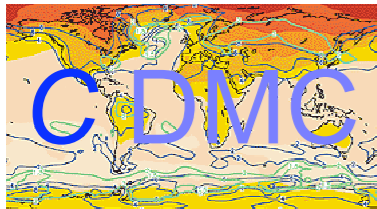




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Integration

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INTEGRATE WHAT?

- Story with questions that lead to learning
- “Disciplines” so that they fit problems
- Evidence to see if they fit with theory/story
- ...



STORY

- A good story keeps you reading long after bedtime.
- We make stories to explain the world around us:
 - ◆ Hem length and the stock market

“In 1926 US economist George Taylor coined the theory of the hemline index. It was a kind of frock exchange using skirt lengths as a signal of the state of the economy so that lower hemlines coincided with a falling market.”

- Any differences between stories, superstitions and theory?



CONFIRMATORY EVIDENCE

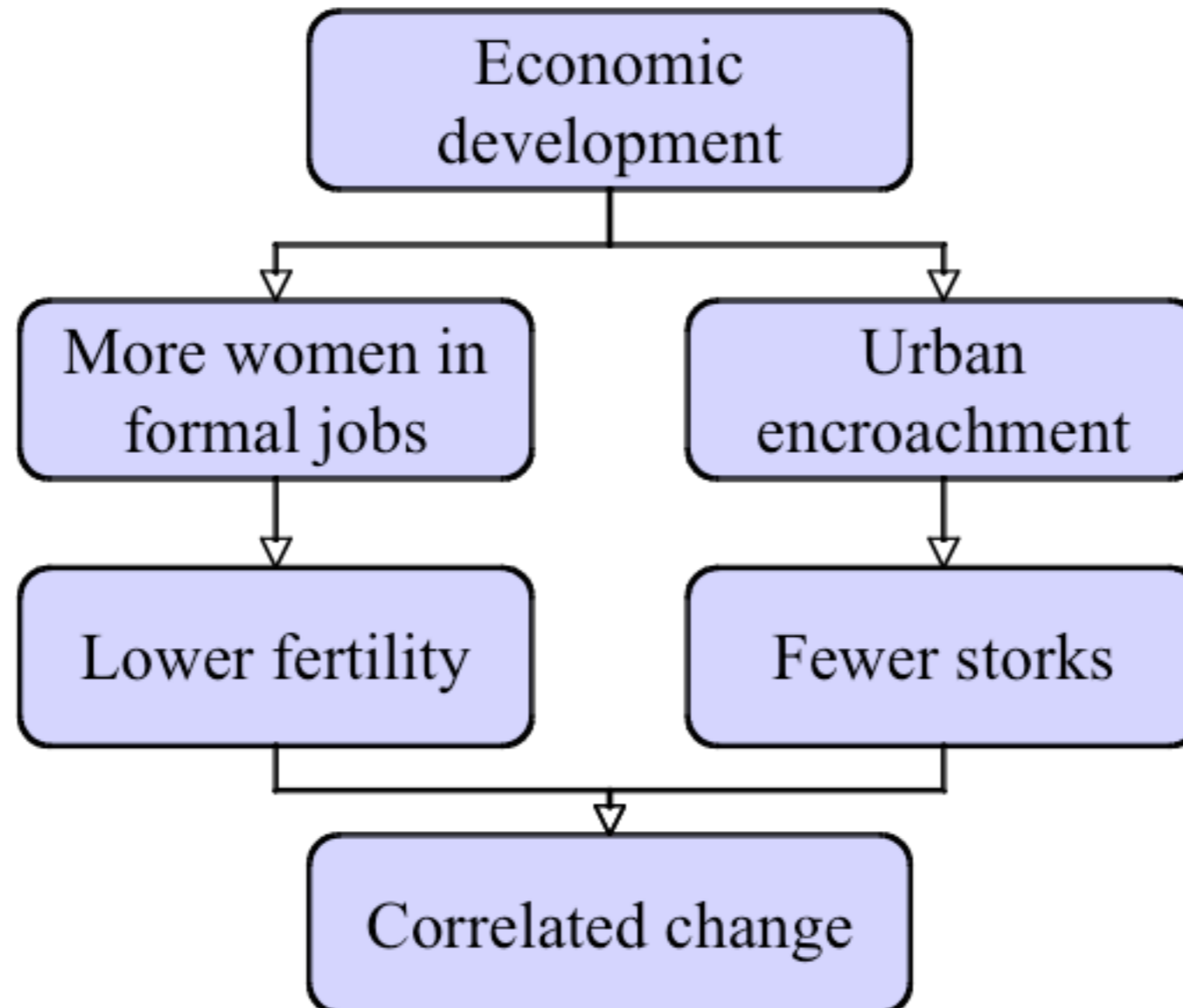
“A COLLECTION OF ANECDOTES IS NOT DATA.” FD, 2008

- Story leads to theory and supporting data.
 - ◆ Storks are iconic birds in China and China is the most populous nation on earth,
 - ✿ ... so it must be true.
 - ◆ Storks bring babies, just look at the evidence from Eastern Europe.
 - ✿ Massive decline of stork populations during the 2nd half of the 20th century, concurrent with a most dramatic fall in fertility.



COMPETING THEORIES

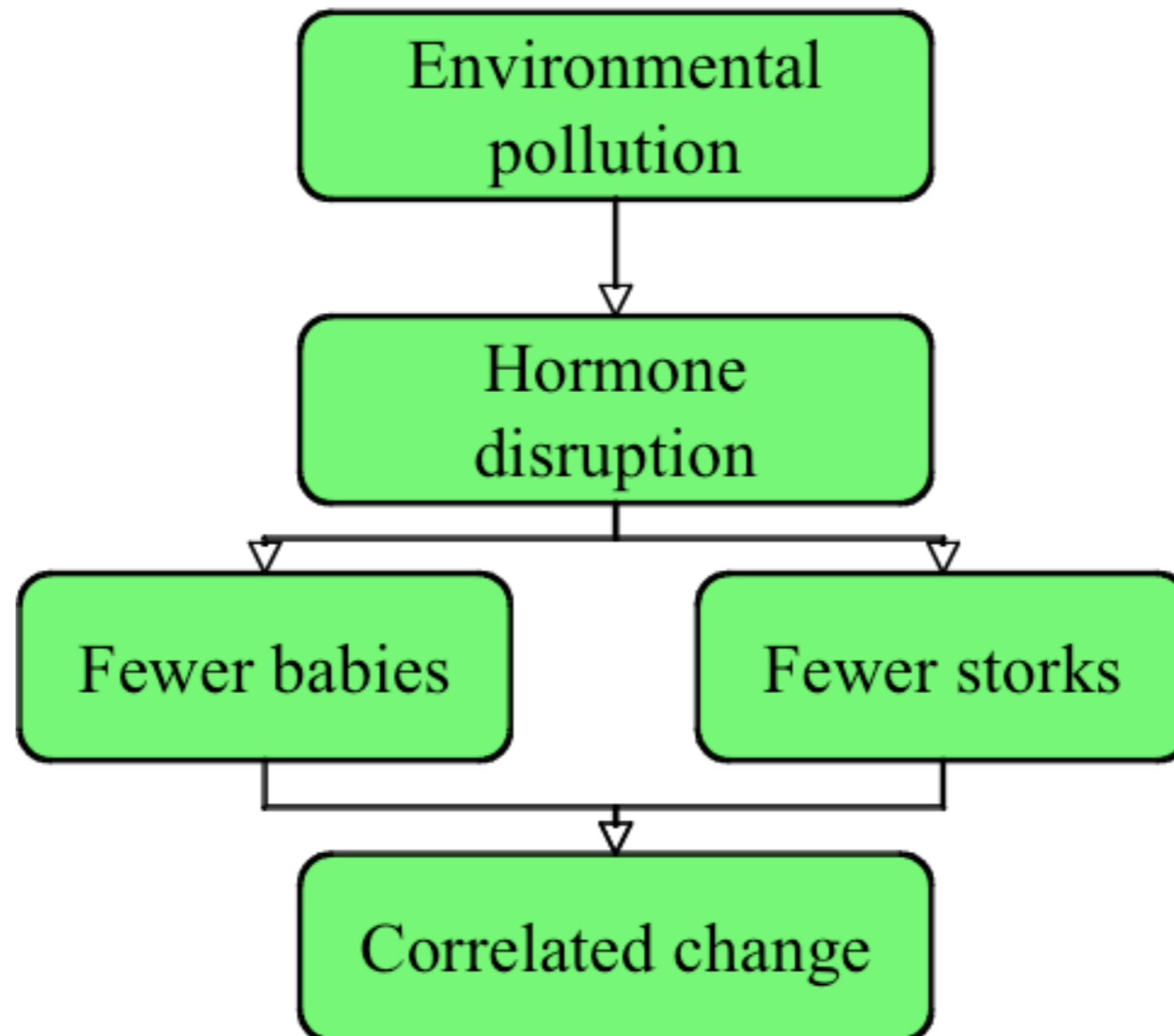
Model 1





COMPETING THEORIES

Model 2





UNDERSTANDING TECHNOLOGY ADOPTION

- Economics
- Psychology
- Sociology
- Diffusion theory
- ...

“Each social science discipline offers competing and often conflicting models of human behaviour. Differences persist because disciplinary models are founded on selective assumptions commensurate with established theories and particular types of empirical data.”

C. Wilson, 2008

- Are natural sciences any different?



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EVEN IN PHYSICAL ANTHROPOLOGY

- At the turn of the 20th century, evolutionary theory was leading leading physical anthropologists to theorise that white folks were the most evolved form of *h. sapiens*.
 - ◆ They argued that brain capacity was a reliable indicator of intelligence.
 - ◆ They measured the volume of skulls of different ethnicity stored at Harvard Museum of Palaeontology.
 - ✿ They found that the brains of whites were the largest and those of blacks the smallest. In between were the other races.



A FINAL WORD ABOUT QUANTIFICATION

- Not all that is measurable is worth measuring. Not all that is worth measuring is measurable”

AE, 1954



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FOLLOWING THE PROBLEM

- Disciplinary knowledge has *only* grown because of interdisciplinary boundaries.
- By assuming “all else held constant” the influence of one variable over the “system of interest” can be measured and theorised about.
- But in the real world interactions abound and the most interesting problems are where different disciplines have a boundary.
- ◆ Because disciplinarians leave such a huge gap from where they work to the fence!



BE DISCIPLINED, NOT DISCIPLINARY

- Please be a sceptical inquirer and teach your students to be the same.
 - ◆ More than 95% of what is published today in peer reviewed journals will later be proven wrong.
- Please make sure your students learn that outside highly proscribed problems, very few problems have singular & absolute answers.
- Please take the time to learn how to estimate stuff and make sure what is said passes the laugh test.
 - ◆ “Screen-savers on computer screens are equivalent to 400 coal power stations”
- Science is full of fun and wonder and you are the Messiah



Undisciplinary



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FINDING SUSTAINABILITY!

- How did we get here?
 - ◆ How do the system components interact?
- What are our resources?
 - ◆ How do we choose to manipulate the system?
- What are the absolute limits?
 - ◆ What can technological progress bring us?
- What are the social limits?
 - ◆ Can we define a future ideal that is acceptable to our children?