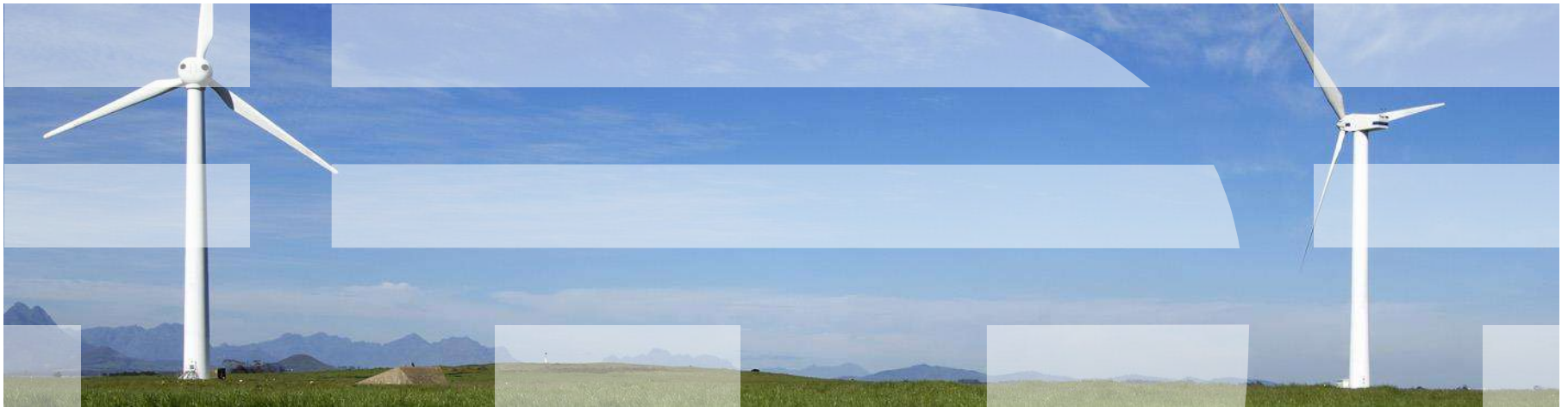IBM

Interdisciplinarity

Heather Dunlop-Jones, IBM Distinguished Engineer

Agenda

- Why interdisciplinarity?
- Plan A
- Plan B

Why interdisciplinarity (1)?

- Today's problems are complex !
  - Some of these problems are compelling e.g. sustainability, the environment, Smarter Cities

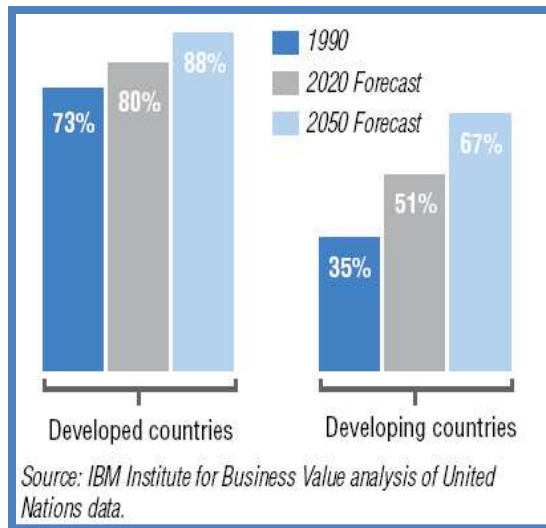- They demand perspectives and knowledge from multiple different disciplines

Why are cities important?

There are a lot of us already, and more every day – 10 billion by 2070

•***More than 50% of the world's population (80% in developed economies) live in cities.***

The way we create value and consume resources is changing:

•*Cities cover 2% of the world but use 80% of its resources, through increasingly congested supply chains.*

http://www.e-skills.com/insights2010
http://royalsociety.org/policy/projects/people-planet/report/
http://www.newscientist.com/issue/2678

Photo of the digital screen in "The Place", Beijing, China by Trey Ratcliff
http://www.stuckincustoms.com/2011/12/11/the-digital-aurora-borealis/

Photo of Dhaka, Bangladesh by Joisey Showa
http://www.flickr.com/photos/joiseyshowaa/2402764792/

An example of what is possible
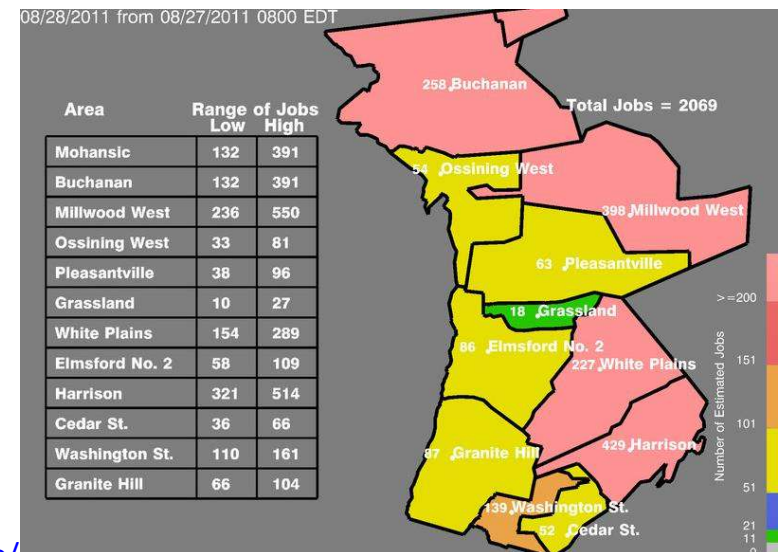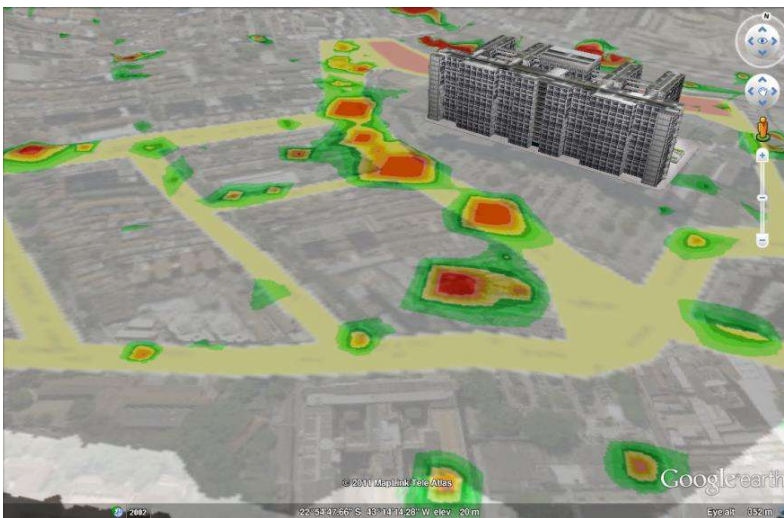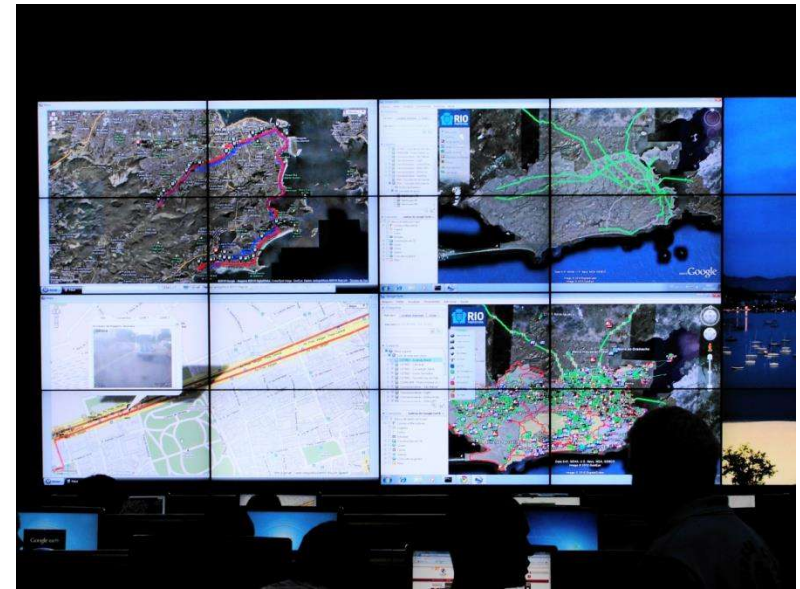
Another example – in process

Cities are 'systems of systems'

Utilities

Transportation

Healthcare

Gov. Services

Education

Jobs

Sustainability

GDP

- Electric vehicle infrastructure
- Car/lorry related pollution
- Train/boat transport of freight

- Water/air pollution, global warming related health effects
- Sick days for utility workers
- Union retiree healthcare costs

- Access to gov. offices impact on citizen participation rates
- Speed of road construction permit issuance
- Toll revenue

- Student sick days
- Disease prevention education
- CPR training
- Supply of nurses, doctors

- Crime and willingness to pay taxes
- Crime's neg. impact on economic activity driving need for more gov. services

- Graduation rates and crime prevention
- Neighbourhood crime and school absence rates

* The bullet points in boxes are illustrative interrelationships points.
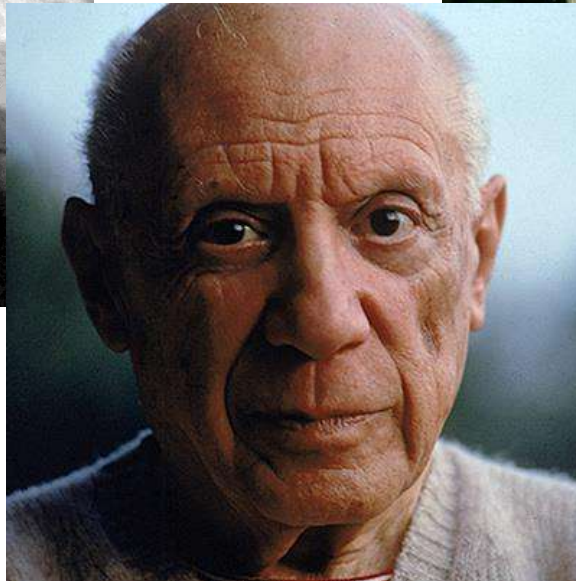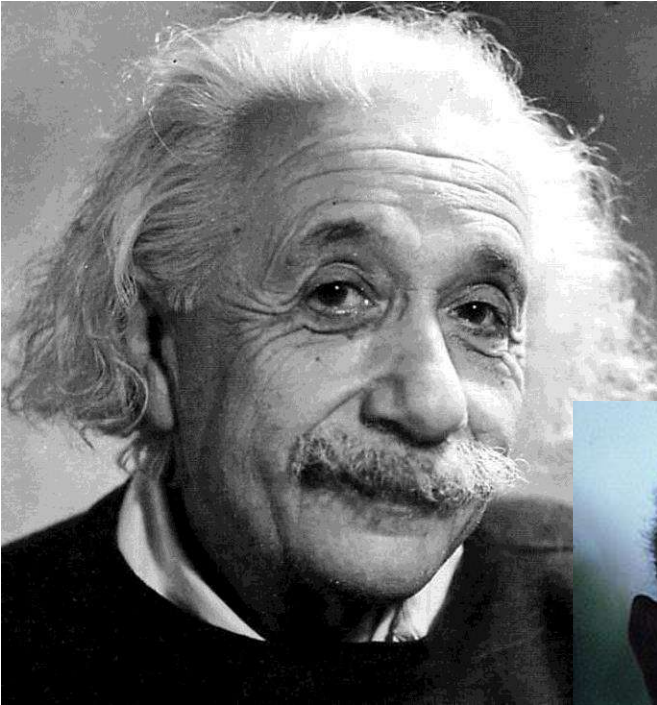
Why interdisciplinarity (2)?

– it is possible to go beyond multi-discipline work

– to develop new approaches, methods and theory based on synthesis or integration

– which transcend each individual discipline

  • 1+1 > 2

Youngblood, D. (2007). Interdisciplinary Studies and the Bridging Discipline: A Matter of Process, Mutli-Discipline versus InterDiscipline, Journal of Research Practice Vol. 3:2
Newell, W. H. (2001). A theory of interdisciplinary studies. *Issues in Integrative Studies, 19,* 1-25. Retrieved October 30, 2007, from http://www.units.muohio.edu/aisorg/pubs/issues1/restricted/042/paper.pdf
Repko, A. (2005). *Interdisciplinary practice: A student guide to research and writing*(Preliminary edition). Boston: Pearson Custom.
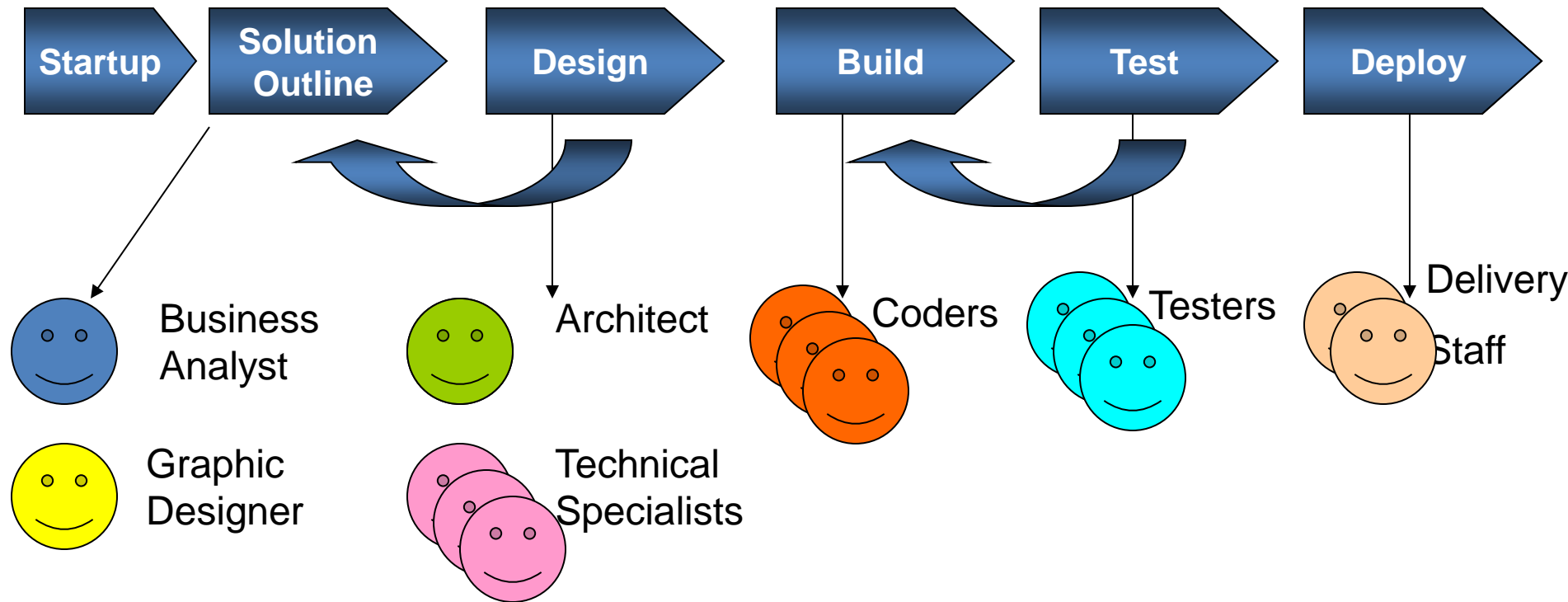
Why interdisciplinarity (3)?

Plan A: Is there a Predictable Path to Success?

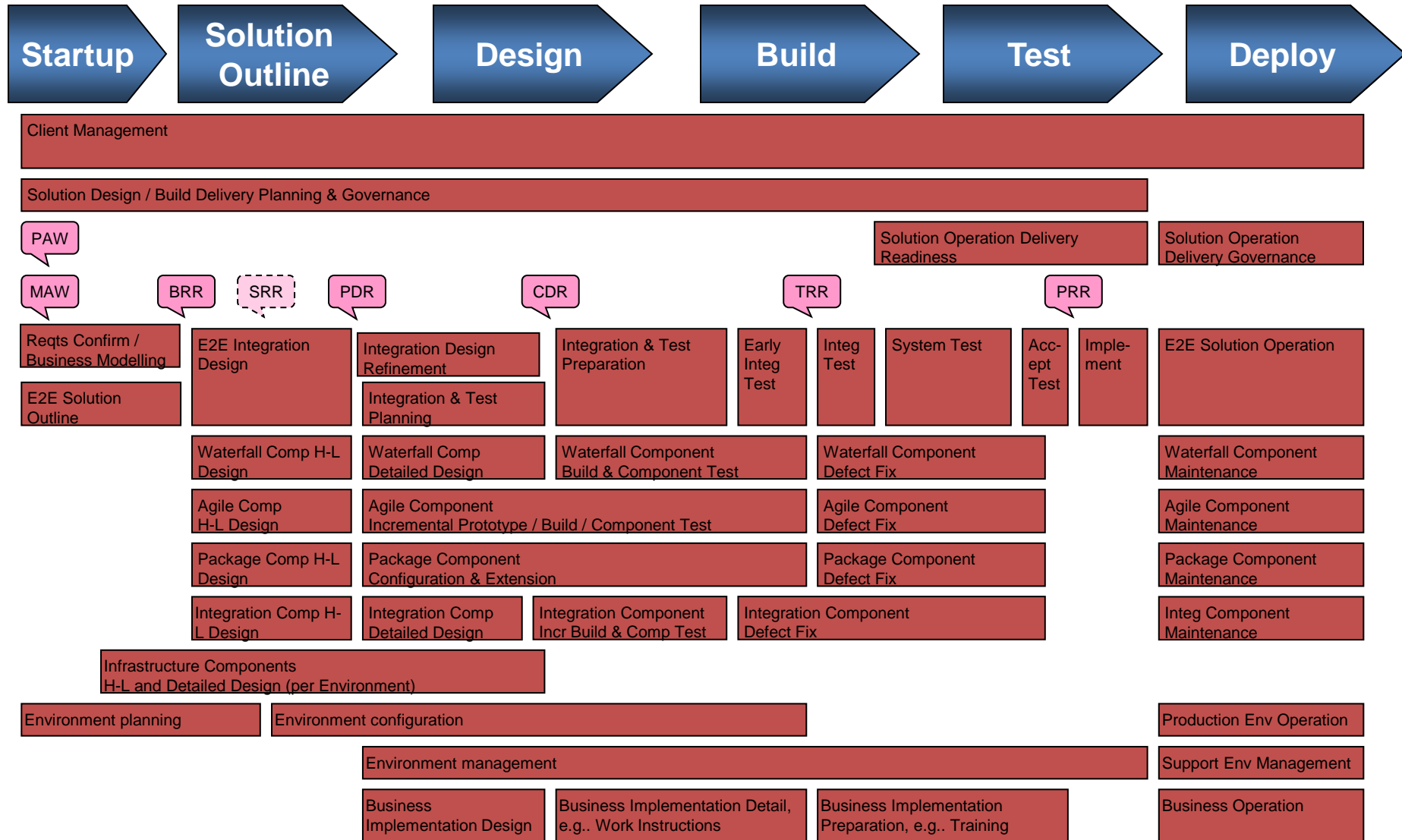Startup → Solution Outline → Design → Build → Test → Deploy
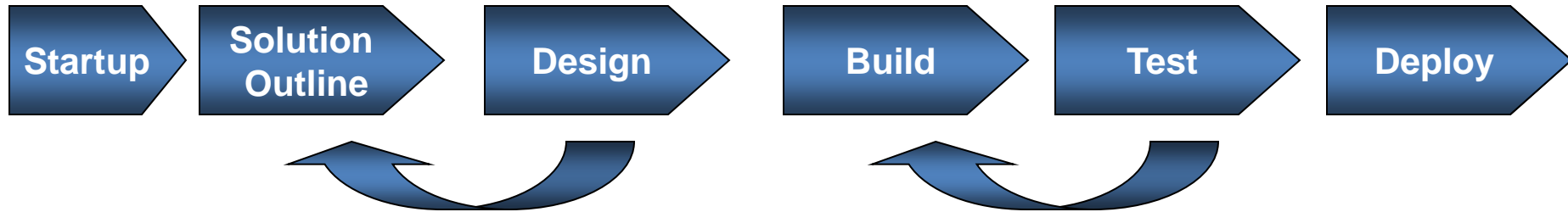
Plan A : Is there a Predictable Path to Success?

A method – a tiny sample

Flawed method

- Engineers at the UK site of an engineering manufacturer built a gun specifically to launch dead chickens at the windshields of airliners and military jets, all travelling at maximum velocity.

- The idea was to simulate the frequent incidents of collisions with airborne fowl to test the strength of the windshields.

- Engineers at the manufacturer's sister site in North America heard about the gun and were eager to use it to test the windshields of their new high speed trains. Arrangements were made, a gun plus documentation were dispatched.

- When the gun was fired, the engineers stood shocked as the chicken hurtled out of the barrel, crashed into the shatterproof shield, smashed it to smithereens, blasted through the control console, snapped the engineer's back-rest in two and embedded itself in the back wall of the cabin, like an arrow shot from a bow.

- The horrified engineers sent their UK colleagues the disastrous results of the test, along with the designs of the windshield and begged the UK engineers for suggestions.

- The UK engineers responded with a one-line memo:

"Defrost the chicken."
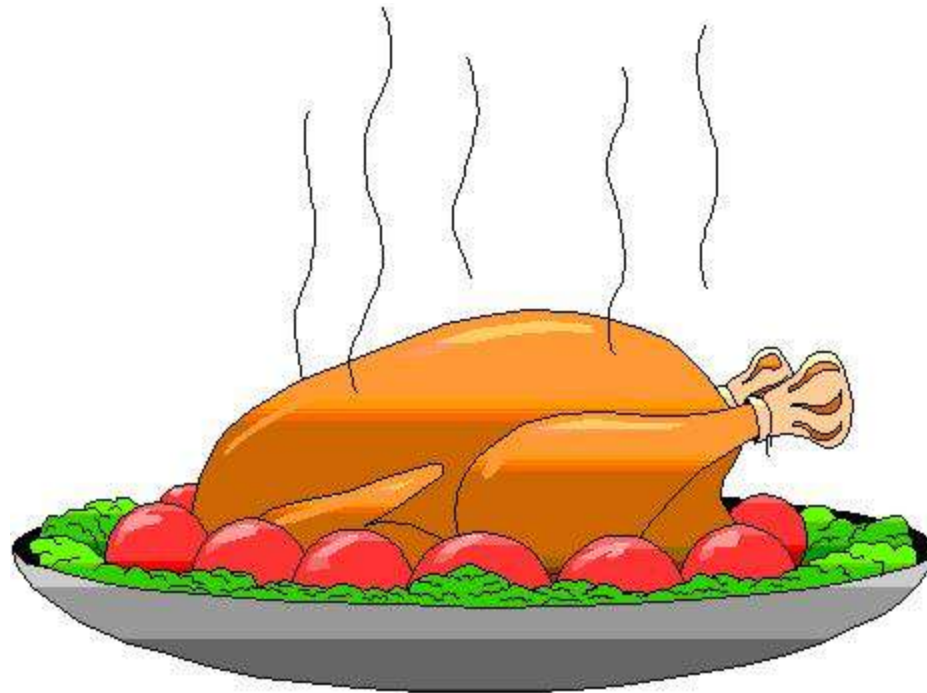
Successful Method

Plan B : if no predictable path – then what?

- Mindset

- Be patient

Thank you