

Advancing Green Chemistry: Barriers to Adoption & Ways to Accelerate Green Chemistry in Supply Chains

July 23, 2015



What is the GC3?

- Cross-sectoral, B2B network of over 70 companies and other organizations
- Formed in 2005
- Collaboratively advances green chemistry across sectors and supply chains



Today's Speakers

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Ground Rules

- Due to the number of participants in the webinar, all lines will be muted
- If you have a question or comment, please type in the Q&A box located on the right hand side.
- Questions will be answered at the end of the presentation

BARRIERS TO GREEN CHEMISTRY ADOPTION AND MEANS TO ACCELERATE GROWTH ALONG THE SUPPLY CHAIN

A report commissioned by the Green Chemistry and Commerce Council

Webinar Presented
July 23, 2015

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- 1. Why isn't green chemistry in wider use?**
 - 2. What is the means to accelerate availability and adoption?**

Despite efforts to accelerate green chemistry use, adoption rates remain low.

Compliance/
Incentive Programs

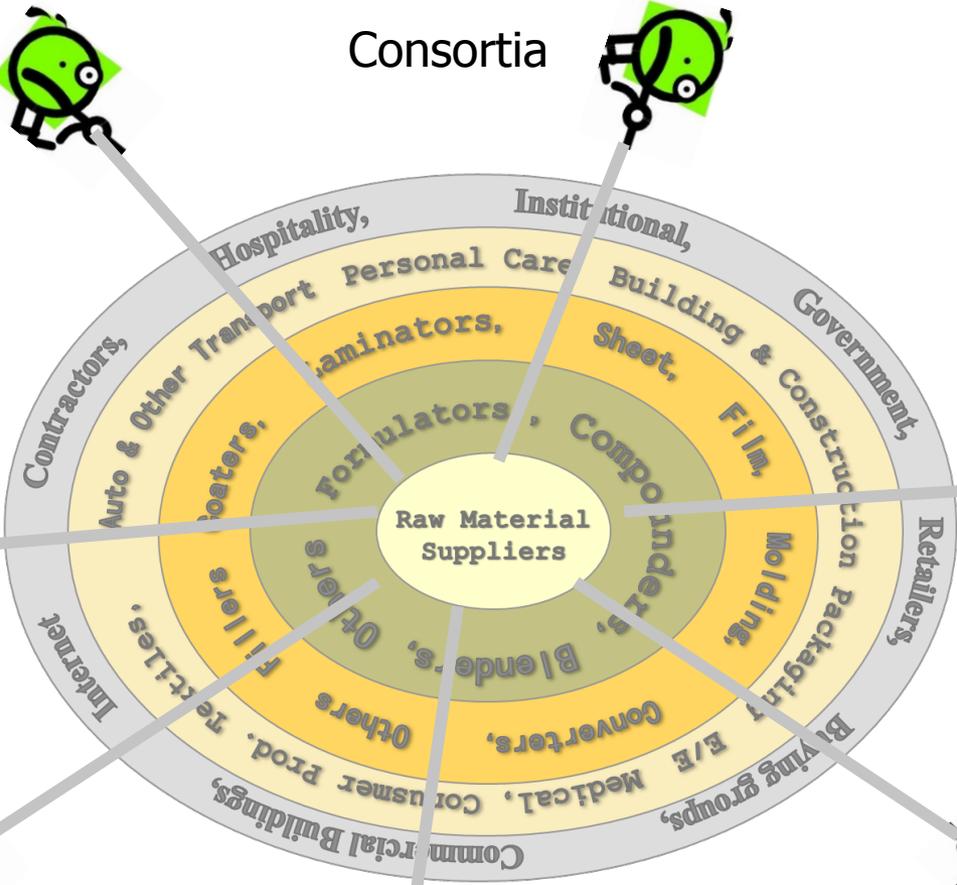
Consortia

Start with a Green
Chemistry Design



Buying Groups/
GPO's

Influential
NGOs

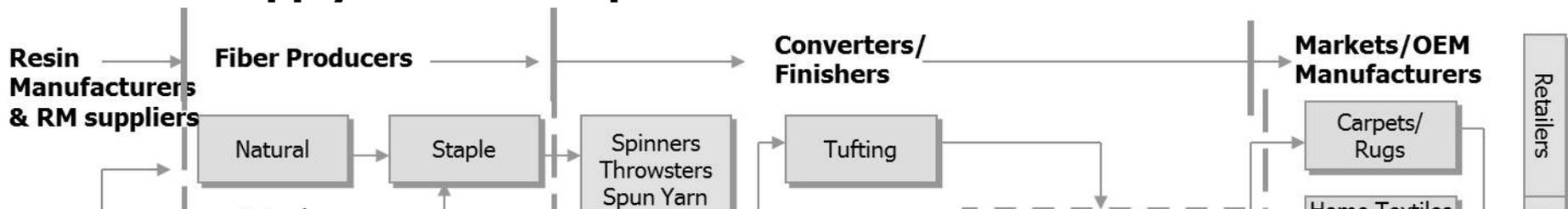


Regulation

Influential
Customers

Vertical Integration

Textile Supply Chain Example



And before you begin **green chemistry** discussions, define what you mean by **green chemistry**

IT ISN'T ESSENTIAL TO PICK A "RIGHT" DEFINITION.
IT IS ESSENTIAL TO BE ON THE SAME PAGE.

Polymer Modifiers

- Carbon
- Glass
- Ceramic
- etc.
- Organic
- Cellulosic
 - »Acetate
 - »Rayon
 - »etc.
- Non-cellulosic
 - »Acrylic
 - »Nylon
 - »Polyester
 - »Aramid
 - »Etc.

Note: Distributors are used at multiple points in the chain

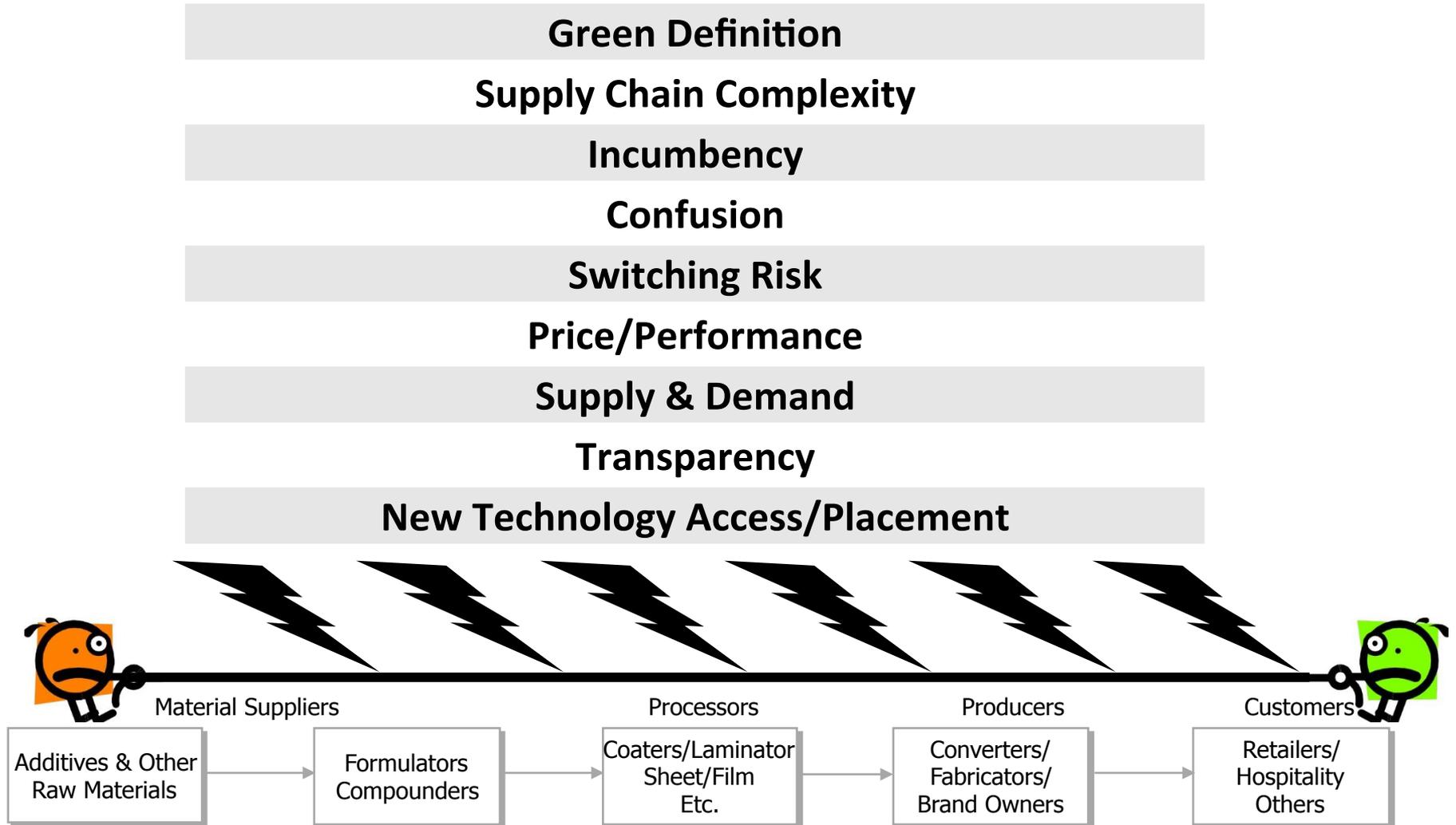
Additional raw materials used in converting
Films

Adhesives
Coatings
Etc.

Target
JC Penny
Wal-mart
Military
Etc.

**Green Chemistry Definition
And
Supply Chain Complexity
are
just two of the issues**

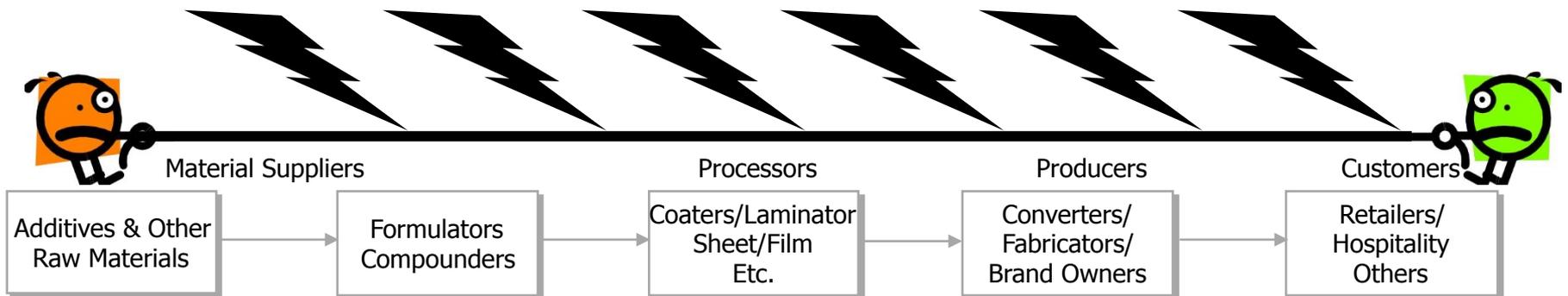
TFA Identified 9 key issues that misalign the supply chain and slow green chemistry adoption



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Incumbancy

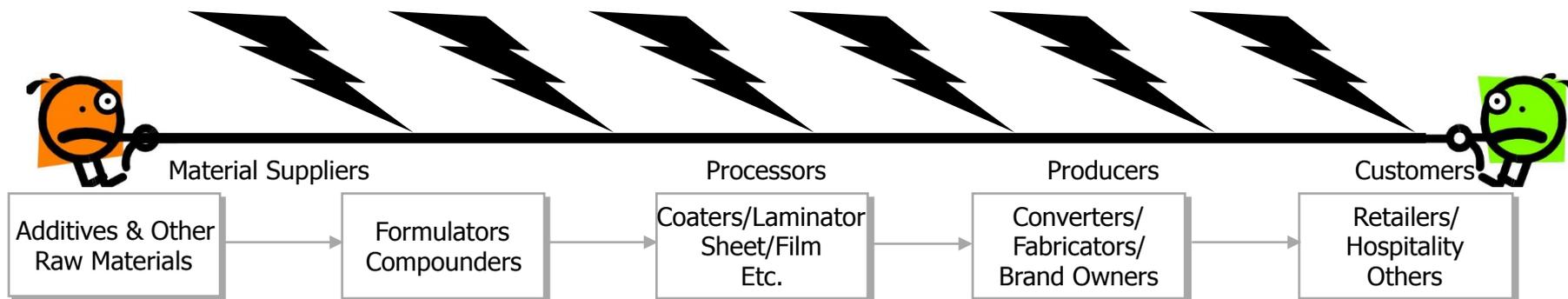
- Competing with the infrastructure of a mature supply chain is a challenge for all new entrants, green or not.
 - Entrenched relationships
 - Low costs, generally facilitated by large scale production and logistical efficiencies
 - Multiple suppliers/ sources that creates \$ competition and lowers shortage risk.



TFA Identified 9 key issues that misalign the supply chain and slow green chemistry adoption

Confusion

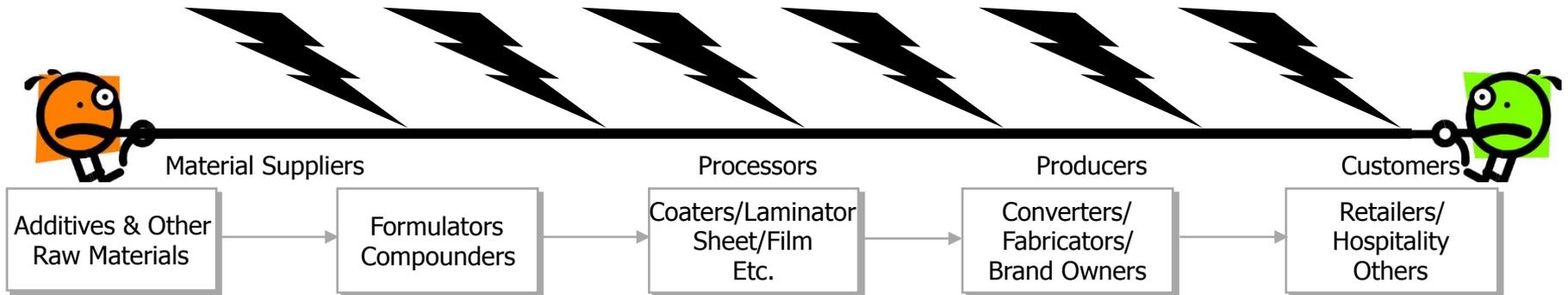
- Conflicting campaigns, research studies, and various restrictions produce widespread uncertainty about what specific chemicals are and are not safe.



TFA Identified 9 key issues that misalign the supply chain and slow green chemistry adoption

Switching Risk

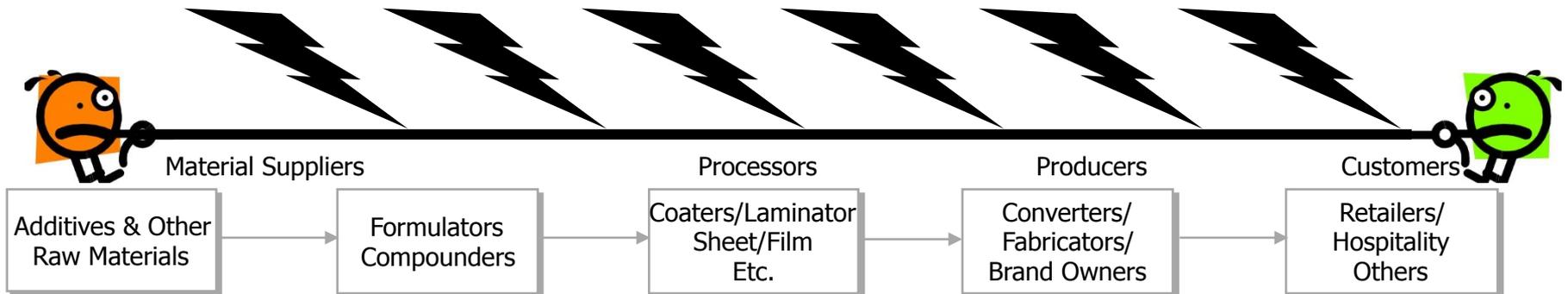
- There is concern that switching to a green chemistry alternative could lead to product failures, market failures, hidden costs, brand tarnishing and others.



TFA Identified 9 key issues that misalign the supply chain and slow green chemistry adoption

Price/Performance

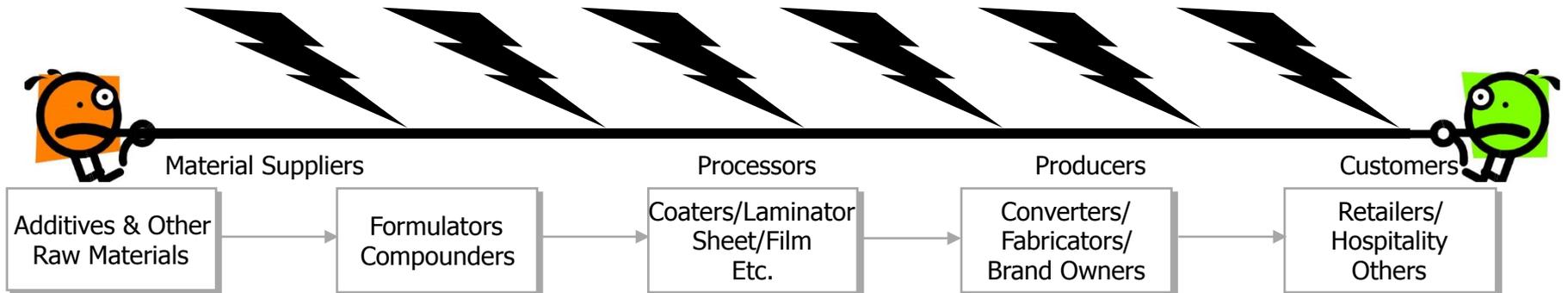
- Price/performance was the most cited reason for the slow adoption of green chemistry
- Entrenched COC's have set the standard for price/performance.
- Green Chemistry as a performance factor is tough to quantify for customers focused on \$/lb pricing.



TFA Identified 9 key issues that misalign the supply chain and slow green chemistry adoption

Supply & Demand

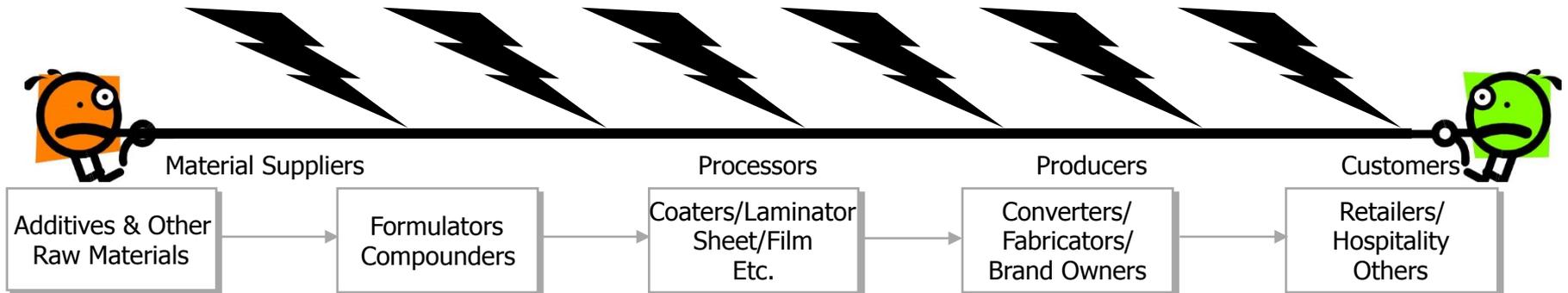
- New technology supply and demand is a “chicken and egg” dilemma.
- New production requires \$\$\$ and years to establish.
- Demand is needed to justify the investment.
- Customers expect a new technology to ramp quickly, perform seamlessly, meet large volume needs and be available from more than one source.



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Transparency

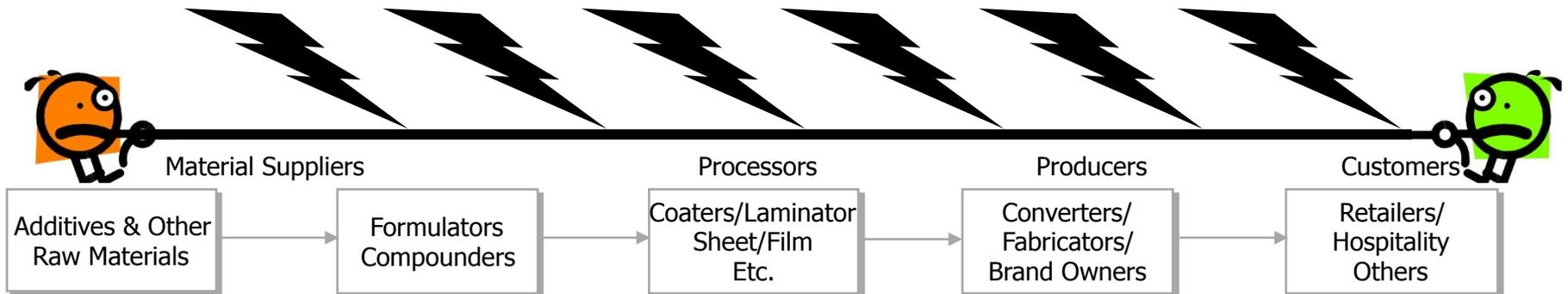
- Often suppliers need to protect IP and/or Trade Secrets of new technology to shield investments and poaching by competitors.
- Suppliers need disclosure to mitigate the risk in handling or selling products with unknown ingredients that could be COCs.



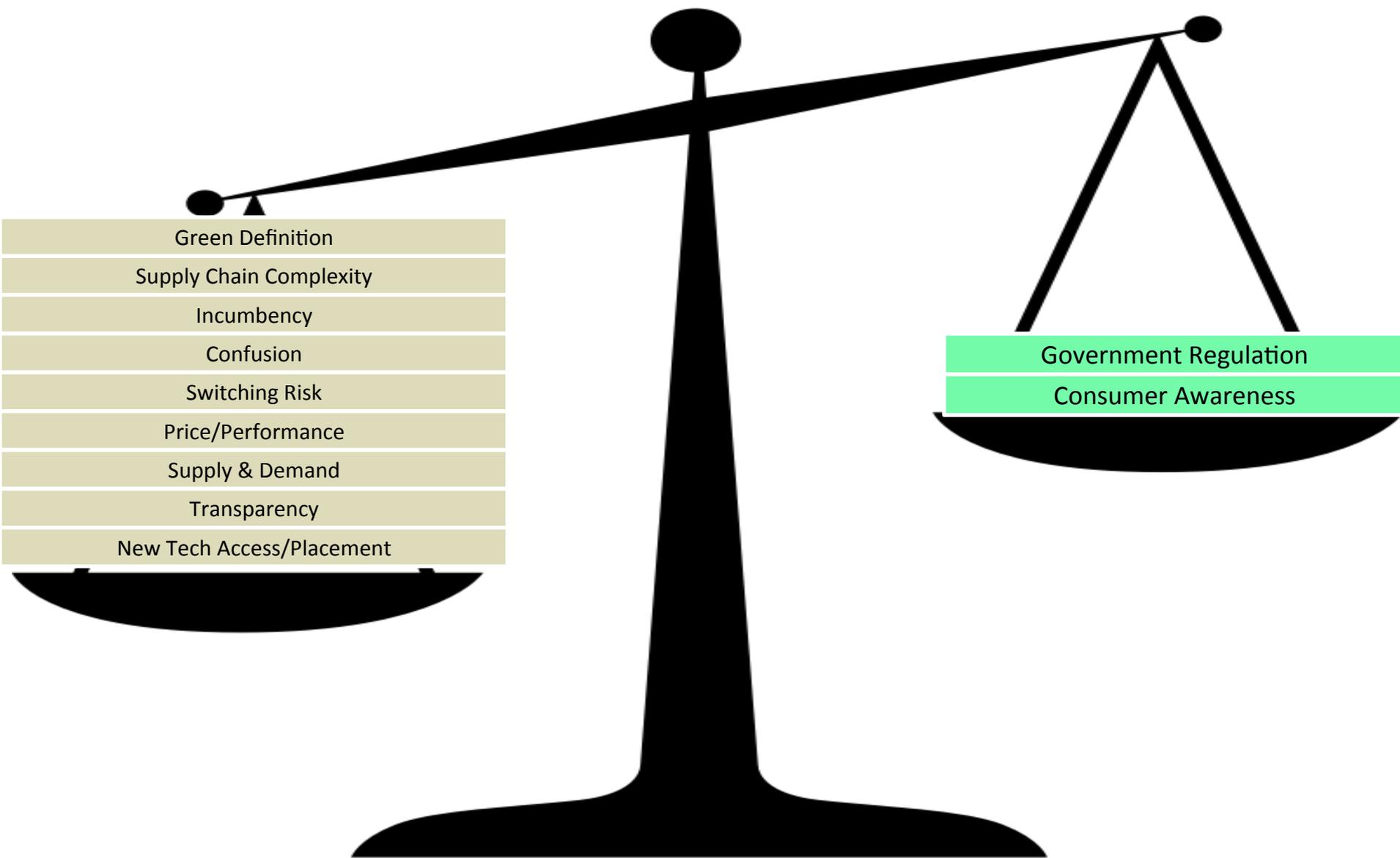
TFA Identified 9 key issues that misalign the supply chain and slow green chemistry adoption

New Technology Access/Placement

- Finding and vetting green chemistry materials remains a weak link.
- Material suppliers struggle to identify early adopters.
- Customers struggle on where to look for new solutions beyond the traditional supply chain.



Currently, misalignment issues far outweigh the main drivers



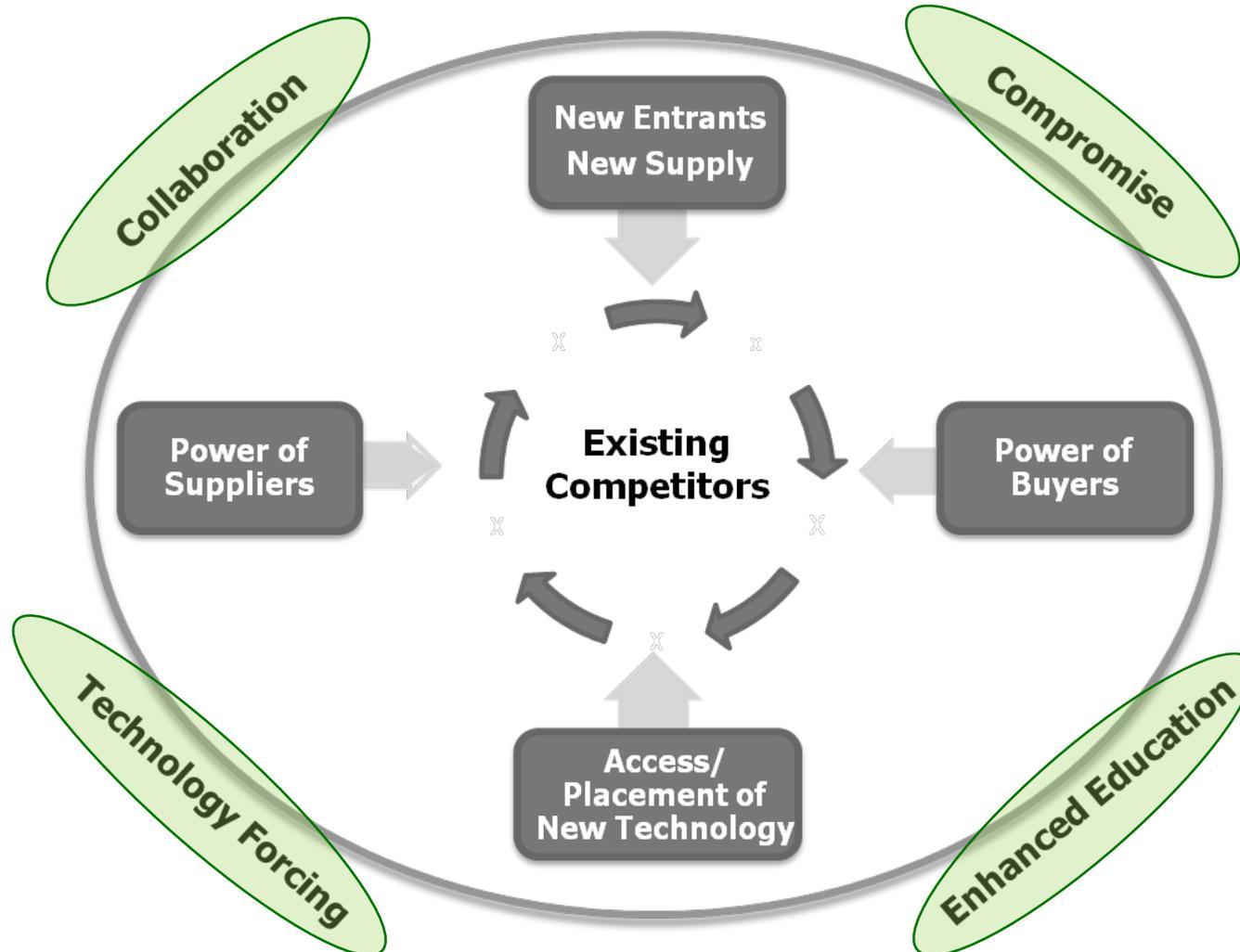
Traditional thinking drives behavior and decision making...



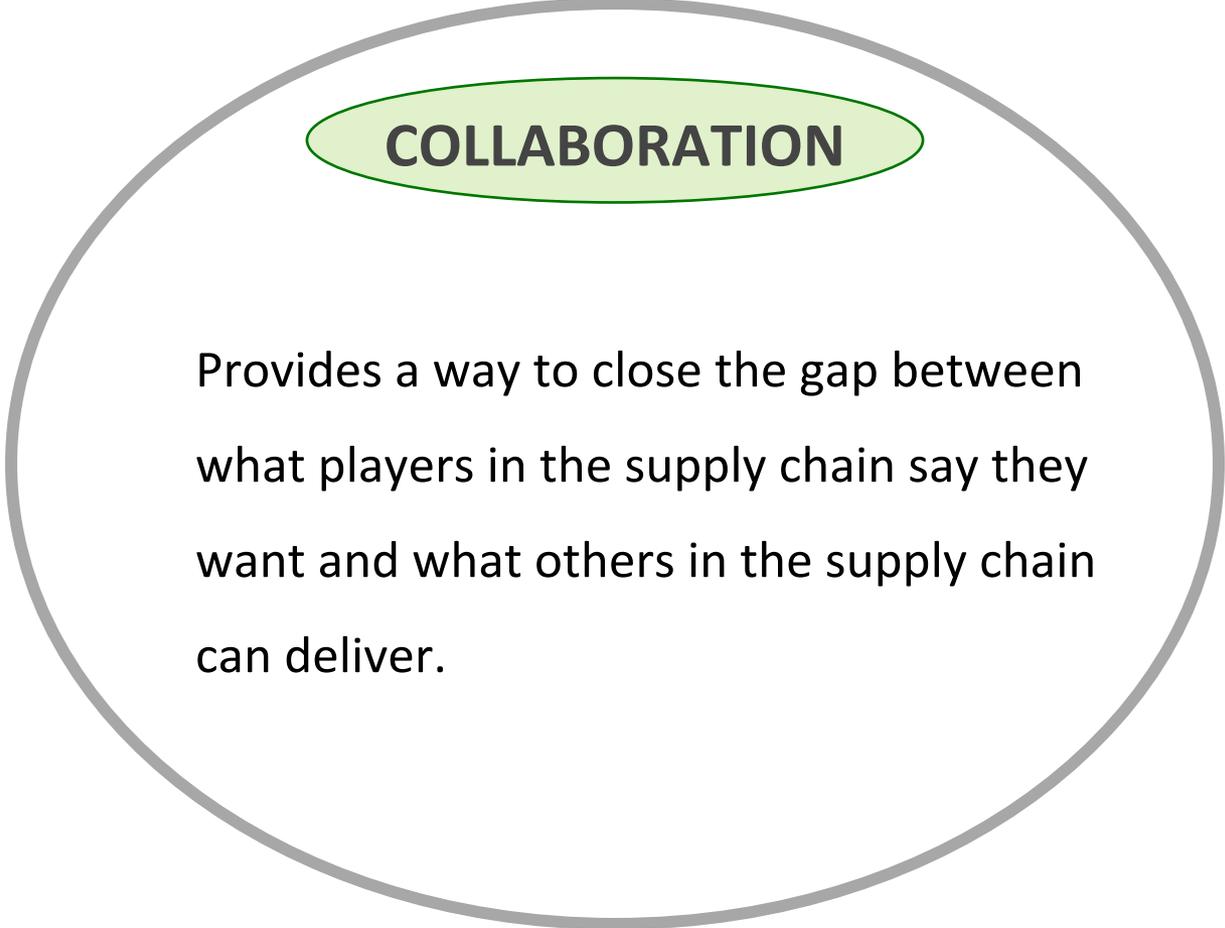
Michael Porter's 5-forces model

...but models can be adapted for beneficial change

- We've identified four green chemistry accelerators
- These tools can be applied to cooperative efforts based on 5-forces principles



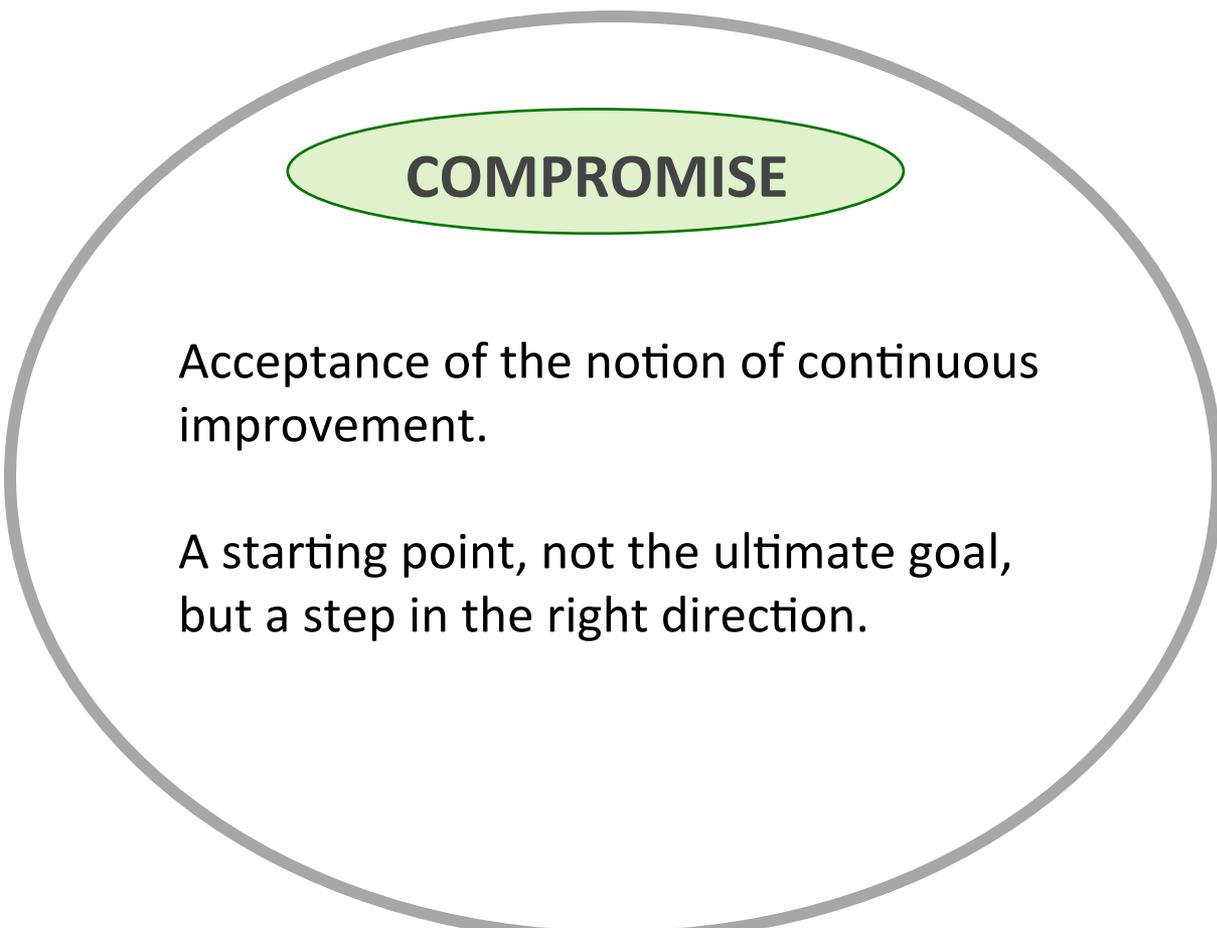
Accelerator: Collaboration



COLLABORATION

Provides a way to close the gap between what players in the supply chain say they want and what others in the supply chain can deliver.

Accelerator: Compromise

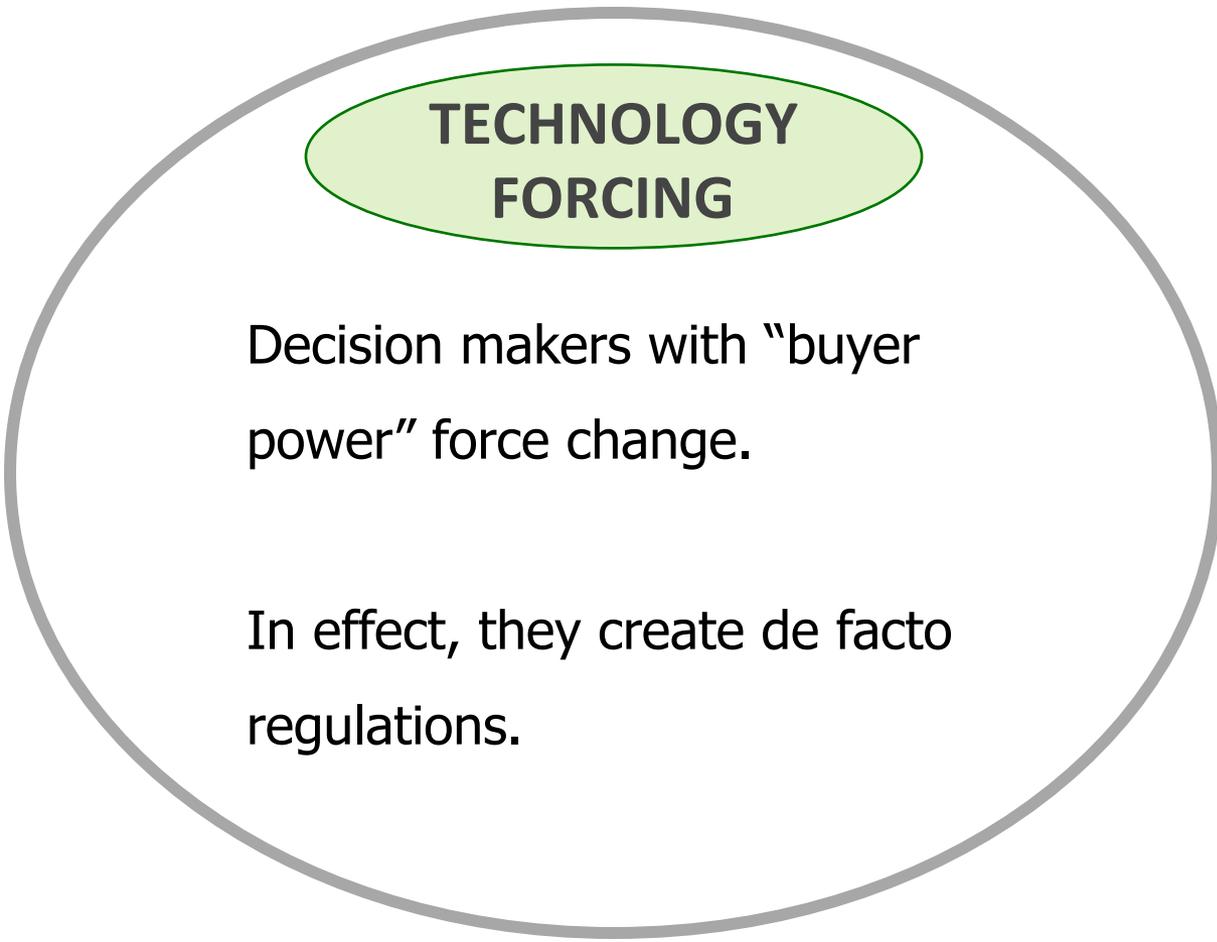


COMPROMISE

Acceptance of the notion of continuous improvement.

A starting point, not the ultimate goal, but a step in the right direction.

Accelerator: Technology Forcing



TECHNOLOGY FORCING

Decision makers with “buyer power” force change.

In effect, they create de facto regulations.

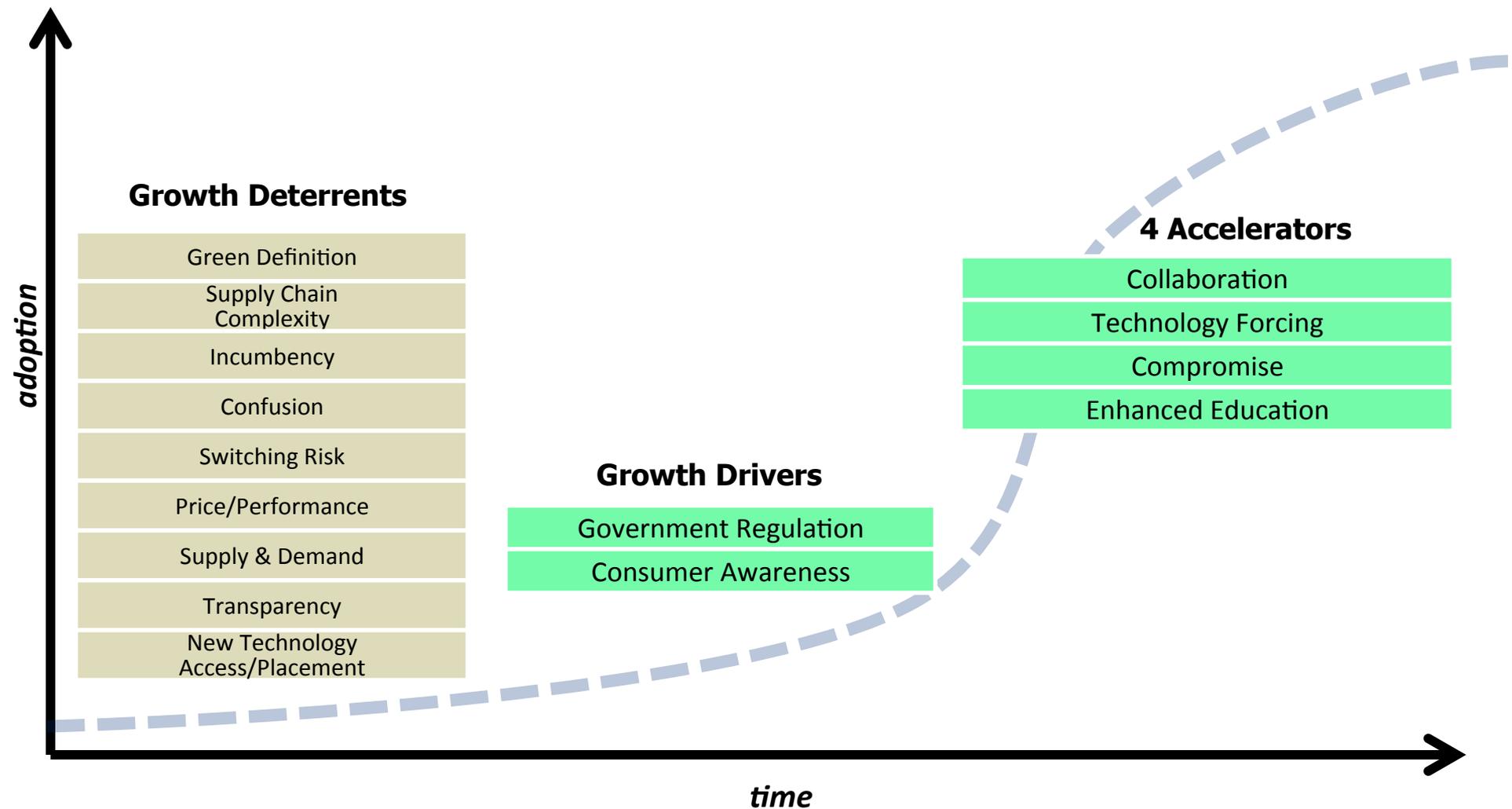
Accelerator: Enhanced Education

ENHANCED EDUCATION

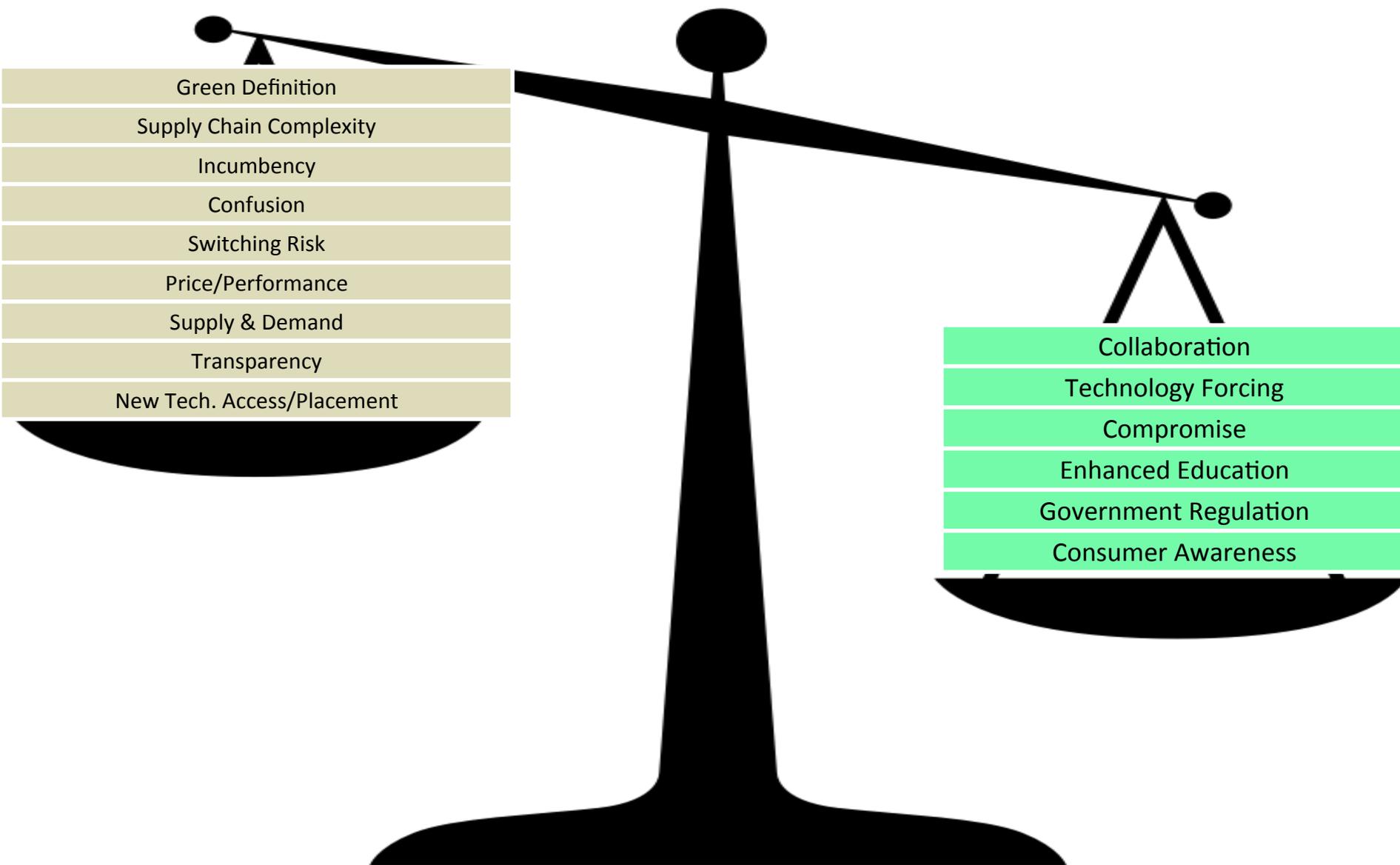
Better educated consumers can accelerate demand for green chemistry.

A workforce better trained in green chemistry can accelerate adoption. Starting with a green chemistry design is the fastest way to accelerate adoption.

The four accelerators should be part of the toolbox to drive change



And can tip the balance in favor of change...



To access the full report:

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ACCELERATE GROWTH ALONG THE SUPPLY CHAIN**

please refer to the GC3 website [http://
www.greenchemistryandcommerce.org/](http://www.greenchemistryandcommerce.org/)

or contact

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**T. Fennelly
& Associates, Inc.**

Upcoming Events

EVENT

Sustainable Chemistry Conference 2015: the way forward
Berlin, Germany
September 24-25, 2015



11th Annual GC3 Innovators Roundtable
sponsored by Seventh Generation
Burlington Hilton Hotel, Burlington, VT
May 24-26, 2016



Thanks for joining us!

For more information about the GC3:
www.greenchemistryandcommerce.org

