Policy workshop on advanced technology applications

Policy cycles, implementation gaps, and case studies

A presentation at HKU School of Professional and Continuing Education (Hong Kong, China)

29 Mar 2019

Kai L. Chan, PhD
Kai.Chan@alumni.princeton.edu
www.KaiLChan.ca

HKUSPACE
香 港 大 學 專 業 進 修 學 院
HKU School of Professional and Continuing Education

Advanced technology applications

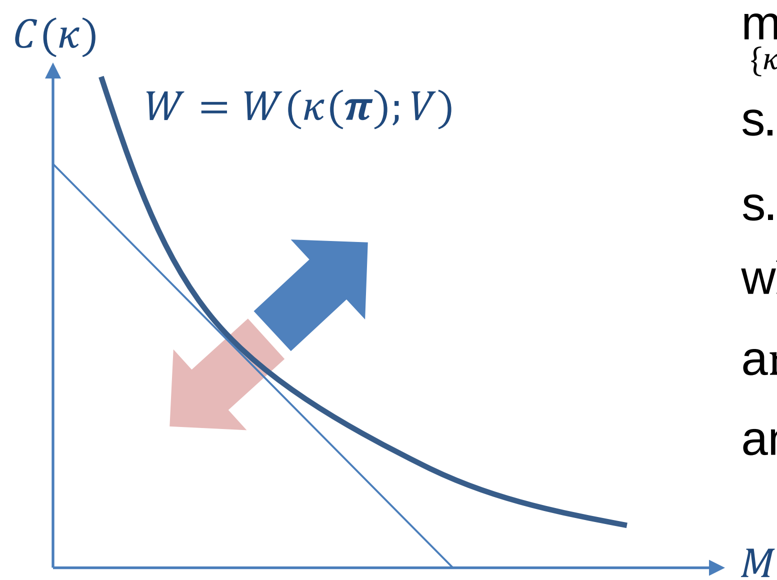
Policy cycles, implementation gaps, and case studies

- Policy: A course or principal action proposed or adopted by a government, party, business or individual (Oxford Dictionary)
- Policy is, mathematically speaking, a multidimensional constrained optimisation problem
- Because of political economy, human behaviour, natural idiosyncrasies and other considerations the actual policy path rarely (if ever) follows the planned/ expected/optimal path. Making good policy is hard. Its effects are rarely exactly known and it inevitably makes some people better off and some worse off, leading to group politics
- The Law of Unintended Consequences states that policy actions have effects that are unanticipated, unintended and often also unpredictable (positive and negative)
- Political infrastructures play a significant role in the ability to formulate and implement policies
- Policy making ideally should be proactive rather than reactive, especially when there is a lag between policy and its effects
- Consensus policy-making risks choosing the "safe" (continuous) option rather than pushing for more risky disruptive (discrete) changes
- Policy is a vital lever in promoting, accelerating and leveraging the introduction of new/advanced technologies in an economy

Policy as an optimisation problem

Maximise objective function choosing policy variable(s) that achieve goal(s)

Policy-making is a multidimensional optimisation problem with competing trade-offs, budgetary concerns, time dimensions, stakeholders, etc. It is complex because the tools/instruments of policy are imperfect, as are the ways to measure the intended outcome (target). Moreover, seldom (if ever) is a policy outcome Pareto efficient (i.e. no one is made worse off). With limited resources, heterogeneous groups in the population, and differing political values, there is always a need to consider distributional issues of policy.



$$\max_{\{\kappa;\pi\}} \boldsymbol{W} = \textstyle\sum_{i=1}^{N} \omega_i W_i(\boldsymbol{\kappa}; \boldsymbol{V})$$

s.t. $\boldsymbol{V} = \sum_{j=1}^{M} \vartheta_j V_j \geq \bar{V}$ and $M = min\{\boldsymbol{M}\}$

s.t. $C\big(\kappa(\boldsymbol{\pi})\big) \leq B$ and $\kappa_{t|0} \rightarrow \kappa_{t|T}$

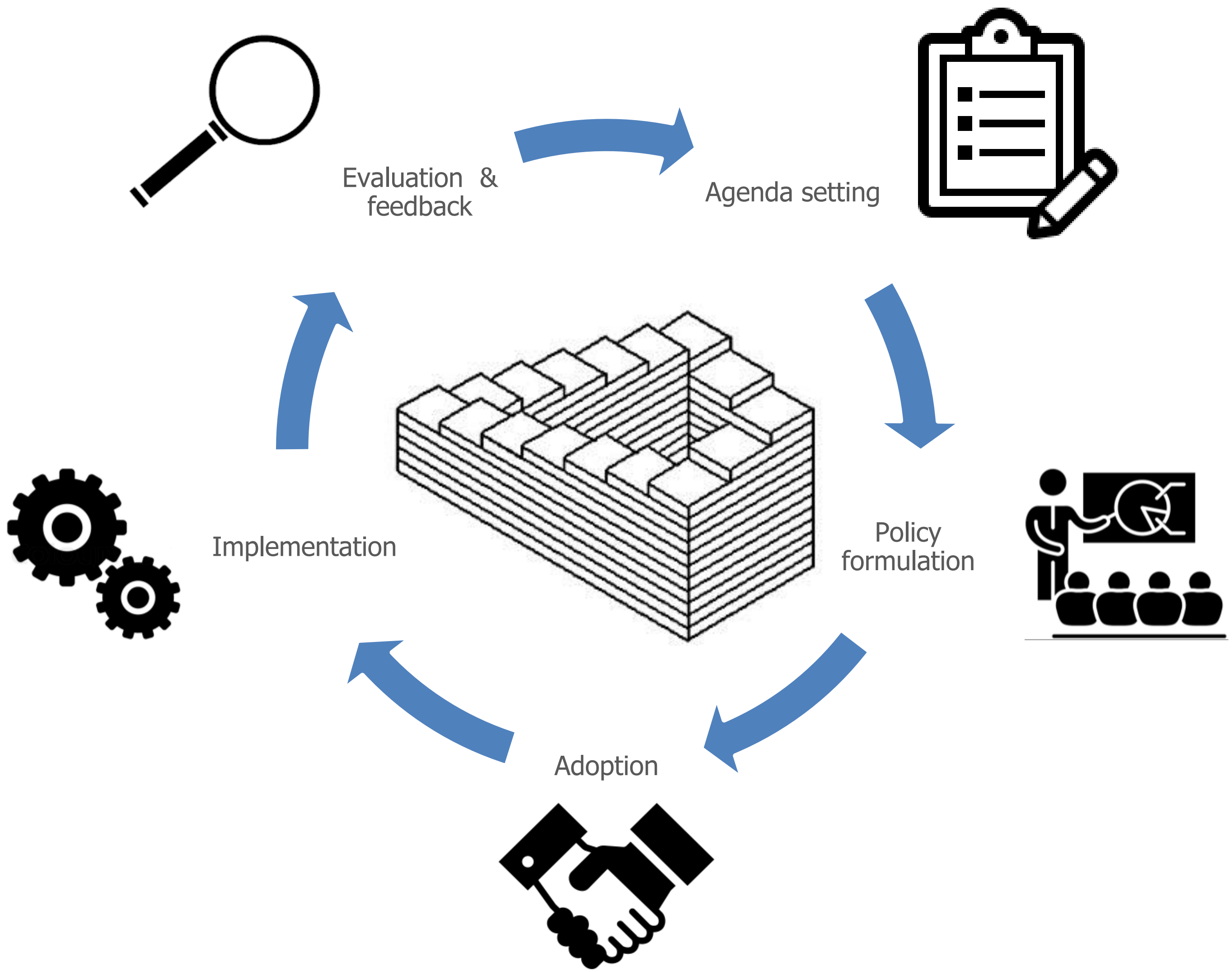
where $W_i'(\boldsymbol{\kappa};\cdot) \geq 0$ and $W_i'(\cdot;\boldsymbol{V}) \geq 0$

and $g(\boldsymbol{\kappa};\cdot) \geq 0$; and $\boldsymbol{\kappa}$ a set of KPIs

and $\kappa = \kappa\underbrace{(\pi_1, \pi_2, \pi_3, \dots, \pi_L)}_{\text{Policy variables}} = \kappa(\boldsymbol{\pi})$

Policy cycles

What process should policy take?



Policy cycles

Agenda setting

Before policy can be made it is required to specify what the are the desires/intended goals (and how they should be measured) and/or what are the questions/problems that need to be solved. An agenda is the set of ideas that authorities deem relevant to discuss and hope to influence via policy. The list should ideally be ranked by priority and is usually set by the authority with consultation from stakeholders.

Policy cycles

Policy formulation

Policies are formulated by the government or the competent authority. It is the blueprint by which the desired outcome is supposed to be achieved. Sometimes the policy-setting bodies are made independent of government so that policies are not beholden to the group in power (e.g. monetary policy in many advanced free market economies is set by an independent central bank or monetary authority).

Policy cycles

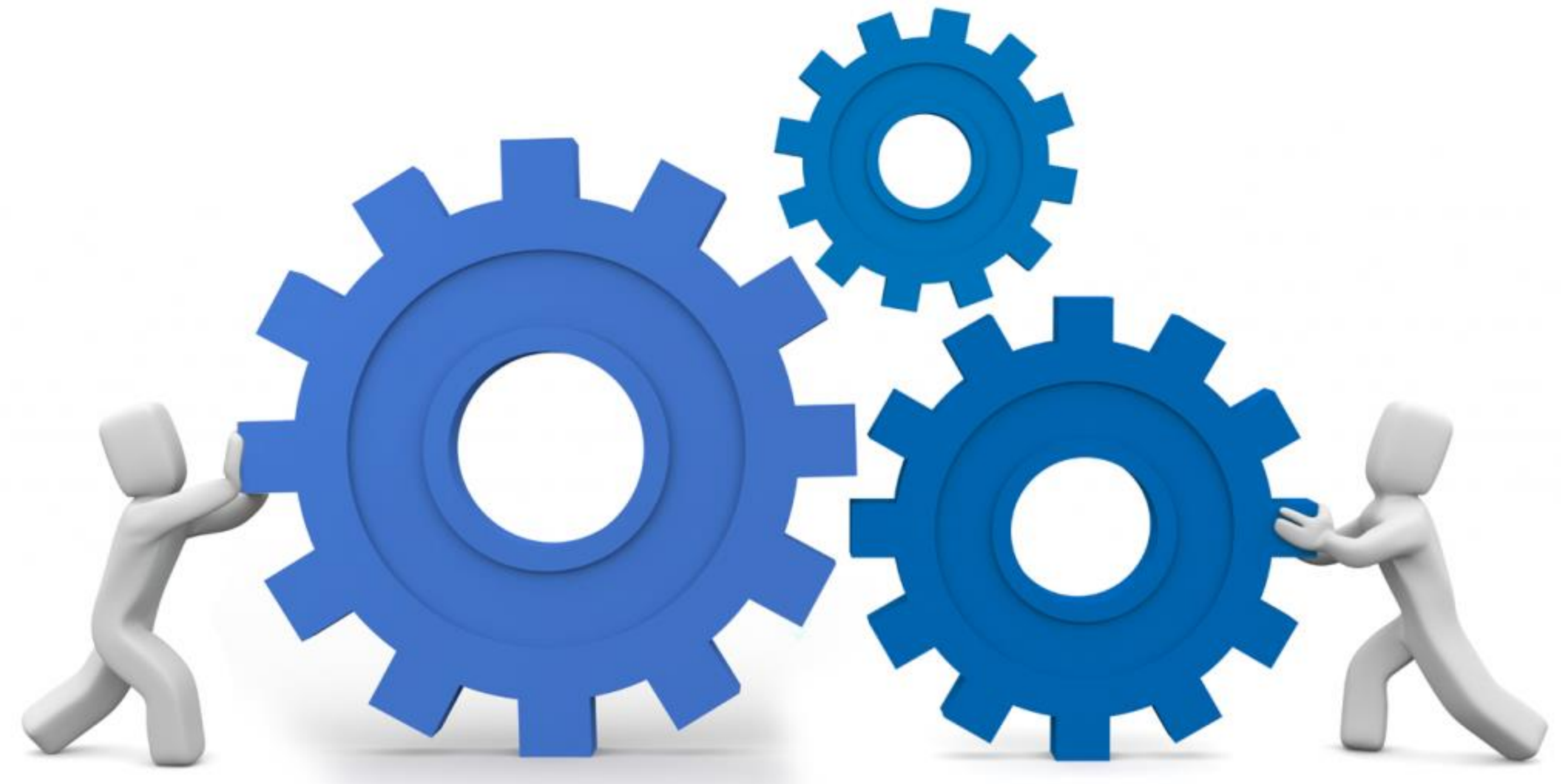
Policy adoption

A policy is adopted when its goals and the blueprint for attainment are accepted by the competent authority. The decision rule for policy adoption can have a profound impact on the policy path and its implementation.

Policy by consensus runs the risk of creating "safe" (incremental) solutions at the expense of forgoing disruptive improvements.

Policy cycles

Policy implementation



Policy implementation refers to the task of carrying out public policy. Implementation is how ideas are mapped to actionable (and usually also measurable) items. The plan needs to be detailed and well structured so that it can be executed without error or corruption. Ultimately, actions speak louder than words, and it is the implementation process rather than plan itself that is the *de facto* policy.

Policy cycles

Evaluation and feedback

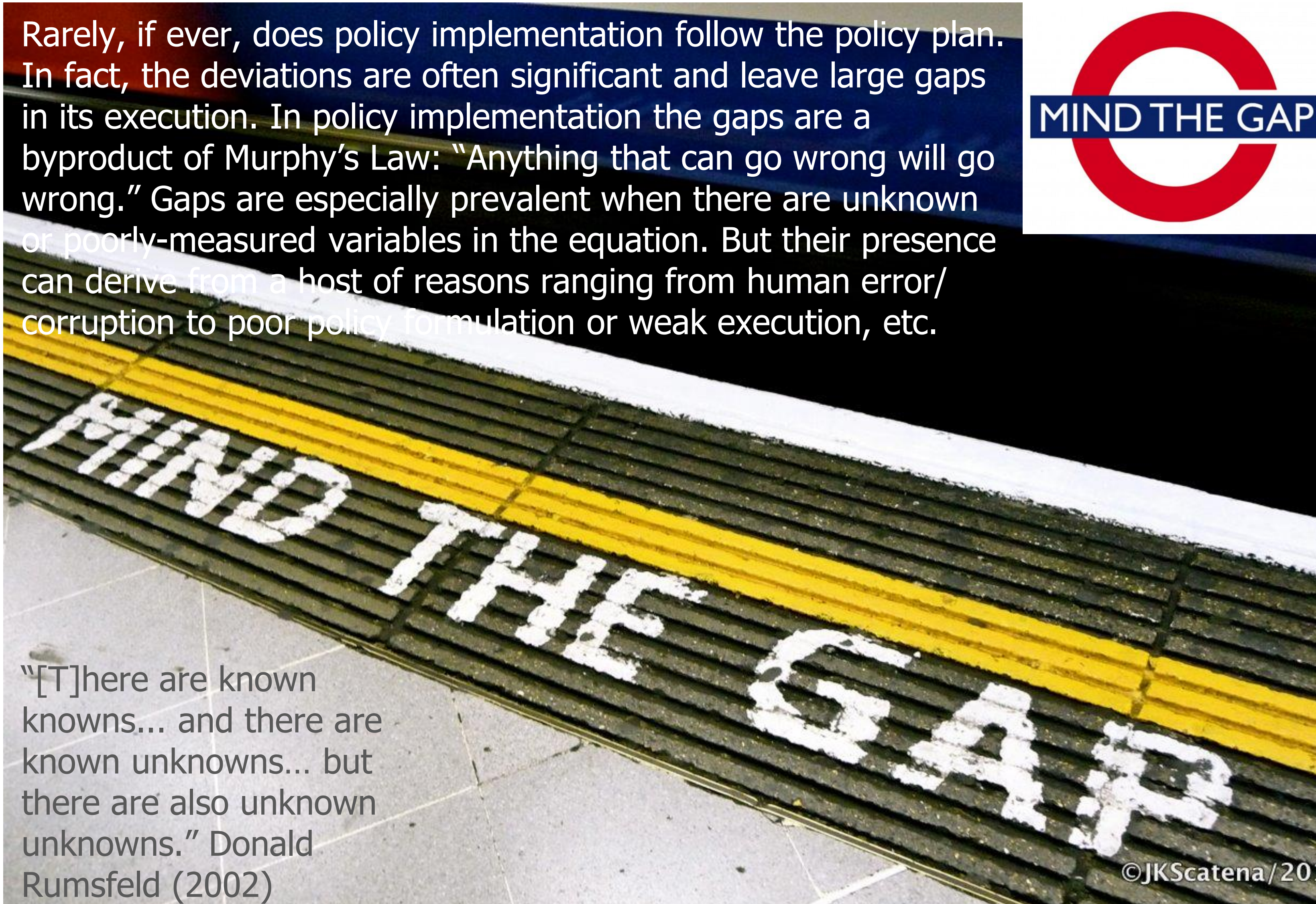
To ascertain the effectiveness of the policy it is required to measure its impact, as well as the ancillary and secondary/unintended effects. With robust measurement (based on a well-defined objective function), policy makers can then tune their actions to ensure that the chosen policy levers and their levels, timing, etc. are calibrated to try to achieve the stated goal. For example, in monetary policy the tool chosen by a central bank may be the money supply acting through the interest rate, while the target is the inflation rate. Depending on where inflation is relative to target allows the central banker to adjust the supply of money in a feedback loop/process.

Implementation gaps

Rarely does implementation follow the plan

Rarely, if ever, does policy implementation follow the policy plan. In fact, the deviations are often significant and leave large gaps in its execution. In policy implementation the gaps are a byproduct of Murphy's Law: "Anything that can go wrong will go wrong." Gaps are especially prevalent when there are unknown or poorly-measured variables in the equation. But their presence can derive from a host of reasons ranging from human error/ corruption to poor policy formulation or weak execution, etc.

MIND THE GAP

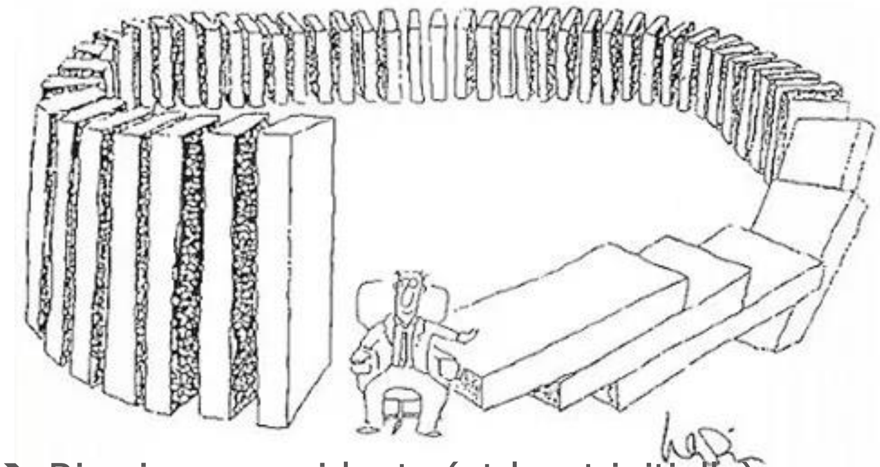


"[T]here are known knowns... and there are known unknowns… but there are also unknown unknowns." Donald Rumsfeld (2002)

Law of Unintended Consequences

Policies have secondary and unintended effects

The Law of Unintended Consequences is a phenomenon whereby economic decisions or policy actions have unintended and unexpected effects. In some cases the unintended consequence is so severe that it makes the situation worse. Even if the desired outcome is achieved (in whole or in part), there may be secondary impacts – either to the intended group or to others – which may negate/offset the intended benefits. The phenomenon is best encapsulated by the English proverb: "The road to hell is paved with good intentions." (c.f. VER of 1980s.)



Seat belt laws ➔ Rise in car accidents (at least initially)

Autonomous driving cars ➔ Rise in alcohol consumption?

Establishment of Information Superhighway (Internet) ➔ Dumbed down population?

Augmented and virtual reality devices ➔ "Otaku" problem and decline in health?

Proactive rather than reactive policy

Policy that is reactive misses the bigger picture

Reacting to "leaks" or putting out the proverbial fire distracts policy-makers from surveying the bigger picture.

Incremental technology growth

Policy often favours continuous growth when adoption is by consensus

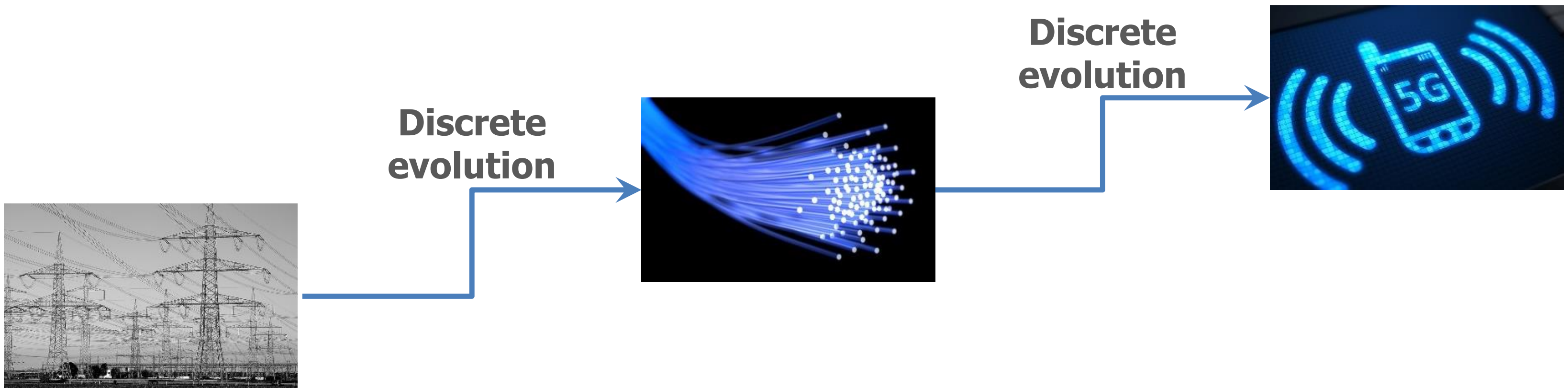
Incremental technologies do not have as large of distributional dynamics as compared with disruptive innovation (e.g. adding credit card machines in taxis versus the introduction of Uber or other ride-hailing services).

Evolution of cell phone continuous or discrete?

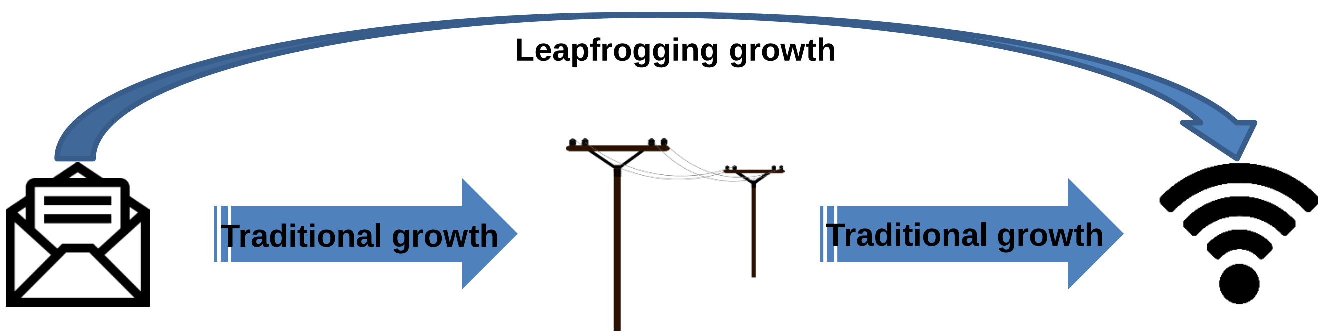
Technological advancement

Discrete/disruptive technological growth

Policy should encourage disruptive growth and embrace leapfrogging

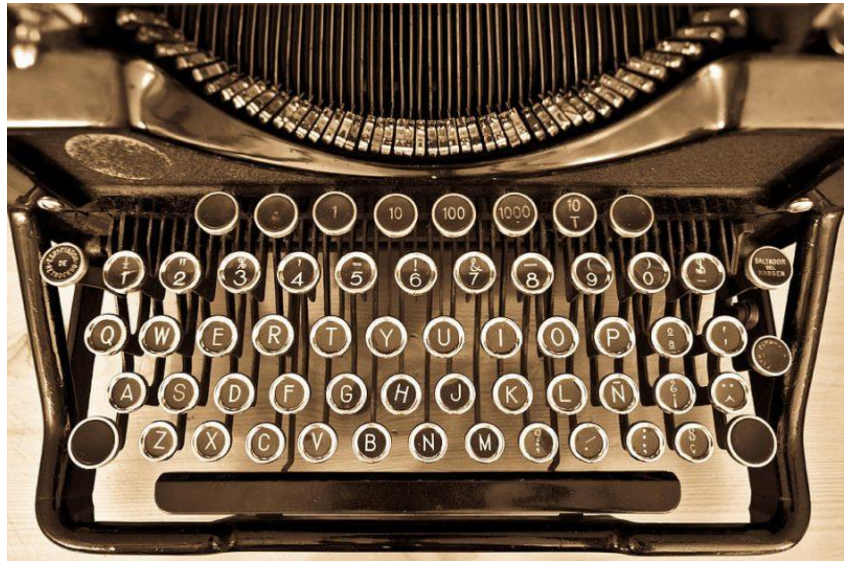


1887 Gramophone | 1925 Record player | 1954 Transistor radio | 1962 Cassette tape | 1979 Walkman | 1982 Compact disc | 1993 MP3 | 2001 iPod



Positive role for policy intervention

Markets left to themselves may adopt an inferior technology



Accident of history, bad marketing, etc. can lock a county into an inferior technology. The QWERTY keyboard is an inefficient product of history. (At the time it was designed to *slow* down typing so as to avoid jamming the gears.) Likewise, an inferior technology such as VHS won over Betamax the market due to its superior marketing strategy.

Leapfrogging technologies

"Advanced" countries may be locked into older/inferior technologies

The New York City Subway system is over 100 years. Its legacy infrastructure has locked it into older technologies. So rather than investing in frontier technology for its underground system, money is spent on repairing and upgrading the existing (old) technology/ infrastructure.

The Hong Kong metro system, on the other hand, began operation in 1979. Without the hindrance of a locked-in and outdated infrastructure, it was able to build *de novo* a modern underground mass transit system. Hong Kong also benefits from a political system that better facilitates large-scale policy initiatives.

Political bickering vs political will

Toronto vs Hong Kong as an example of reactive vs proactive planning

1989	2019

1989

Toronto

Hong Kong

2019

Toronto

Hong Kong

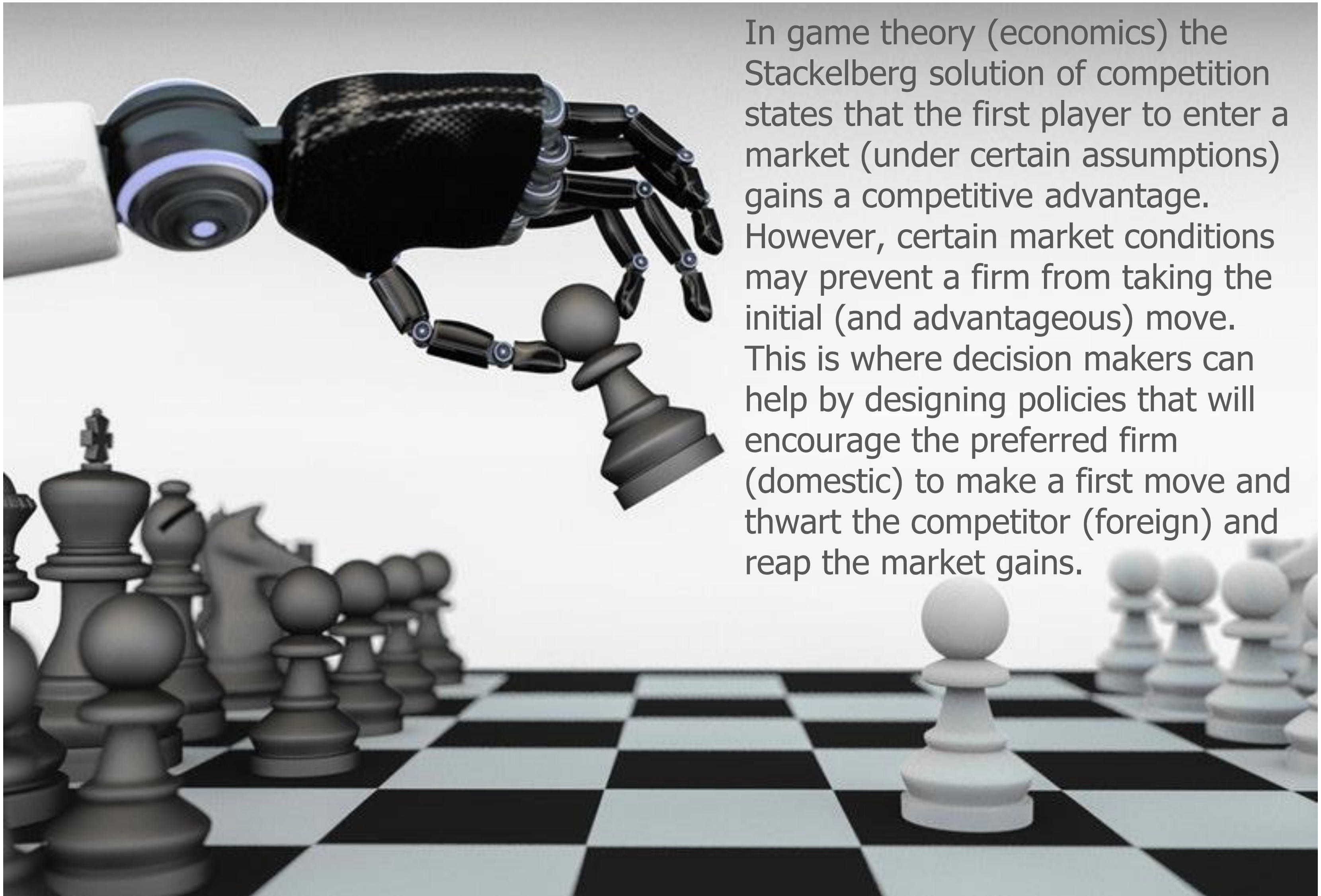
Policy by fiat

Is democracy the best way to enact policy for growth?

DEMOCRACY DEMOCRACY DEMOCRACY DEMOCRACY

First-mover advantage

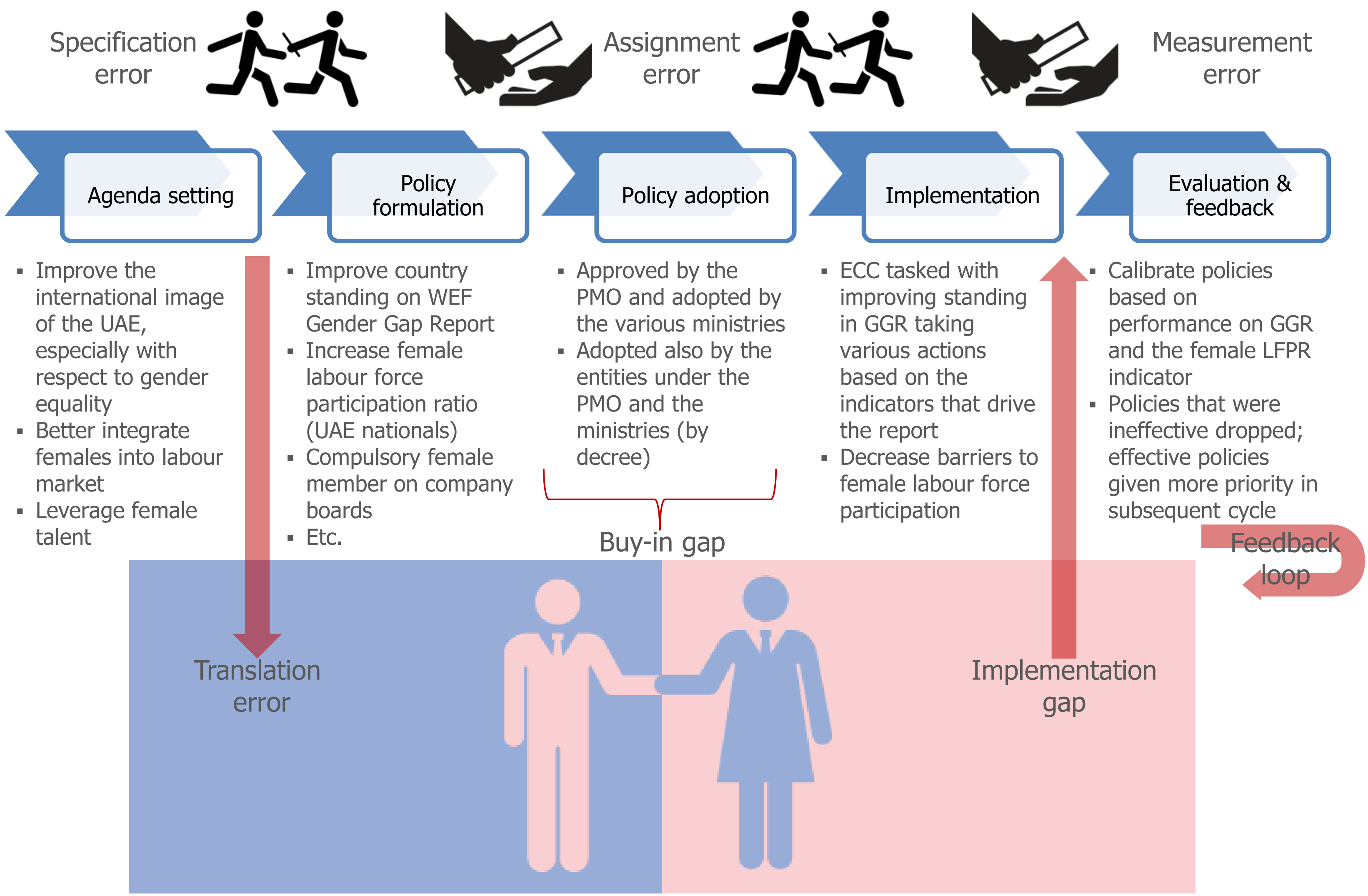
Initial entrant into market may have significant and persist advantages



In game theory (economics) the Stackelberg solution of competition states that the first player to enter a market (under certain assumptions) gains a competitive advantage. However, certain market conditions may prevent a firm from taking the initial (and advantageous) move. This is where decision makers can help by designing policies that will encourage the preferred firm (domestic) to make a first move and thwart the competitor (foreign) and reap the market gains.

Promote gender equality

Harness full potential of women in society



Become a knowledge-based economy

Diversify economy and move into high-value-add sectors

Agenda setting
- Economic diversification
- Become a knowledge-based economy
- Implement advanced technologies

Policy formulation
- Increase share of non-oil GDP
- Target INSEAD Global Innovation Index
- Implement advanced technologies

Policy adoption
- Approved by the PMO and adopted by the various ministries
- Adopted also by the entities under the PMO and the ministries (by decree)

Implementation
- Ministry of Economy aims to improve indicators in the GII
- Increase share of non-oil GDP
- Implement advanced technologies

Evaluation & feedback
- Calibrate policies based on performance GII
- Policies that were ineffective dropped; effective policies given more priority in subsequent cycle

United in Knowledge

Competitive Knowledge Economy

Main Sponsor	Ministry of Economy
Source	INSEAD
Description	
Measurement Unit	Rank
Year of Measurement	2018
Score	Rank 38
Executive Team	Executive Team for Global Innovation Indicator

Policy challenge: Shock to textile industry

How to evaluate the following technology shock?

- New technology to make textiles more efficiently (e.g. AI automation)
- Will result in job losses and greater income inequality
- Women are more likely to be working in textile industry
- Textile workers have lower average education than the general population
- Textile workers are older than the average worker
- Question: Should Bangladesh embrace the new technology? If so, how?

- What questions do you need to ask to get a better grasp of the problem?
- What kind of framework do you need to evaluate the problem?
- What extra information do you need?
- What assumptions are required/used?
- Who are the stakeholders?

Policy challenge: Made in Bangladesh vs Italy

Why the gap in value? How can Bangladesh move up the value chain?

Agenda setting

Policy formulation

Policy adoption

Implementation

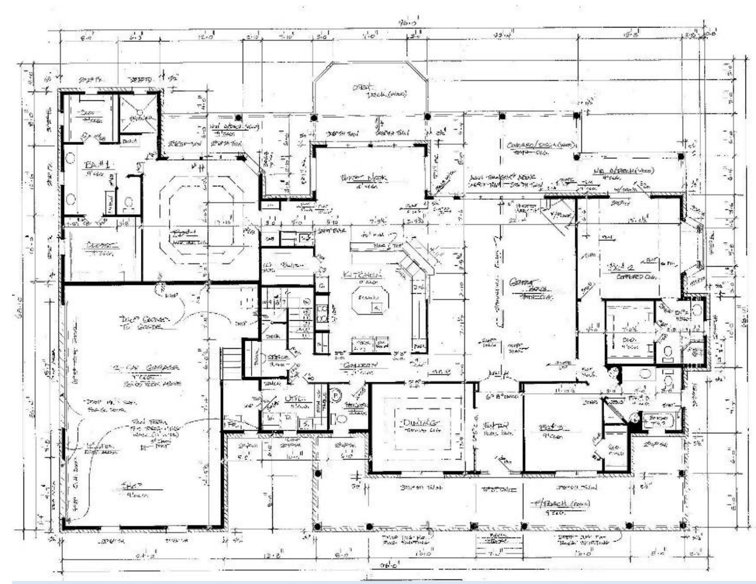
Evaluation & feedback

VALUE

Policy requires a DETAILED plan

Need to translate ideas into actionable items that cannot be manipulated

"Allow me to explain the terms of our easy payment plan."



- Policy requires a detailed plan for every path/outcome/situation
- Must have accountability in tasks/responsibilities
- Must be corruption proof