

5a. Conferência Nacional de CT&I
Brazil-China Innovation Dialogue 2024:
Technology and Development
April 8 - 11

Energy Transition and Sustainability roundtable

A note on Uncertainty, resilience and antifragility in corporate strategic management

Adriano Proença

Escola Politécnica e IBRACH/INCT/PPED

UFRJ



Summary

- Introduction
- Corporate Strategy: a definition
- Dynamic Capabilities framework
- Business ecosystems
- Disruption and Uncertainty
- Resilience and Antifragility
- Strategic management for resilience and antifragility

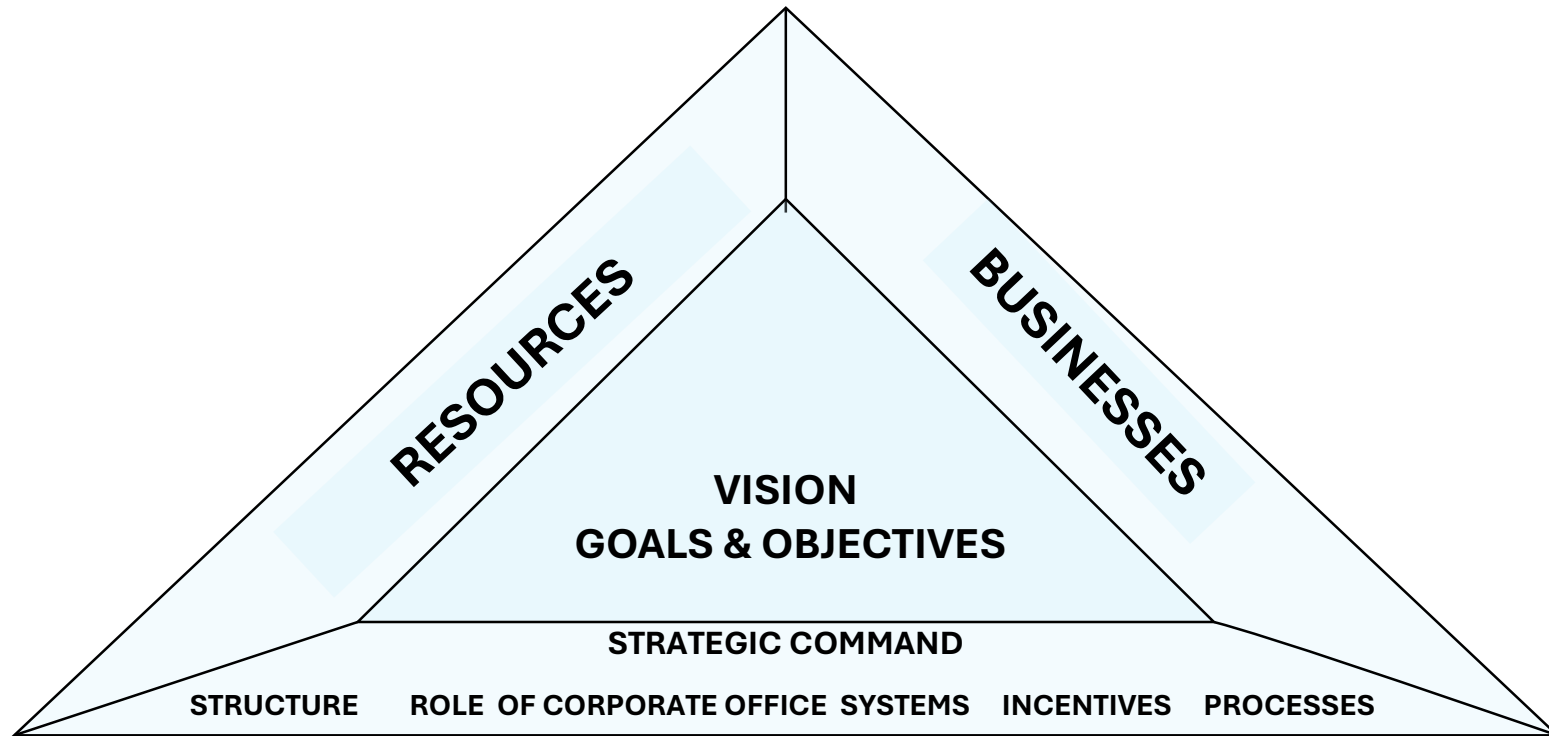
Introduction

- Bringing corporate strategy issues to the debate: the role of Dynamic Capabilities
- Climate change/variability and energy transition: ‘disruption’
- Turbulence and strict uncertainty:
 - More intense and longer heat waves, droughts, floods; rising sea levels, changes rainfall patterns, etc. → How? How fast? Who? Where?
 - “Net zero” targets → enforced new regulation; supply chain leaders (e.g. CDP (ex-Carbon Disclosure Project) group demands); technological progress; innovations – How? How fast? Who? Where?
- In what and how (much) to invest?

Corporate Strategy

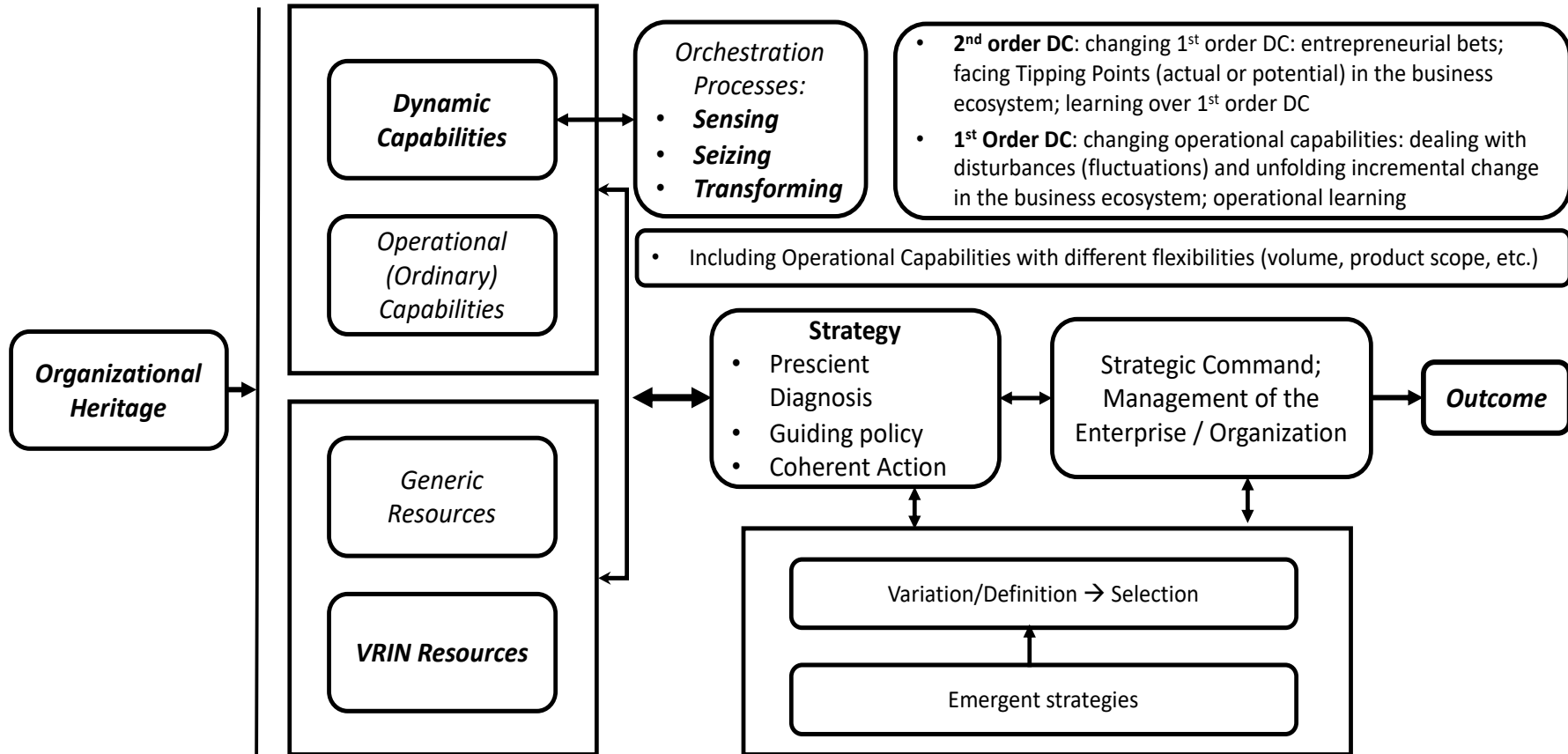
- It is the way in which a company creates value through the configuration and coordination of its multi-market activities.
 - Configuration: scope of multi-market activities
 - Coordination: how the company manages the businesses and activities that make up the corporation.

The (classic) triangle of Corporate Strategy



Adapted from Collis and Montgomery, 1997

Corporate strategy: Dynamic Capabilities framework



Proença and Burlamaqui, 2023

Business ecosystems

- “an economic community supported by a foundation of interacting organizations and individuals... the produces goods and services of value to customers”; “a **biological metaphor** that highlights **the interdependence of all actors in the business environment, who co-evolve their capabilities and roles**” (Moore, 1996).
- Business ecosystems: socio-economic-technical **complex adaptative systems**.
- “Ecosystems by association” x “**Structured ecosystems**” → **centered on an integrated value proposition** (Adner, 2017).
- Business ecosystems: **when firms are dependent on each other to deliver an 'integrated value proposition'** - a dependence **centered on the complementarity of assets, knowledge and products** (*throughout all the Value Network*) that allow the development of relevant capabilities and the realization of value (Jacobides et al., 2018).
- Structured ecosystems: the **shaping** of its business ecosystem is undertaken by the company. It is an **entrepreneurial initiative** (Drucker, 1973; Helfat et al., 2007; Teece, 2007).

'Orchestrating' business ecosystems

- Dynamic capabilities and the business ecosystem:
 - Sensing
 - Seizing & Shaping
 - Transforming
- Internal business ecosystems: multiple business units under the corporation strategic authority. Different governance and management models.
- External business ecosystems: autonomous complementary agents that the company seeks to 'orchestrate'.

Climate change/variability and energy transition: ‘Disruption’

❖ **Disruption:** disturbance, disorder, shock, stress, disaster, crisis. Imply a **level of turbulence and uncertainty.**

❖ Climate change/variability and energy transition: ***drivers of disruption***

- Changes in the ecological environment
- Environment degradation
- Natural resources growing scarcity
- Changes and evolution of regulations for environmental protection
- Supply-chains emerging demands and choke-points
- Growing dependency on complex technological systems
- Innovation unpredictability
- Emerging new businesses models and new enterprises
- Novel strategies from relevant players
- Availability of appropriate power supply
- Energy prices volatility
- Mismatch between new strategic needs and available funding
- Evolving customer behaviour; demand volatility

Facing Turbulence and Uncertainty

- **Fragility:** when systems are vulnerable and can be detrimentally destroyed or broken in consequence of disruptions (fragile).
- **Robustness:** when systems can sustain shocks and remain steady (robust).
- **Resilience:** when systems can absorb shocks and although temporarily changing, they recover from those shocks, through absorption or adaptation or even transformation. The affected system is able to return to an acceptable state, not necessarily the same as before. It refers to the system ability to reorganize, restructure and even reinvent when appropriate in response to disruption (resilient).
- **Antifragility:** when systems absorb shocks and get better afterward. It gains from disorder. It refers to survive and thrive when dealing with unknown randomness and disruptions (antifragile) (Taleb, 2012).

Ramezani and Camarinha-Matos, 2020

Resilient systems

Adaptive capacity:

- Capacity of a system to rebound from trauma and recover.
 - Readiness; Response; Recovery.
- Capability of a system to maintain a desirable state (i.e. bouncing back to a new ‘in regime’ condition (‘equilibrium’) or to an accepted state);
- Capacity of a system to withstand stress with the focus on persistence thresholds (how long the system remains at a certain state before changing to a different one; gradual adaptation and transformation).

Hale and Heijel, 2006; Ramezani and Camarinha-Matos, 2020.

Antifragile systems

- Not only survive the shocks, but also actively “employ” them to become stronger.
- Open to positive disruptions.
- It gains from being stressed (till a certain point).
- Antifragile systems gain from disorder: a capability to regenerate, prosper and improve in response to unpredictability, volatility, randomness, chaos and disturbance.
 - Errors and randomness are essential for organizations to improve → depriving them from volatility and shocks will weaken the system.

Since Taleb, 2012

From the Strategic Innovation Management literature: a framework for Portfolio Management

	Disruption	Dynamic stability
Performance improvement	Transformative Initiatives (H2)	'Incremental' initiatives (core and adjacent) (H1)
Enablers	Incubation Initiatives (H3)	Productivity enhancement initiatives (H1)

Moore, 2015

Facing Climate change/variability and energy transition uncertainty: Dynamic Capabilities – sensing; seizing; shaping; transforming processes

	Disruption	Dynamic stability
Performance improvement	<p style="text-align: center;">Transformative Antifragile</p> <ul style="list-style-type: none"> Seizing opportunities: large strategic projects; implementing transformative (radical) innovation; Transforming the Corporation: Management innovation; M&A's; Reshaping the ecosystems. <p style="text-align: center;">Resilient</p> <ul style="list-style-type: none"> Adaptive capacity: Transformation process; Rebound and recover; Reconfiguration of Business Units / Assets portfolio; Related diversification; M&A's; reshaping the ecosystem Management and governance model reconfiguration. 	<p style="text-align: center;">'Incremental' initiatives (core, adjacent)</p> <p style="text-align: center;">Robustness</p> <ul style="list-style-type: none"> Absorptive coping capacity Defending core competitive positions ('current dividend streams and market valuations') – incremental innovation; Adjusting the business mix and the capital allocation and organizational capabilities; Entering adjacent markets; incremental innovation.
Enablers	<p style="text-align: center;">Incubation – seeding resilience and antifragility</p> <p>Internal Ecosystem:</p> <ul style="list-style-type: none"> R&D (sensing) New Businesses Initiatives – studying and testing where and how to compete (sensing) <p>External Ecosystem:</p> <ul style="list-style-type: none"> Ecosystem sensing and orchestration. 	<p style="text-align: center;">Productivity enhancement initiatives</p> <ul style="list-style-type: none"> Efficiency for environmental sustainability Developing Smart Digital Infrastructure Improving business processes: efficiency; flexibility; speed; agility.

	Disruption	Dynamic stability
Performance improvement	<p>Transformative Antifragile</p> <ul style="list-style-type: none"> • Seizing opportunities: large strategic projects; implementing transformative (radical) innovation; Transforming the Corporation: Management innovation; M&A's; Reshaping the ecosystems. <p>Resilient</p> <ul style="list-style-type: none"> • Adaptive capacity: Transformation process; • Rebound and recover; • Reconfiguration of Business Units / Assets portfolio; • Related diversification; M&A's; reshaping the ecosystem • Management and governance model reconfiguration. 	<p>'Incremental' initiatives (core, adjacent) Robustness</p> <ul style="list-style-type: none"> • Absorptive coping capacity • Defending core competitive positions ('current dividend streams and market valuations') – incremental innovation; • Adjusting the business mix and the capital allocation and organizational capabilities; • Entering adjacent markets; incremental innovation.
Enablers	<p>Incubation – seeding resilience and antifragility</p> <p>Internal Ecosystem:</p> <ul style="list-style-type: none"> • R&D (sensing) • New Businesses Initiatives – studying and testing where and how to compete (sensing) <p>External Ecosystem:</p> <ul style="list-style-type: none"> • Ecosystem sensing and orchestration. 	<p>Productivity enhancement initiatives</p> <ul style="list-style-type: none"> • Efficiency for environmental sustainability • Developing Smart Digital Infrastructure • Improving business processes: efficiency; flexibility; speed; agility.



Needed: 2nd order Dynamic Capabilities

Thank you!

謝謝

Obrigado!



UFRJ
UNIVERSIDADE FEDERAL
DO RIO DE JANEIRO



UFRJ
COLEGIADO BRASILEIRO DE
ALTOS ESTUDOS



CEBRI
Rethink Tank

