DYNAMIC CAPABILITIES AND INNOVATION: Capability Building and Strategic Management for Today's Global Economy

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1. D.J. Teece, "Toward a Capability Theory of (Innovating) Firms: Implications for management and policy", *Cambridge Journal of Economics*, 2017 1 of 28

2. D. Teece, M. Peteraf, S. Leih, "Dynamic Capabilities & Organizational Agility: Risk, Uncertainty, & Strategy in the Innovation economy", *California Management review*, *Vol.58, No.54 (Summer 2016)*..

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I. The need for a capabilities perspective

Already in 1921 Frank Knight hinted at the need for dynamic capabilities theory of the firm

- "With uncertainty present, doing things, the actual execution of activity becomes in a real sense a secondary part of life; the primary problem or function is deciding what to do and how to do it" (Knight, 1921:268)
- Interpretation: Making the right investments is critical while optimizing current activities for efficiency is less important.
- However, if investments are irreversible, there are potential problems

The capability to innovate and change is the very essence of capitalism, but it is deeply underplayed in modern economic theory

- As Nelson (1981) explains, the very essence of capitalism—in fact, the very advantage of a private enterprise economy over a planned one—is that, with private enterprise, firms innovate, compete, sometimes disrupt each other, and sometimes cooperate
- Nelson is surely right; so theories of the firm that do not put innovation and change center stage are not in tune with the essence of our economy or the fundamental managerial challenges of our time

Lord Keynes & Jeff Bezos (Amazon) see eye-to-eye?

- Keynes stressed that if human nature felt no temptation to take a chance and investment had to rely on cold calculation, there might not be much investment
- Likewise, Jeff Bezos, the CEO/founder of Amazon, noted:

  "there are decisions that can be made by analysis … Unfortunately, there's this whole other set of decisions that you can't ultimately boil down to a math problem" (Deutschman, 2004, p. 57)

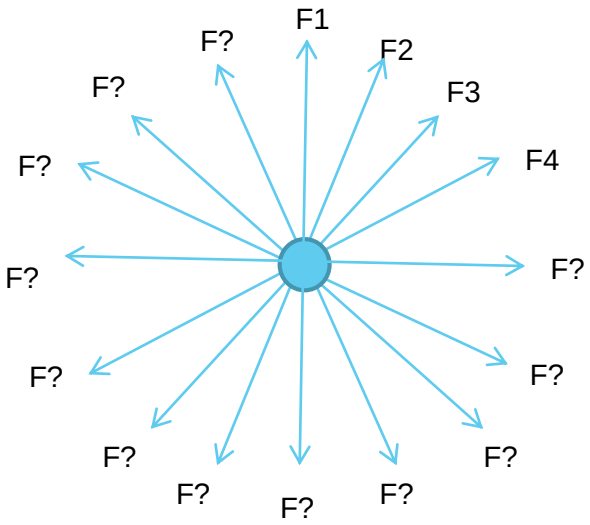
Capabilities have been identified as the key enabler of competitiveness

- "The proximate cause [of differences in the wealth of nations] lies, for the most part, in the capabilities of firms" (John Sutton, London School of Economics, 2012)
- Capabilities are the fulcrum for leveraging tangible resources into human achievement (Amartya Sen, Nobel Laureate)
- The main reason firms perform differently in the long run can be traced to dynamic capabilities

II. Risks & uncertainty in management

Strategic management requires distinguishing between risk and uncertainty

Uncertainty



Don't know most futures or their probabilities with (unknown unknowns with probabilities)
F 1-4 are possible futures
F? are undefined futures

Chess v. Mixed Martial Arts (MMA). MMA is a good metaphor for competition under uncertainty in the innovation economy

Chess

Each move is knowable (closed world). The better player almost always wins. A large but finite number of moves and counter moves. If the player (e.g. a computer) has unlimited computational powers, chess is a trivial game as Von Neumann and Morgenstern once observed

MMA

Not a closed world… rules more permissive. Striking, grappling, boxing, kickboxing, Brazilian Jujitsu, Judo, and wresting are all widely employed

There is a premium to entrepreneurial management when there is deep uncertainty

The lack of predictability and deep uncertainty in MMA is not unlike todays interdependent innovation economy.

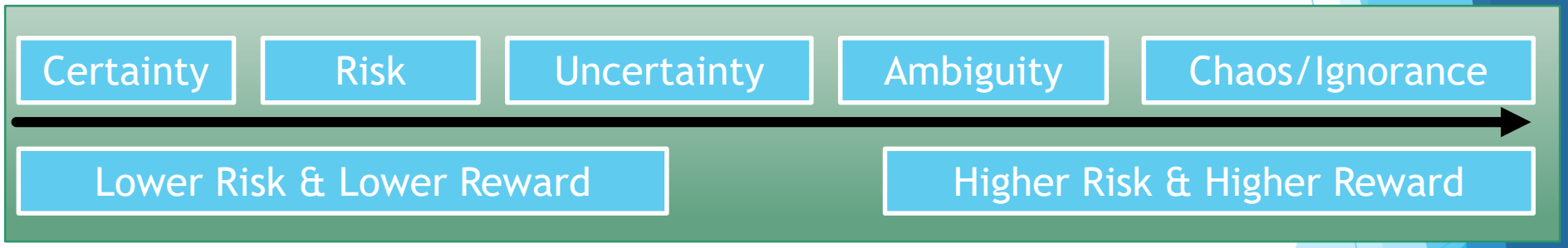
- Existing “rules” of competition are being changed
- Entirely new “rules” are invented (e.g. cloud computing; Amazon Prime, internet of things)
- New players constantly emerging (e.g. mobile money, start-ups versus the banks)

To succeed in this world, managers need to be entrepreneurs, and entrepreneurs need to be (or find) managers too (e.g. Brin and Page found Schmidt to be CEO of Google).

A shift toward greater ambiguity

Newer Tools

Influence Diagrams
Scenario Planning
Real-options Analysis
Hedging/Derivatives
Enterprise Risk Management
System Dynamics Modeling



Traditional Tools

Extrapolative Forecasting
Net Present Value Analysis
Decision Trees
Expected Utility Theory
Computer Simulation
Portfolio Optimization
Insurance/Safety Programs

Dynamic Capabilities

Adapted from: Paul Schoemaker Robert E. Gunther, **"Profiting from Uncertainty: Strategies for Succeeding No Matter What the Future Brings"**, Atria Books; Reprint edition (October 8, 2016), p. 9.

III. The dynamic capabilities framework

Strong “ordinary” (or normal) capabilities: require resources to be used efficiently

- There is little attention to the validity of fundamental of resource allocation decisions
- Operations, administration and governance are ordinary capabilities
- Routines / standard operating procedures are key to ordinary capabilities
- Ordinary capabilities reflect technical efficiency
- Diffusion of ordinary capabilities to rivals is enabled by
    - More information in the public domain
    - Better business school training
    - Management consultants
- “Best practices” logic connected to strong ordinary capabilities
- Admittedly, not everyone gets the simple stuff right

Best practices don't suffice anymore

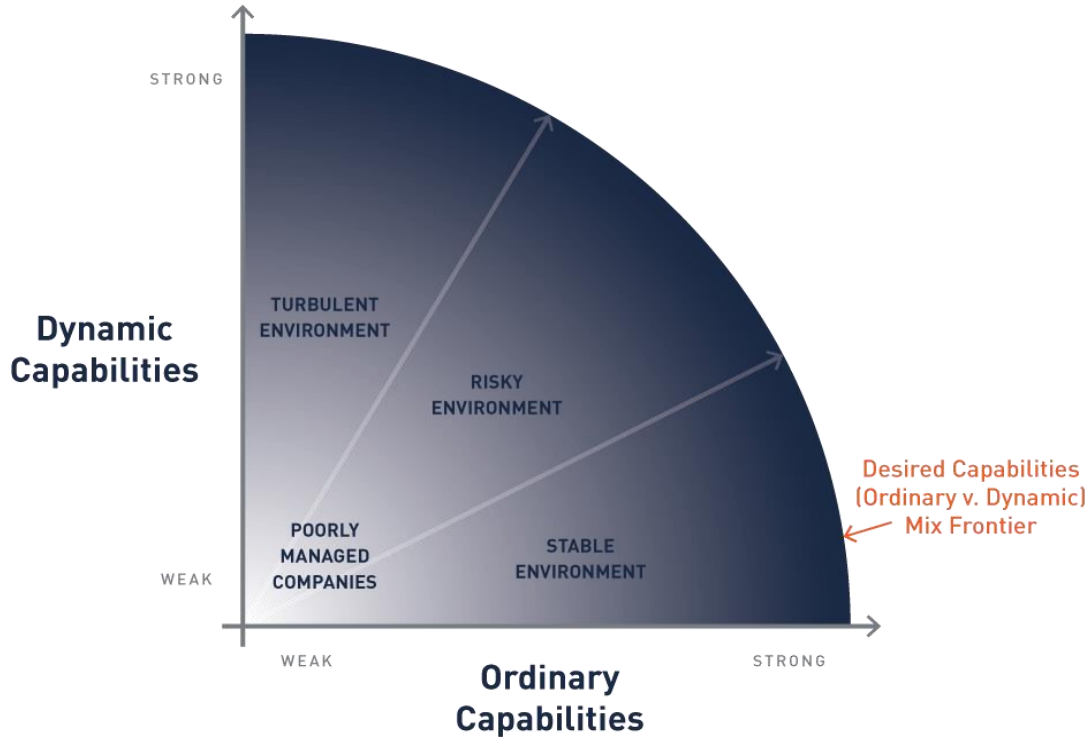
- There is no benefit at being very good at delivering the "wrong" products
- Best practices alone are generally insufficient to ensure a firm's success and survival, except in weak competitive environments (which are still ubiquitous in less-developed countries).
- Much of the knowledge behind ordinary capabilities can be secured through consultants or through a modest investment in training (Bloom *et al.*, 2013).

Being a top performer in productivity is unlikely to lead to competitive advantages because it only takes a few firms at the frontier to drive prices down to competitive levels

From ordinary to dynamic capabilities in autos

- **Ordinary: The operations portion of the automobile business has been thoroughly optimized** over many decades, doesn't vary much from one automobile company to another, and can be managed with a focus on repetitive process. It requires little in the way of creativity, vision or imagination. Almost all car companies do this very well, and **there is little or no competitive advantage to be gained by "trying even harder"** in procurement, manufacturing or wholesale
- **Dynamic:** Where the real work of making a car company successful suddenly turns complex, and **where the winners are separated from the losers, is in the long-cycle product development process,** where short-term day-to-day metrics and the tabulation of results are meaningless.
- *-Bob Lutz, former vice chairman at General Motors, Wall Street Journal, June11, 2011*

Deep uncertainty (turbulent environments) require strong dynamic capabilities:

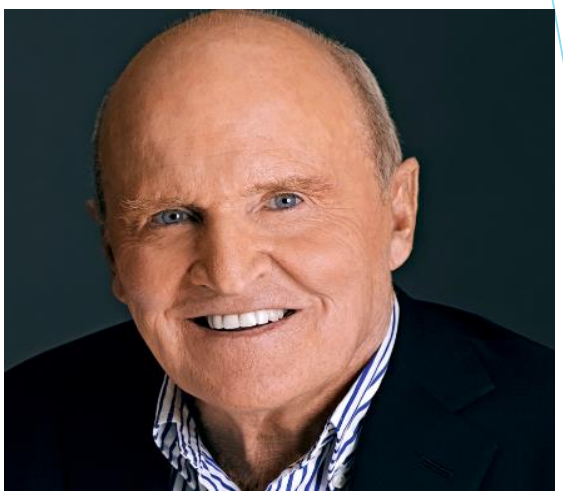


With stable environments ordinary capabilities are good enough and provide meaningful guidance

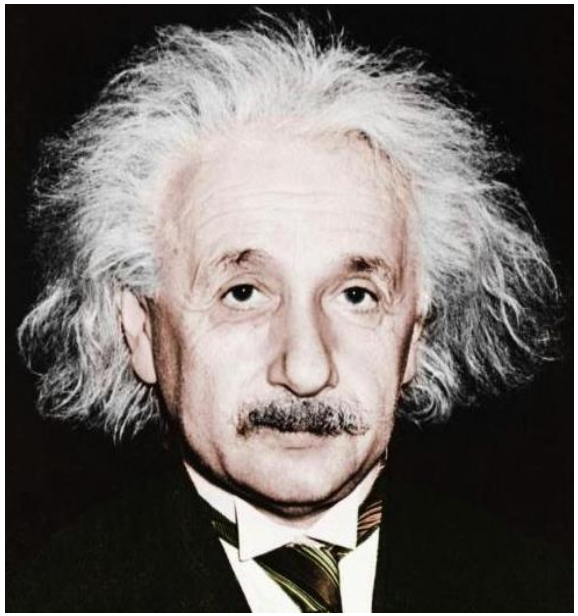
Dynamic capabilities can be thought of as falling in three categories:

Sensing is the ability to see around corners

The ability to foresee future opportunities and threats… what Jack Welsh (CEO of GE) once referred to as the ability to “**see around the corners**”



Sensing is akin to discovery of the truth



"**Intellect has little to do on the road to discovery.** There comes a leap in consciousness, call it intuition or what you will, and the solution comes to you, and you don't know how or why."

Albert Einstein

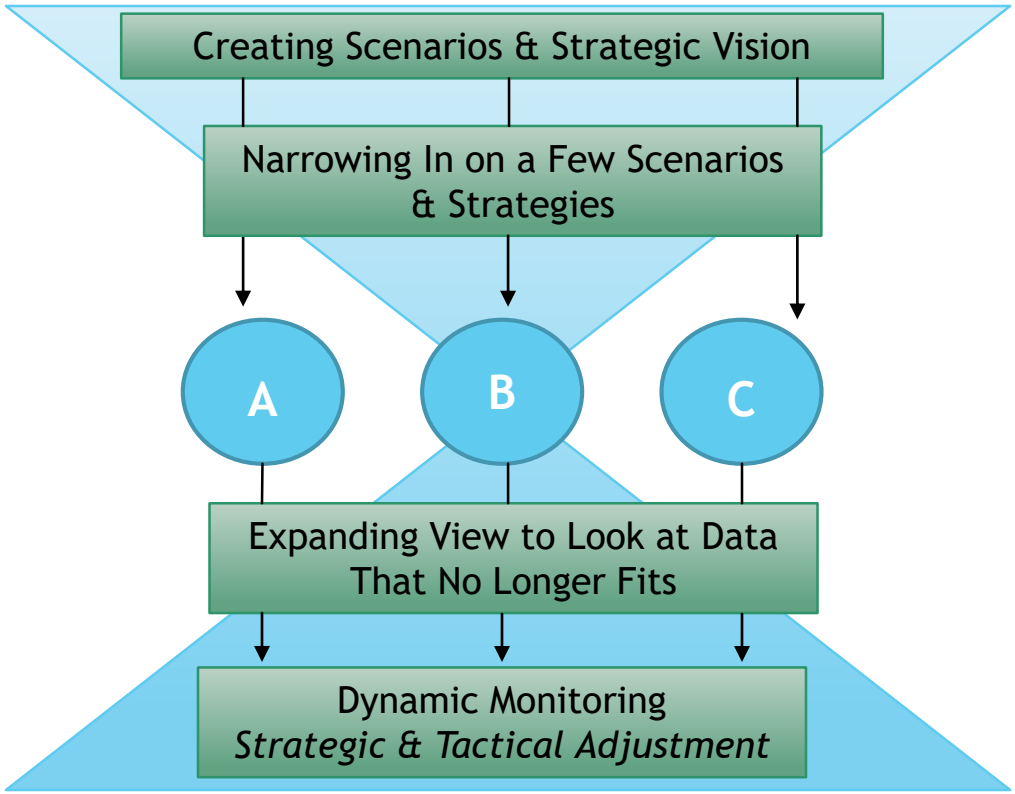
Good sensing benefits from "abductive" reasoning as a way to help sense the future

- Explanations are developed for surprising or anomalous behavior/phenomenon
- Induction & deduction depend on the past
- Abductive reasoning moves ahead through "logical leaps of the mind" and uses all available data in a search for patterns
- Once an abductive hypothesis is established, data is searched to test the hypothesis, which in turn spurs original thinking
- Not used to determine if something is true or false, but to indicate a new path to "deep truth" about a phenomenon or a situation

Abductive reasoning is the handmaiden of sensing

The challenge is to develop a valid hypotheses about what is going on in the market

Zooming in & out to master uncertainty



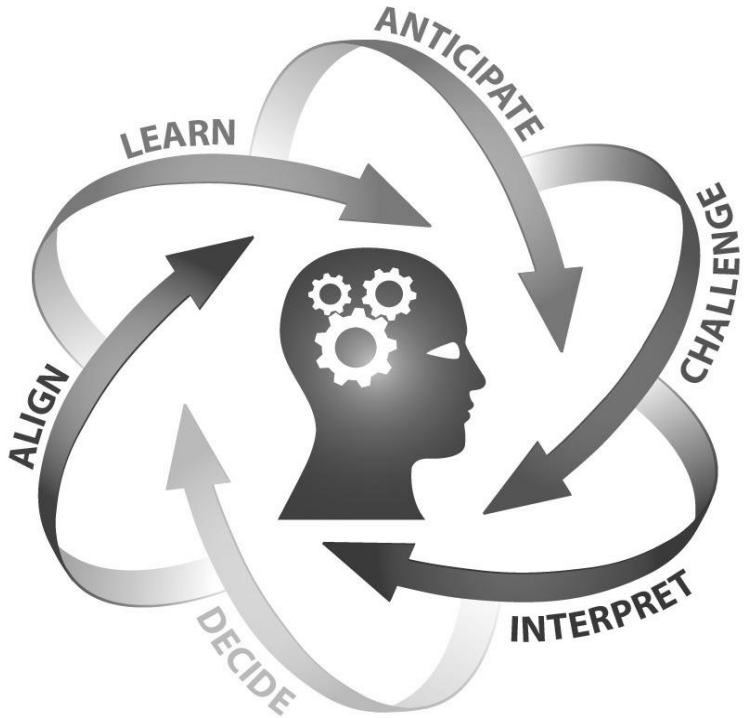
Adapted from: Paul Schoemaker Robert E. Gunther, **"Profiting from Uncertainty: Strategies for Succeeding No Matter What the Future Brings",** Atria Books; Reprint edition (October 8, 2016), p. 142.

Seizing/Asset Orchestration is also core to dynamic capabilities

"Apple still has strong growth opportunities because of its ability to work simultaneously on hardware, software and services… Apple has the ability to innovate in all three of these spheres and create magic… **This isn't something you can just write a check for. This is something you build over decades.**"

-*Tim Cook, Apple CEO* (Taipei Times, February 2013)

Asset orchestration requires many skills



Source: Krupp, Steven and Paul J.H. Schoemaker, *Winning the Long Game: How Strategic Leaders Shape the Future*, Public Affairs/Perseus, 2014.

Transformation is about redeploying financial, physical, and human resources to effectuate organizational change

- What's needed is some kind of dynamic optimization, rather than the static optimization. Lou Gerstner, IBM's former (turnaround) CEO put it this way:

> "In anything other than a protected industry, longevity is the capacity to change ... If you could take a snapshot of the values and processes of most companies 50 years ago—and did the same with a surviving company in 2014—you would say it's a different company other than, perhaps, its name and maybe its purpose and maybe its industry. The leadership that really counts is the leadership that keeps a company changing in an incremental, continuous fashion. It's constantly focusing on the outside, on what's going on in the marketplace, what's changing there, noticing what competitors are doing."
>
> (Davis and Dickson, 2014: 125).

Transformation and organizational structure & culture

- Organizational structures, culture, and dynamics represent a significant irreversibility
- Dorothy Leonard-Barton (1992) noted that the source of a company's strength can become a "core rigidity" that inhibits its development
- It is often harder to repurpose an organization than to repurpose a technology. The latter is often little more than writing a check; the former requires organizational reengineering
- Benner and Tushman (2003) observed that activities focused on measurable efficiency and variance reduction drive out variance-increasing activities and, thus, affect an organization's ability to innovate and adapt outside of existing trajectories ... Core capabilities may become core rigidities

Dynamic capabilities emphasizes advanced agility, i.e. redeployment capacity

- Dynamically capable firms have more than agility and more than ambidexterity
- Too often, agility is defined as the ability to do commonplace things faster and cheaper. If that's what one means by agility, it is more akin to ordinary (rather than dynamic) capabilities
- When agility refers to a reduction in the time required to reach best practices, it is simply an incantation for Six Sigma, Value Engineering, or other efficiency initiatives
- Those may be necessary for the organization to become more efficient; but they are only secondarily related to conferring evolutionary fitness
- What matters most is management's ability to redeploy physical, financial, and human assets to new and better commercial avenues

Capability/efficiency choices at Pepsi

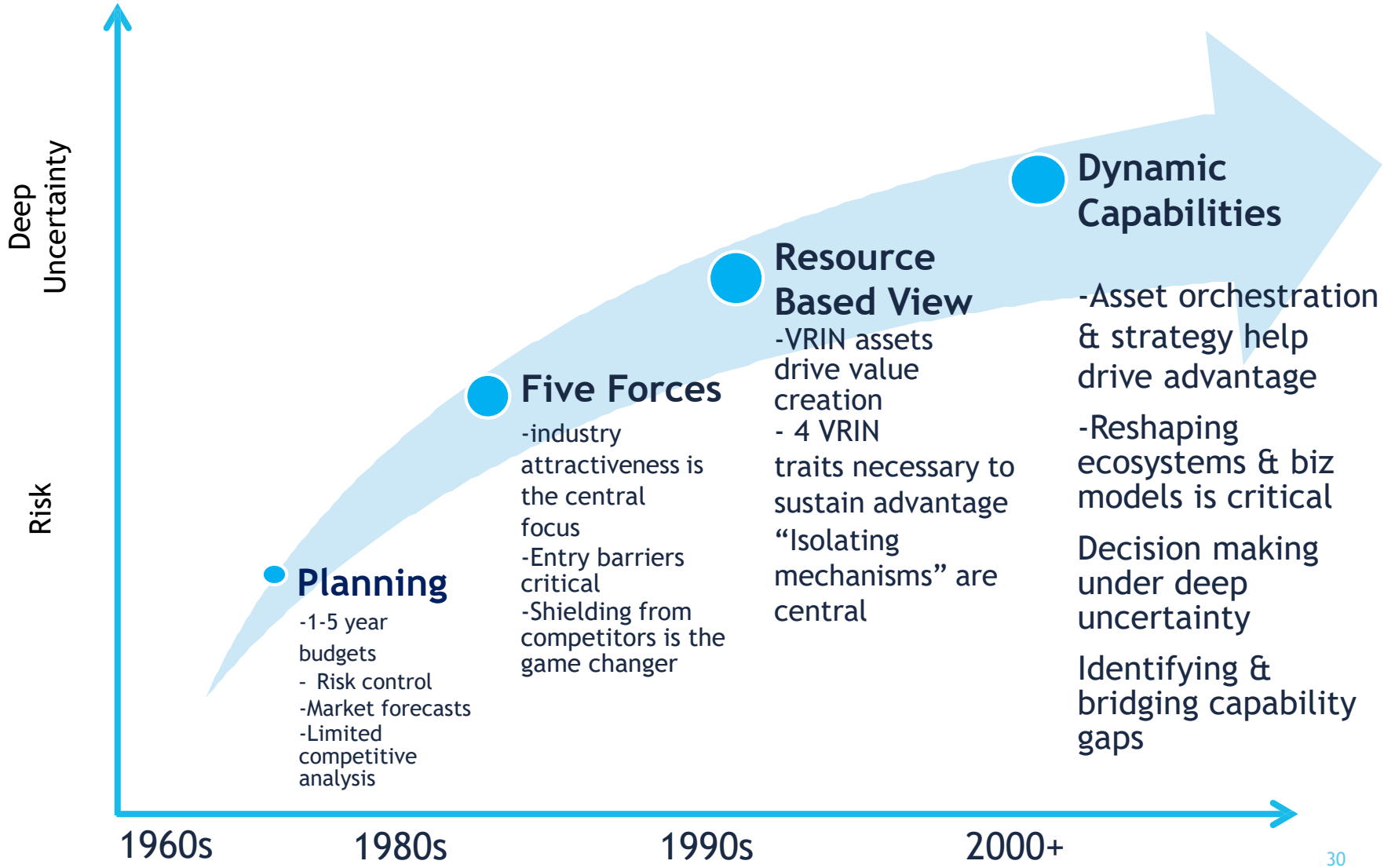
"I had a choice. I could have gone pedal to the metal, **stripped out costs**, delivered strong profit for a few years, and then said adios. But that **wouldn't have yielded long term success.** So **I articulated a strategy to the board focusing on the portfolio we needed to build, the muscles we needed to strengthen, the capabilities to develop**…we started to implement that strategy, and we have achieved great shareholder value while strengthening the company for the long term."

Indra Nooyi and Adi Ignatius, "How Indra Nooyi Turned Design Thinking Into Strategy: An Interview with PepsiCo's CEO," Harvard Business Review (September 2015).

Dynamic vs. ordinary capabilities

	Ordinary Capabilities	Dynamic Capabilities
Purpose	• Technical efficiency in basic business functions	• Strategic "fit" over the long run (evolutionary fitness)
Tripartite schemes	• Operational, administrative, and governance	• Sensing, seizing, shaping and transforming
Imitability	• Relatively easy; imitable	• Difficult ; inimitable
	Doing things "right"	Doing the "right" things

Dynamic capabilities in the strategic management theory space



IV. Closing capability gaps

Closing capability “gaps”

- Capability gaps are of at least three kinds:
  - Technology gaps
  - Market gaps
  - Business model gaps

Recognizing capability gaps isn't straight forward

- The first challenge is to understand the location and magnitude of capabilities deficiencies
- Often it is only after an organization tries to do something (and fails) that the gap is apparent. The early phase of a project looks okay because there are typically few outcomes metrics to evaluate
- Later on, problem begin to crop up, the senior team gets more and more involved, and the goal slips further away
- Ad hoc "solutions" are attempted and failed. Only then is there general recognition of a capability gap

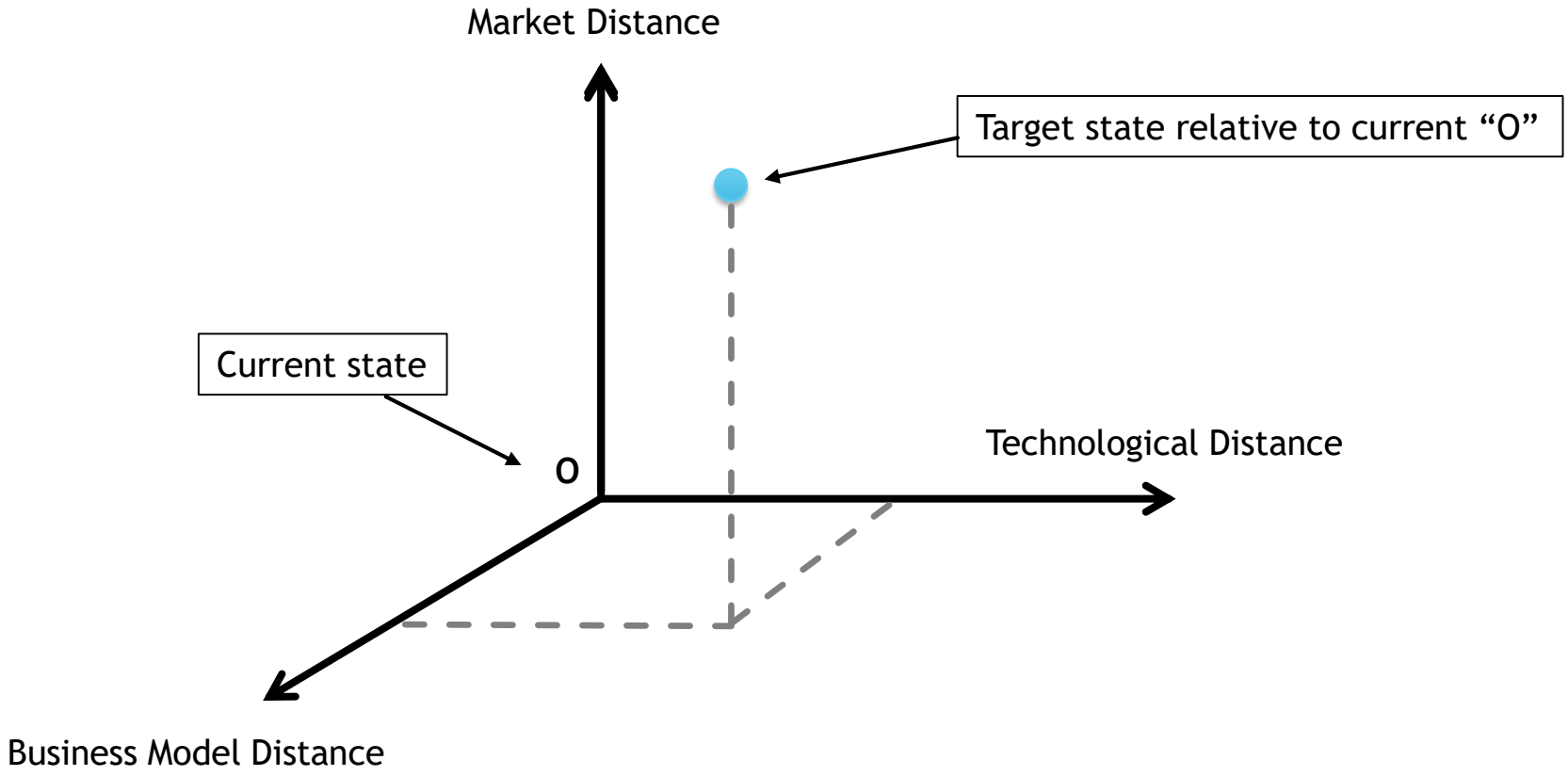
There may or may not be a resource gap behind an identified capability gap

- Resources are not capabilities
- There may be budgets and people assigned to a project (resources) but, if employee capabilities are not strong, performance failure is likely
- Building capabilities is hard; the silver lining is that, once built, they are then difficult for others to imitate
- Put differently, the absence of a market for capabilities means that benefits can flow from entrepreneurial and managerial activity that builds and hones value-creating capabilities

Addressing capability gaps

- The search for capability gaps begins by examining the match between a proposed business model and the firm's existing capabilities
- An analysis of existing capabilities needs an objective point of view that is detailed and realistic
  - Recognize what capabilities are needed
  - Develop them quickly, efficiently and effectively. This itself is a dynamic capability (Feiler and Teece, 2014)

Capability gaps & the transformation challenge



V. Dynamic capabilities in ecosystems

The dynamic capabilities framework is hard to master given that our education system favors deep specialization

- Dynamic capabilities is relatively challenging to comprehend and apply but can be the foundation to a more thorough understanding of complex reality
- Good (Silicon Valley type) managers have an intuitive dynamic capabilities/systems view of the world. By making elements and inter-relationships more explicit, the dynamic capabilities can galvanize managers and management to action
- The dynamic capabilities framework must be applied, further clarified, further elaborated, and made more precise not only within the company but in the surrounding ecosystem

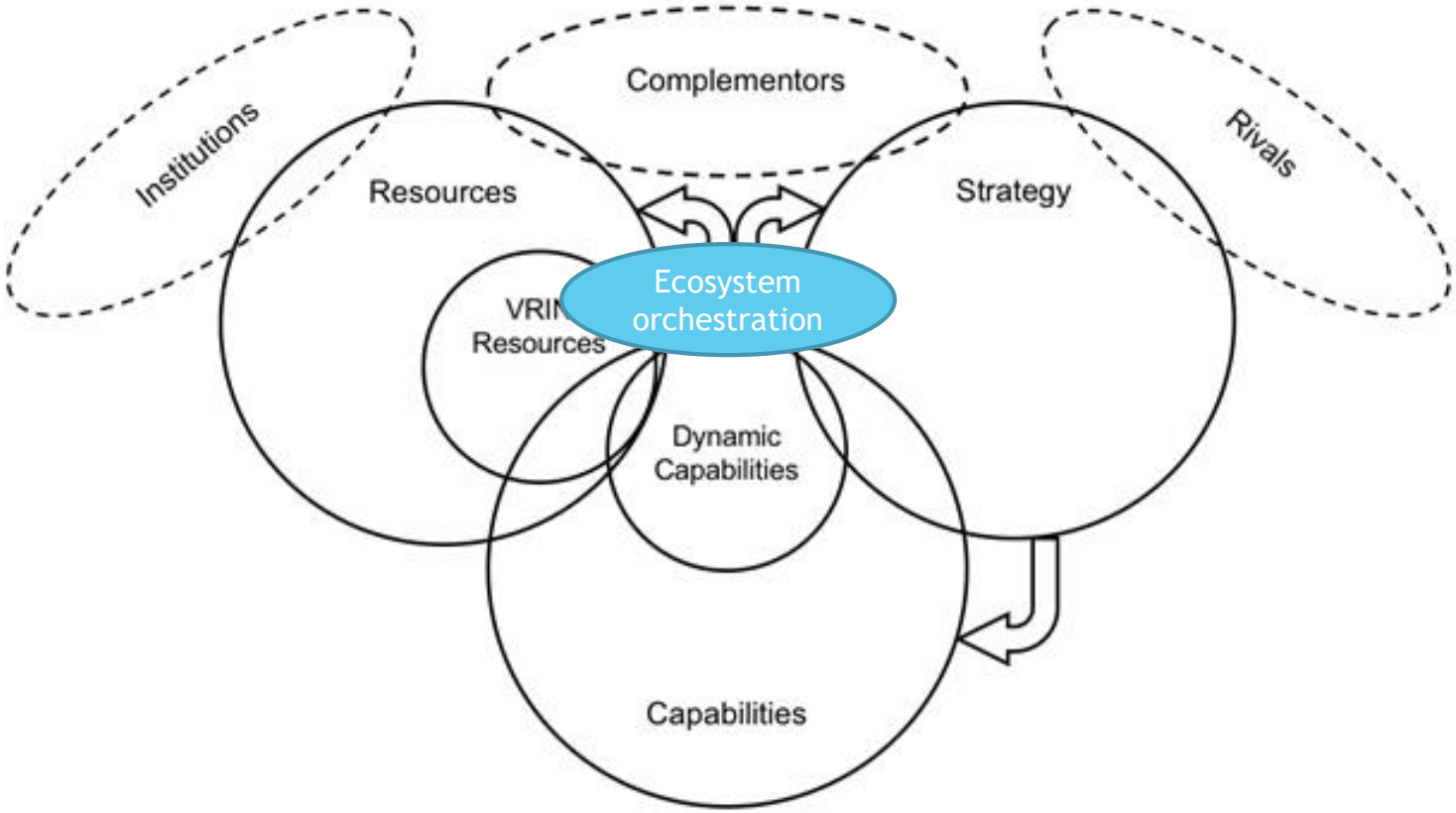
Implications of digitalization on capabilities

Elements of digital convergence

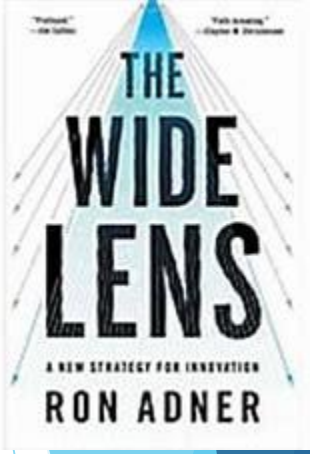
- Digital data and signals, provide a common (0,1) base for handling diverse types of information, including words, sounds, and images
- Widespread use of common standards allows connectivity between diverse information devices and complementary enterprises
- Systems integration is both easier and more necessary
- Co-invention/Co-innovation opportunities & challenges
  - Requires integration of on going value creation and building of dynamic capabilities
  - The ubiquity of digital platforms must be recognized
  - A "grand convergence" may be in process

Implication: Ecosystem orchestration and access and control of complementary assets may now be more important to competitive advantage than installed base/switching cost considerations

The key elements of the dynamic capabilities ecosystem framework



Adner's ecosystem methodology

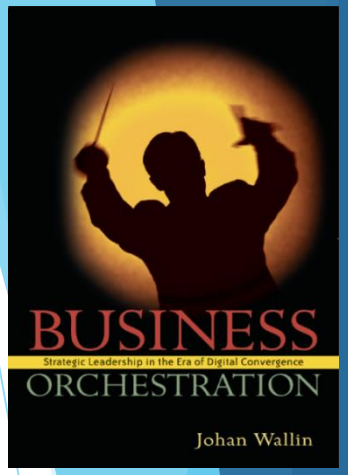


Stresses:

- the importance not only of alignment with customers but also with investment partners to minimize co-innovation risk
- the role of ecosystem leader (the ecosystem orchestrator)
- helps one identify gaps in complementary assets/capabilities

A useful methodology to help clarify the structure of required collaboration, i.e. who hands off what to who & when?

Ecosystems and Wallin's social architecture



The social architecture stresses:

- The culture, communication patterns, reward systems, policies, procedures and form of organizing
- People's capacity and willingness to adapt to changes and their attraction to the network

When the unit of analysis shifts from firm to ecosystem:

- The orchestrator must secure the formation of both the right social architecture and the dynamic capabilities on ecosystem level
- In the example of Betterplace used by Adner the sensing was not an ecosystem level property, but wishful thinking by Betterplace founder Shai Agassi

The focus of dynamic capabilities

The focus of Dynamic Capabilities is:

- Continuous innovation & change
- Creating as well as capturing value
- Orchestrating complementary assets

The impact of General Purpose Technologies (GPT)

- These technologies have three characteristics
  - Pervasive
  - High potential
  - Enhance research productivity
- GPT's often start out as something less, (e.g. user invented with no initial obvious application)
- GPT's allow development of derivative technologies in diverse fields (e.g. printing press, transistor, microprocessor)
- In general new GPT's introduce new appropriability challenges

GPT's by definition open up the field for new business model options

- With digital convergence, a plethora of complements must often be deployed to assure commercial success
- In multi-invention contexts, which individual offerings draw on multiple internal and external sources of technology (patented and unpatented)
- Business model choices for a new innovation, even with reference just to appropriability, are more complex than the original "licensing versus in-house production" appropriability model (Teece, 2010; Zott et al., 2011)

Key GPT takeaways for ecosystems

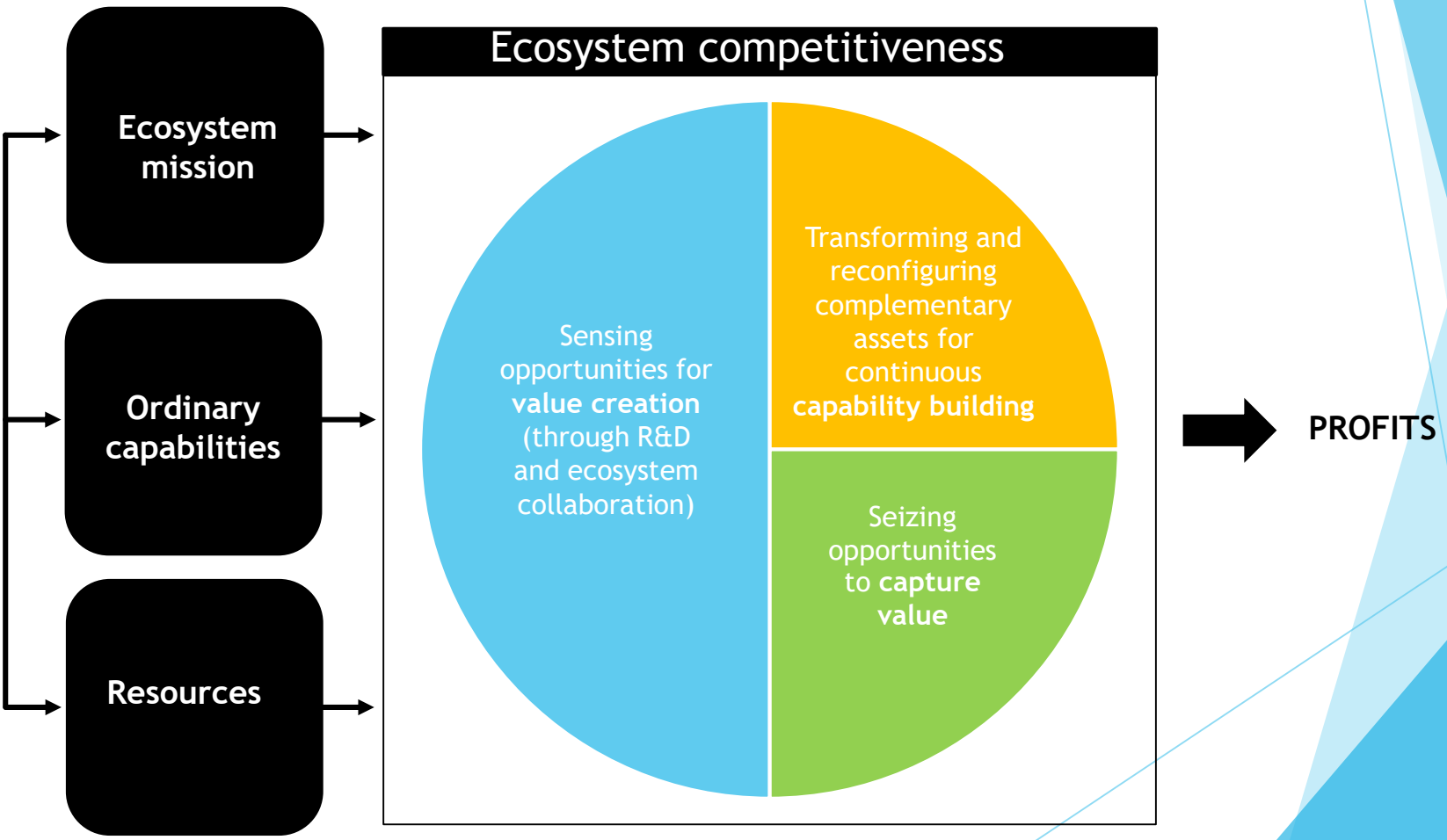
Intangible assets are core to value capture

Disaggregating the value chain requires standards

Coordination across organizational boundaries & orchestration of the entire network is particularly important to the success of modularization

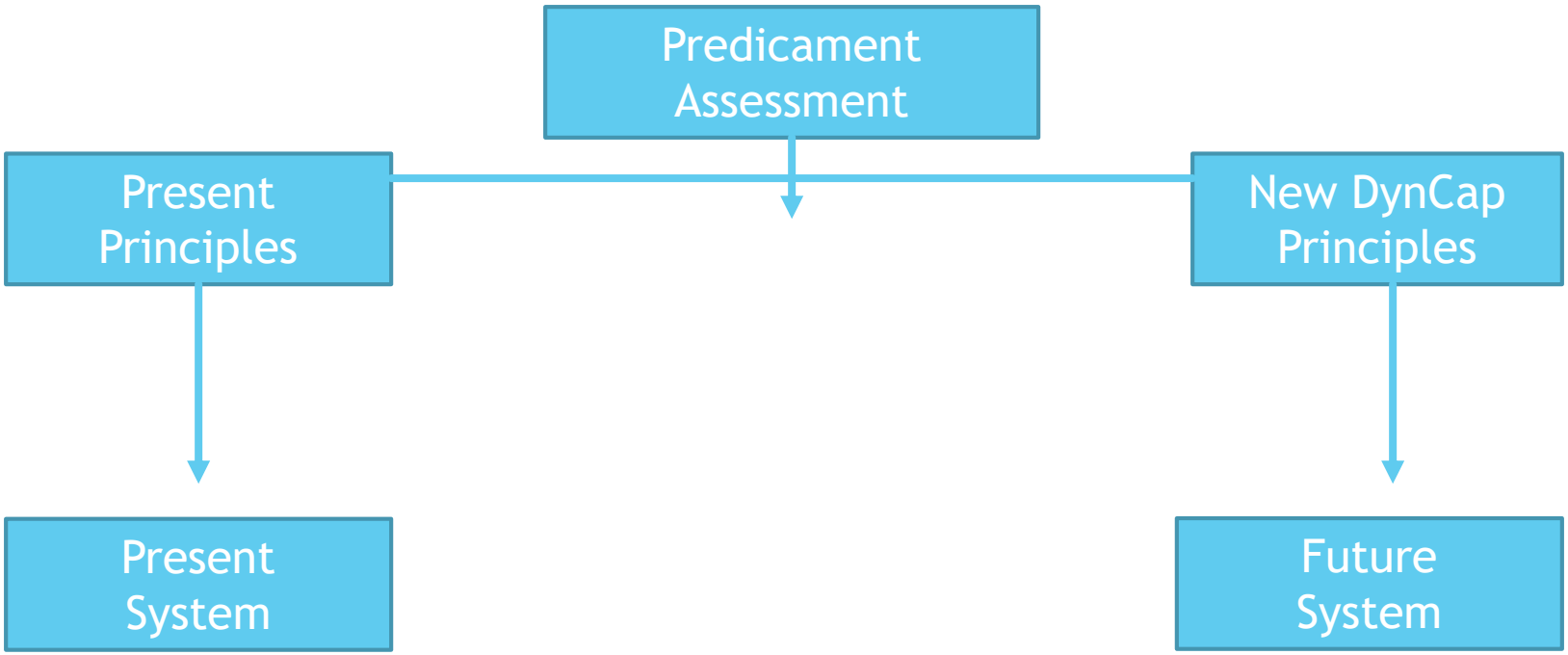
Dynamic capabilities in ecosystems

- Creating & capturing value from innovation & sustaining continuous capability building is the essence of dynamic capabilities and provides the wider aperture lens that is needed for ecosystem competitiveness



VI. Reflections from practice
(with assistance from: Gary Getz (Strategos)

The first step in Dynamic Capabilities is to test the relevance of implicit principles of strategy & organization



Sensing:
Unmasking
Orthodoxies

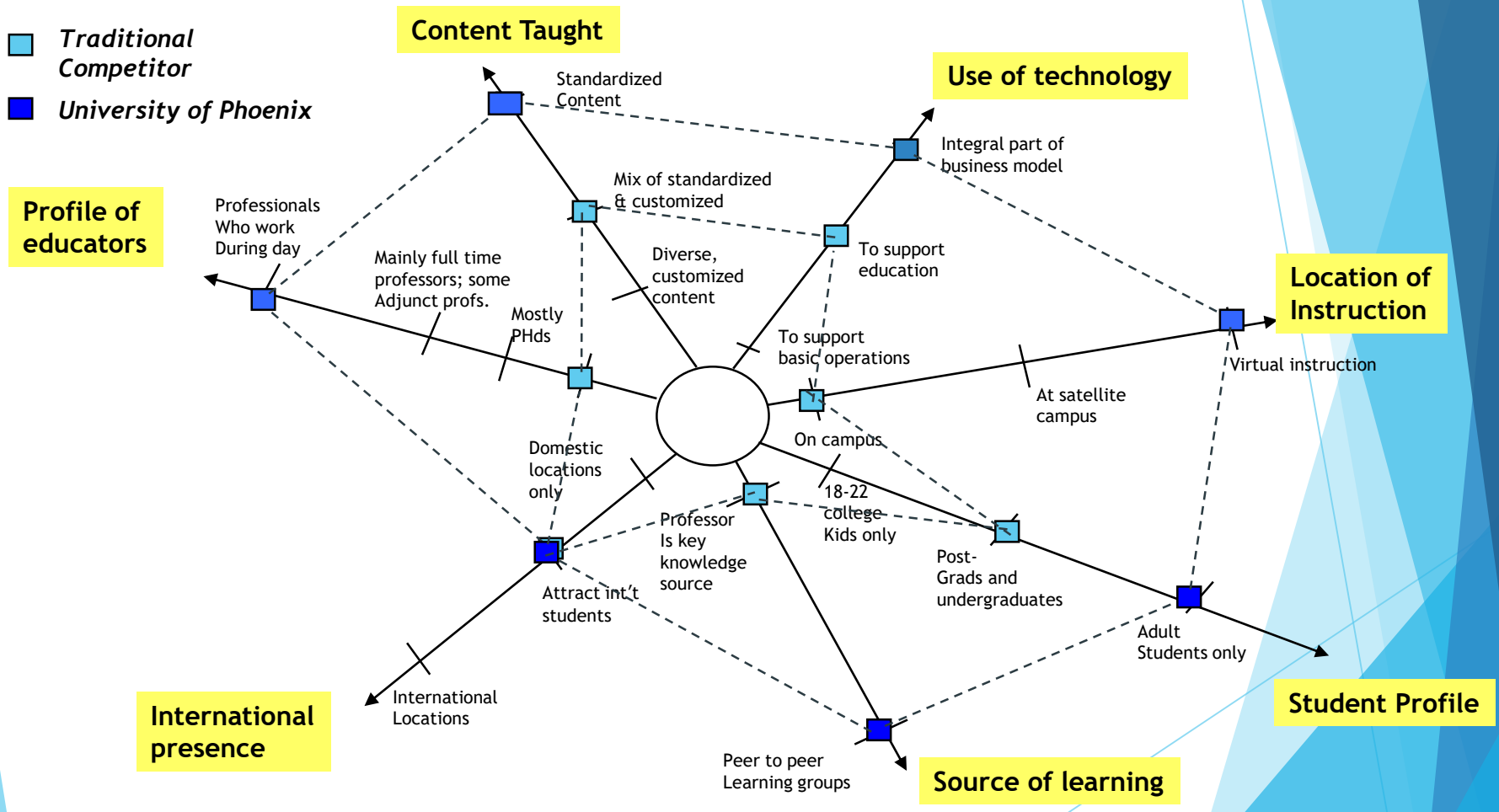
WHY DO WE CHALLENGE THEM?

1. THEY DEFINE THE "RULES OF THE GAME"
   in our company and in the industry
2. THEY BECOME SELF-IMPOSED BOUNDARIES
   on how we compete
3. THEY CAN BLIND US
   to emerging business opportunities

Industry map help with sense-making

1. Helps one VISUALIZE THE COMPETITIVE LANDSCAPE and expose our orthodoxies where and how we compete
2. Helps one gain INSIGHT INTO THE BUSINESS MODEL OF COMPETITORS, both current and potential
3. Enables one to begin ENVISIONING POSSIBLE FUTURE OPPORTUNITIES – by exposing “white spaces” and finding innovative new opportunities and directions.

Redefining competition in university education



Source: Gary Getz, Strategos

SENSING: WHAT IS A CUSTOMER INSIGHT?

An **unmet** or **unarticulated need** or frustration, which can lead to the identification of a new opportunity

A Customer Insight redefines the combination of:

- **Who** (consumer target, segment)
- **What** (unmet need, benefit)
- **Why** (why does the consumer have this need?)

Source: Gary Getz, Strategos

Valuable insights are grounded in needs that lie under the surface

1. **UNARTICULATED**
   The customer settles or works around it.

2. **UNDERAPPRECIATED**
   The industry hasn't seen this as important.

3. **UNDERLEVERAGED**
   Our capabilities can have a greater impact.

Source: Gary Getz, Strategos

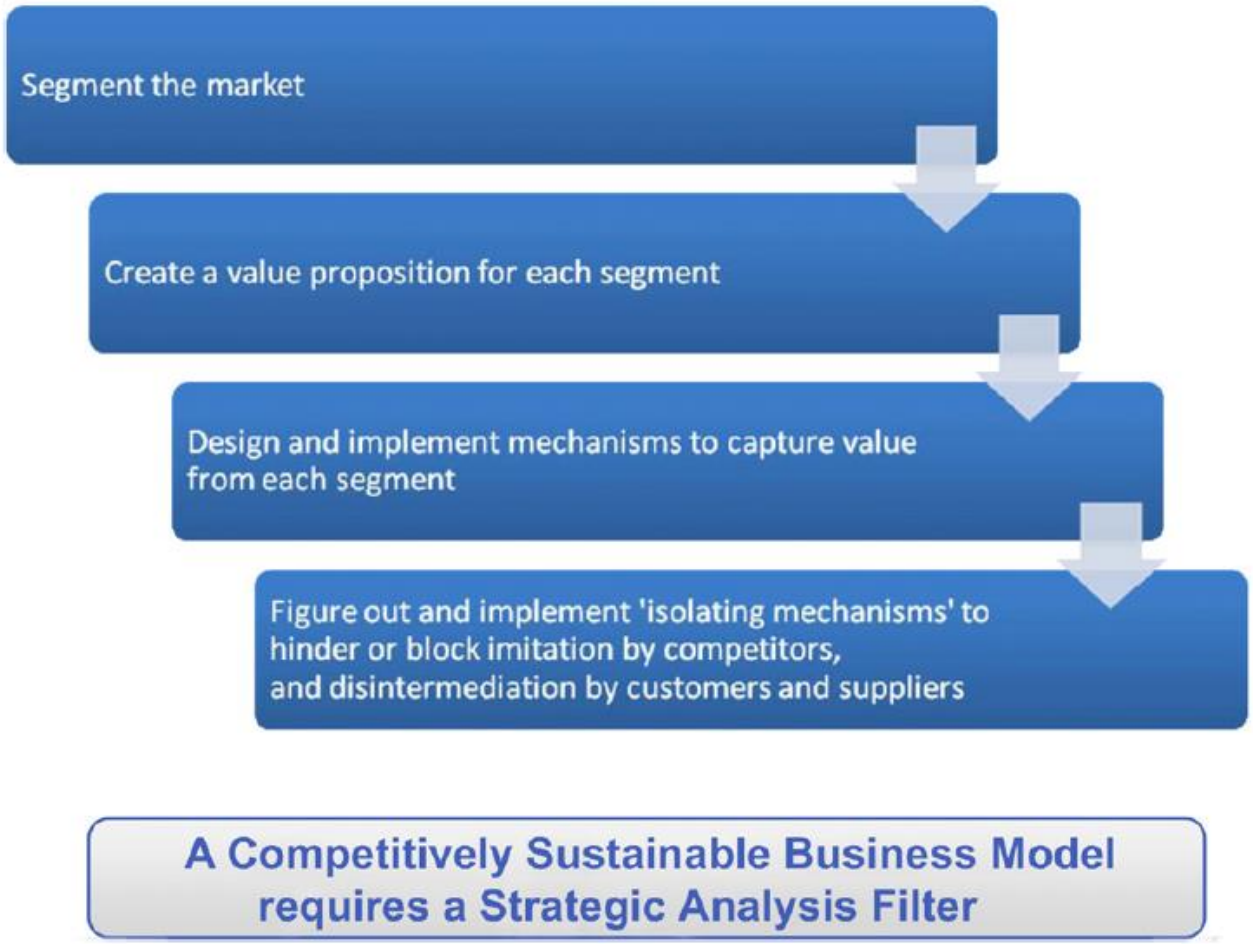
Seizing: Technology commercialization advisory activities involves addressing in parallel

- Testing key hypothesis behind new business concepts
  - Cycles of experimentation
- Repeatedly refreshing business concepts and models to incorporate what we are learning
  - The dynamic capabilities business brief
- Building the infrastructure for commercial launch
  - The build phase

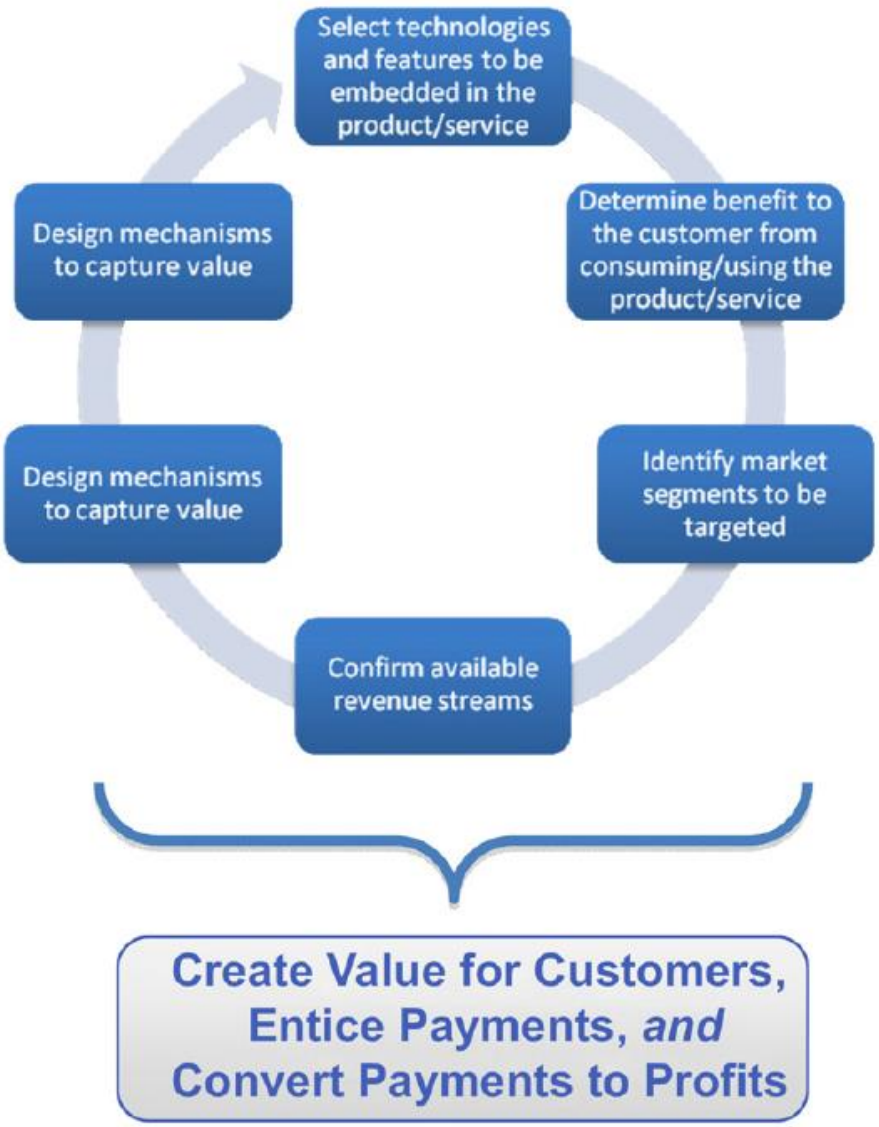
What is required for “seizing” is a highly disciplined approach based on core design principles

- Don’t wait too long for commercial launch
- Close key knowledge gaps through targeted capabilities assessment and rapid experimentation
  - Focused on most critical hypotheses
  - Disaggregated elements of the business model and require an exchange of value with the participant
- Be able to answer key questions at every point
- Who is the customer and what is the value proposition?
  - What are our intended business and profit models?
  - How will the client win vs. competition?

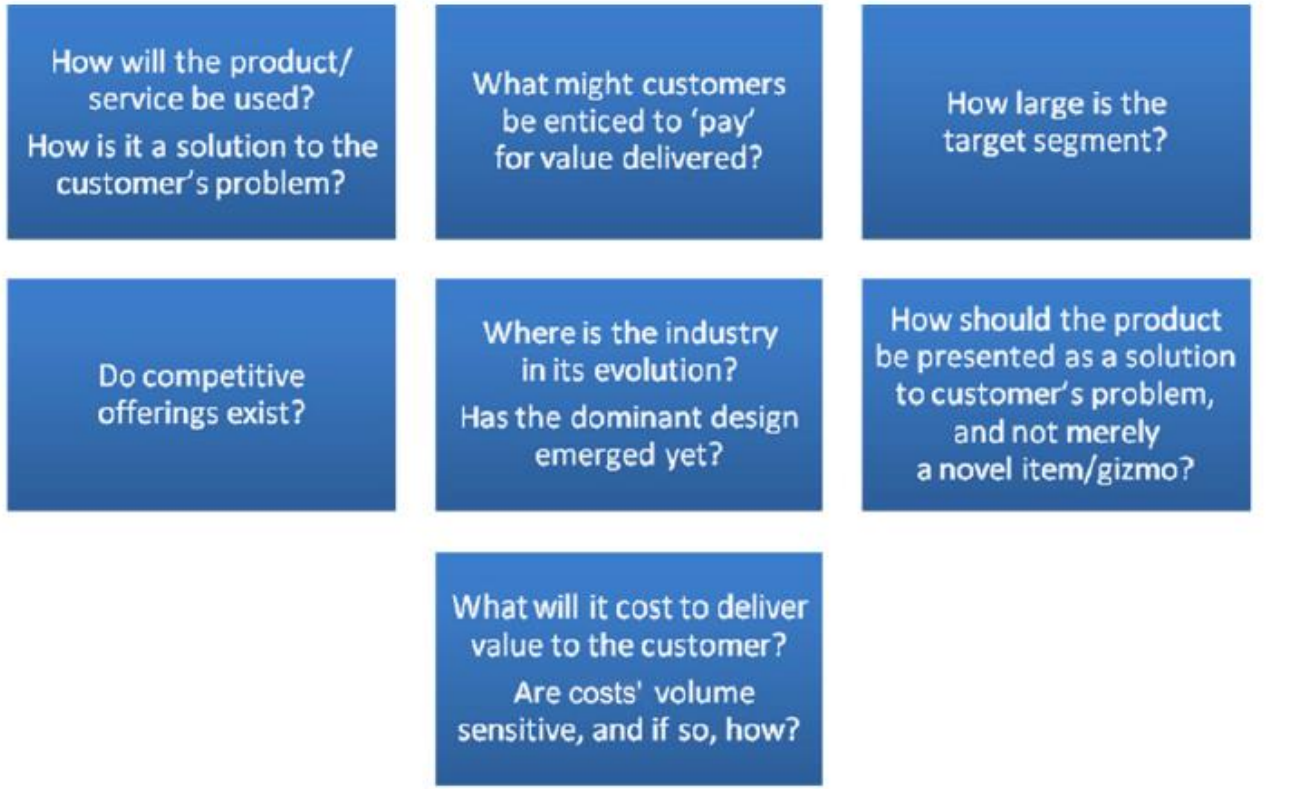
Steps to achieve sustainable business models



Elements of business model design



Questions to ask about a (provisional) business model



Tools: Business Model Action Lab

Process:

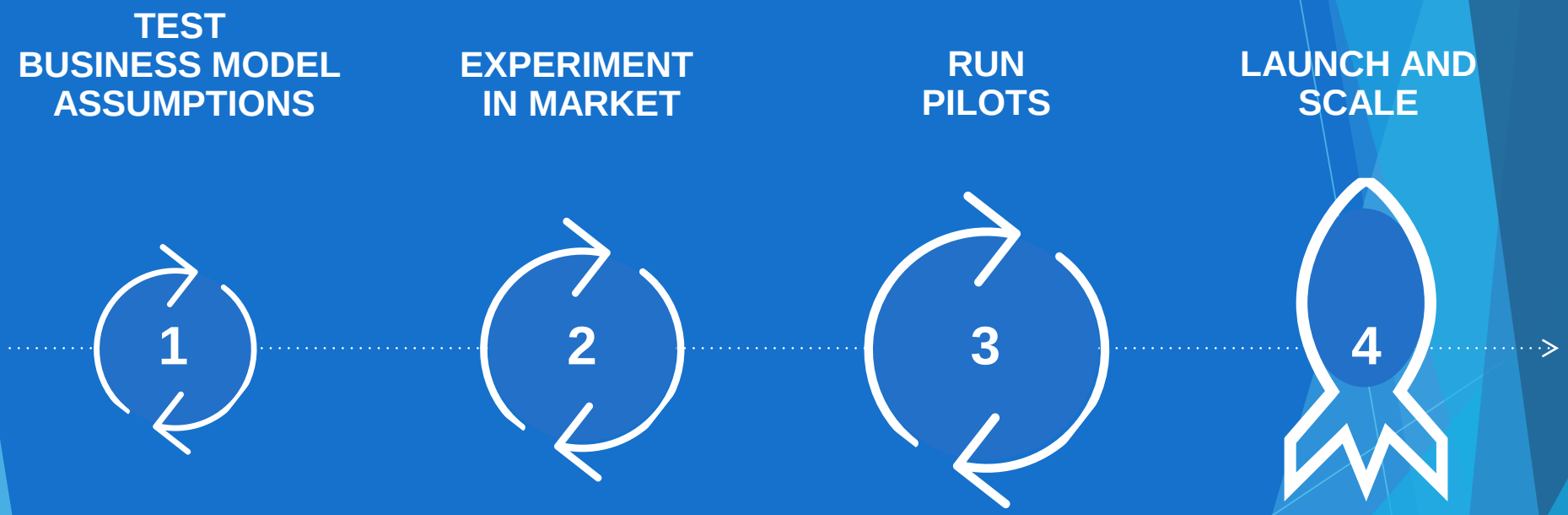
- Details an idea selected from a key strategic area
- Participants the core team, invited experts, and advisors
- Workshop session to define the customer, the value proposition, and operating, and economic models

Results:

- Idea converted into a full business concept
- Often, novel ideas as a result of stretching/challenging
- Key unknowns identified to feed into the experiment design process
- Input to develop a pitch document for senior management

Source: Gary Getz, Strategos

AGILE SEIZING: "LEARNING BEFORE EARNING"



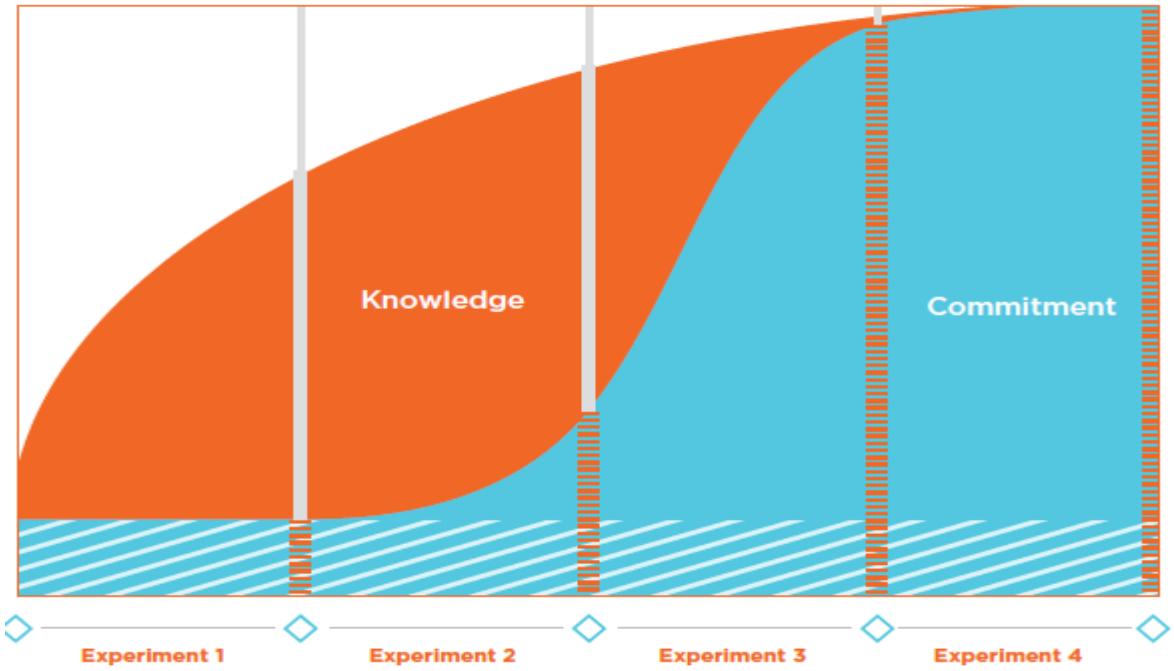
PRIORITIZE LEARNING OVER INVESTMENT TO DE-RISK AND ACCELERATE

Source: Gary Getz, Strategos

Experimentation is important to reduce the risk of an opportunity before recommendation that the business to commit significant resources

All information about the business is certain

No information about the business is certain

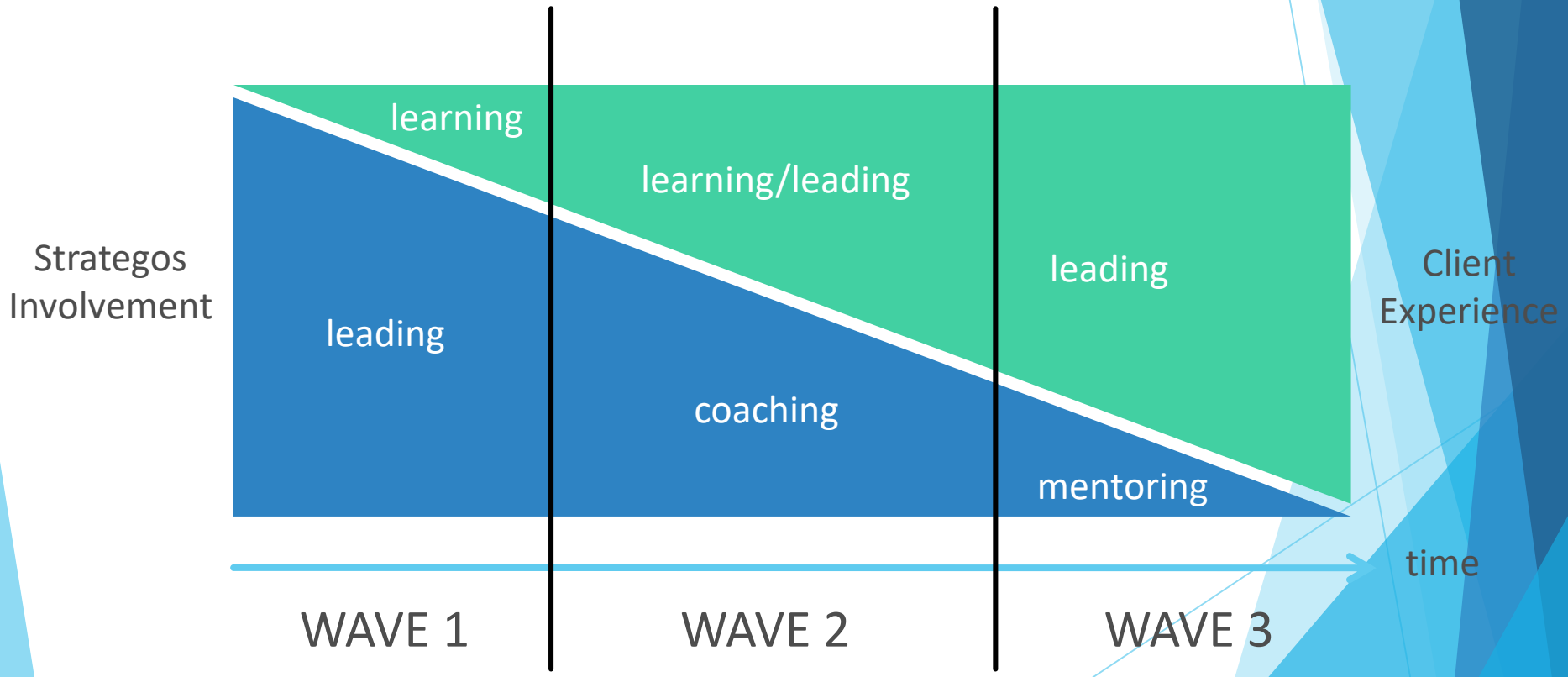


Level of commitment is high

Level of commitment is low

Source: Gary Getz, Strategos

Good transformation assistance works the consultant out of a job;



Source: Gary Getz, Strategos