 20% off project NPV
- PROJECTS NEED CLEAR MANAGEMENT STRUCTURE
and
- A WAY OF GETTING DIFFERENT EXPERTISE TO CONTRIBUTE
- Projects without clear structure usually fail because they make all the other mistakes in this talk!
- Google 'PRINCE2' ...

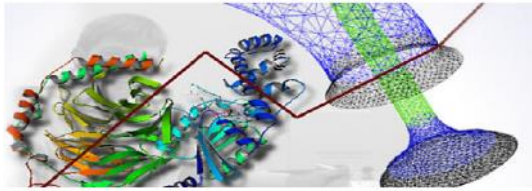


New Insight: 'Working with People in Teams

- Typical team evolution
- Team Role Preferences
- Identifying preferred roles
- Building a successful team
- Often a Weakness in University Spin-outs and start-ups
- 'Surround yourself with good people' is not helpful advice!



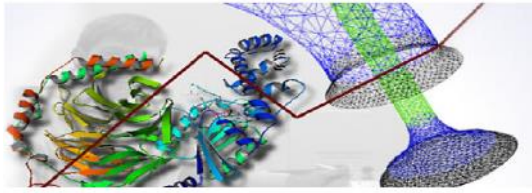
See YouTube talk at: [RSE Enterprise Fellowship Application Workshop: You and your Team](#)



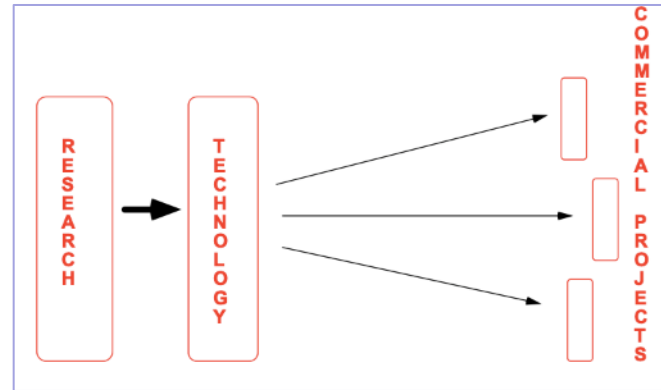
New Insight: Complexity of IP Ownership

- 'Clean IP' is essential to fundable project
- Major obstacle for university spin-outs
 - How to reward inventors vs managers of new company
- Universities may assign IP to spin-out (with reversion clause)
- IP ownership is defined by employment or funding contracts
- **Don't disclose before patent application**

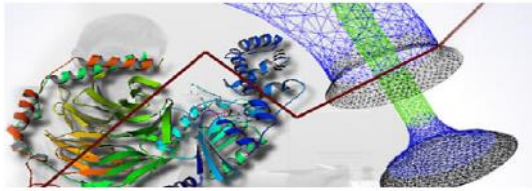
See YouTube talk at: [RSE Enterprise Fellowship Application Workshop: Intellectual Property](#)



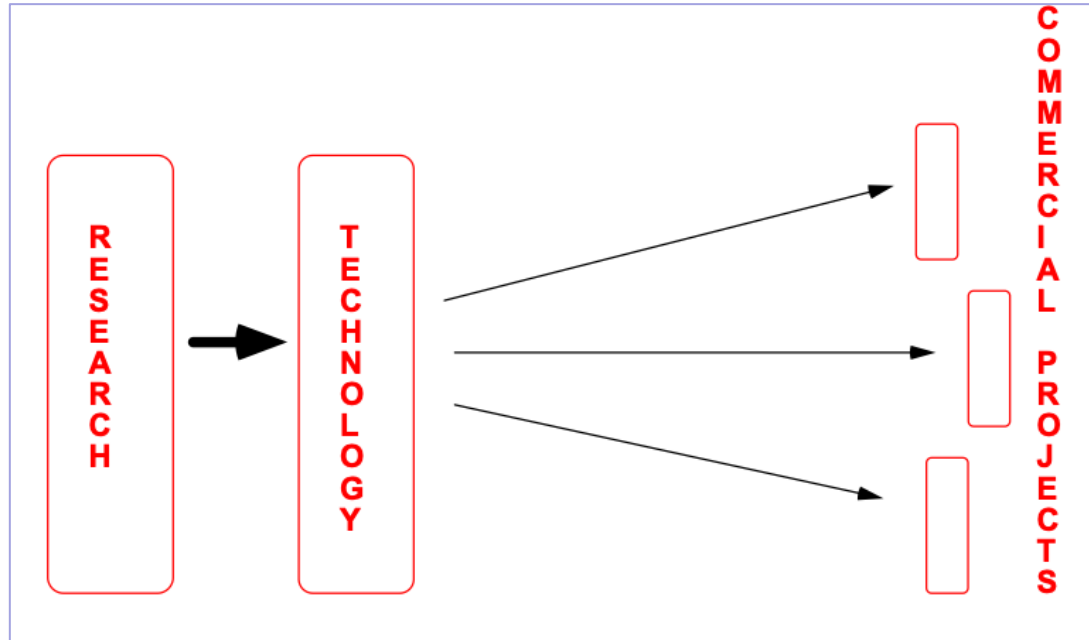
Great Mistake # 5 Valuing Platform Technologies



- The value of a technology is:
 - NPV of the current project arising from that technology
 - plus
 - The opportunity to invest in all the other projects enabled by that technology
 - Usually undervalued
- And the whole thing takes longer than you first think
 - Result, companies don't ask for, or get, enough money

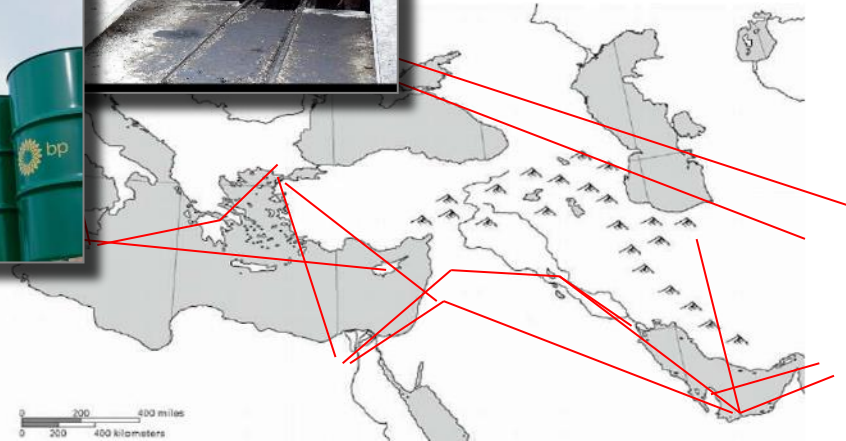
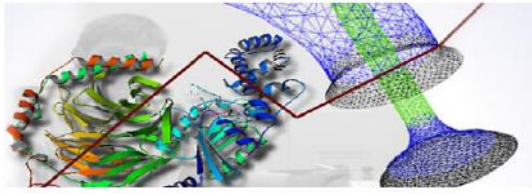


New Insight - Not Enough Money

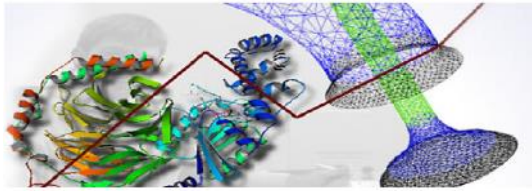


If it's bad to ask for too much money, its even worse to ask for too little!

New Insight: The Cost of Selling

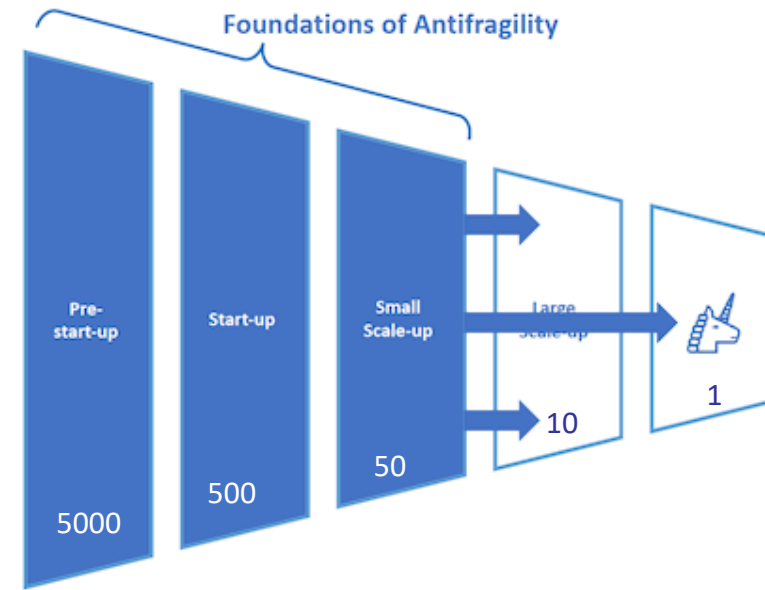


- Working in International Sales
 - established and well known product range
- What was the ratio of Income/Cost of Salesperson?
 - Cost of salesperson/salary?
- Can internet replace traditional methods in B2B?



Great Mistakes - do we need to improve?

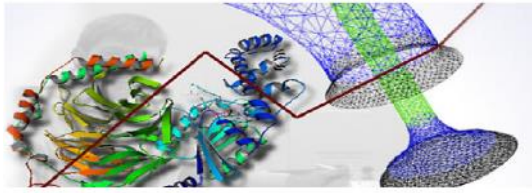
- On average only 1 in 7 development projects are commercially successful (1 in 10 for start-ups)
- 50-75% of development money is spent on projects that never reach the market
- Of 50+ failed projects, technology factors were responsible for only 2 to 3
- UK/much of Europe growth stuck at 2.5% pa irrespective of macroeconomic policy
- **New Insight: you need to train 150 people in entrepreneurship to each successful tech business exit**
- *(It takes on average £100k to create each new technology job)*



Logan Strategy on Scottish Tech Cluster 2021

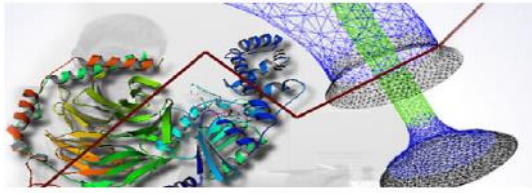
Go from 5000 pre-start-ups to get 1 Unicorn...

You need to train 15,000 people to do this this! (~20% of the annual 'output' of graduates in Scotland)



Avoiding Great Mistakes...

- Distinguish features and (4) benefits
- Don't do 'top-down' market analysis
 - Do early market research yourself
- Identify the Chicken-Gun test
- Project Manage Well
 - 'Surround yourself with good people'
 - Clarify Ownership of IP
- Ask for and get enough money



Resources and further study

Articles based on this talk

‘Great Mistakes in Technology Commercialization’ Paper

https://www.researchgate.net/publication/229486612_Great_mistakes_in_technology_commercialization

YCF Articles ‘what are the basics?’

<https://www.ycfscotland.co.uk/wp-content/uploads/Great-Mistakes-in-Technology-Commercialisation-a-20-year-retrospective.pdf>

RSE Enterprise Fellowship Application Workshop Videos

https://www.youtube.com/playlist?list=PLDDx0l6rOAYuE1ms-Yp3H_qnSUQZSoZvG

Review of Scottish Tech Cluster 1996-2022: ‘The last (and next) 25 years of Commercialization in Scotland’

<https://www.ycfscotland.co.uk/wp-content/uploads/YCF-2022-KK1.pdf>

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The Royal Society of Edinburgh
NOW PLAYING
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The Royal Society of Edinburgh
24:13
- 4 RSE Enterprise Fellowship - Application workshop - Intellectual Property



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- Thu, 02 Mar (11:00-11:45) Employee Share Plans And The Benefits For SMEs
- Mon, 06 Mar (11:00-11:45) Catastrophes – Are They Becoming Too Big To Insure? Are Cats Eating Reinsurers' Lunch?
- Tue, 07 Mar (10:00-10:45) What Is China's Growth Potential After Covid?

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