

DYNAMIC CAPABILITIES, RELATED PARADIGMS, AND COMPETITIVE ADVANTAGE IN THE INNOVATION 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)..
3. D. Teece, “A Capability Theory of the Firm: An Economics & (Strategic) Management Perspective”, *New Zealand Economic Papers (NZEP)*, (forthcoming).

- ▶ “The proximate cause [of differences in the wealth of nations] lies, for the most part, in the capabilities of firms”

-John Sutton, London Business School, 2012

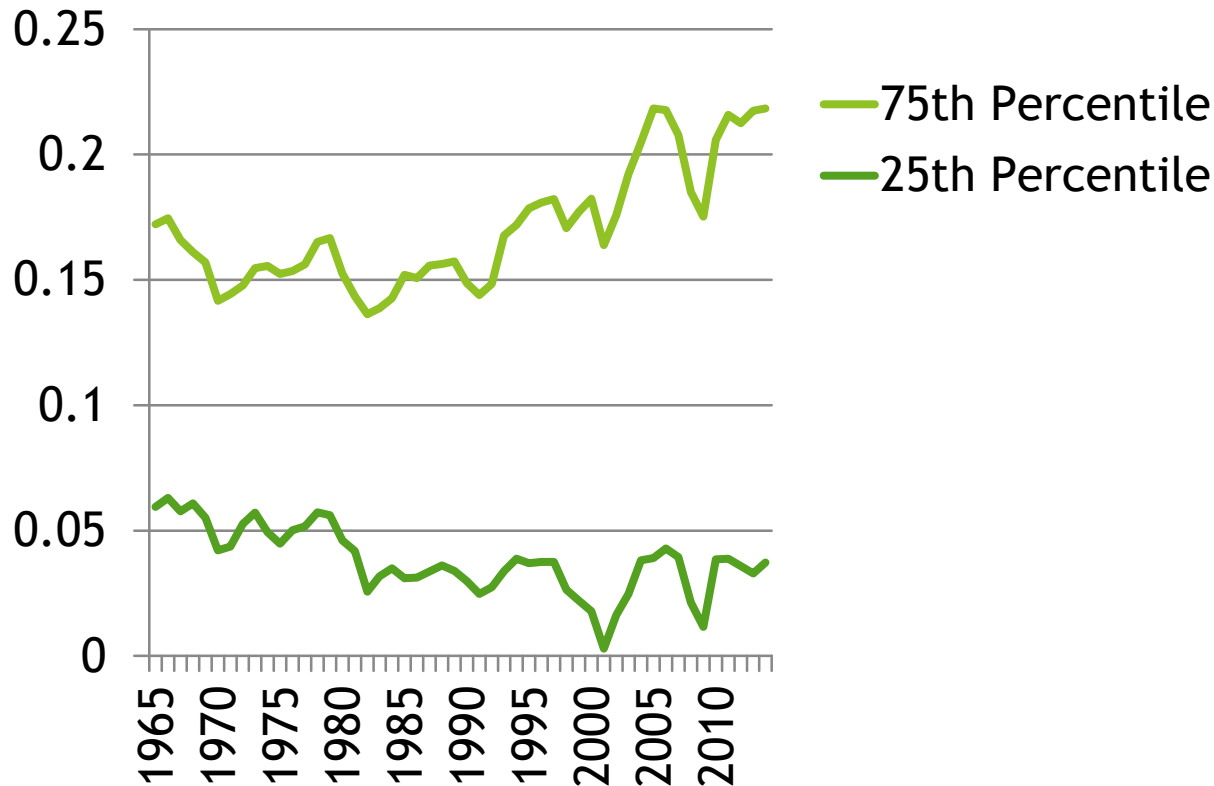
Three Nobel Laureate economists express deep concern about the current state of economics

- “Year after year economic theorists continue to produce scores of mathematical models and to explore in great detail their formal properties ... without being able to advance, in any perceptible way a systematic understanding of the structure and the operations of a real economic system.” (Wassily Leontief, 1982: 107)
- “Economics as currently presented in textbooks and taught in the classroom does not have much to do with business management”, which has “severely damaged both the business community and the academic discipline” (Ronald Coase, 2012)

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

- 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, 1981)
- 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

Top and Bottom Profit Margin Percentiles indicate that competitive advantage is becoming less durable



Source: Compustat

Notes:

- Profit margin is defined as EBIT divided by revenue
- The sample was restricted to firms with \$100 million in revenues in at least one of the years between 1965 and 2014
- Revenue field was considered missing whenever it was zero or negative
- Industries were defined using manual grouping by the 2-digit SIC code. Quartiles were calculated across all industries
- Only years with the minimum number of 20 companies were considered
- Industries included: Multiple
- Annual data derived from the financial statements of active and inactive North American publicly traded companies. The sample was restricted to companies with \$100 million in revenues in at least one of the years between 1965 and 2014

Alfred Marshall (the founder of modern microeconomics) recognized that management matters and “adventure” is required

- In *Principles*, Marshall (1920) recognizes the role of management in determining enterprise performance
- Managers fall into those “who open up new and improved methods of business and those who follow beaten tracks.”
- Managers, or “businessmen”, “adventure” or “undertake” the risks (and uncertainties) of business. They bring together capital and labor, conduct planning, and superintend to minor details
- The manager is “the natural leader of men” (Book IV, Chapter XII, p.173). Marshall notes that good managers are hard to find, and that management skills tend to atrophy

Frank Knight (1921) 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.

Lord Keynes (1936) with his appeal to "animal spirits" was perhaps searching for a theory of (dynamic) capabilities?

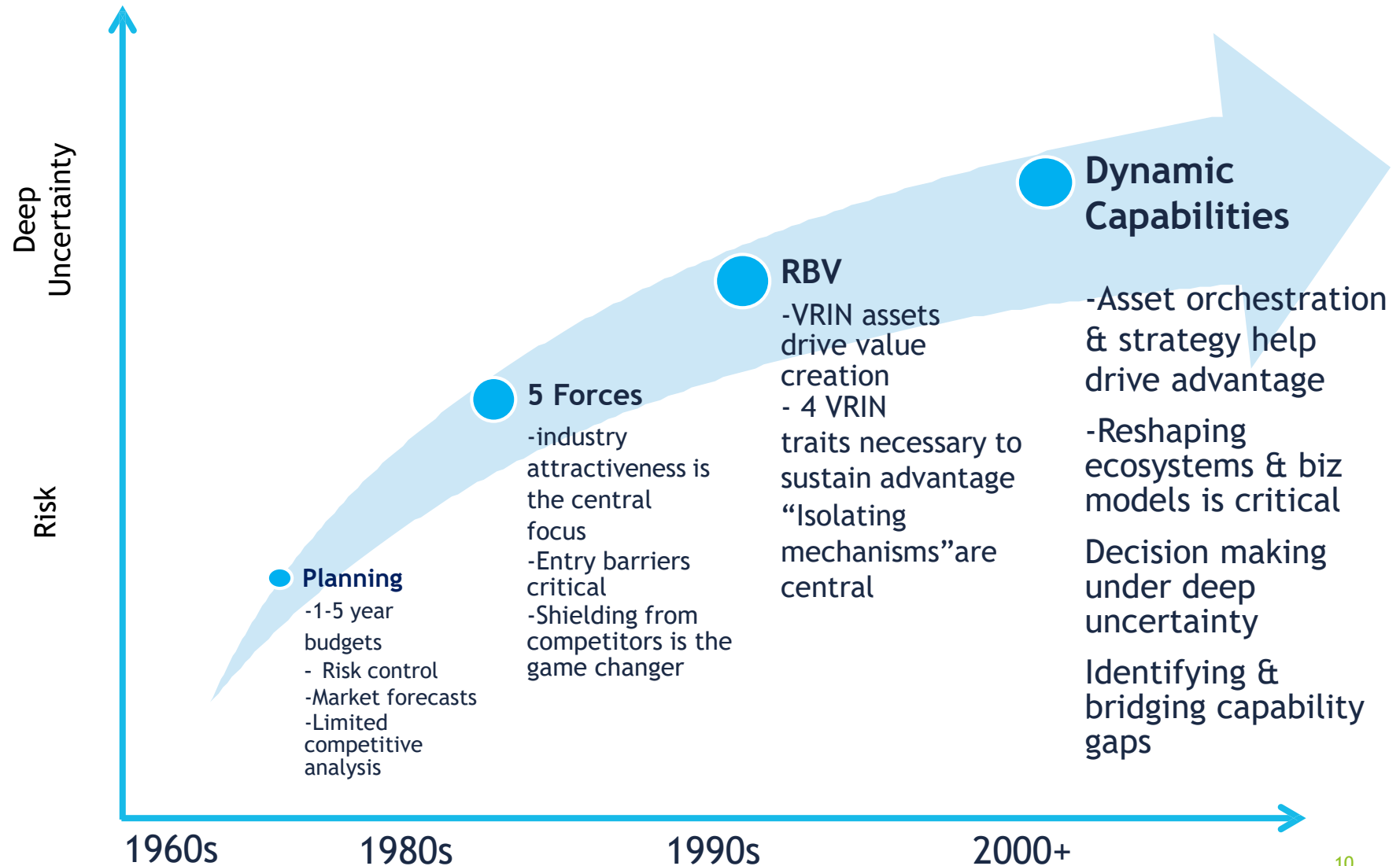
- Was keenly aware of the importance of firm-level investment decisions and long-term investor expectations for macroeconomic theory
 - Invoked “animal spirits” not to signal irrational behavior but to help explain investment decisions under uncertainty. Investing requires some kind of “leap of faith” because of the fog of ambiguity around financial outcomes
- Observed that: waiting too long for the future to unfold will often cripple decision making
 - “Most, probably, of our decisions to do something positive, the full consequences of which will be drawn out over many days to come, can only be taken as a result of animal spirits—of a spontaneous urge to action rather than inaction, and not as the outcome of a weighted average of quantitative benefits multiplied by probabilities... Thus if the animal spirits are dimmed and the spontaneous optimism falters, enterprise will fade and die.”

-Keynes, 1936, p.161

Animal spirits foreshadowed “dynamic capabilities”

- The Keynesian concept of animal spirits is very consistent with dynamic capabilities
- “Animal spirits”—an ability to envision a positive business outcome requiring an astute investment path under uncertainty—and is consistent with strong dynamic capabilities
- Weaker firms and management teams are indecisive, devoid of dynamic capabilities, and wait too long for greater certainty

The evolution of strategic management & “research based” thinking



The fundamental question in Strategic Management: How do firms build long-run Competitive Advantage?

- Limited ability of a firm to generate “supernormal” profits over the long run
 - Competitive advantage is often fleeting
 - Few firms change and thrive over the long haul: GE, IBM, 3M, Apple...
- My thesis: With deep uncertainty, strong asset orchestration, internally and externally, coupled with good strategy and the astute assembly of resources undergirds **Dynamic Capabilities** which enables supernormal profits
- **Definition of Dynamic Capabilities:** “The ability of an organization and its management to integrate, build, and reconfigure internal and external competences to address rapidly changing environments”*
- **Evolutionary fitness, not best practices, define great firms.**

Dynamic Capabilities Builds on/Accepts Resource Based View. However:

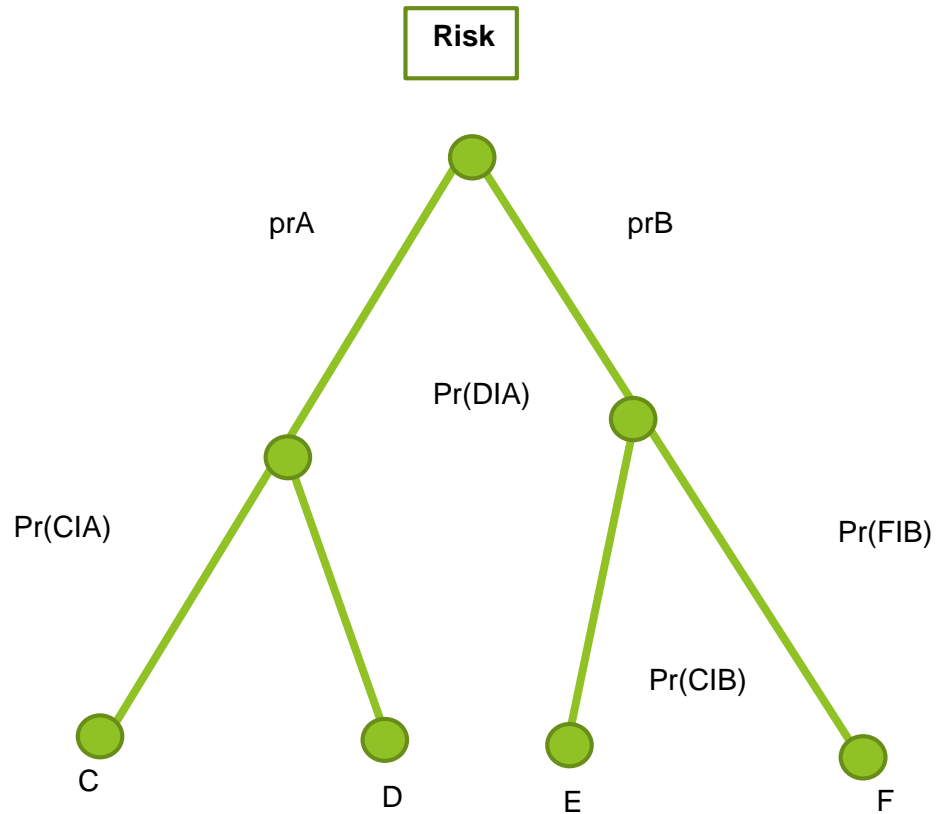
- ▶ The resource view is Ricardian and therefore static
- ▶ Each element of VRIN can change over time:

Resource-Based Concept

V= Valuable
R= Rare
I= Imperfectly immitable
N= Non-substitutable

Commentary

- Bottlenecks can migrate up and down the value chain, horizontally and laterally, e.g. valued Computerland's retail footprint in the 80's & 90's was destroyed by Dell's direct-to-customer business model
- Patents can expire, products can be reverse engineered
- New substitutes are being invented constantly, e.g. margarine for butter; electric cars for internal combustion engine cars



Alternative futures with known probabilities & known conditional probabilities

Mixed Martial Arts. MMA is a good metaphor for competition under uncertainty

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

Mixed Martial Arts

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

MMA is a better metaphor for the innovation economy than is chess

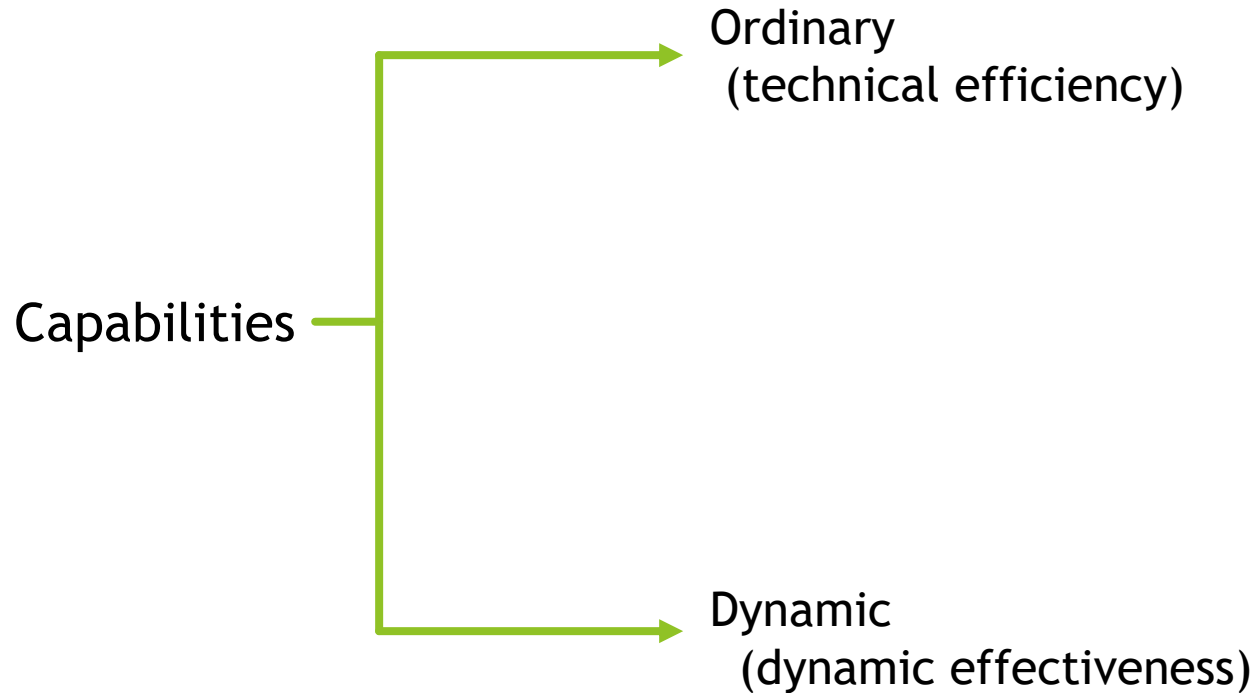
The innovation economy puts a premium on entrepreneurial management when there is deep uncertainty

The lack of predictability and deep uncertainty in MMA is not unlike today's 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).

To understand competitive advantage, don't confuse ordinary and dynamic capabilities



Strong “ordinary” (or normal) Capabilities: Only requires resources to be used efficiently

- 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” reflect strong ordinary capabilities
- Admittedly, not everyone gets the simple stuff right

Best practices don't suffice

- 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 advantage because it only takes a few firms at the frontier to drive prices down to competitive levels

The Problem:



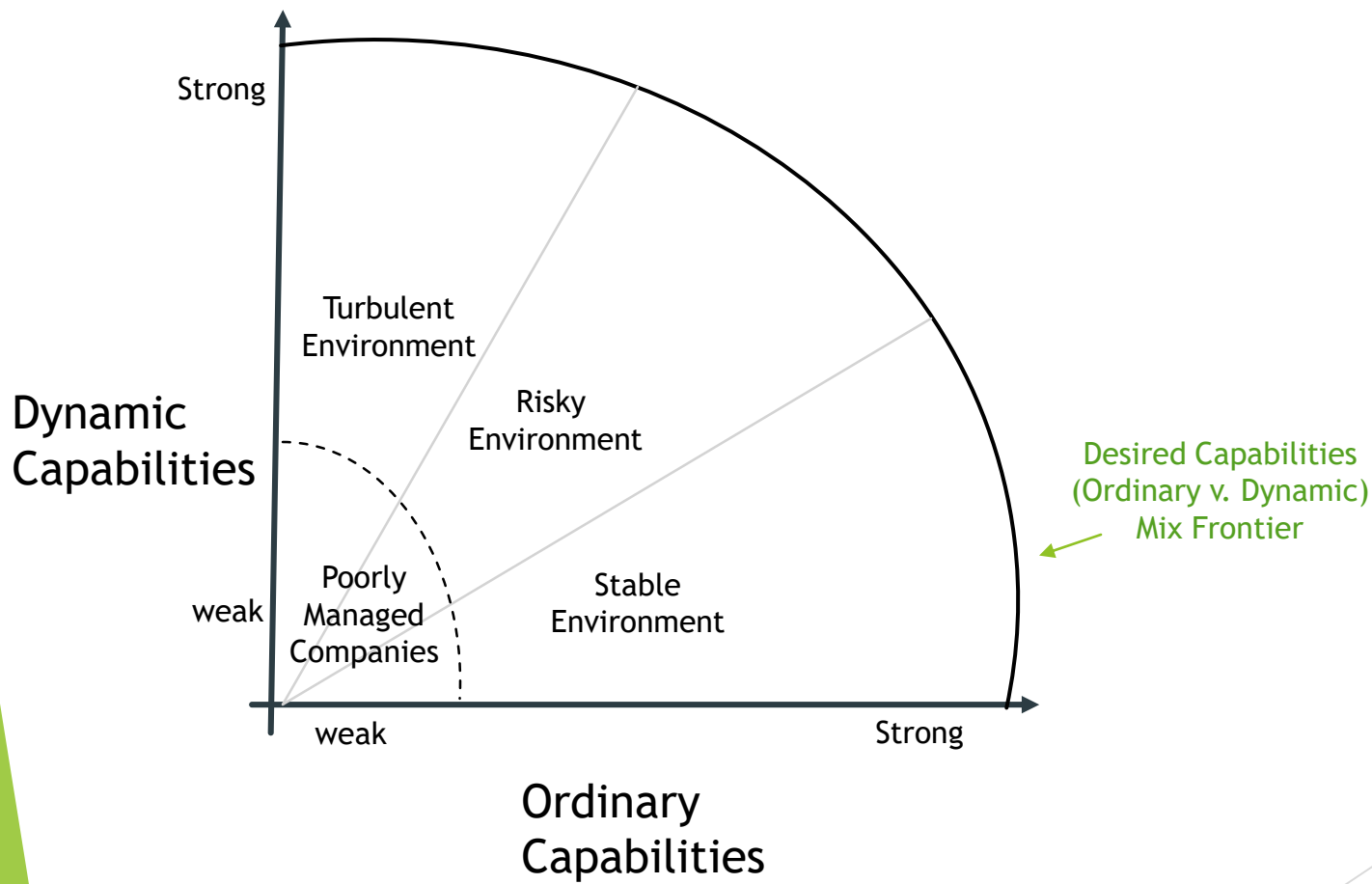
"The Red Queen has to run faster and faster in order to keep still where she is. That is exactly what you all are doing!"

Lewis Carroll, "Through the Looking Glass"

From ordinary to dynamic capabilities in autos

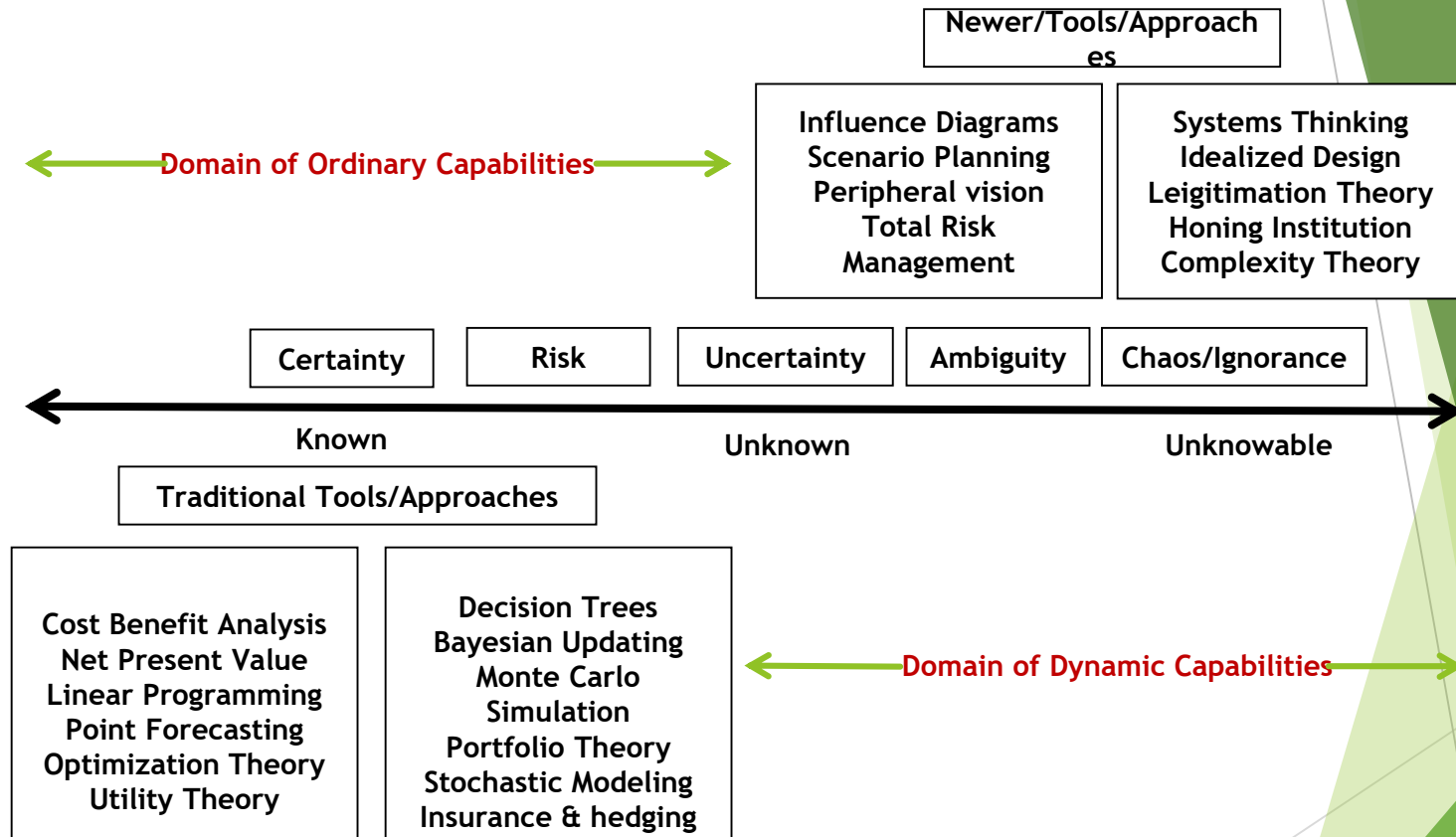
- **Ordinary:** The operations portion of the automobile business has been thoroughly optimized over many decades, doesn't vary much from one automobile company to another, and can be managed with a focus on repetitive process. It requires little in the way of creativity, vision or imagination. Almost 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, June 11, 2011*

Deep uncertainty (turbulent environments) require strong dynamic capabilities:



With stable environments ordinary capabilities are good enough & the VRIN criterion provides meaningful guidance

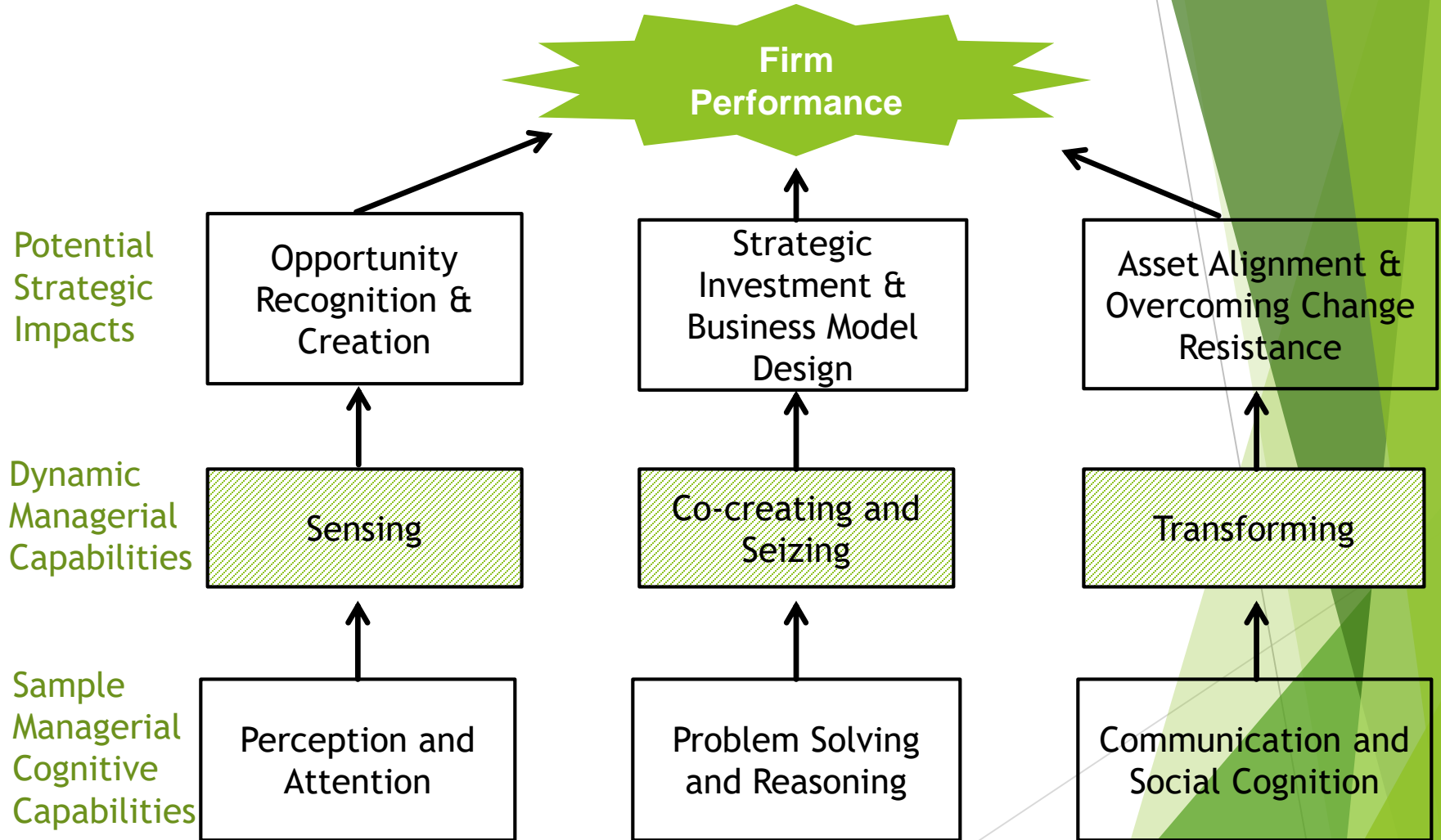
Capabilities and Tools Required for Stable & Uncertain Environments are Different



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



Sensing, Seizing & Transforming Are The Practical Pillars Of Dynamic Capabilities

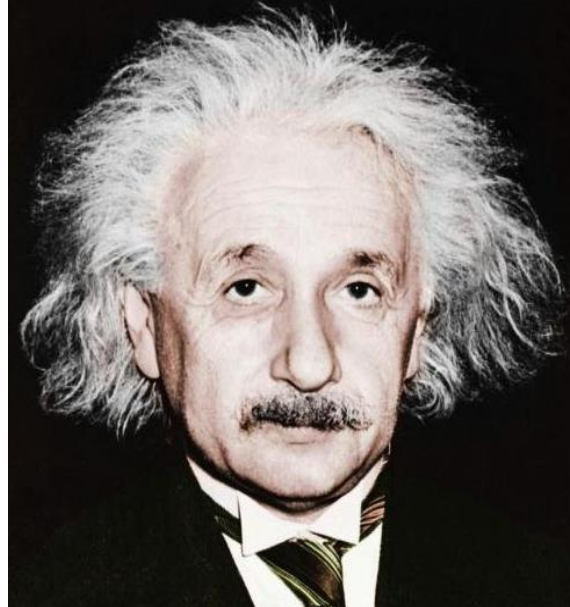


Sensing & Black Swans



- Alert businesses can “discover” the future ahead of the competition
 - The future is bound to surprise us, but we don’t have to be dumbfounded
- Kenneth Boulding

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

Logical Implications of Abductive Reasoning

- If an investment option has a deductive logic, then the options can only ever reflect thinking that started with a proven template
- If an option has an inductive logic, then “new” options simply follow an established template
- Neither inductive or deductive logic allow one to find fundamentally new knowledge. Abduction digs deeper and helps create new knowledge
- Management must suppress a tendency to apply known rules;

Abductive reasoning is the handmaiden of sensing

Other tools to improve sensing

- Sometimes sensing is enabled by internal R&D activities (“search activities”) and internal scenario planning and other tools to probe the future
- Internal R&D can be complemented (but not displaced) by crowd-sourcing ideas, or by tapping into ideas of customers (Von Hippel), supplies and/or other partners

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

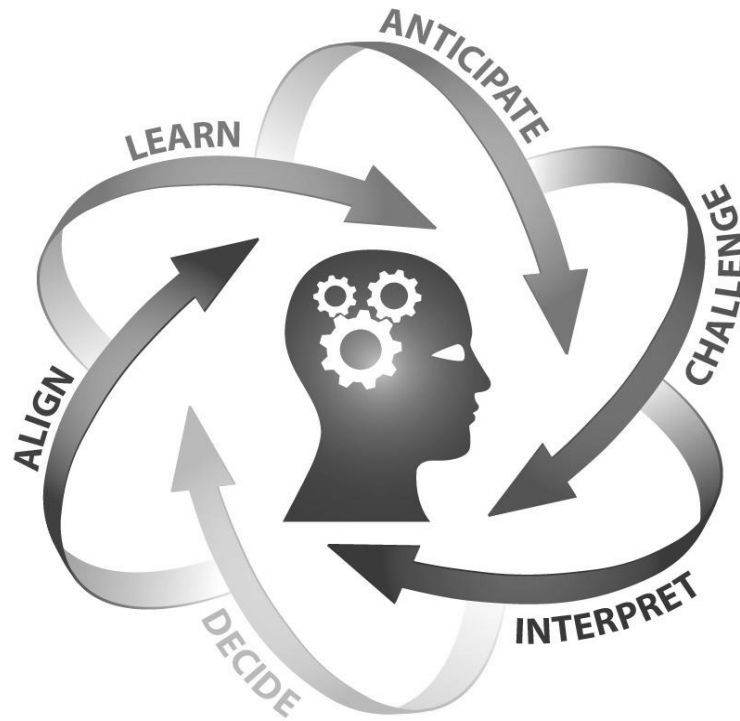
Seizing/Asset Orchestration is also core to dynamic capabilities



“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.

Orchestrating co-specialized assets can be value creating & value capturing building blocks

- Building and assembling assets designed specifically to perform some joint purpose inside the firm rather than accessing commercially available assets through a skein of contracts is not done primarily to guard against opportunism and recontracting hazards
- Instead, it is done to ensure the maintenance of effective coordination and alignment of assets/resources/competences over time as circumstances change
- This adaptation is often more easily accomplished by managerial fiat inside the firm than through the price system, an argument perhaps first made by Barnard (1938)

Transformation/Renewal

- Transformation issues reside between two extremes:
 - On one extreme, it is frictionless organizational world of mainstream microeconomic theory, in which production technologies can be swapped modified
 - At the other extreme lies path dependence, captured by the organizational ecology view that some kind of organizational inertia (irreversibility) prevents most firms from changing in response to existential strategic threats

Irreversibilities and the impact on renewal: Ken Arrow's insight

- in cases where a commitment is costlessly reversible, uncertainty poses no problem for the firm (Arrow, 1973)
- With zero cost irreversibilities, there would be no need to peer into the future because, if today's plan proves unprofitable, the firm can try something different tomorrow without penalty
- With zero cost irreversibility, there would be no path dependence, and strategic renewal would be a straightforward affair

Organizational structure & culture can amplify or ease irreversibilities

- ▶ Organizational structures, culture, and dynamics create a different- and probably more 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

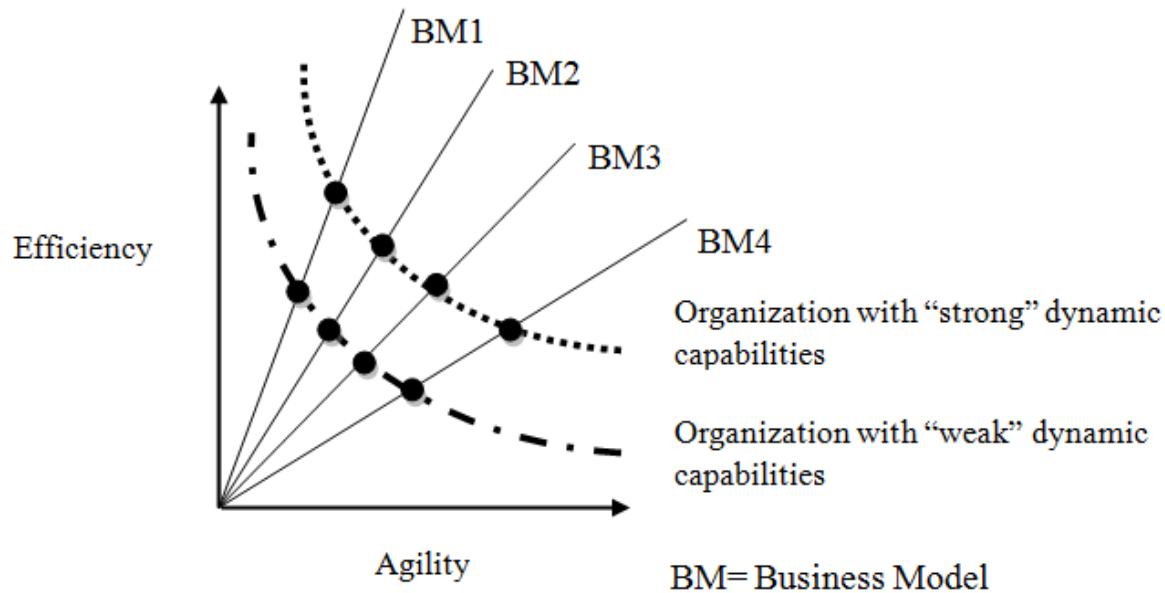
Figuring out how to manage/improve the agility/efficiency tension between aids renewal and strengthens dynamic capabilities

- ▶ Agility is the capacity of an organization to efficiently and effectively redeploy / redirect resources to value creating and value protecting activities as internal and external circumstances warrant
- ▶ Agility is costly to maintain and need not always be desirable (when constructing Shinto Temples, change is undesirable)
- ▶ “The ability to calibrate the requirements for change and to effectuate the necessary adjustments would appear to depend on the ability to scan the environment, to evaluate markets and competitors, and to quickly accomplish reconfiguration and transformation ahead of competition” (Teece, Pisano, and Shuen, 1997:521)

Dynamic capabilities emphasizes a special kind of agility/ambidexterity

- Dynamically capable firms have more than agility and 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

The Tradeoff between Efficiency and Agility is different in Organizations with Strong/Weak Dynamic Capabilities



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).

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).

Dynamic Vs. Ordinary US Dynamic Capabilities

Summary Chart

Ordinary Capabilities

Dynamic Capabilities

Purpose

- Technical efficiency in basic business functions

- Strategic “fit” over the long run (evolutionary fitness)

Tripartite schema

- Operational, administrative, and governance

- Sensing, seizing, shaping and transforming

Imitability

- Relatively easy; imitable

- Difficult ; inimitable



Doing things “right”



Doing the “right” things



Congruence (with strategy & capabilities) is important, and general systems theory alerted us to this 50 years ago

- Systems theory views organizations as social systems existing in different environments with units that must be associated if the organization is to be effective (Churchman, 1968)
- The underlying logic was later redeveloped into a pragmatic model of organizational alignment by Nadler and Tushman
- The Nadler-Tushman framework might be lacking some critical components. A business model, for example, defines the architecture of a business, specifying the value proposition to the customer and how the delivery of value is to be monetized (Teece, 2014). It is missing from the framework

**EVEN IF ALL INTERNAL COMPONENTS FIT WELL TOGETHER,
THE ORGANIZATION MAY FAIL IF IT DOESN'T FIT WHAT THE
MARKET REQUIRES AND ITS BUSINESS MODEL IS
MISSPECIFIED**



“You have to be fast on your feet and adaptive or else a strategy is useless.”

Charles de Gaulle, French general and statesman

“Resources” (number & tonnage of warships) isn’t decisive: Stalemate at the Battle of Jutland where strategy was absent

The British Navy at the Battle of Jutland, 1916



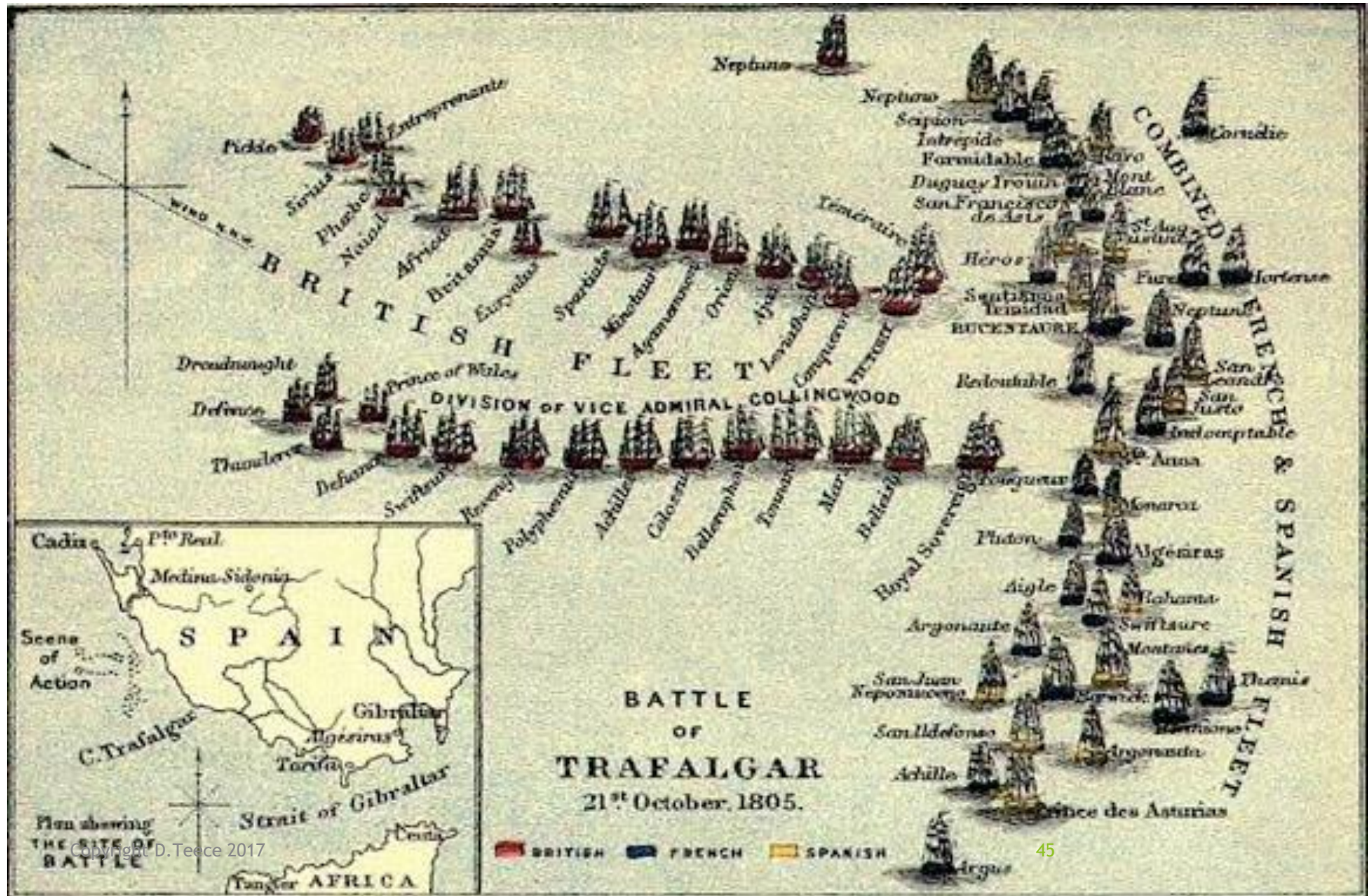
“There seems to be something wrong with our bloody ships today.”

Admiral John Jellicoe

“The real deficiency, however, was the loss of [Vice Admiral Horatio Lord] Nelson’s touch. It was not the bloody ships that were principally at fault. It was the inadequate doctrine of command and control.”

Frank Hoffman, “What we can learn from Jackie Fisher,” *Proceedings of the Naval Institute*, April 2004, p. 70.

Aligning agility & strategy - The Battle of Trafalgar



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

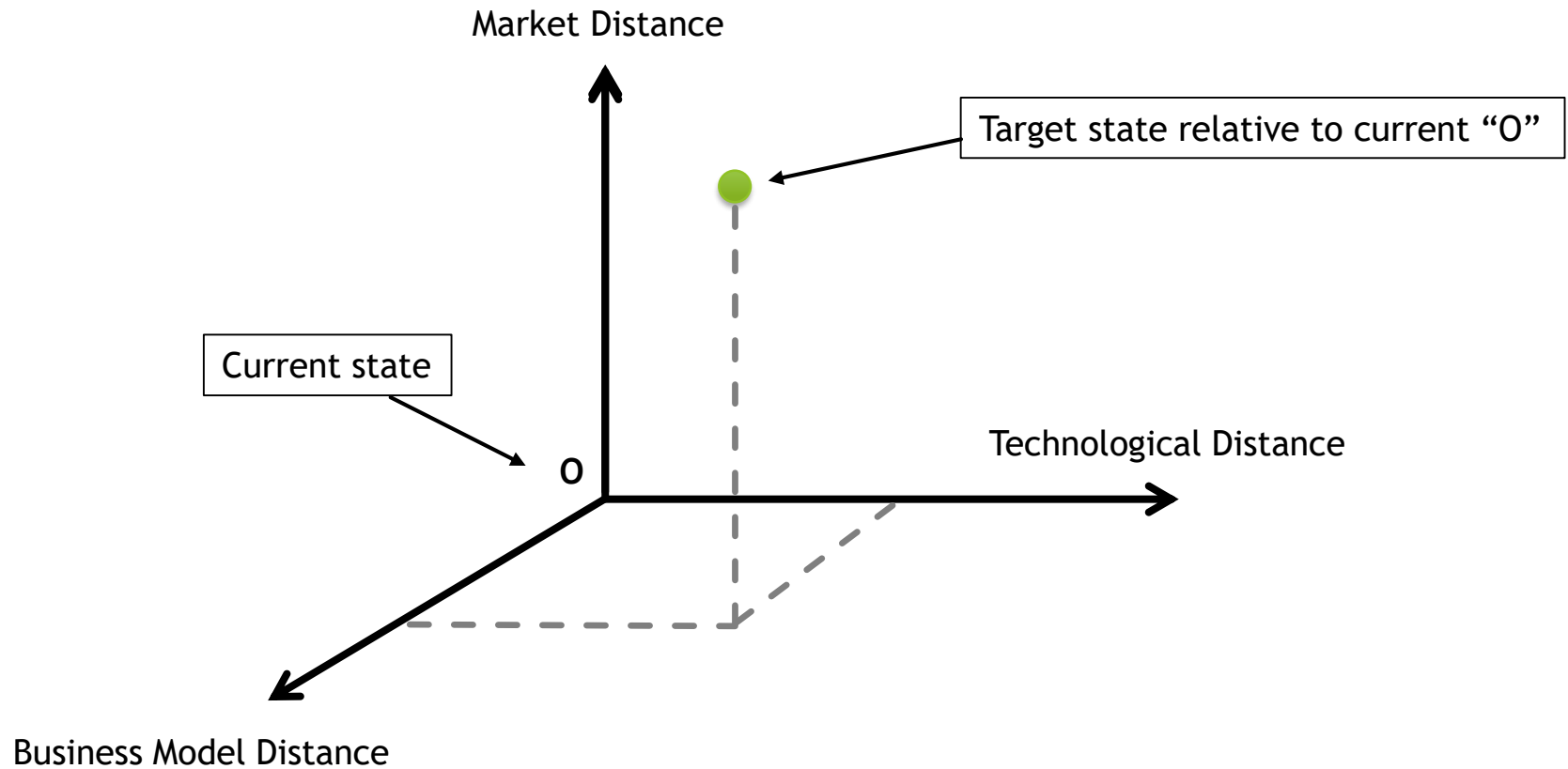
There may or may not be a resource gap behind an identified capability gap

- 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

Organizational instincts tend to compel the exaggeration of current capabilities

- 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

Capability gaps & the transformation challenge

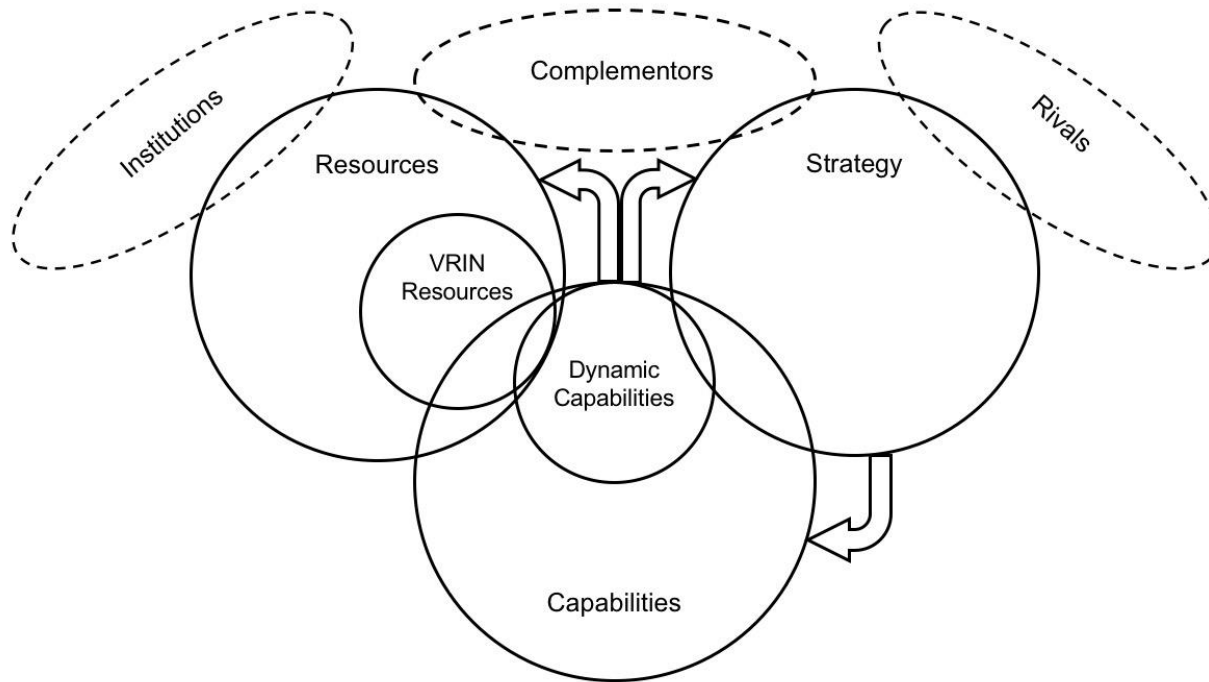


Dynamic capabilities as general management systems theory “light”

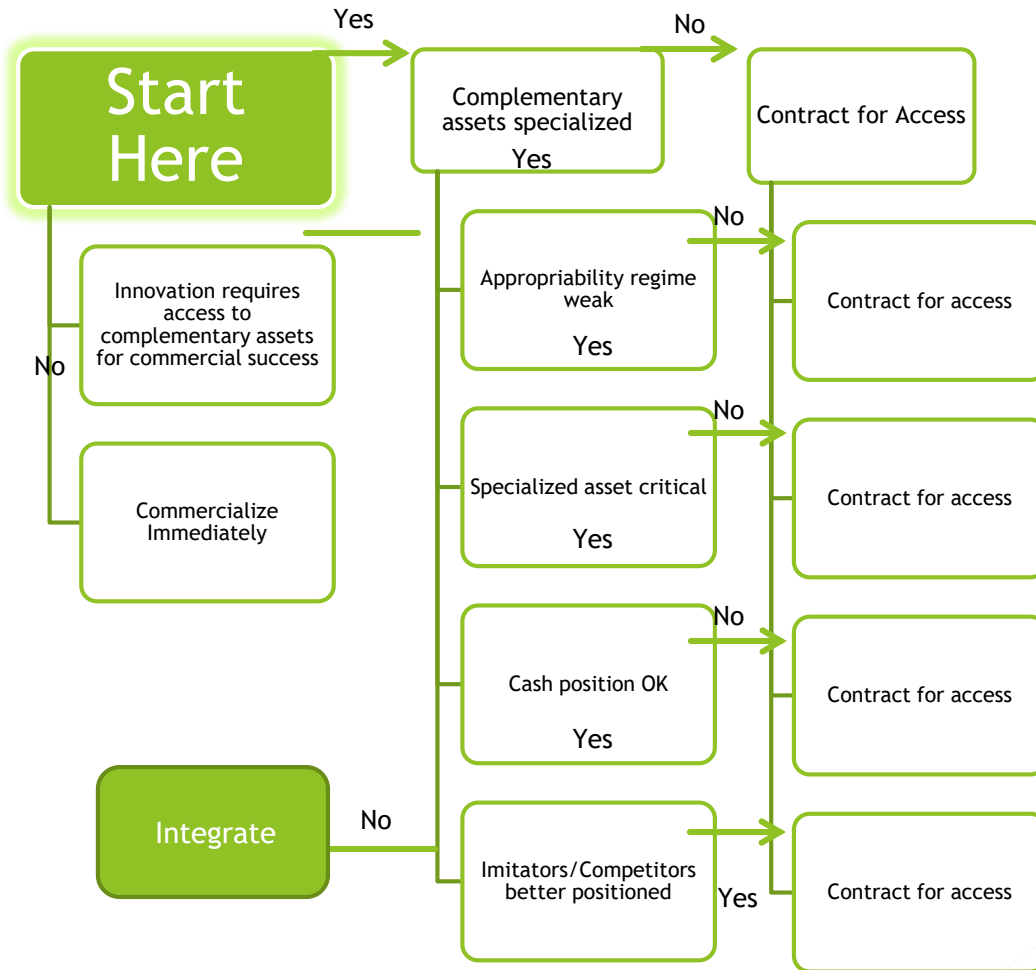
- “One of many objectives of General Systems Theory is to develop a framework of general theory to enable one specialist to catch relevant communications from others” (Boulding, 1956)
- “There is not much doubt as to the demand for it. It is a little more embarrassing to inquire into the supply”, (Boulding, 1956)

Dynamic capabilities is an effort to build the necessary interdisciplinary framework

UNDERSTANDING DYNAMIC CAPABILITIES AS A FRAMEWORK SYSTEM: VERSION 2



Business Model Implications:



Profiting from innovation

- ▶ PFI is a product-level, not a firm-level construct
- ▶ PFI didn't focus much on the entrepreneurial side (complementary asset orchestration) because for simplicity it was looking at a static issue: How to commercialize an (assumed) winning technology and profit from doing so
- ▶ Despite the static framework, the essence of the thesis is nevertheless intact ... owning/controlling the bottleneck (assets) is still job #1 and the gateway to one shot riches
- ▶ Effectuating asset accumulation and continuous asset orchestration requires a wider aperture lens. When wide open, dynamic capabilities come into focus

Bringing the plethora of complements into focus



Ron Adner, Dartmouth

- ▶ Adner’s “Wider Lens” is a halfway house between PFI & Dynamic Capabilities. It is most insightful & outlines the importance of “lining up all the ducks” to achieve commercial success

Adner correctly points out that the innovators success at PFI likely depend on the combined efforts of multiple partners

Adner's Examples:

- ▶ Better place LLC which is working on batteries for hybrids
- ▶ Apple's iPod & iPhone*
- ▶ Self-healing tires

Teece Examples:

- ▶ Lockheed L1011 & Rolls Royce delay in developing the RB211 engine
- ▶ Boeing Dreamliner

Chesbrough & Teece Example:

- ▶ Cell phone handset and battery producers need some in-house R&D in order to pace technology development (HBR, 1996)

*See: Teece, "Dynamic Capabilities: A Guide for Managers," *Ivey Business Journal* (March/April 2011).

Adner's "The Wide Lens" value blueprint 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 "captain")
- Helps one identify gaps in complementary assets/capabilities
- Adner's (implicit) focus is evolutionary fitness (dynamic capabilities)

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

Adner's modified PFI thesis:

Adner proposition:

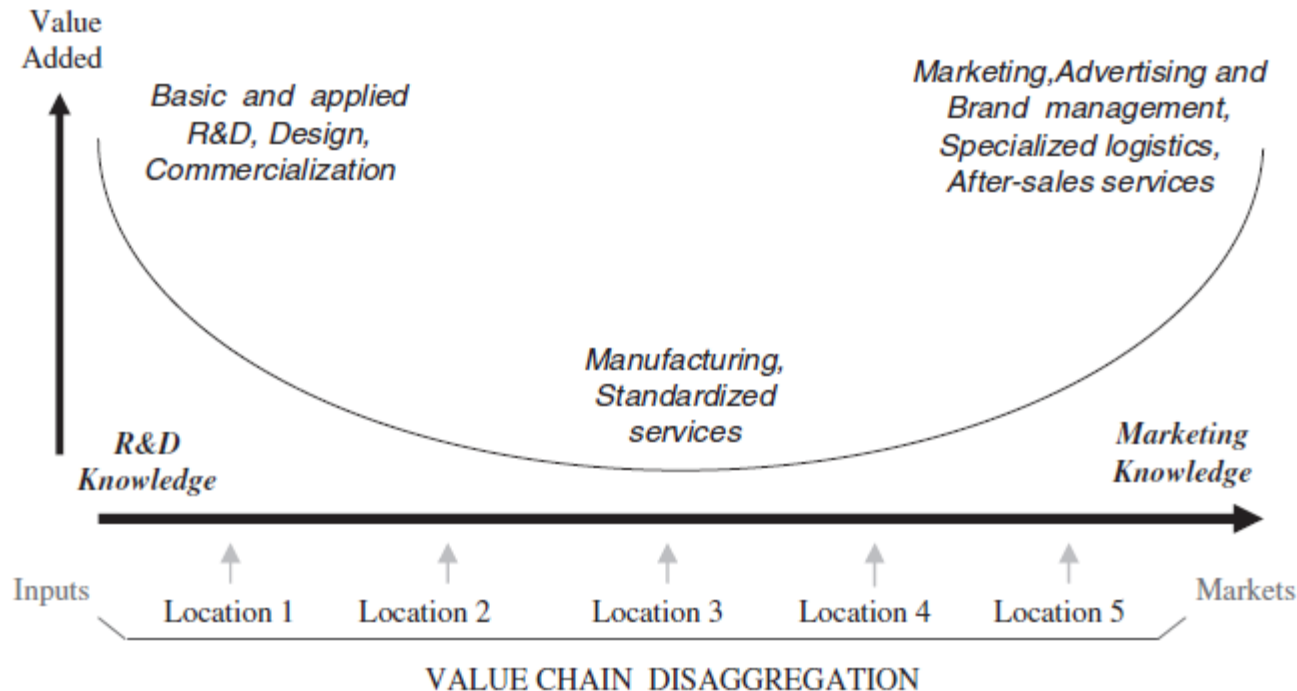
“The major prize was destined to go, not to the party that puts down the first piece of the puzzle, but the one that puts down the final piece.”*

The PFI (Teece) proposition:

The major prize might also go to the party that puts down the first piece. It depends on whether or not the “piece” is the bottleneck. The scarcity of the underlying resource has much to do with the answer. (e.g. is it is protected by intellectual property?)

*Adner interview in Brian Leavy's, “Ron Adner: managing the interdependencies and risks of an innovation ecosystem”, *Strategy and Leadership*, (2012).

Smile Curve indirectly leverages PFI/VRIN/Dynamic Capabilities theories/frameworks



Source: Mudambi, 2008

Smile Curve Dynamics

1. Ends of the smile curve reflect difficult to replicate assets
2. Improving process (ordinary) technology depresses the middle
3. Ends are pulled up by increased personalization & customization in design & delivery (VRIN attributes)
4. Firms at the bottom of the smile have strong incentives to integrate out & up & do so by learning
5. Moving to the corners of the smile requires innovation & Dynamic Capabilities (and innovation)

Open Innovation



Henry Chesbrough

“The use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively.”

Henry Chesbrough et al,

Open Innovation: Researching a New Paradigm, Oxford University Press, 2006

Some elements of open innovation have been around for decades

1. **Knowledge Dispersion**: Greater geographic and organizational dispersion in the sources of new knowledge
2. **Speed**: Need to achieve “integration” and new product launch rapidly because of stronger (global) competition
3. **Intellectual property**: Stronger IP right expand choices with respect to internal development or licensing
4. **Standards**: Publication/acceptance of standards facilitates crowd sourcing

STRONGER GLOBAL COMPETITION HAS ENHANCED THE IMPORTANCE OF OPEN INNOVATION

Open Innovation Enhances Dynamic Capabilities



The open innovation framework can enhance dynamic capabilities (with respect to all three classes of micro-foundations) through explicit recognition that sensing and seizing can be extended to external stakeholders and also to members of crowds

Lean Startup



Eric Ries

An approach to entrepreneurship and new enterprise development

- Emphasis on learning and pivots
- Deemphasizes planning

E.Ries, “The Lean Startup”, Crown Business; First Edition edition (September 13, 2011)

Learning Under Deep Uncertainty is Key

“ I’ve come to believe that learning is the essential unit of progress for startups. The effort that is not absolutely necessary for learning what customers want can be eliminated. I call this *validated learning* because it is always demonstrated by positive improvements in the startup’s core metrics”

Eric Ries, [The Lean Startup](#), 2011, p.49

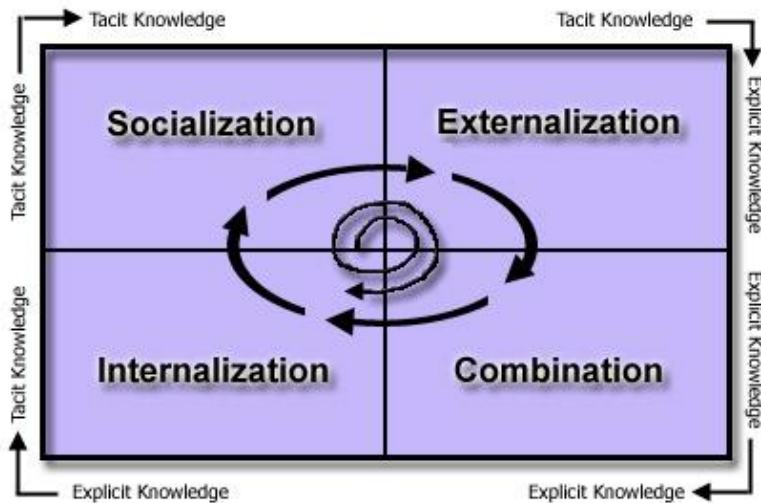
“Tuning” and “Pivots” ... two lean startup concepts that mesh with dynamic capabilities

- ▶ Ordinary capabilities involve “tuning the engine”... a process of optimization
- ▶ Circumstances often require a change in strategy or in business models. This is called “pivot” and requires agility...which is relatively easy for a startup

Issues with Lean Startup

- ▶ Focus is on startup...only one aspect of what's required for established companies to have dynamic capabilities
- ▶ Not explicitly grounded in theoretical framework...but deep uncertainty is implicit
- ▶ Mechanisms for sensing and seizing not well specified

Further research: open innovation & Knowledge co-creation



Spiral of Knowledge Creation
by Nonaka & Takeuchi (1995)

- Based on abduction type logic, SECI requires additional effort to demonstrate how knowledge creation can be married to open innovation and dynamic capabilities

- Disruptive innovations originate in (a) low end or (b) new market foothold
- Unless a new entrant is on a disruptive trajectory, it can be ignored
- Under Christensen's definitions, Netflix is a disruptor; Neither Uber nor Tesla are
- ▶ Implications
 - ▶ Because disruption can take time incumbents frequently overlook competition
 - ▶ Disruptions often build different business models which may lower their competitive profile
 - ▶ Learning (by the new entrant) and strategic blind spots (framing errors) by the incumbent are implicit in the paradigm

EVOLUTIONARY ECONOMICS



Richard Nelson



Sidney Winter

- ▶ Firms seen as information processing and problem solving entities which interpret signals coming in from the environment (Cyert & March, March & Simon Lineage)
- ▶ Adaptation is the key behavioral algorithm
- ▶ Normative/Prescription implications
 - a) Firms adapt
 - b) Change is incremental (local)
 - c) Local mutation is possible
- ▶ Formalized through Kauffman and Levin NK models:
 - ▶ K = Complexity of landscape, N = Number of components of the system; hills & valleys represent profit

Evolutionary economics applied to management

- ▶ In evolutionary economics, “the concept of routines and capabilities were put forward as components for a description theory of organizational behavior, not a source of advice for businessmen.”*
- ▶ Deliberate acquisition of (potentially) valuable skills is part of an intentional action by managers that can be advantageous*
- ▶ Success is a consequence of effort and luck joined by alertness and flexibility**
- ▶ According to Levinthal’s models, organizations trapped in local optima can reach, at low probability, global optima though radical mutations
- ▶ No strong managerial implications

*S.G. Winter, “Problems at the Foundation? Comments on Feline Foss, *Journal of Institutional Economics*, 7(2) p. 257-277, (2011).

**Denrell, Fang, and Winter, *Strategic Management Journal* (2003).