

South Africa -- Engineering to Thrive



SAICE Railways and Harbours Division

Dr James Robertson PrEng

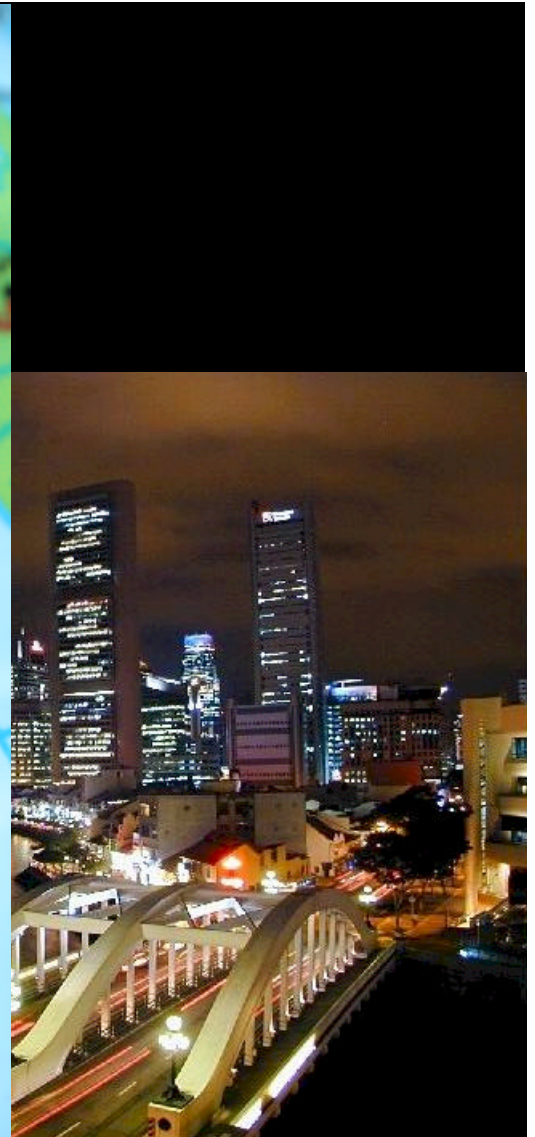
Is South Africa facing relegation?



“South Africa is facing relegation”

Clem Sunter and Chantal Illbury in their report “The World and South Africa in the 2010’s”

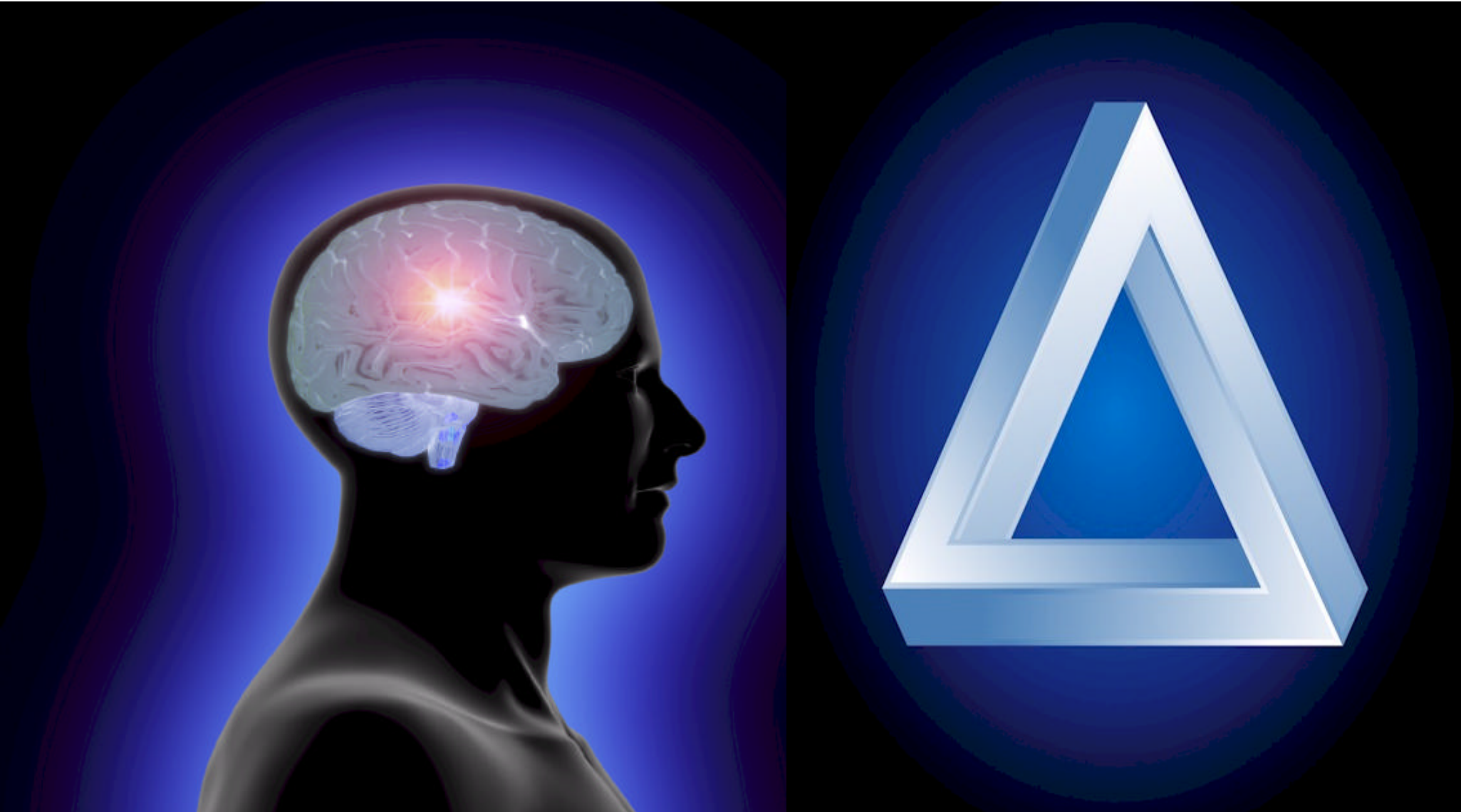
Quo Vadis?



What is an engineering approach?



What is NOT an engineering approach?







Engineer against failure



**Engineers do not design
bridges to stand up, they
design them**

not to fall down...

Closer to
home

The Star

with BUSINESSREPORT



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CRUSHED

One worker dead, another
missing after three-storey
building crumbles to ground



What is strategy?



Strategy



Doing the right things

Tactics



Doing things right

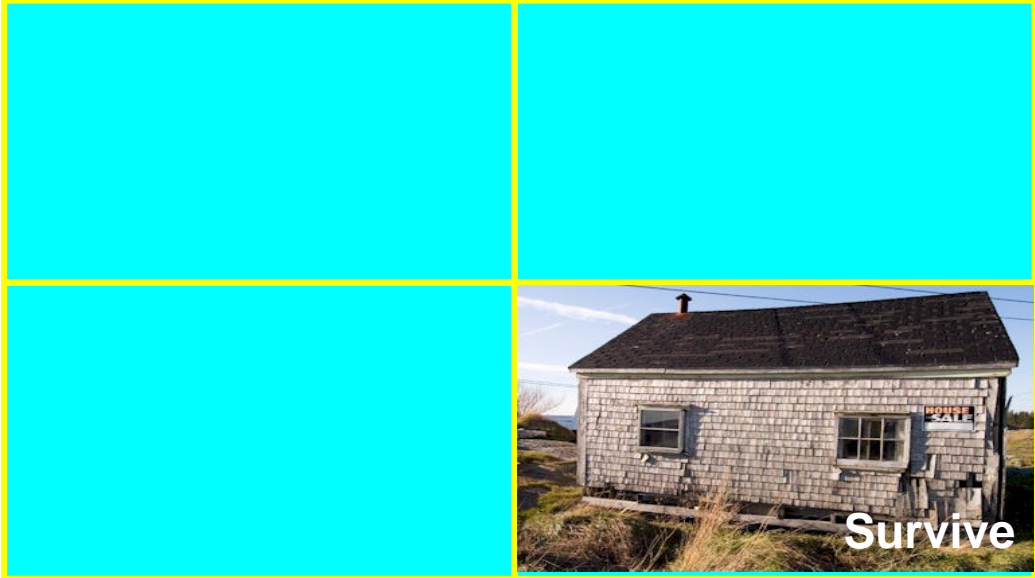
The relationship between strategy and tactics



The relationship between strategy and tactics

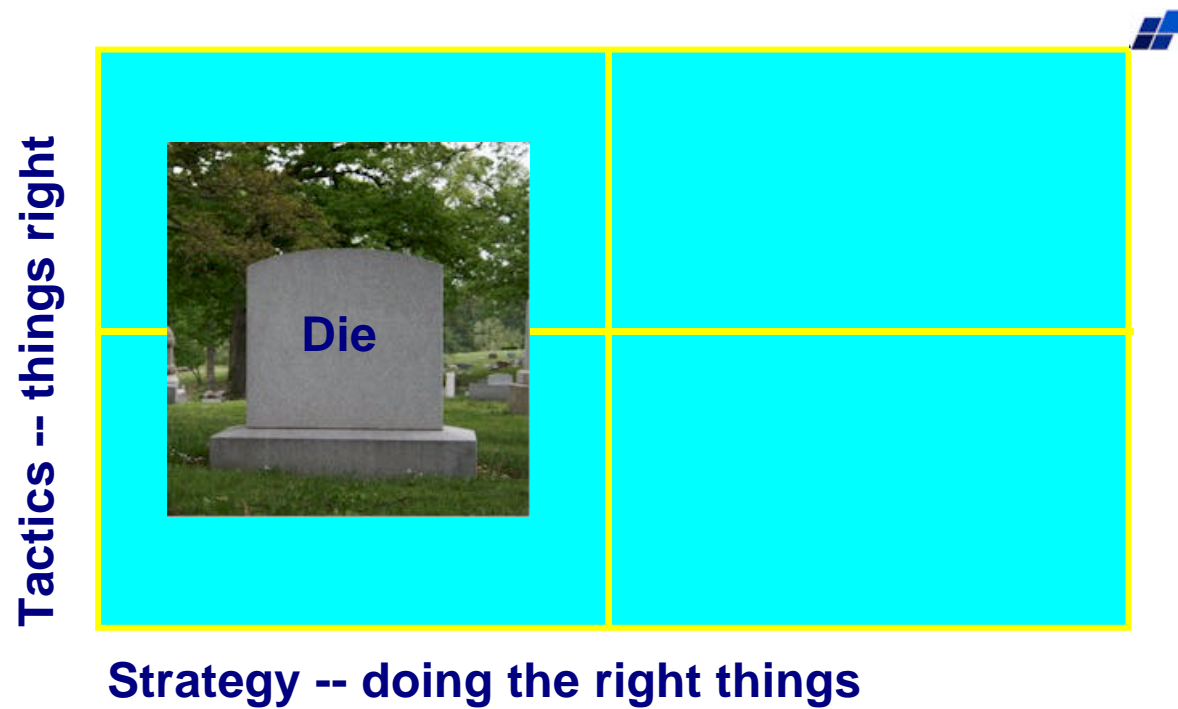


Tactics -- things right



Strategy -- doing the right things

The relationship between strategy and tactics



The relationship between strategy and tactics



Tactics -- things right



Strategy -- doing the right things

The relationship between strategy and tactics



Tactics -- things right



Strategy -- doing the right things

What is strategy?



The essence of why an organization exists and how it thrives

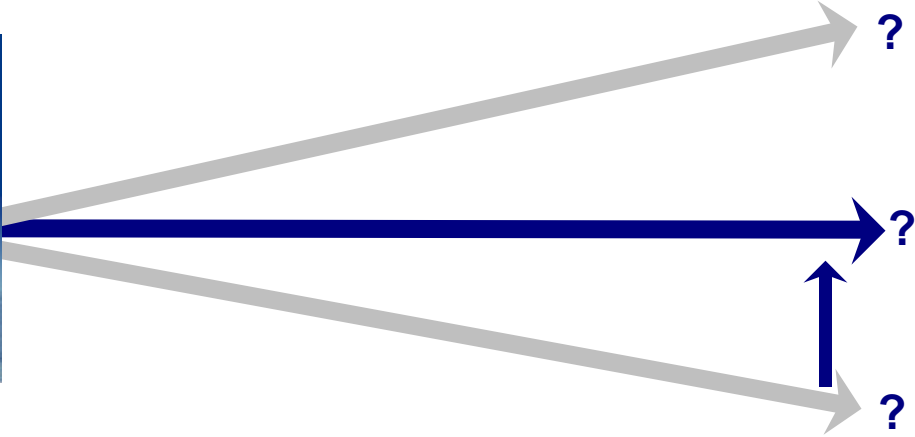
The time dependency of strategy



Not a forecast



Today



Forecast

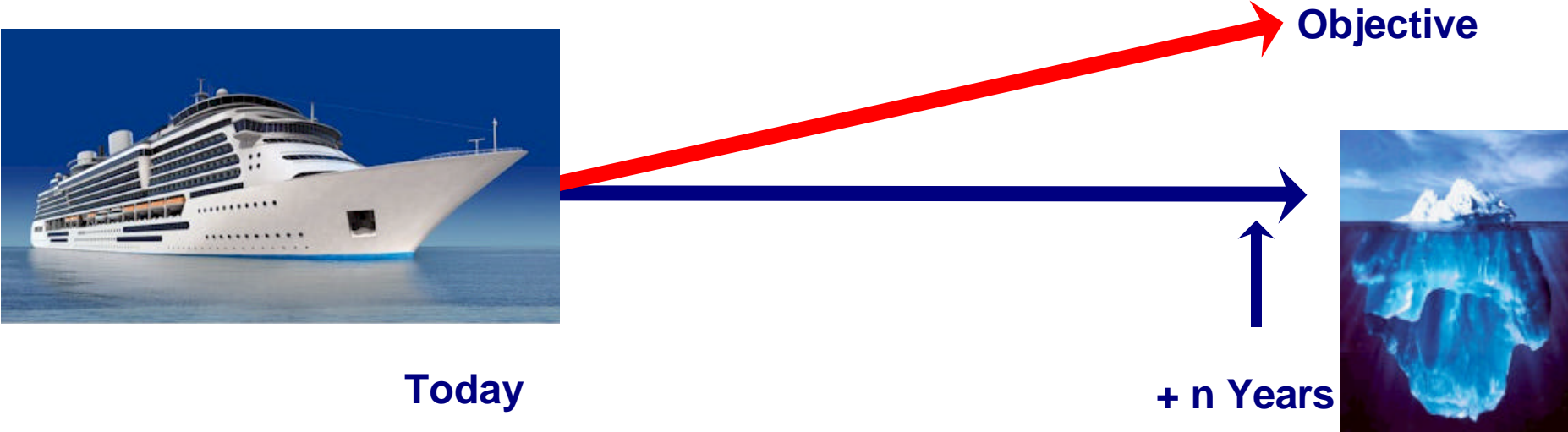


+ n Years

The time dependency of strategy



Not an objective



The time dependency of strategy



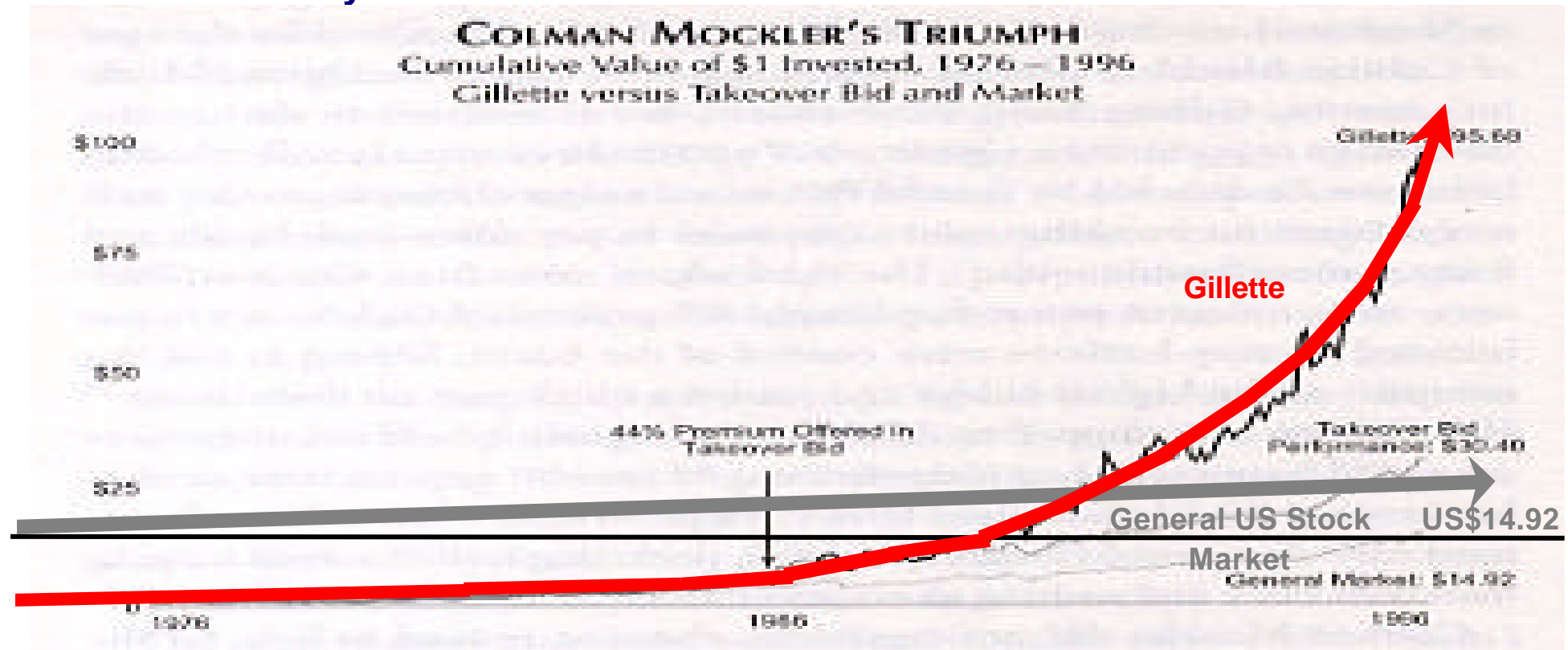
Strategic plan -- the path to competitive advantage



The trajectory from good to great



Gillette case study



↑
1975
Colman Mockler Appointed
CEO

↑
1986
Hostile takeover thwarted

↑
1991
Mockler
retires

↑
1996
End Study

Causes of information technology investment failure



Causes of ~~information~~ technology investment failure

- 65%
1. ~~Information~~ technology mythology (30%)
 2. Lack of executive custody and inappropriate policies (20%)
 3. Lack of strategic alignment (15%)
 4. Lack of an engineering approach (12%)
 5. Poor data engineering (10%)
 6. People / soft issues (8%)
 7. Technology issues (5%)

Remember that technology is value inert





Causes of ~~information~~ technology investment failure



The critical factors for success



59%

1. 25% -- Executive Custody and Policy
2. 18% -- Strategic Architecture
3. 16%-- Strategic Alignment
4. 14% -- Business Integration and Optimization
5. 12% -- Project Schedule, Budget and Resource Management
6. 10% -- ~~Data Engineering and Information Management~~
7. 5%-- Technology Components

And ... Remember ... IT is ALL about PEOPLE!



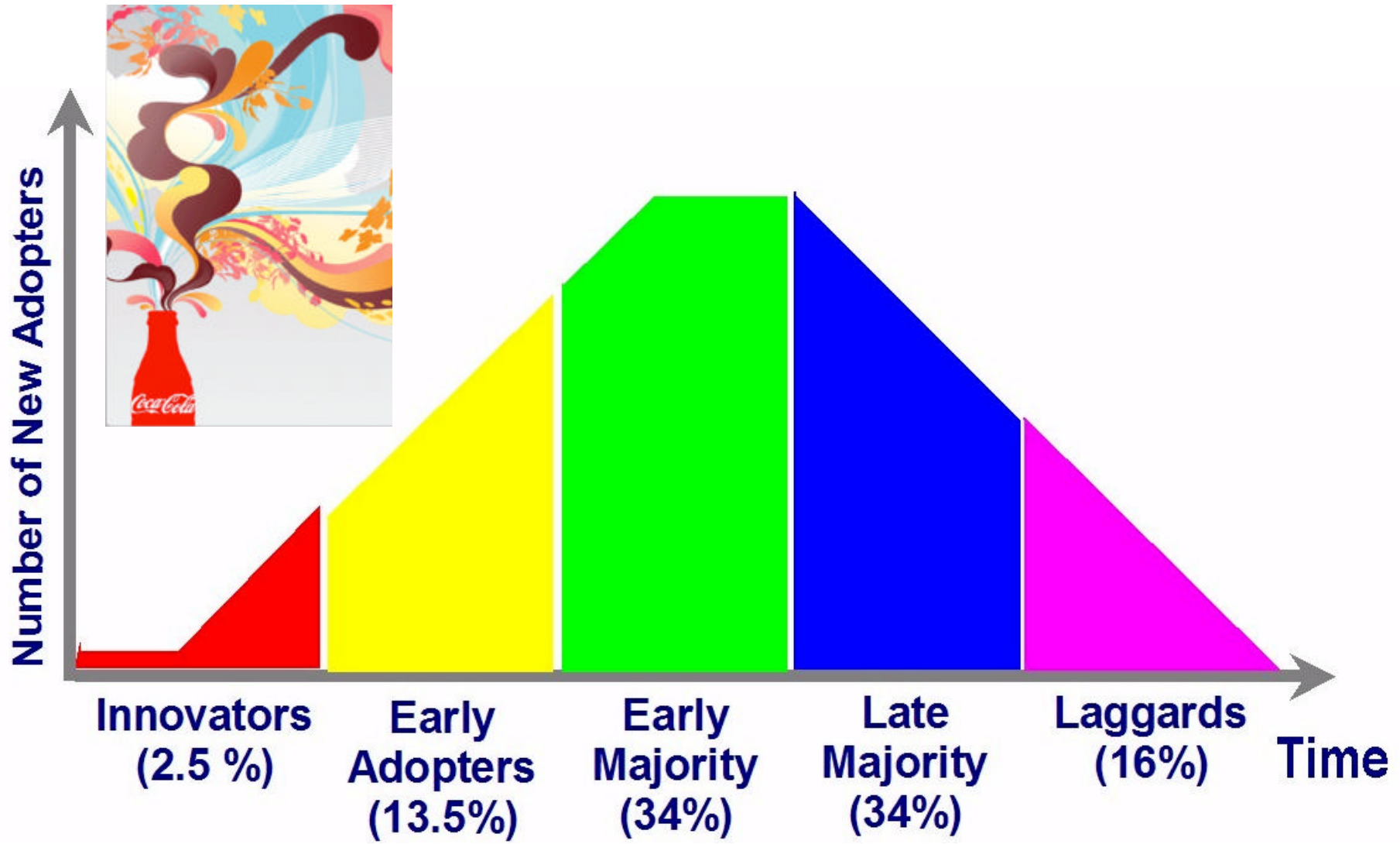
The critical human foundation



1. **Business Competence (Knowledge and Experience)**
2. **Technology Competence (Knowledge and Experience)**
3. **Personality Profiles and Related Human Traits**
4. **Solution Knowledge**
5. **Solution Experience**
6. **Communication**
7. **Other Human Factors**
Paradigms, culture, generations, history ...



Diffusion of innovation -- constraint on change





Relationship Innovator

"John is a good friend and if he says so that is good enough for me!!"



"If it's been done that way before there must be a better way!!!"

"I like things just the way they are!!!"



"I want it done now and I don't care who gets hurt in the process!!!"

Adminstrator /
Bureaucrat

Results

after Jung

Competence = Knowledge and Experience



6 = Considerable knowledge and experience, ability to train others

0 = No knowledge or experience

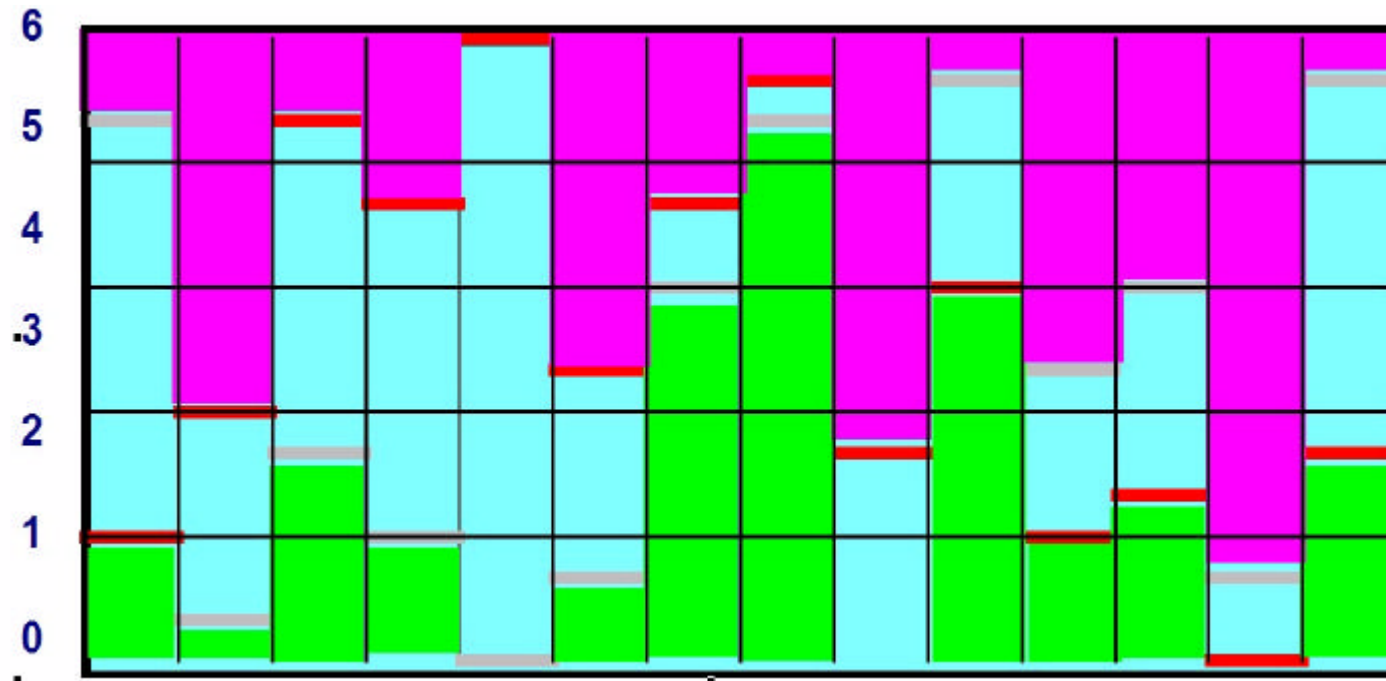


Gap > 1.0 = Communication problem

Gap < 0.7 = Hierarchy problem

refer McPhee : Job Analysis and Competence Evaluation

Competence = Knowledge and Experience



Every human being is a unique and complex compilation of knowledge and experience

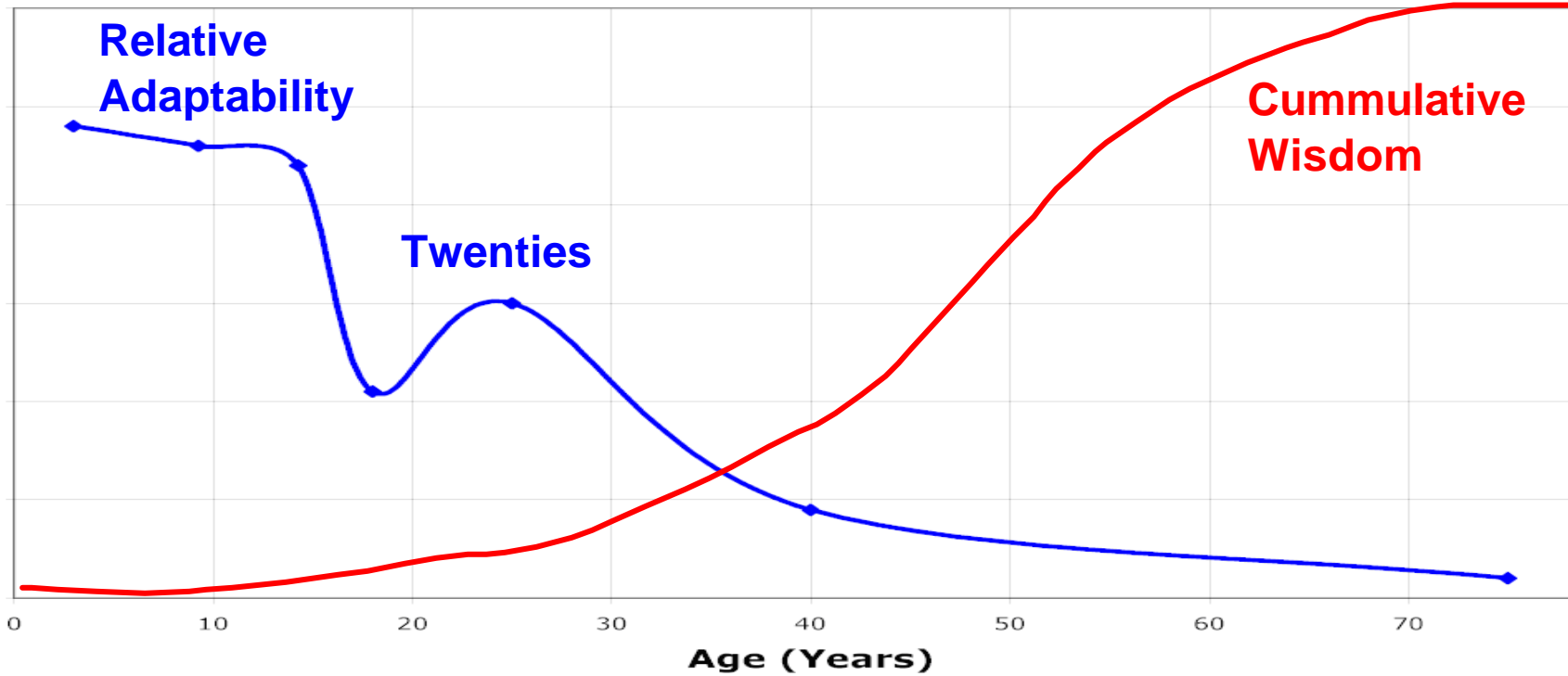
Every job requires a specific compilation of knowledge and experience

Assembling teams is a challenge

Human adaptability and wisdom



Relative Adaptability at Different Ages (%)



Wisdom % of Total

The exponential trajectory of developing effective technical expertise (e.g. engineers)



1. Shaped -- first five years
2. Developed -- next fifteen
3. Moulded and matured -- next twenty
4. Lead large projects -- age forty plus
5. Required engineer demographics -- sixty plus years



Essential business knowledge



-
1. Every organisation has a fundamental reason it exists
 2. Money is only a medium of exchange and measurement
 3. Only humans create, destroy and determine value
 4. Ways of being create or destroy value
 5. Ways of doing create or destroy value
 6. Service or supply to others creates exchangeable value
 7. The rest -- technology, assets, etc

Paradigms

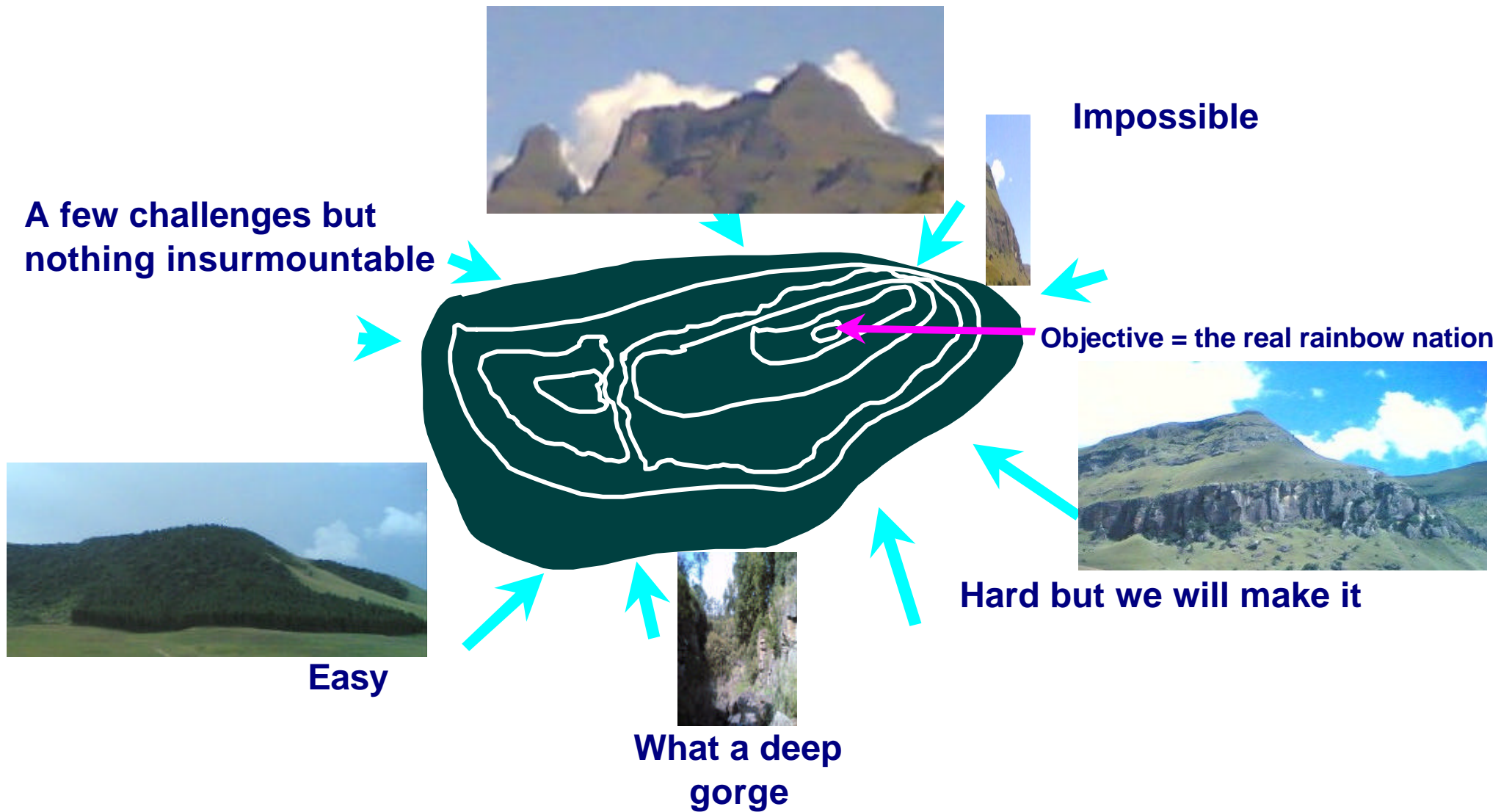


A mental model of the world -- knowledge and experience

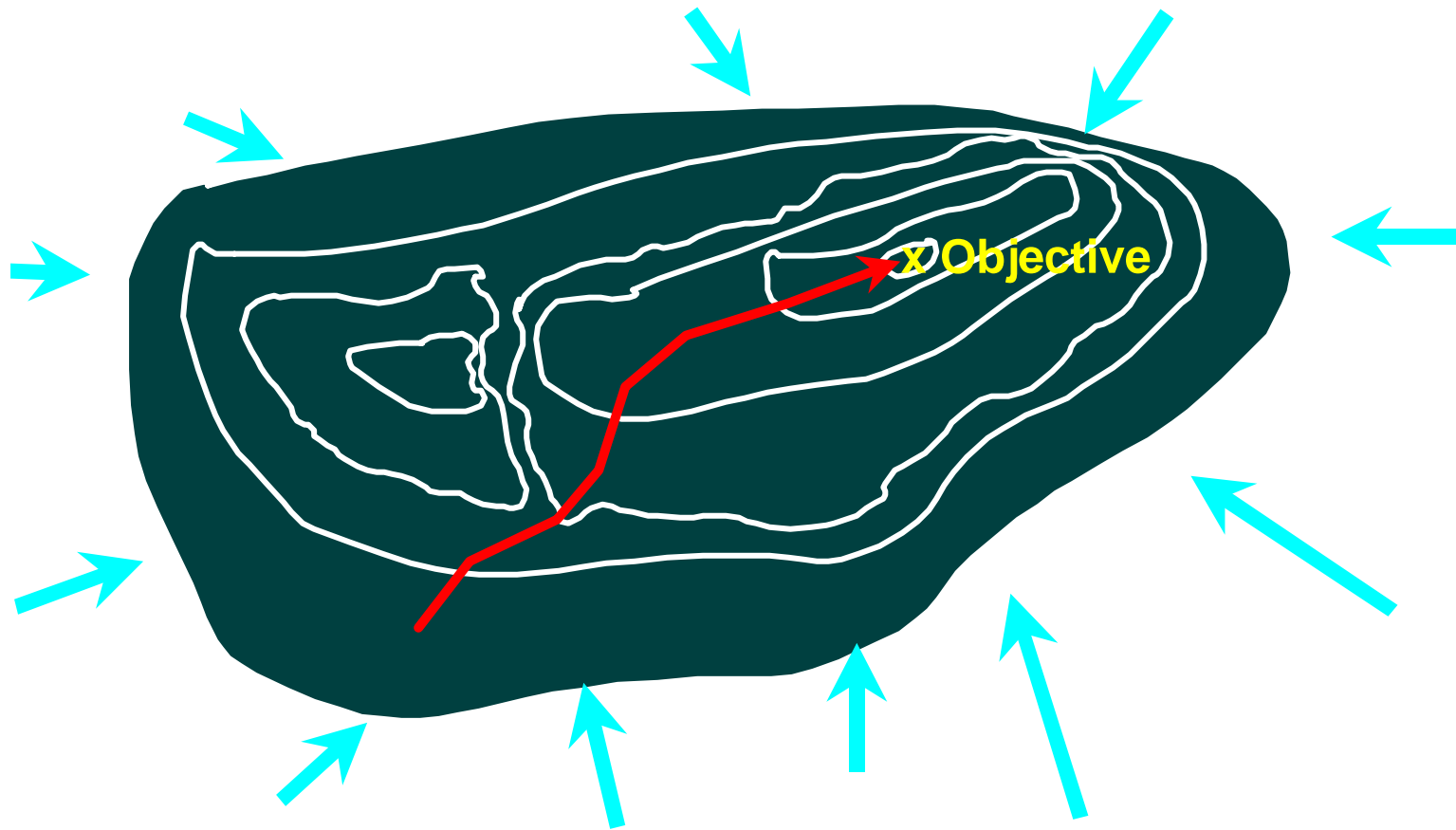
Paradigms are neither good nor bad they are JUST DIFFERENT



Paradigms -- the different views of the mountain



Paradigms -- the different views of the mountain



Paradigms -- performance factor scoring

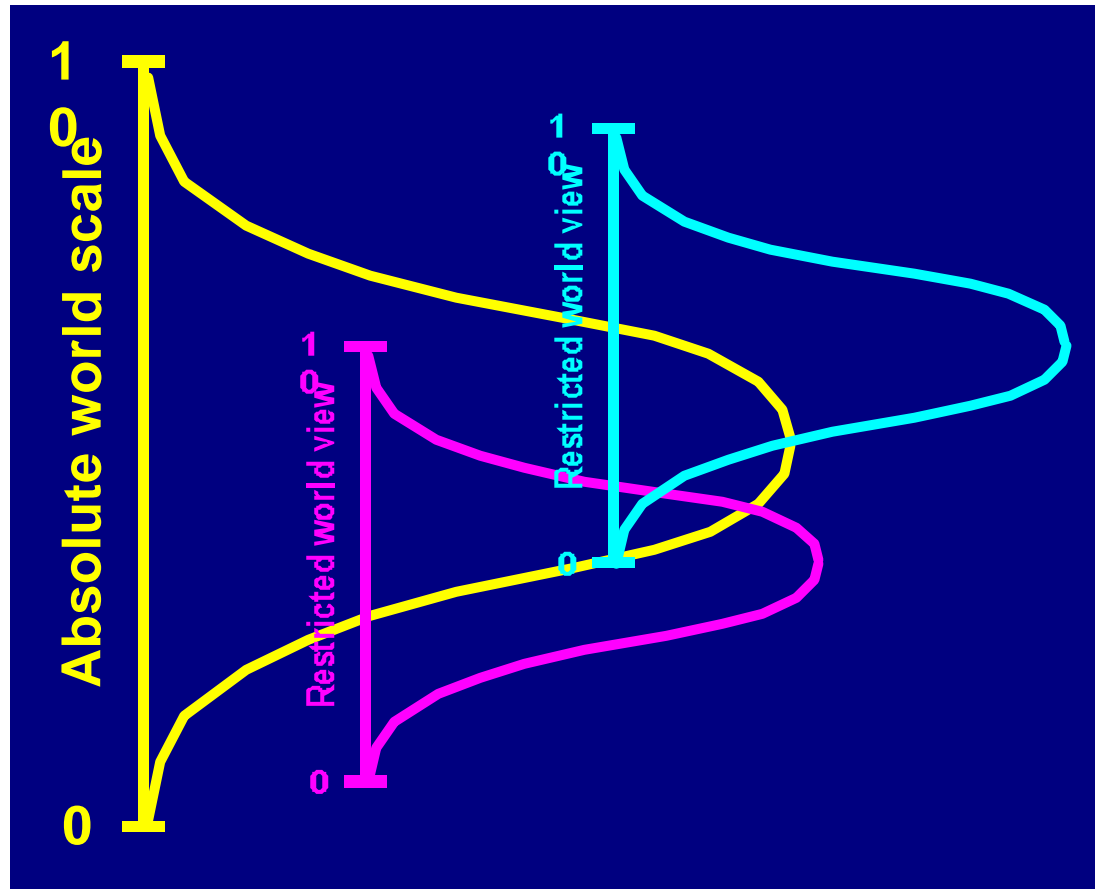


-
- 0 = Abysmal - could not be worse anywhere in the world**
 - 1 = Extremely weak**
 - 2 = Very weak**
 - 3 = Weak**
 - 4 = Mediocre**
 - 5 = Average - could be better / could be worse**
 - 6 = Acceptable**
 - 7 = Strong**
 - 8 = Very strong**
 - 9 = Extremely strong**
 - 10 = Exceptional - could not be better anywhere in the world**

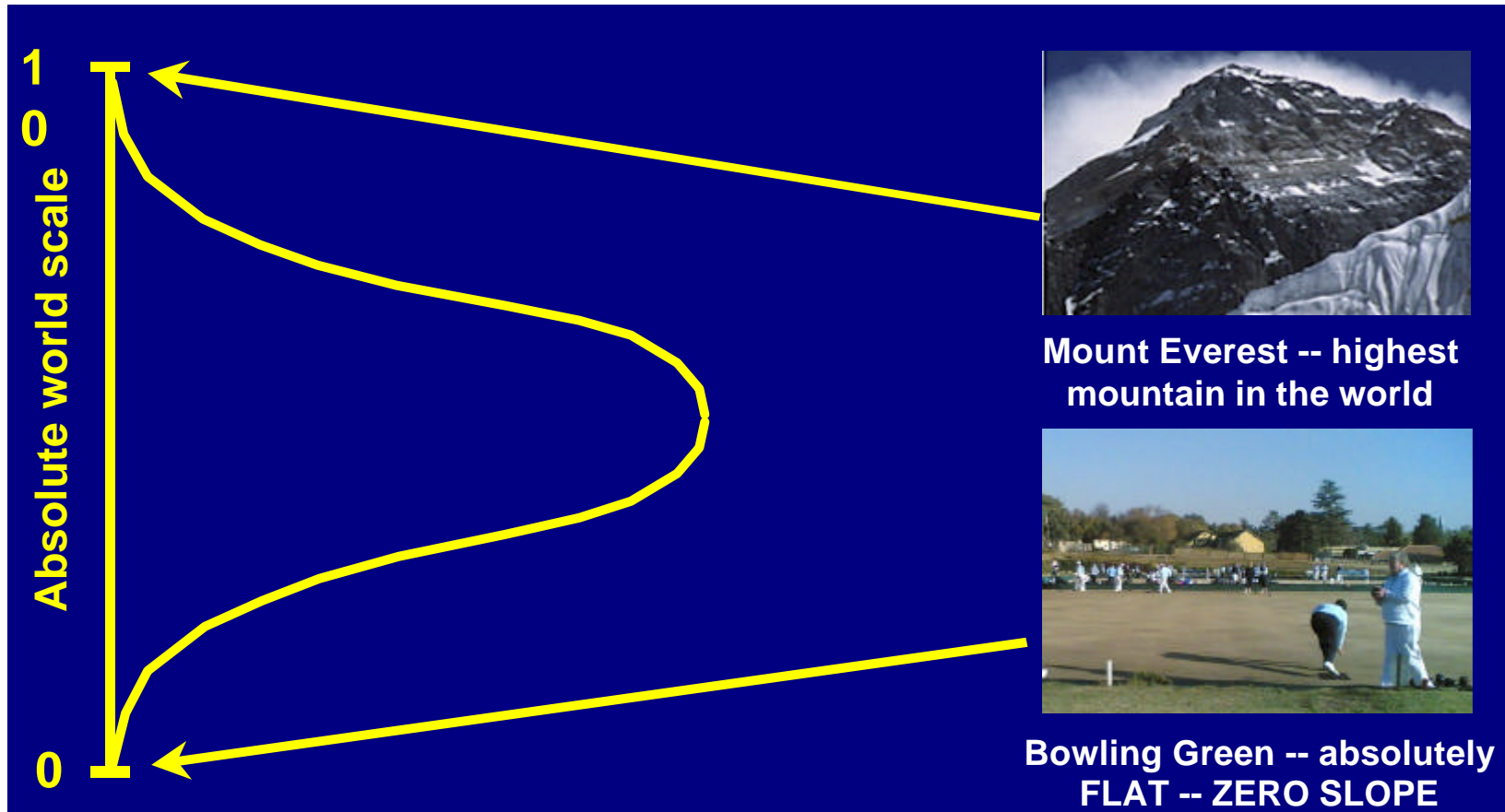
Paradigms -- factor scoring



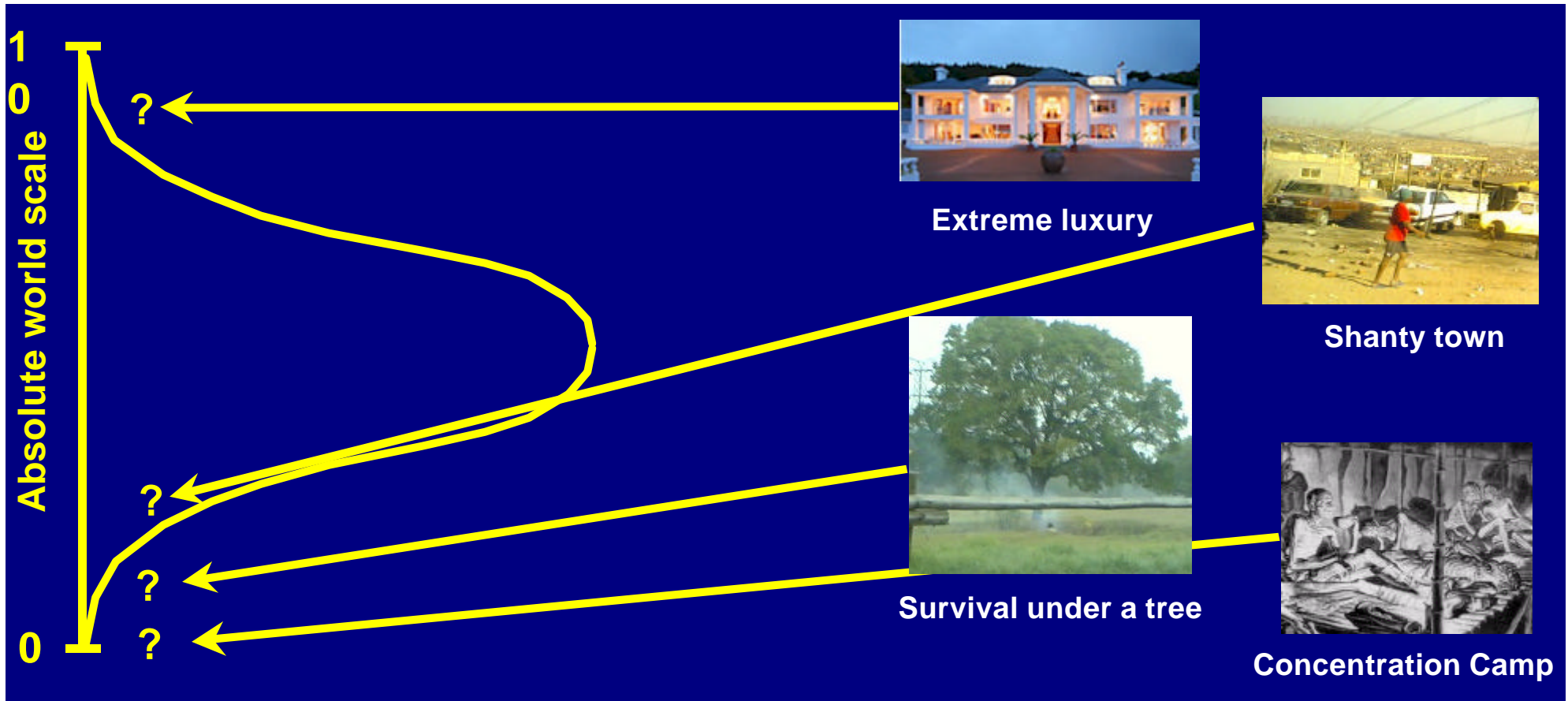
The challenge -- you do NOT know what you do NOT know and if you do not know what you do not know then ...



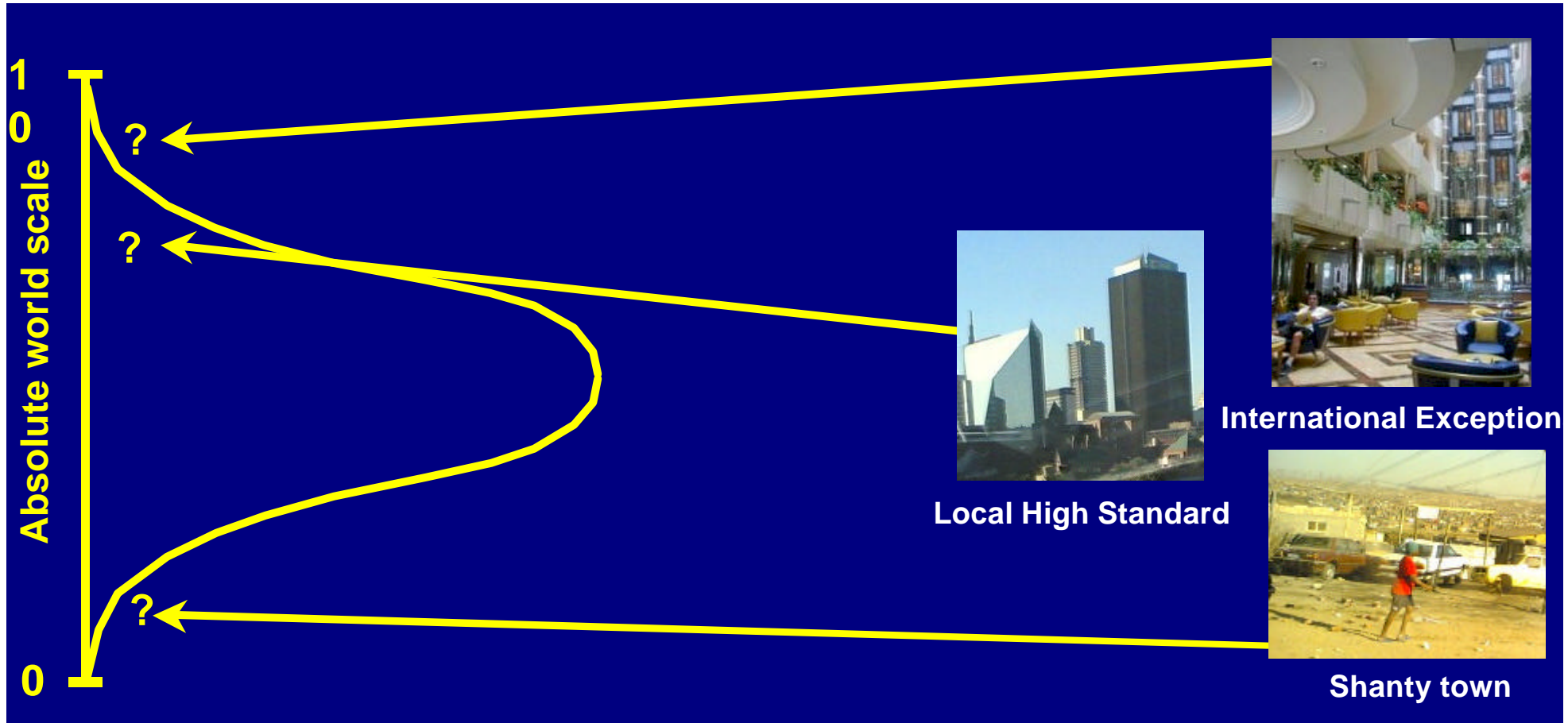
The challenge of our paradigms -- mountains



The challenge of our paradigms -- living conditions



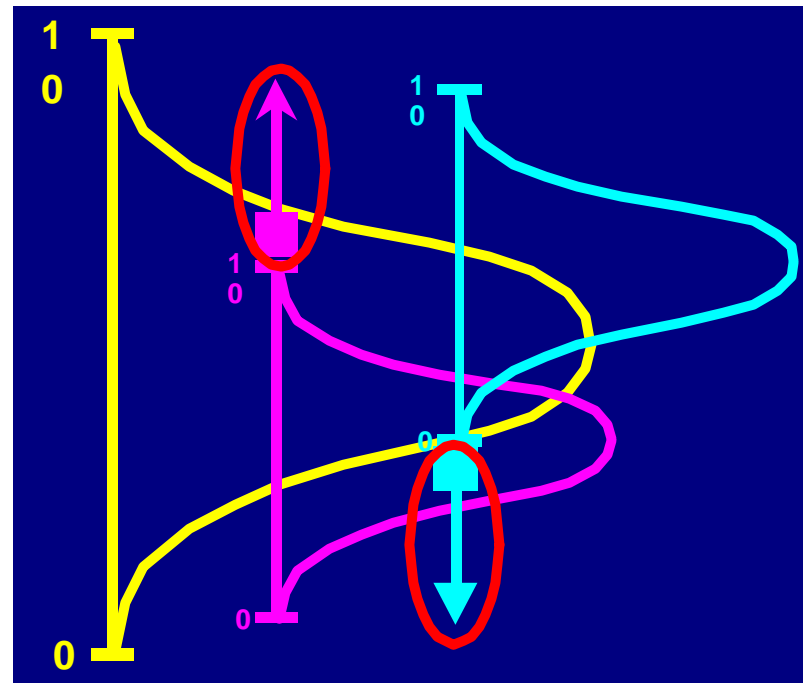
The challenge of our paradigms -- business standards



Paradigms -- stretching our worldview



- Experience
- Education
- Culture
- Generations -- baby boomers, X, Y, etc
- History -- World War II?
- Always had jet planes
- etc

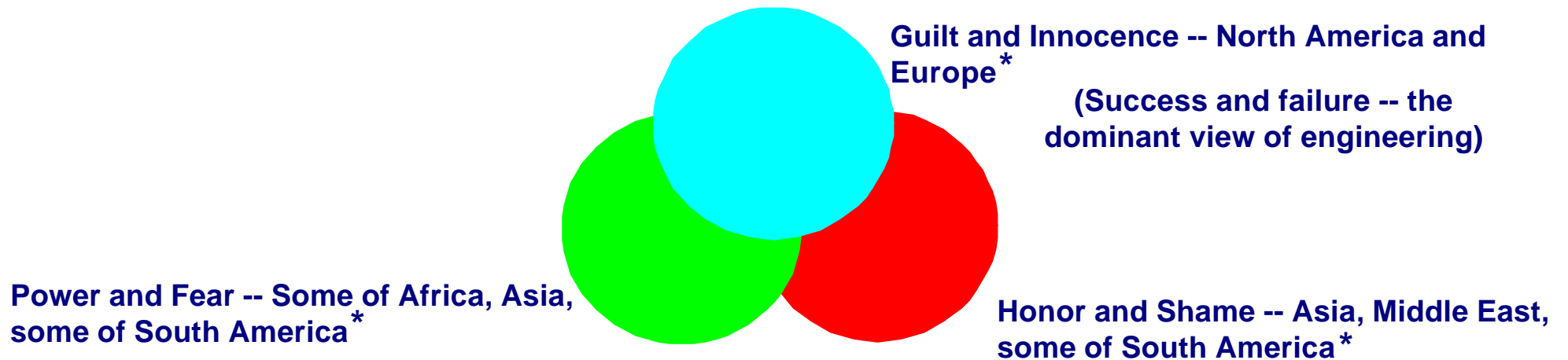


This is real --
“harder than
concrete”

Inter Cultural Intelligence



Three Colors of Worldview^{*}



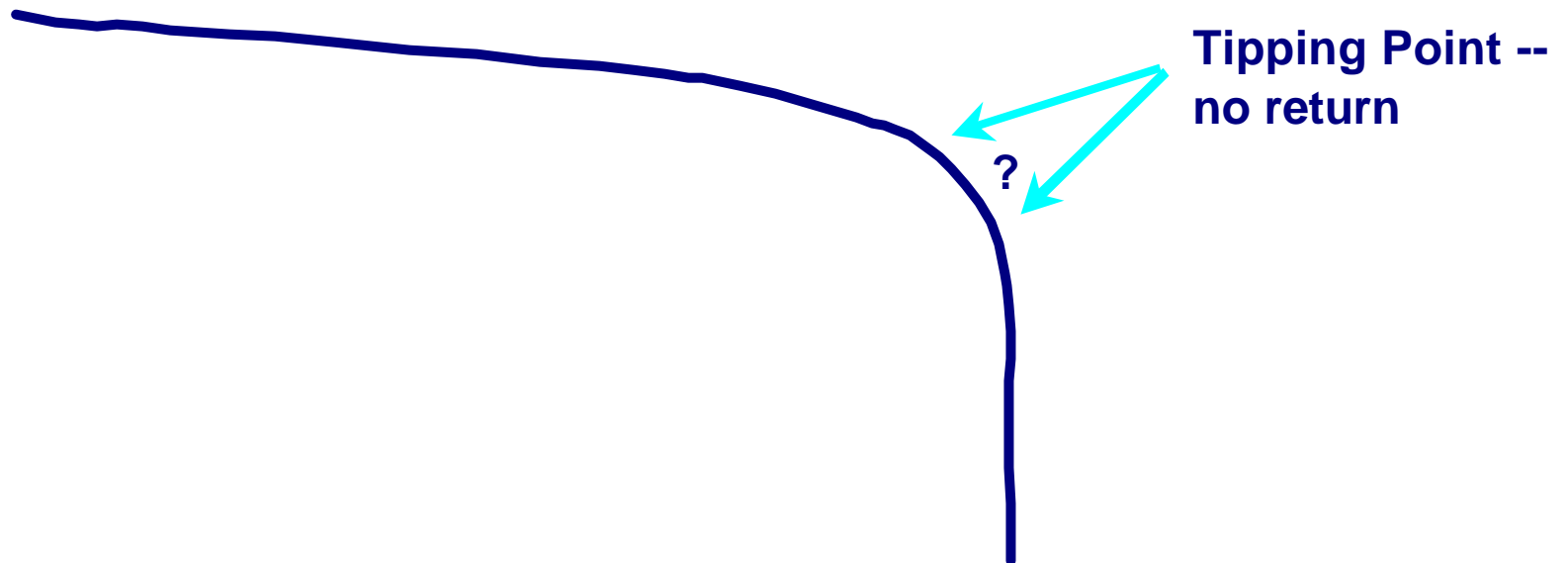
None of these are RIGHT or WRONG, they are a dimension of paradigms -- just DIFFERENT

^{*}KnowledgeWorkx -- Marco Blankenburgh

What engineers know



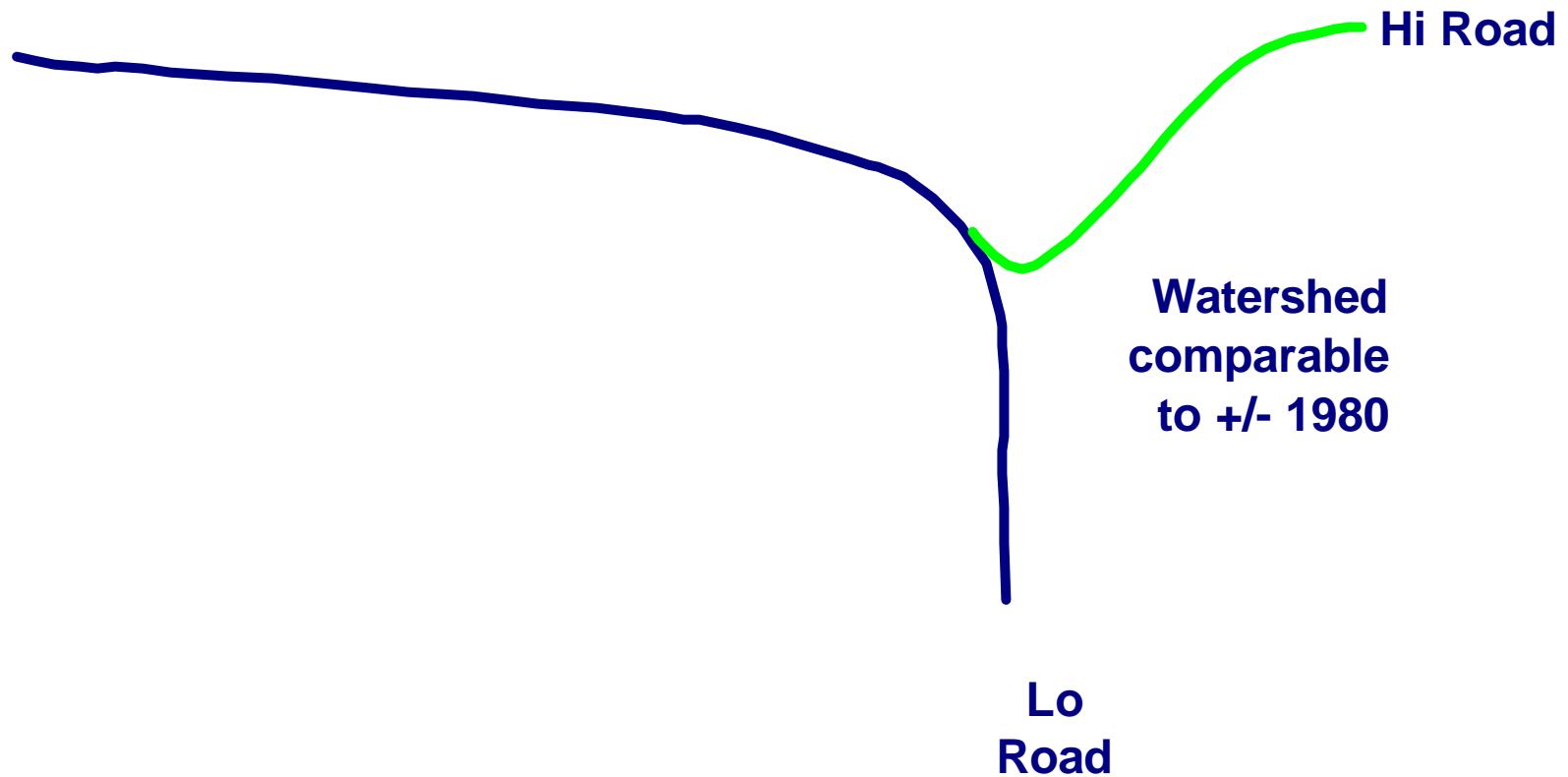
Exponential decay in the absence of constructive human investment in life generally and engineering systems in particular



Watershed opportunity



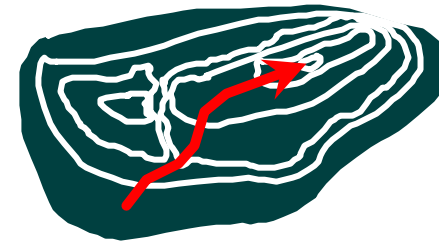
South African core infrastructure -- the infrastructure necessary for the economy to thrive sustainably for ALL South Africans



Quo vadis South Africa?



- Paradigms -- the material of empowerment
- **CHOOSE** to climb the mountain **TOGETHER**



Doing things right



Doing right things



Call to action



1. What is your single most important insight from this presentation?
2. What is the single most practical action that you can take tomorrow to apply I.T. more effectively?



New insight that does not result in action within 48 hours is wasted

Acknowledgement and dedication



Clients, associates and staff

**Father and mother Angus and
Thelma**

Children Alexandra and Struan

**Fiona, Ingrid, Sandra and
Helene**

**To the glory of the Eternal
Creator**

*Psalm 136:5 "To Him who by wisdom made
the heavens, for His mercy endures
forever;"*



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Finding the missing pieces of your I.T. and strategy puzzles