

**ENHANCING ENTREPRENEURIAL INNOVATION
THROUGH INDUSTRY-LED ACCELERATORS:

CORPORATE - NEW VENTURE DYNAMICS AND
ORGANIZATIONAL REDESIGN

IN A PORT MARITIME ECOSYSTEM**

By
Cristóbal García-Herrera

Dyson School of Design Engineering,
Imperial College London

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DECLARATION

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*This PhD Thesis is dedicated to my much-loved Dad Juan Ignacio aka “TataNacho”
who always inspired me and supported me on my academic quest.*

ABSTRACT

This PhD dissertation studies the management and design of corporate accelerators, in particular, industry-led value chain corporate accelerators. I addressed a multi-faceted research question about the novelty, corporate impact, dynamics and design of industry-led accelerators. Using a longitudinal, inductive, multiple-case embedded research design that analyses the industrial accelerator interface, the relationships between incumbent firms and external new ventures and the R&D/innovation units of established firms in a port maritime complex, this dissertation addresses this multi-faceted research question and it makes five core contributions. First, it positions, for the first time, the corporate accelerator phenomena at the intersection of fundamental management research streams, including organizational design, dynamic capabilities and corporate entrepreneurship. Second, it conducts the first study of the promising model of industry-led accelerator by inductively generating a four-step framework of how these accelerators work: i) co-define a broad innovation remit, ii) generate an innovation funnel to attract start-ups and scale-ups, iii) mutual sensing via flexible matching iv) select for scale and investment. Third, it finds striking counter-intuitive evidence in that the industry-led accelerator not only accelerates external new ventures but rather the corporate partners themselves by triggering them to internalize the lean start-up method and redesign their R&D/innovation processes and routines. To explain this, I inductively developed a four-phases process model of corporate entrepreneurial capability-building, comprising: a) attracting, b) strategic fit sensing, c) shaping and d) internalizing. Fourth, this dissertation uncovers three novel tensions—internalization, implementation and role—at the incumbent - new venture interface and develops a new ecological and symbiotically-inspired framework for tension identification and mitigation in industrial acceleration contexts. Fifth, and finally, using the frameworks and process models developed, this dissertation proposes a new toolkit (industrial acceleration design canvas and workshops) to orient practitioners when strategizing, designing and sustaining corporate new venture ecosystem acceleration initiatives.

Keywords: *organizational design, exploration, ambidexterity, corporate accelerator, entrepreneurial capabilities, dynamic capabilities, process model, incumbent vs. new venture, tensions, industrial architecture, business model innovation, ecosystem disruption, complementary assets, appropriability, design management, canvas, port maritime complex, longitudinal multiple case studies.*

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PROLOGUE AND ACKNOWLEDGEMENTS

This thesis simultaneously marks both the end and the beginning of a journey.

Having been an entrepreneurship educator in my previous life, I started my PhD with the following broad, simple, yet paradoxical question: can established firms behave as start-ups?

The short answer is: yes and no. For the long answer, read ahead.

During the initial phases of my research, I came across a novel unit in established firms designed to bring entrepreneurial innovation into the organizational core: the corporate accelerator. I realized it was a wonderful setting to study not only how acceleration methods such as lean start-up works, but also how incumbents are coping with incoming disruption and engaging new ventures in novel ways, thus unfolding unseen dynamics and multi-level tensions.

As I write this prologue, the whole world is suffering from the viral acceleration of COVID-19, and, as a consequence, a massive unexpected de-acceleration of the global economy, social and urban life, transport networks, global trade and so on. Many industries and organizations of different sizes across the world are coping, at present, with different degrees of de-acceleration and economic crisis. I believe that the pages that follow contain some small yet valuable lessons and frameworks that we might use to re-build and re-accelerate entire industries, as well as the large and small companies within them. We will need to further create, democratize and test faster novel approaches to re-accelerate new corporate, industrial, venture activity and value creation mechanisms across sectors. With this present work, I hope to contribute in a small way to this daunting endeavour.

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OceanAccel was the gateway for me to access, learn and understand the corporate new venture dynamics that I have attempted to unravel in this PhD thesis. Through OceanAccel, I was able to access a myriad of people in different organizations, all of whom I would like to deeply thank.

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INTRODUCTION

1 INTRODUCTION TO THIS DISSERTATION

This PhD dissertation studies the design and management of corporate accelerators, in particular, industry-led value-chain consortium corporate accelerators. Given the pace of disruption in every industry and coinciding with the global diffusion of the lean entrepreneurship practice, including independent seed accelerators, corporate accelerators have emerged as new organizational interfaces aimed at increasing the exploration speed through experimentation with new business models, technologies and start-ups outside the core – but bound by the strategic objectives – of incumbent firms.

In particular, this PhD positions the industry-led accelerator as a novel previously untheorized organisational interface through which value is created and captured for established companies, new ventures and industrial stakeholders operating in value chains facing disruption. This novel industrial acceleration process of value creation and capture is mainly cooperative yet it also presents latent “coopetitive dynamics” (Brandenburger & Nalebuff, 2011) and thus, it is subject to new tensions among the involved stakeholders, particularly between incumbents and new ventures as the industrial architecture (Michael G. Jacobides, Knudsen, & Augier, 2006) is reshaped.

1.1 Research Questions

To position corporate and industrial acceleration research as a novel domain of inquiry into value creation, this PhD addresses the following five research questions in the chapters that ensue: 1) *How do corporate accelerators, and in particular, industry-led ones, differ from previous organizational designs for innovation exploration?*; 2) *How do industry-led accelerators enable external new ventures to engage with value chain incumbents and create value for the corporates, ventures and the sector as a whole?*; 3) *How do established firms develop new entrepreneurial orientations and capabilities through their engagement with industry-led accelerators and new ventures?*; 4) *What are the novel tensions between established firms and external new ventures in industrial acceleration contexts and how might we anticipate and resolve them in industrial acceleration contexts?*; and finally, in concluding, I use the answers to the above questions, to address the final practitioner-oriented question 5) *How do we design industry-led accelerators?*

1.2 Research Methods and Setting Overview

As for the research methods, I deployed an inductive, longitudinal, theory-and-framework building multiple-case research design, with three embedded units of analysis: i) the acceleration interface, i.e., the industry-led accelerator program and its design parameters; ii) the coopetitive relationships (tensions) between incumbents and new ventures during industrial value chain/ecosystem architectural disruption; iii) the corporate R&D/innovation units of the established firms sustaining the industry-led accelerator in this maritime complex. Each unit of analysis serves as the base for my three core empirical dissertation papers, which, in turn, serve as the main chapters of this dissertation, i.e., chapters 3, 4 and 5. Though all empirical chapters use an inductive approach and a similar dataset in the same setting, the methodological treatment is different. Hence, each empirical chapter presents its own methods section, as well as its own theoretical framing and discussion. For instance, in Chapter 3, where I analyse and induct the novel working principles of the industry-led accelerator, I use a single longitudinal case, with the accelerator program as the focal unit of analysis. In Chapter 4, I focus on the new entrepreneurial capabilities and routines acquired by the corporate R&D/innovation units due to their involvement with the industry-led accelerator. In Chapter 4 the focal unit of analysis is the corporate R&D and innovation unit of the incumbent firms supporting the industry-led accelerator. I studied four incumbents – especially their corporate R&D/innovation units, which interfaced with the accelerator - longitudinally, for over 3 years. Then, in Chapter 5 concerned with the relationships (tensions) between incumbents and the accelerated new ventures, the focal unit of analysis is the incumbent - new venture dyad. Each dyad constitutes an experiment to test and further develop the theory using a confirmatory replication logic among cases (Yin Robert, 1994).

The chosen accelerator, incumbents and new ventures were selected using *theoretical sampling* criteria (Eisenhardt, 1989; Eisenhardt & Graebner, 2007) due to the revelatory potential of the industry-led accelerator case as well as the variance among the four longitudinal cases of large firms and the twenty-four incumbents – new venture dyads. The industry-led accelerator was chosen for the rich coopetitive – interplay of collaboration and competition - and spilling over dynamics among incumbents and new ventures. The industry (port, maritime, logistics, energy petro-chemical/refinery) was chosen because of its long tradition of its functional architecture, which is being disrupted and thus, present clear opportunities to observe change at both the incumbent and new venture level.

In terms of type of evidence, I use primary qualitative and archival data from the accelerator, incumbents, and new ventures (start-ups and scale-ups) as well as data from a maritime logistics R&D Center, a leading university incubator, a regional investment agency, a VC Fund specializing in port maritime logistics. I conducted extensive semi-structured interviews over three years with all relevant stakeholders in these three units of analysis, especially the accelerator staff, senior executives and R&D/innovation managers of the incumbents and new ventures' founders.

The bulk of the data was collected between December 2016 and June 2018. During the 2017 and 2018 programs (March through June), I observed core activities involving the accelerator staff, the incumbents, and new ventures on a weekly basis, including new venture training, corporate mentoring to founders and proof-of-concept validation sessions. During 2019 and up until early 2020 several follow-up interviews were conducted to further understand the dynamics and clarify the relationships in my frameworks and theoretical constructs. I digitally recorded all the interviews: 80% of the interviews were conducted in person and about 20% remotely. The interviews lasted between 45 and 90 minutes and were fully transcribed. Observations of staff meetings, mentoring sessions, training, advisory boards and events were also recorded and live notes taken. Each interview transcript was approximately 15 pages long. See Table 1.1 for the overall Data Collection effort, including data sources, total of interviews, type of informants and events and meetings attended for data collection.

Table 1.1 Data Collection

Period of Data Collection	December 2016 through March 2020
Data Sources	1) Semi-structured interviews, 2) Observations of industry-led accelerator's scouting, selection and mentoring of new ventures, training, roadshows at corporate premises, 3) Participation in advisory board meeting, industry events and graduation/demo days
Total # of Interviews	85 Incumbent Firms: 30 Interviews in 4 Firms New Ventures: 34 Interviews in 17 Ventures Industry-Led Accelerator: 10 Interviews Industrial Ecosystem Stakeholders (VC Firm, R&D Center, University Incubator, Regional Business Association): 11 Interviews
Type of Informants	Executives from the Incumbent firms such as the CEO, CFO and COO as well as the R&D General Manager, the Digital Innovation Officer, Innovation Engagement Leaders, Innovation Coordinator, R&D Engineers, Chief Scientist, Head of Corporate R&D and Innovation, Innovation Manager, Senior Digitalization Officers, Intrapreneurs, Program Management Heads, Deputy Innovation Officers; Staff from the Industry-led Accelerator such as the Managing Director, the Director, the Scouting Officer, the Investment Lead, Mentoring

	Lead, and the Community Engagement Leader; Founders and the CEO, CTO and CFO as well as Business Development Staff from all new ventures
Events and meetings attended for data collection	Ocean Accel Training for new ventures, Ocean Accel advisory board meetings, Incumbent - New Venture mentoring session, Corporate Start-up Engagement facilitation sessions, new ventures' roadshows at incumbent premises, graduation ceremonies/demo days and industry-wide events such as the international maritime fair and the CEO platform annual meetings

As for the empirical setting, I selected a revelatory industry-led corporate start-up accelerator, that I label OceanAccel, in a leading European port complex. This industrial accelerator was co-launched by port maritime industry incumbents – including the port regulatory authority - to catalyze innovation in the maritime logistics sector and drive the disruption. This has been a collective effort to engage entrepreneurial ventures for a re-think of how this sector works, i.e., how value is created and captured in the sector.

Given the long traditions and long-established architecture of the sector, OceanAccel provides an ideal context for the study of the dynamics that may enable or inhibit incumbents from proactively drive technology-induced industry transformations through exchange of resources (Pfeffer & Salancik, 2003), organizational learning (Argote, 2011) and dynamic capability development (Helfat & Peteraf, 2003). It is also an ideal setting to simultaneously study both competition and cooperation (Hoffmann, Lavie, Reuer, & Shipilov, 2018) among incumbents and between incumbents and new ventures.

Two technological discontinuities prompted the creation of OceanAccel: digitalization and energy transition in maritime, logistics, energy and petro-chemical-refinery sectors. Therefore, OceanAccel specifically focuses on technological discontinuities in: (1) robotics and automation; (2) network platforms; (3) simulation and VR; (4) IoT and big data analytics, and (5) energy efficiency and environmental awareness. The associated disruption scenarios include but are not limited to: i) increasing digitalization and transparency of the supply chain that might eliminate brokers and freight forwarders intermediaries; ii) the energy transition towards cleaner sources will undermine legacy assets based on fossils fuels (e.g., oil pipelines, storage and refinery facilities); iii) new algorithmic and automation technologies that might render obsolete legacy workforce at the operators and middle-management levels. This is an asset-driven industry with heavy equipment, machinery, vessels and physical port maritime infrastructure. However, digitalization and energy transition are impacting both core technologies and complementary

assets in this industrial complex, and thus, unleashing novel tensions among incumbents, regulators and, especially between incumbents and new ventures, as I shall discuss in Chapter 5.

OceanAccel was co-founded by four incumbents, which we call ROYAL PORT, TANKTECH, VOX, and SATELLITE. As the focal regulatory Authority, ROYAL PORT was the main initiator and orchestrator behind OceanAccel. ROYAL PORT's business model has evolved between 2003 to 2018 from that of a landlord regulator to becoming an ecosystem enabler and orchestrator and to an entrepreneurial regulator that also competes in the sector with mainly digital products and services. TANKTECH is a 400-year old global storage company that has invested heavily into digitalization during recent years. VOX and SATELLITE are both leaders in dredging, marine infrastructure and off-shore energy and they both compete – yet sometimes they cooperate - against one another in several services. I provide a complete in-depth overview of these four incumbents with regards to their entrepreneurial innovation development in Chapter 4 and Appendix A (#7).

OceanAccel – along with its corporate partners and new ventures - has catalyzed the co-creation of an industrial ecosystem whose business logic has evolved from zero-sum contract-based supplier relationships of previously stand-alone firms in a value chain to an emergent maritime ecosystem of collaborators, co-competitors and complementors to create and capture value in the midst of technological disruption.

1.3 Understanding a Maritime Ecosystem via Ecological Metaphors and Symbiotic Resource Exchanges

To make sense of the emergence of a new maritime ecosystem whereby current occupants are somewhat transformed through the interaction with new entrants, I use marine biology metaphors to refer to the main agents of this story, namely, incumbents and new ventures. Incumbents are referred to as 'whales' that may become 'sharks' (Chapter 4) and new ventures are referred to as either 'young or mature dolphins' as they interact with 'whales' or even 'killer-whales' (Chapter 5). The inspiration for these biological metaphors is twofold.

On the one hand, prior research on corporate venture capital through a lens of resource dependency (Pfeffer & Salancik, 2003) has theorized about incumbents as being very attractive yet dangerous entities that can gobble new ventures during their engagement: incumbents are like 'sharks' (Katila, Rosenberger, & Eisenhardt, 2008). In our empirical context, we found

bidirectional resource exchanges among incumbents and new ventures, which are asymmetric. However, these maritime incumbents behave not as ‘sharks’ who intend to eat (acquire) the selected external accelerated ventures but rather as ‘whales’ who slowly *wait and see* and accidentally misappropriate some of their resources (potential technologies and new business models) during the open-ended engagement process. Furthermore, these whales-like incumbents have recently developed—through the symbiotic engagement with the accelerator and the new ventures—novel capabilities to increase speed, agility and ‘entrepreneurial appetite’. In a way, these ‘whales’ are in a learning process of becoming ‘sharks’ (Chapter 4). The new ventures, in turn, behave as ‘dolphins’ who iteratively tinker with their MVP and business models and who trust the incumbents that had selected them in the first place. The dolphins-like ventures can be either younger or mature, depending on the strength of their defences to respond to misappropriation attempts.

On the other hand, I draw on biologically inspired accounts to theorize about the relationships and tensions between incumbents and new ventures in changing and to-be-disrupted industrial ecologies, where both entities are co-evolving and trying to adapt to new environmental conditions. Furthermore, I contribute to a nuanced understanding of the ecological and compositional logics of accelerated industrial ecosystems facing disruption at different sources: module, function, role. Using an ecology inspiration to illuminate ecosystem generation and evolution, I developed a novel framework for incumbent - new ventures engagement, which identifies four main symbiosis modes: mutualism, commensalism, parasitism and predation. Each incumbent – new venture symbiotic engagement mode includes drivers, mechanisms, outcomes and mitigation strategies for the identified tensions. I put all together into a decision flow model, which summarizes starting conditions, likely tension types, and possible symbiotic outcomes as well as mitigation strategies in different situations, echoing previous leading research practice (Michael G. Jacobides et al., 2006; D J Teece, 1986; David J. Teece, 2018).

This is the initial outline of an ecological theory to understand industrial acceleration through symbiotic incumbent new venture engagements that I expect to further develop in the years to come.

1.4 PhD Thesis' Structure and Content per Chapter

This PhD dissertation is organized as a set of four self-contained papers that are integrated as chapters with their own internal sections, but which logically relate to the overall corpus. The PhD dissertation structure is as follows:

I start with Chapter 2, which is entitled **A REVIEW OF ORGANIZATIONAL DESIGNS AIMED AT EXPLORING INNOVATION OPPORTUNITIES: POSITIONING CORPORATE AND INDUSTRIAL ACCELERATOR RESEARCH.**

The aim of this introductory chapter is to review extant research on organizational designs aimed at promoting and accelerating innovation exploration (incremental, architectural, radical) and, thus at spotting significant gaps that are relevant to both the following chapters in this dissertation and to potential avenues that can be explored in further corporate and industrial acceleration research. The question(s) guiding this literature review are: What are the key research streams that inform or can inform corporate and industrial accelerator research and, in the case of the latter, how so? That is, how are corporate accelerators different from previous organizational designs for innovation exploration? What is similar, what is different and what is new under the sun in relation to these new organizational arrangements? The contributions of this chapter are three-fold. First, it positions the corporate acceleration phenomena within a larger tradition of key organizational research streams. Second, it proposes an integrative framework to bring together these different streams, shed light on particular relevant gaps and, in so doing, positions this PhD thesis and its subsequent chapters. Third, this chapter identifies unexpected sources and insights that actually inform corporate and industrial acceleration research that I utilize in the following chapters.

Then, it continues with Chapter 3, the first empirical Chapter, entitled **INDUSTRY-LED ACCELERATORS: WHAT ARE THEY AND HOW DO THEY WORK?: THE CASE OF OCCEAN ACCEL**

In this empirical chapter, I focus on a promising model of corporate and industrial acceleration, i.e., the industry-led consortium accelerator, by asking the following research question: *How do industry-led accelerators enable external new ventures to engage with value chain incumbents and create value for the corporates, ventures and the sector as a whole?* To address this research question, I used an inductive framework-design approach based on the single

longitudinal case of a revelatory industry-led accelerator operating in a major European port maritime complex. Using this case, I inductively derived four steps to explain how industry-led accelerators work. Generally, they i) define a broad innovation remit through an inter-company collaborative approach, ii) generate an innovation funnel to attract/select external innovation streams (start-ups and scale-ups) that fit the innovation remit, iii) connect corporate partners, through flexible matching, with external new ventures for further validation and, finally, iv) select start-ups/scale-ups for corporate engagement through short-term POC/pilots and roll-out deployment contracts, as well as potential acquisitions or investments to ensure scaling.

Then, this dissertation continues with the two core empirical chapters. Chapter 4 is entitled **HOW DO ‘WHALES’ BECOME ‘SHARKS’?: A PROCESS MODEL TO DEVELOP CORPORATE ENTREPRENEURIAL CAPABILITIES.**

This chapter inductively develops a process model of co-accelerated corporate entrepreneurial capabilities and frames its contribution against the dynamic capabilities, organizational design and incumbent adaptation streams, which were introduced in Chapter 1. The process model comprises four capability-building steps: i) disruption co-sensing, ii) selecting streams, iii) shaping and engaging streams and iv) internalizing and re-designing structures. In so doing, we advance a novel mechanism-based explanation of how R&D units and corporate innovation units of established firms can develop entrepreneurial capabilities through a four-phase cooperative engagement process with industry-led accelerators. The process model includes a dissection of this co-accelerated, corporate entrepreneurial, capability-building construct based on its key enacting drivers, comprising knowledge flow direction, people, resources, temporal orientation and governance. This thesis contributes to the corporate entrepreneurship/venturing and organizational design research by bringing together previously disconnected streams to resolve a puzzle in a novel setting in order to theorize about capability building, accelerated learning, adaptation and lean entrepreneurial innovation redesign in the modern corporation.

Then, I follow with Chapter 5 entitled **WHEN ‘WHALES’ MEET ‘DOLPHINS’: A COOPERATIVE MODEL FOR INCUMBENT – NEW VENTURE RELATIONSHIPS DURING ARCHITECTURAL DISRUPTION.** In this final empirical chapter, I focus on tensions between incumbents and new ventures in an industry-led corporate accelerator set up in order to ‘self-disrupt’ the maritime logistics value chain in the context of two technological

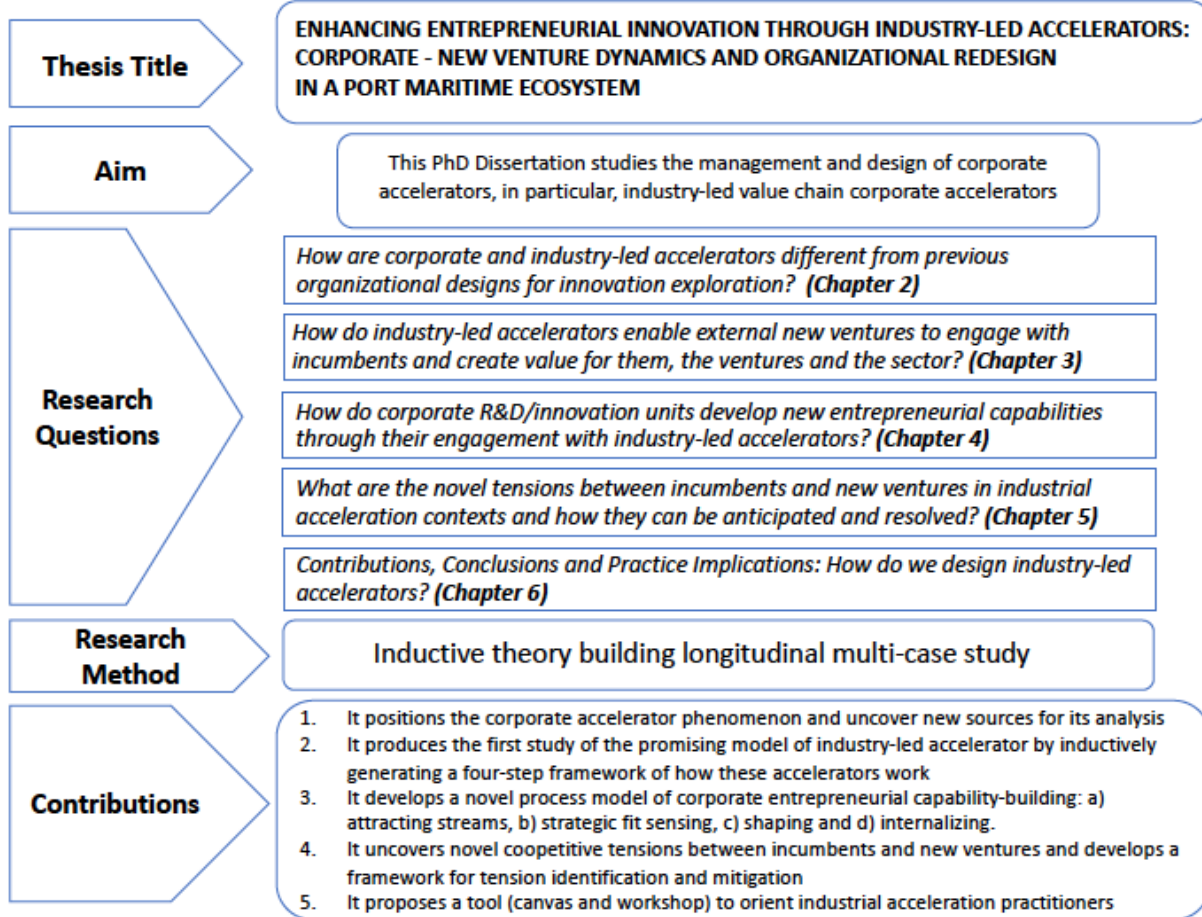
discontinuities: digitalization and energy transition. First, I explore tensions that arise in incumbent/new venture relationships, where the new venture may not represent a direct substitute to the incumbent but, rather, may threaten to disrupt a given sector's architecture of value-creating functions and associated ecosystem roles. Second, I explore the dynamics that may either enable or inhibit the ability of incumbents to respond to ambiguous threats in the face of sector disruptions. Finally, I develop an inductive model to theorize about these tensions and the associated response and mitigation mechanisms by incumbents and new ventures alike in industry-led accelerators.

Finally, I bring all together in the Final Chapter 6, where I synthesized the main findings and contributions of the three empirical chapters and positioning outlined in Chapter 2 to explain how they collectively and distinctively contribute to the overall corpus of this PhD Thesis. In addition, I also include in this final chapter a practitioner-oriented output derived from the value creation and capture process analyzed in the previous chapters to orient industrial incumbent – new venture acceleration practice. Thus, I propose and justify a new Industrial Acceleration Design Canvas and related Workshop to inform managerial practice and corporate start-up engagement in similar industrial contexts by orchestrating value creation and capture at the new venture, firm and value chain/ecosystem levels. Last but not least, I also highlight the study limitations, generalizability and boundary conditions as well as discuss avenues for further research.

I also include **Appendix A** (numbered as #7 to keep the order) entitled **CORPORATE R&D, INNOVATION MANAGEMENT AND ACCELERATOR START-UP ENGAGEMENT IN A PORT MARITIME COMPLEX**. This section is an empirical descriptive account, i.e., case narratives of the four corporate cases with regards to their R&D/innovation strategy, innovation management processes and emerging internal entrepreneurial practices vis-à-vis their engagement with both the industry-led accelerators and new ventures.

To sum up and to aid the reader, I present below in Figure 1.1 an Overview of my PhD Thesis

Figure 1.1 PhD Thesis Overview



CHAPTER 2

**A REVIEW OF ORGANIZATIONAL DESIGNS AIMED
TO EXPLORE INNOVATION OPPORTUNITIES:
POSITIONING CORPORATE AND INDUSTRIAL
ACCELERATION RESEARCH**

2 A REVIEW OF ORGANIZATIONAL DESIGNS AIMED TO EXPLORE INNOVATION OPPORTUNITIES: POSITIONING CORPORATE AND INDUSTRIAL ACCELERATION RESEARCH

The aim of this chapter is to review extant research on organizational designs aimed to promote and accelerate innovation exploration (incremental, radical, architectural, ecosystem) and thus, to spot relevant gaps in extant research and to position this dissertation and the following chapters as well as propose avenues for further corporate and industrial acceleration research. This review is guided by what we know and do not know about organizational units designed for entrepreneurial innovation exploration. This review is also guided by the search of key insights and gaps to shed light on the burgeoning yet under theorized and poorly understood phenomena of corporate accelerators, including industry-led ones, which are the focus of this PhD.

2.1 Review structure and levels

This review is structured using two main theoretical levels. The first level includes meta-theoretical streams that inform innovation exploration: organisational design, dynamic capabilities and radical innovation management. The second level comprises phenomenon-driven theories informing the corporate acceleration phenomena in particular, including corporate venturing, start-up accelerators and open innovation. This second level of this review will discuss the main findings of selected studies regarding the following specific organizational units for innovation exploration at the modular, incremental, architectural and radical (R. M. Henderson & Clark, 1990) levels: i) Ambidextrous Designs, ii) Spin-outs, iii) Skunk works, iv) Corporate Ventures Units, v) Corporate Accelerators.

The objective is to position corporate and industrial acceleration research in general, and industry-led accelerators, in particular within these fundamental and phenomenon-driven management streams, and thus to situate the various gaps to which this thesis contributes to in the subsequent chapters (#3, #4 and #5).

To structure this review I search for articles on organizational designs, e.g., ambidextrous designs, spinouts, skunk works, corporate venturing and corporate accelerators from the 1990s onwards in top business and management journals, including—but not limited to: *Administrative Science Quarterly*, *Academy of Management Journal*, *Strategic Management Journal*, *Academy*

of Management Review, Organization Science, Management Science, Research Policy, Entrepreneurship theory and practice, Journal of Business Venturing, Journal of Management and Industrial and Corporate change. Given the nature of the phenomena under study, I also searched and obtained relevant results in practitioner-oriented journals such as *Harvard Business Review, Sloan Management Review, California Management Review* and *less known ones such Business Horizons, Journal of Applied Business Research* and *Creativity and Innovation Management*, where the initial corporate acceleration research has been published.

The first section of this literature review on previous organizational designs and units for innovation exploration is not exhaustive, however. The goal of this theory-led review approach (Pawson, 2006, 2013) is to illuminate corporate acceleration research by uncovering structures, processes and issues previously analyzed in these other organizational contexts that are relevant for our understanding of the new phenomena in ferment. Based on the theory-led approach, I further narrowed the scope of this literature review in two ways. On the one hand, it does not discuss the broader research stream on alliances, as it does not exclusively refer to organizational arrangements for innovation exploration. And on the other hand, this review neither does assess the teams' literature nor the influences of individual differences as these also go beyond the scope of this chapter and overall dissertation.¹ The second section of this review dedicated to corporate accelerators themselves follows the standard systematic review procedures (Denyer & Tranfield, 2009), which are briefly described below.

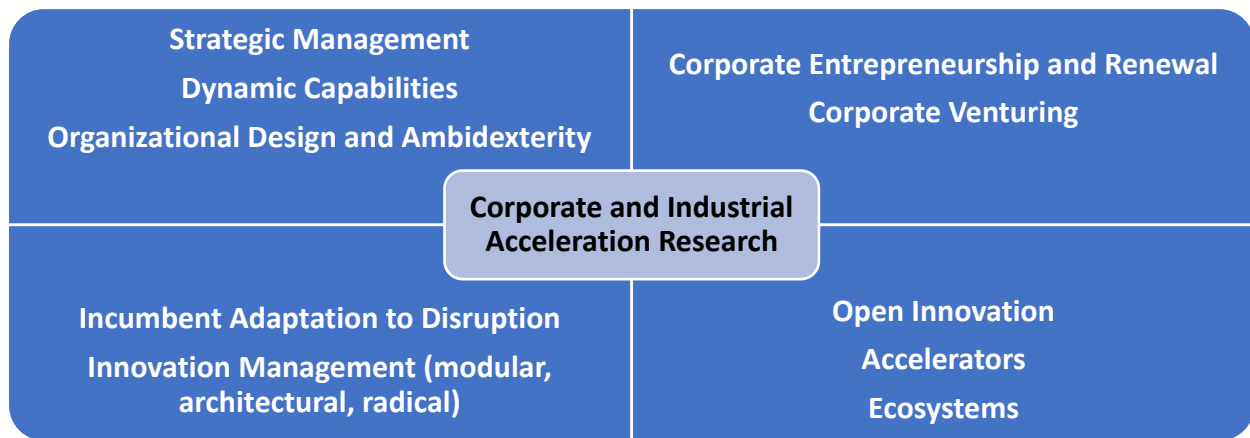
Therefore, the aim is to review and discuss specific organizational units for innovation exploration and their theoretical underpinnings so that we can appropriately position corporate and industrial acceleration research. The questions guiding this literature review are: What are the key research streams that inform or can inform corporate and industrial acceleration research, and if the latter, how so? That is, *how are corporate and industry-led accelerators different from previous organizational designs for innovation exploration? What is similar, what is different and what is new under the sun in relation to these new organizational arrangements?*

The contribution of this chapter is three-fold. First, it positions the corporate accelerator phenomena within a larger tradition of key organizational research streams. Second, it proposes a

¹ In fact, the empirical chapters (# 4 and # 5) analyze the novel entrepreneurial capabilities of the R&D/Innovation Units and the tensions between incumbents and new ventures that arise in the context of an industry-led accelerator.

new framework to bring together these different streams and shed light to particular aspects of the corporate and industrial accelerator phenomena. In so doing, it enables new questions and further theorization about it, which is done in Chapters 3, 4 and 5. Third, this chapter identifies unexpected sources that might inform corporate acceleration research and that I utilize in the subsequent chapters of this dissertation. With this knowledge, I position corporate acceleration on a more fundamental level by connecting the dynamic capabilities, organizational ambidexterity and organizational design streams, with corporate entrepreneurship, radical innovation management and organizational adaptation as well as with more phenomenon-driven streams such as open innovation and accelerators research. I highlight in Figure 1 the meta-theoretical and phenomenon-driven research streams that I discuss below in relationship with corporate and industrial accelerators, in particular regarding organizational structures, processes and practices.

Figure 2.1 Research streams at the crossroads of corporate and industrial acceleration



2.2 On Organizational Structure and Processes

Researchers of organizational structure (e.g. (S. L. Brown & Eisenhardt, 1997; Burns & Stalker, 2005; Galbraith & Merrill, 1991; Pierce & Delbecq, 1977; Thompson, 1967; Tsai & Ghoshal, 1998) have studied the internal operating principles of firms to identify how the organization of activities affects both the investment in innovation and the productivity of innovation efforts. This large body of literature can be broadly divided into two categories: (1) *organizational structure* and its effect on innovation; and (2) *organizational processes* and their effect on innovation (Ahuja, Lampert, & Tandon, 2008)

2.3 Structural Forms

The organizational structure research stream has identified three main archetypes of organizational structure: mechanistic, organic, and ambidextrous, and it has tried to identify the implications of such structures for innovation. Following the classic description of bureaucracies (Weber, 1947) and their mechanistic designs, including defined roles and responsibilities as well as strict controls (Aiken & Hage, 1971), subsequent research focused on organic structures characterized by fluid job descriptions, loose organization charts, a low degree of formal, centralized control, and horizontal communication (J. T. Hage, 1999). The organic argument and its initial evidence established the superiority over mechanistic, bureaucratic organizations when coping with technological change. However, later studies, have argued that organic structures might be better in terms of innovation for smaller firms rather than larger firms and superior only in presence of high technological complexity and discontinuities (Hull, 1988). Thus, contingency arguments were brought to bear as the degree of environmental turbulence and velocity might determine the level of optimal organic structures.

More recent work has also suggested that organizational structures for innovation need to distinguish between incremental and radical innovation as a structure appropriate for one may not be ideal for the other (Benner & Tushman, 2003; Smith & Tushman, 2005; M. Tushman, Smith, Wood, Westerman, & O'Reilly, 2010). However, organizations may need to conduct both types of activities. This insight has prompted the fertile and ongoing research into organizational ambidexterity (Adler & Borys, 1996; Birkinshaw & Gupta, 2013; Duncan, 1976; Gibson & Birkinshaw, 2004; March, 1991; O'Reilly III & Tushman, 2013; O'Reilly III & Tushman, 2008; Raisch, 2008; Sheremata, 2000; Zimmermann, Raisch, & Birkinshaw, 2015), about which we elaborate further below. Organizational ambidexterity research is built around the central premise that organizations face a fundamental tension between exploration and exploitation in its core learning function (March, 1991). Organizational ambidexterity is the dynamic capability that enables organizations to simultaneously perform both (O'Reilly III & Tushman, 2008).

Several organizational solutions have been identified and implemented to address this fundamental tension between exploitation and exploration in organizational learning. The first solution is to use structures such that the organization utilizes an organic design to explore and then switches to a mechanistic design to execute the innovation (Duncan, 1976). Hence, the organization alternates between the two types of structures over time in what have been termed

temporal switching (Birkinshaw, Zimmermann, & Raisch, 2016). Westerman and colleagues have similarly suggested different organization designs for different stages of the innovation cycle (Westerman, McFarlan, & Iansiti, 2006). Eisenhardt and colleagues draw attention to yet another structural variation adopted by firms to deal with innovation in rapidly changing environments: they have observed that organizations use flexible structures to compete through small and frequent shifts given continuous environmental turbulence (S. L. Brown & Eisenhardt, 1997; Eisenhardt & Tabrizi, 1995). They found that, in the computer industry, organizations handle the problem of continuous change not through organic or mechanistic structures but through *improvised semi-structures* that combine elements of both. Thus, roles, responsibilities and project priorities were clearly defined through good communication and flexibility. The improvised semi-structures imply that the actual design processes were left flexible, combining some structured features with more free-form interactions as semi-structures rather than tightly structured in a hybrid organizational form. Moreover, the continuously adaptive organization not only operates through these improvised flexible semi-structures and communication flows but also with time-paced evolution and rhythmic transitions: “Continuously changing organizations are likely to be complex adaptive systems with semi-structures that poise the organization on the edge of order and chaos and links in time that force simultaneous attention and linkage among past, present, and future.” (S. L. Brown & Eisenhardt, 1997, p. 32)

The use of dual but integrated structures has also been advanced to outline organizational ambidexterity paradigm research in several seminal papers (Gibson & Birkinshaw, 2004; Raisch, 2008; M. Tushman et al., 2010; M. L. Tushman & O'Reilly III, 1996). They identified organizational ambidexterity as a dynamic capability to solve the mechanistic vs. organic design trade-off through the use of ambidextrous structures that split up the organization into differentiated sub-parts that are only connected at the top-management level. Thus, instead of units cycling through different organizational structures over time or using semi-structures that are simultaneously both loosely and tightly defined, in ambidextrous organizations, *loose* and *tight* organization structures simultaneously co-exist. However, they do not co-exist as hybrids. In particular, O'Reilly and Tushman have argued that ambidexterity is a dynamic capability because “the ability of a firm to simultaneously explore and exploit enables a firm to adapt over time.” (O'Reilly III & Tushman, 2008, p. 185) Consistent with Teece's triple taxonomy of *sensing*, *seizing*, and *reconfiguring* (David J Teece, 2007; David J Teece, Pisano, & Shuen, 1997),

organizational ambidexterity requires a coherent alignment of competencies, structures and practices to engage in exploration, a contrasting alignment focused on exploitation, and a senior leadership team with the cognitive and behavioral flexibility to nurture both. In other words, organizational ambidexterity *becomes* a dynamic capability if both exploration and exploitation activities are strategically integrated and orchestrated through a set of values, shared vision and governance process.

Organizational ambidexterity research has devised three key modes of adaptation to cope and reconcile these conflicting demands of exploitation and exploration: i) *structural separation* of the two activities into different organizational units; ii) the *behavioural integration* of the two activities within a single unit (*contextual ambidexterity*); and iii) the *sequential alternation* between both activities over time (temporal switching).

As mentioned before, *the structural separation* mode enables structural ambidexterity, including those semi-structures that facilitate organizational units to alternate between both requirements (S. L. Brown & Eisenhardt, 1997) as well as complex structures that combine organic and mechanistic structural elements (Adler & Borys, 1996; Sheremata, 2000). Much of the existing literature equates structural ambidexterity with spatial separation at the business unit or corporate level. In addition to the spatial separation that have dominated ambidexterity research, some previous studies have described an alternative path to structural ambidexterity by the use of parallel structures that allows people to switch back and forth between two or more types of structures, depending on their specific task (Bushe & Shani, 1991; McDonough III & Leifer, 1983).

Behavioral integration, in turn, is what has been defined as “the behavioural capacity to simultaneously demonstrate alignment and adaptability across an entire business unit” (Gibson & Birkinshaw, 2004, p. 209), suggesting that contexts characterized by a combination of stretch, discipline, support, and trust may facilitate contextual ambidexterity.

The third mode to achieve ambidexterity is through *sequential alternation and temporal switch*, that is, the succession of exploitation-focused periods followed by exploration-focused periods of time at the functional, corporate innovation unit or program level. For example, BMW has successfully pioneered this mode of adaptation by developing a *focus-shifting capability*, enabling executives and front-line managers to move from seizing to sensing and back over long periods of time. (Birkinshaw et al., 2016)

These ambidextrous modes of adaptation are relevant – yet incomplete - because they

frame one of the contributions of my PhD Thesis: the novel organizational adaptation afforded by industry-led accelerators that I label *simultaneous adjacent co-accelerated sensing and internalizing*. This adaptation process is *simultaneous* because it happens externally and internally at the same time. That is, corporates perform parallel activities and complement the internal R&D/Innovation work with that of the engagement with the industrial accelerator and the new ventures. This mode of adaptation is *adjacent* because it operates through search for market/technological solutions that are neither very distant nor immediate proximal by looking at the intersection between external distant entrepreneurial streams and local corporate use cases. This process is *co-accelerated* because it happens through collaborative time-compression (Qin, Wright, & Gao, 2019) and change in speed through experimental engagement with new ventures, and sometimes other corporates. It also comprises a collaborative *sensing* of opportunities and threats, where value chain corporates together scout, select, nurture and learn from external ventures. This collaborative *sensing* is relevant to enable further ambidexterity in an age of asset sharing (Faridian & Neubaum, 2020). Finally, this new mode of adaptation comprises the *internalizing* of capabilities and the *redesigning* of R&D/innovation routines, as I shall analyze in greater detail in Chapter 5.

2.4 Structural variations and specific organizational units for radical exploration

In addition to these main organizational structures and ambidextrous designs, at least four other organizational variations have been identified in the context of radical innovation exploration: skunkworks, spinouts, corporate venture units and, more recently, corporate accelerators. These previous organizational designs are relevant as they are immediate antecedents of corporate accelerators, therefore this review will allow to situate their novelty.

In a skunk works, a select group of employees or sub-part of the organization is separated from the rest of the organization to provide greater autonomy to pursue a radical innovation opportunity, which is then usually brought back into the organization to be commercialized.² To

² Skunk Works was adopted as the official alias for Lockheed Martin's Advanced Development Programs (ADP), which designed a number of radically innovative aviation technologies including the U2 and SR-71 spy planes, and the F-117 stealth fighter.

stimulate radical innovations, researchers are often isolated from the influence of the rest of the organization. The skunk works model is claimed to bring several advantages for innovation and growth. Following the discussion on myopia in organizational learning (Levinthal & March, 1993; March, 1991), the skunk works design provides scientists and engineers the required autonomy, creativity and independence to escape the established habits of thought and action to produce novel ideas that might be translated into new products or services through non-official and peripheral leaders (D Ancona, Malone, Orlikowski, & Senge, 2007). In addition, the skunk works model can help to surpass the resistance that radical innovations encounter inside organizations. Examples of the skunk works model include IBM's organizational design to nurture the former revolutionary personal computer (Roberts, 2007), Ericsson Mobile Communications' separate unit to develop the Bluetooth technology (Nobelius, 2000) as well as Intel and HP efforts to develop potential breakthroughs (Fosfuri & Rønde, 2009). However, cases in which the skunk works model have failed show the critical success factors. First, top management team (TMT) support for a countercultural activity, with at least one top manager that explicitly support the nascent skunk works and insulate its personnel from day-to-day corporate activities. Second, the TMT must devise a strategy and pathway to eventually integrate the skunk works' outputs into the core company and, more importantly, facilitate its go-to-market and final commercialization (Ellaway, 2014; Gwynne, 1997) The critical challenge for the skunk work model of innovation is to be able to successfully advance beyond the proof-of-concept or prototype status. As we shall see – specially in Chapter 3 when I introduce the different corporate accelerator models – both the Exclusive internal and Hybrid internal Accelerators follow the skunk works model in that they isolate and insulate their employees' venturing ideas, yet for a limited time of 3 to 6 months. The challenges regarding the integration of these accelerated (validated) ideas back into the organizational core, remain, and resemble those problems that the skunk works model faced.

There are two organizational practices for exploration that resembles the skunk work model that are relevant for this review: bootlegging and communities of practice. However, they differ in important ways with the skunk works model of innovation. Rather than formal organizational designs, they are emergent bottom-up practices, which may also feed current acceleration models.

Bootlegging involves *underground* practices in the context of research and development (R&D), where individuals attempt to get greater autonomy over the official direction of their R&D efforts, and thus, to escape the constraints of organizational accountability and bureaucratic control. Following Augsdörfer's definition (Augsdorfer, 2005), Criscuolo and colleagues describe bootlegging as an R&D activity in which intrinsically motivated individuals, engage secretly in bottom-up, non-official, non-programmed and not authorized innovation efforts but which are for the benefit of the company (Criscuolo, Salter, & Ter Wal, 2013). The lack of official organizational approval distinguishes bootlegging from free-time models of innovation such as 3M's 15% rule (Gundling, 2000) or Google's 80% of core prescribed work and 20% time allowance for "pet projects". In addition, bootlegging also differs from skunk works and similar *structured* initiatives focused on radical and breakthrough innovations within separate official dedicated units, where individuals can work outside the normal rules of the organization. In summary, bootlegging is an emergent un-official deviant practice that allows R&D scientists to follow unconventional paths to explore novel distance ideas, including previously rejected ones. In their study of a large, technology-intensive multinational company, Criscuolo and colleagues found that what matters is not only the level of strategic autonomy that firms grant to their R&D staff but also the degree to which these employees creatively seek to increase their strategic autonomy and initiative, in restricted work settings. They also identified a mechanism that connects underground creative bootlegging efforts to innovation performance: the delayed assessment of early-stage ideas that postpone the monitoring and evaluation of those ideas until later in the process, where further validation has been obtained. Finally, they suggest that individual bootlegging efforts tend to be successful only in high performance organizational settings (Criscuolo et al., 2013).

Though value can be created and eventually captured through uncovering and nurturing those underground deviant creative ideas in a corporate acceleration context, the identified mechanism of delayed assessment of early-stage ideas seems contradictory to the fast-pace and time-compressed process of problem/solution fit validation advanced in accelerators, where the initial value proposition is even assessed before entering the program. Delayed or accelerated assessment refers to the temporal dimension of acceleration (Shankar & Clausen, 2020), to which I will come back at the end of this chapter and in Chapter 5.

The second related bottom-up emergent organizational arrangements for exploration and problem-solving are the communities of practice. Drawing on the work by Julian Orr (Orr, 1996),

Lave and Wenger (Lave & Wenger, 1991), Suchman (Suchman, 1987) and Weick and Daft (Daft & Weick, 1984), Brown and Duguid offer an insightful unified view of working, learning and innovating in communities of practice (J. S. Brown & Duguid, 1991, 2017). Ethnographic studies of workplace practices indicate that the ways people actually work usually differ fundamentally from the ways organizations describe that work in manuals, training programs, organizational charts, and job descriptions. These *generic* descriptions inevitably and intentionally omit the details. Employees are viewed as performing their jobs according to formal job descriptions. Thus, education, training, technology design and innovation support generally focus on abstract representations to the detriment, if not exclusion of actual practice. Thus, managers develop an outlook that cannot comprehend the importance of *non-canonical practices*, which actually are underground practices that can enable problem solving and support explorative innovation. Echoing the bootlegging activities, these non-canonical practices are deviant practices that can be secret, illegitimate or unnoticed ones that can lead to incremental innovations and creative problem-solving such as the technicians who repair machines using shared narratives and not IT manuals (Orr, 1996). Innovating and learning in this context refer to daily work activities that lie at one end of a continuum of innovating practices that stretches to the type of radical innovation cultivated in R&D's labs and skunk works on the other end (J. S. Brown & Duguid, 1991).

The overlooking of those situated actual practices due to the restrictive influence of the existing canonical generic organizational view can have two consequences: i) it can increase the gap between non-canonical practice and canonical discourse of practice and, thus, diminish opportunities for organizational learning, change and innovation over time, ii) such a gap can lead to important loss of knowledge within organizations. Therefore, organizations and management may direct their “eyes and hands” to these non-canonical practices not as informal or even deviant forces (Mainemelis, 2010) but rather as important resources for learning and innovation: the “reliance on espoused canonical practice can blind an organization's core to the actual, and usually valuable practices of its members [as] it is the actual practices, however, that determine the success or failure of organizations.” (J. S. Brown & Duguid, 1991, p. 41)

Though related as emergent bottom-up organizational practices, bootlegging and communities of practice differ in important ways. Bootlegging has been described and analyzed as an individual-level phenomenon, that is, an R&D scientist who pursues an underground project leveraging his autonomy and creative deviance that eventually can flourish in a high-performance

environment. Communities-of-practice, in turn, are a social-level phenomenon, which emerge through the lens of the organization understood as a collective of communities, not simply of individuals, where experimentation is legitimate, and independent community perspectives and creative friction can be amplified by interchanges among communities:

“Out of this friction of competing ideas can come the sort of improvisational sparks necessary for igniting organizational innovation (...) If their internal communities have a reasonable degree of autonomy and independence from the dominant [organizational] world view, large organizations might actually accelerate innovation” (J. S. Brown & Duguid, 1991, p. 54). Thus, communities-of-practice are an underground silent non-official vehicle for collective bootlegging that can open up new paths for learning, working, exploring and innovating by colliding different perspectives about how things work and how things ought to be.

The insights of how bootlegging and communities of practice work are relevant for positioning corporate accelerator research as these new organizational designs may also leverage either external or internal non-canonical underground practices by scaffolding their learning to achieve a canonical mainstream status. This is particularly relevant for acceleration designs as they open up their boundaries, and further connect with communities of practice in other organizations such as value chain incumbents, competitors, and of course, external new ventures. The colliding of different perspectives about how things work or do not work (e.g., product/market fit), including co-experimentation and even tensions between incumbents and new ventures in industrial acceleration contexts become novel sources of organizational learning and capability building, as I shall elaborate in Chapter 4 and Chapter 5.

After the discussion of the above two organizational mechanisms for deviant exploration and non-canonical problem-solving, this review returns to formal organizational structures designed for innovation exploration that also antecede corporate and industrial accelerators yet differ in specific ways: spinouts and corporate venture units.

In the case of spin-outs (Agarwal, Echambadi, Franco, & Sarkar, 2004; Govindarajan & Trimble, 2005a, 2005b; Klepper, 2007), a part of the organization is completely separated to run a business outside the organization using an structural separation mechanism (Turner, Swart, & Maylor, 2013). Due to senior management’s attention span, cognitive framings, organizational inertia, liabilities of change, and existing preferences of *known* customers, incumbents tend to only exploit current technologies and sophisticated customers (Carroll & Teo, 1996; C. M. Christensen

& Bower, 1996; C. M. Christensen, Raynor, & McDonald, 2015; C. W. Hill & Rothaermel, 2003). Christensen's research about the disk drive industry found that because of customer preferences and established resource allocation procedures, organizations evolved through the creation of independent spinouts when dealing with non-core innovations (C. M. Christensen, 1997). Spinouts are, thus, the solution for the so-called innovator's dilemma of large and well-managed leading firms that tend to fail when confronted with new disruptive technologies (C. Christensen & Raynor, 2013; C. M. Christensen & Bower, 1996). Spin-outs have also been found to revamp inventors' innovative activities through a desocialization from the parent-firm organizational codes that enable further distant exploration (Cirillo, Brusoni, & Valentini, 2014). Similarly, Markides (Markides, 1998), Bhide (Bhide) and Foster and Kaplan (Foster & Kaplan, 2001) argue that to overcome the limiting effects of top management team's cognitive inertia and cultural lock-in, firms use alliances, acquisitions, and joint ventures to promote explorative innovation.

For this inertial perspective, the locus of exploratory innovation is situated outside the incumbent's organization and at the corporate level of analysis. Research to date has identified three types of corporate spin-outs: those developed using new technologies, the ones serving new markets and the restructuring spin-outs (Parhankangas & Arenius, 2003). These authors also found that these three types differ in terms of resource and knowledge sharing with the parent; timing of the separation; and direction and breadth of new product development activity (Narayanan, Yang, & Zahra, 2009). These spin-outs types serve as antecedents to understand the ways whereby accelerated ventures engage, through corporate/industrial accelerators, with incumbents' business units, including knowledge spillovers, temporality patterns and scope of product development.

A third organizational design approach for innovation exploration comprises the use of corporate venture units (Robert A Burgelman, 1983; Dushnitsky & Lenox, 2005; Dushnitsky & Yu, 2019; Wadhwa & Kotha, 2006). Corporate venturing refers to units controlled by the parent company with the purpose of developing new business opportunities for financial and/or strategic gain (Birkinshaw, 1997; Block & MacMillan, 1993). The extant literature on Corporate Venturing (CV) has proposed two main distinctions to study the relationship between the parent company and the new venture. Firstly, CV may be regarded as internal where it develops an idea generated within the parent company and as external where it develops an idea sourced from outside the firm (S. A. Hill & Birkinshaw, 2008; Narayanan et al., 2009). Secondly, there is one further distinction for categorizing forms of internal corporate venturing: dispersed and focused modes (Birkinshaw,

1997). Dispersed internal CV describes venturing activities originating via employees across different organizational units, that is, business creation activities performed by individuals or teams within the mainstream divisions of the parent company. Focused internal CV, on the other hand, involves a specially designed organizational unit mandated with building new internal businesses for the parent company. Focused units can also be outward looking, that is, specialized units to search for external ventures to acquire, integrate and learn from. For instance, four types of CV programs have been identified based on two criteria: (a) whether the entrepreneurial idea originated inside or outside the parent; and (b) whether there is an intermediary between the parent and the invested venture (Miles & Covin, 2002). These prior distinctions are useful to map and further analyze the corporate acceleration models, including the internal, external and industrial ones, as described in Chapter 3. The opportunities and challenges to integrate non-core streams, and thus, to achieve fit between the parent company and the venture have been spotted in the extant CV literature (Thornhill & Amit, 2001) and yet remains a key issue up to this day in the emerging corporate and industrial acceleration research, as I shall elaborate in Chapter 4 and 5.

CV studies have been conducted at three levels of analysis, e.g., the parent company, the program and the venture (Narayanan et al., 2009)³. To date, findings are not conclusive. Lack of clarity about the domain of CV and not precise definitions have made it difficult to evaluate common patterns among previous studies to uncover generalizable findings (Narayanan et al., 2009). Compared with independent ventures, CVs often involve less risk and generate lower financial returns (S. A. Hill, M. V. Maula, J. M. Birkinshaw, & G. C. Murray, 2009). Companies vary significantly in their use of CV, probably due to their different environments and other contextual variables (Hitt, Nixon, Hoskisson, & Kochhar, 1999; Zahra, 1991). More recently, studies have intended to evaluate the impact of CV programs vis-à-vis newer approaches such as corporate accelerators in their specific contribution to innovation exploration (Basu, Kher, & Yang, 2018; Winston Smith, 2019)

Given that some incumbents use CVs to develop technologies that differ from what they do, CVs may not fit tightly with their parent financially and strategically (Thornhill & Amit, 2001).

³ Following this tradition, this PhD Thesis also performs analysis at these three levels: the accelerator program (Chapter 3), the parent/sponsor companies (Chapter 4) and the incumbent – new venture dyadic relationship (Chapter 5). The viewpoint on the venture level itself is not included but in relationship with the incumbent level.

Due to the need for emerging ventures to develop their own entrepreneurial practices without the constraints and control protocols of their parent companies, these ventures usually have greater autonomy than existing business units. Thus, this autonomy can affect the fit between CVs and the remaining of the parent organization (Narayanan et al., 2009) and pose integration problems. In terms of the supportive context for integration, prior research shows that successful CV activities require an orchestrated organizational approach to enable effective adoption and implementation. This approach requires having a supportive organizational culture (Badguerahanian & Abetti, 1995), promoting lateral communications, timely evaluation of intrapreneurial activities (Antoncic & Hisrich, 2001) and interorganizational knowledge acquisition (Dushnitsky & Shaver, 2009) . These issues remain relevant and needed when supporting – and capturing value from – industry-led corporate accelerators, as discussed later in this Thesis, specifically Chapter 4 and 5.

To summarize, the extant literature shows that CV activities have a positive effect on a firm's short-term economic benefits as well as its long-term strategic goals, such as learning through a window into new technologies, and more recently into potential focal ecosystems (Dushnitsky & Yu, 2019). However, the literature has described both successful (R. Kanter, 1985) and unsuccessful (H. Chesbrough, 2000) corporate venturing practices. Therefore, one size does not fit all, as contingency factors have to be taken into account. Several attempts have been made to identify key success factors (Block & MacMillan, 1993; Dushnitsky & Lenox, 2006; Siegel, Siegel, & MacMillan, 1988). Leifer and colleagues (2000) found that the creation of radical innovation hubs and corporate venture units helped corporations escape the inertia of existing business units (Leifer, 2000). Yet, such studies have not been conclusive (Susan A Hill et al., 2009). Given the range of strategic benefits associated with CV (e.g., learning, capability building and ecosystem development), new measures are needed for further research. Established firms have continued to experiment with different CV modes and have designed newer organizational forms for innovation exploration such as corporate and industrial accelerators.

2.5 From Structure to Formal Characteristics

A related but separate stream of research has focused on organizational structure characteristics such as complexity, centralization and formalization rather than specific descriptions of structures. Decentralization refers to the distribution of decision-making rights among the organizational members (J. Hage, 1965; Pierce & Delbecq, 1977). It has been argued

that decentralization affects positively the initiation of innovation activities (Damanpour, 1991, 2017; Galbraith & Merrill, 1991; Pierce & Delbecq, 1977) by increasing the experience of involvement and participation among organizational members (Pierce & Delbecq, 1977). Further, decentralization tends to increase the efficiency of information processing by reducing vertical transfer of knowledge (Hull, 1988; Tsai, 2002) and speedier utilization of local knowledge (Siggelkow & Rivkin, 2005). Evidence about the effect of formalization on innovation are less robust than those about the effect of centralization on innovation (Galbraith & Merrill, 1991). In addition, other parameters of organizational structure have been studied, specifically the extent to which the organizational designs are formalized, decentralized, or reintegrated (Siggelkow & Levinthal, 2003). Following the contingency theory of organization design and change (Battilana & Casciaro, 2012; Thompson, 1967), scholars have studied the influence of partitioning of tasks on innovation (Ethiraj & Levinthal, 2004; Siggelkow & Rivkin, 2006). Such partitioning and decomposition of innovation tasks is critical for enabling decentralization of functions, including those related to scouting, acceleration and integration of new ventures.

However, there are constraints for task decomposition due to the nature of knowledge. Von Hippel (1994) showed that knowledge is sticky because it is tacit and task specific (Eric Von Hippel, 1994). Given the knowledge stickiness, i.e., that it cannot be fully codified, translated or mobilized, organizations may partition the innovation tasks so that each organizational module draws on knowledge from only one location. While modularity (Baldwin & Clark, 2000) may enhance innovation by facilitating specialization of search efforts and greater scope of recombination, it is important to get the partitioning right (Ethiraj & Levinthal, 2004; Yayavaram & Ahuja, 2008). Task partitioning may also have effects on the very organizational design structures. In fact, research into modular product portfolio has shown that certain partitioning configurations may influence the organizational structure itself (Hoetker, 2006) and thus trigger flexible modular organizational forms, given certain industry configurations and catalysts such as availability of standards, technological discontinuity pace and competitive intensity (Schilling & Steensma, 2001). Flexible and loosely coupled organizational forms allow organizational components to be flexibly recombined into a variety of configurations, much as a modular product system enables multiple end-product configurations from a given set of components. As I discuss in the subsequent chapters, industry-led accelerators are new loosely coupled hybrid structures in the periphery that effect organizational change via resource exchanges and learning mechanisms.

2.6 Organizational Processes, Spaces and Tools

In terms of organizational processes that influence innovation outputs, four research streams have been identified: informal organizational networks, environmental scanning techniques, innovation management tools and physical organizational spaces. These are relevant because they are used in corporate accelerators, including industry-led ones.

The first stream identified social ties (Cross, Cross, & Parker, 2004; Hansen, 1999; Tsai & Ghoshal, 1998) and organizational networks (Ahuja, Soda, & Zaheer, 2012) among units in facilitating knowledge flows (Allen, 1977, 2001). Such knowledge transfer enables organizations to recombine knowledge (Galunic & Rodan, 1998) and thereby, orchestrate and increase network-centric innovation outputs (Nambisan & Sawhney, 2011). This networking and knowledge sharing also enable firms to make the innovation process more efficient (S. L. Brown & Eisenhardt, 1997; Hansen, 1999), and facilitate interorganizational links that might aid industries and regions alike (Ferrary & Granovetter, 2009). Social and organizational networks are also relevant in the context of start-up, corporate and industrial accelerators as conduits to facilitate the flow of non-redundant information, and to provide early access to this information for learning, validation, investment and scaling purposes (T. Stone, 2018).

The second organizational processes stream looks at establishing methods to probe and experiment the future (S. L. Brown & Eisenhardt, 1997; Gersick, 1994; Thomke, 2020) and to scan the environment (Amer, Daim, & Jetter, 2013; R. Henderson & Cockburn, 1994). As mentioned previously, Brown and Eisenhardt (1997) studied firms that regularly scan the future and create rhythmic processes of transitioning from present to future. Gersick (1994), in turn, identified the importance of time-paced changes where project teams probe the future at regular intervals rather than in response to critical events. Finally, Henderson and Cockburn (1994) found that the pharmaceutical firms that created protocols that encourage R&D staff to engage in the broader scientific community were more productive. More recent accounts include studies that have looked into re-combinatorial practices – or complexity arrangements – that afford multiple orientations simultaneously for the involved actors to enable sustained innovation in the long run (Garud, Gehman, & Kumaraswamy, 2011). Furthermore, in highly accelerated innovation projects, e.g., hackathons, a recent study found that teams who embraced temporal ambiguity and let new temporal structures to emerge by minimal adaptative coordination were successful in dealing with the uncertain futures (Lifshitz-Assaf, Lebovitz, & Zalmanson, 2020).

A third stream identifies various processes and tools that enable product development projects succeed. This literature has identified support from upper management (Day, 1994; Dougherty & Hardy, 1996), the role of champions (Andrew & Sirkin, 2003) and the practice of building power coalitions across the organization to increase the chances for innovation projects to be successful (R. M. Kanter, 1988). In multi-level organizational forms such as industry-led corporate accelerators, these “power games” are critical as external solutions brought by the new ventures need to be tested, validated and adopted in very limited time by different stakeholders within the incumbents. The failure to build a power coalition to support an incumbent - new venture experiment might give rise to conflicts and tensions, as I will analyze in Chapter 5.

Lastly, a fourth stream stemming out of Allen (Allen, 1977, 2001) has studied how physical spaces enable creativity and innovation, especially through the transfer of sticky and tacit knowledge. Though the direct link between the design of physical space and innovation is still unproven, the “reliable research tends to focus on facilitating communication rather than directly on enhancing creativity” (Leonard-Barton & Swap, 1999, p. 55) Allen studied the effects of physical layout on the probability of interaction in R&D laboratories and product development firms (Allen, 1977, 2001). His data showed that the likelihood of communication between two employees was directly influenced by their physical distance: the closer they are, the more likely they will communicate to each other. Furthermore, Allen showed that the probability of interaction approaches zero at a lateral distance of about 25 meters (Allen, 1977, 2001). From an architectural and psychological perspective, Stone and Luchetti (1985) traced the genealogy of space partitioning (cubicle) and proposed an insightful move from fixed workstations to *activity settings* that would allow agile workplaces by enabling serendipitous and accidental interactions that may contribute to innovation work (P. J. Stone & Luchetti, 1985). The flexibility and readiness-to-change contained in the activity settings approach relates directly to what has been termed organizational agility. In this sense, agility is the ability to respond quickly and effectively to rapid change and in the context of the workplace, “that agility is achieved through the co-evolution of the workplace and work” (Joroff, p. 5). This stream of research refers to workplace making as the ongoing process for continual improvement where “people are willing to challenge assumptions about work, employees, workplaces and the ideal state of organizations” (Joroff, p. 8). This agile

workplace-in-the-making approach has also been called process architecture (Horgen, Joroff, Porter, & Schon, 1999). Workplace agility and activity settings built with flexible material enable the kind of situated learning and work practices observed in leading innovation firms (García, 2007). This research stream has identified specific spatial arrangements to support different stages of the innovation process: collaborative transparent spaces for ideation; enclosed spaces—also referred to as BA, from the Japanese ‘shared context in motion’—to support team memory (Moggridge & Atkinson, 2007) and dedicated spaces to support product innovation design and development.

More recently, Fayard and Weeks (2011) have proposed a normative model to promote interaction, collaboration and innovation through physical space arrangements, comprising the so-called three Ps, that is, proximity, privacy and permission (Fayard & Weeks, 2011). First, regarding proximity, designs must drive people traffic to shared spaces and give employees reasons to remain as well as to ensure both literal and metaphorical proximity. Second, organizational spaces need to afford privacy when needed: people should feel confident that they can talk without being interrupted as well as avoid interaction when not desired. Third, senior leadership and the physical space itself must signal that informal conversation is encouraged and that there is no need to ask for permission to interact serendipitously.

The spatial considerations for the workplace where acceleration happens is important for both corporations and new ventures alike, especially as novel flexible and collaborative working arrangements have emerged in the last ten years (Mitev, De Vaujany, Laniray, Bohas, & Fabbri, 2019), including those specific work arrangements used by accelerators, i.e., co-working spaces, fab labs, and maker spaces, among others.

All the above research streams about processes, tools and physical spaces are indeed relevant for corporate/industrial acceleration research and design. However, they are largely absent in the initial yet descriptive corporate acceleration stream, as I discuss below.

2.7 From Internal Structures and Processes Design to Outside Knowledge Leverage: Open Innovation and corporate new venture engagement

Besides the literature on organizational structure and processes that broadly contribute to our understanding of the corporate accelerator phenomena, there is an additional stream that directly feed this nascent research stream: open innovation.

Stemming out of Chesbrough research in the early 2000s (H. Chesbrough & Rosenbloom, 2002; Henry William Chesbrough, 2003), open innovation has attracted considerable attention from both scholars and practitioners over the past fifteen years, including major recent reviews (Bogers et al., 2017; H. Chesbrough & Bogers, 2014; Laursen & Salter, 2006; West, Salter, Vanhaverbeke, & Chesbrough, 2014). Open innovation has been defined as “a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organizations business model” (H. Chesbrough & Bogers, 2014, p. 17). Open innovation has its antecedents in previous research regarding the value of external knowledge, ideas and resources (Freeman, 1974; Eric Von Hippel, 1986; E Von Hippel, 1988). It is directly related to the firm’s absorptive capacity, that is, the capability to identify the value of new, external knowledge, assimilate it, and apply it successfully to commercial objectives (W. M. Cohen & Levinthal, 1990; West et al., 2014).

Open Innovation has emerged, in part, as a reaction to the inward-looking focus of firms and to the erosion of the strategic advantage of internal R&D due to the increased mobility of knowledge workers, that has made increasingly difficult for firms to appropriate and control their R&D investments (Laursen & Salter, 2006). Therefore, open innovation research and practice have opened up new ways and business models for firms to create and capture value from its environment (H. Chesbrough, 2010; H. Chesbrough & Rosenbloom, 2002). Open innovation research has recently moved beyond the dyadic interaction between two firms, to collaborations with external networks, platforms, ecosystems and communities (H. Chesbrough, Vanhaverbeke, & West, 2006; West & Gallagher, 2006; West & Lakhani, 2008).

Despite all the new ways and technologies available to scan, sense and attract external knowledge into the organizational core, this is not a trivial issue. In fact, several challenges remain as to the successful integration of external knowledge, including the case of new ventures in industry-led corporate accelerators, as I will empirically analyze in Chapter 4 and 5.

Out of the open innovation paradigm, four models can be derived for the relationship between established firms and new ventures based on the innovation flow direction and equity consideration, as shown in Table 1, which is based on (Weiblen & Chesbrough, 2015): i) *outside-in* external corporate venturing, involving equity; ii) *inside-out* corporate accelerator for new business opportunities, usually non-core innovations; iii) *outside-in* start-up programs, including acceleration of external start-ups and; iv) *inside-out* platforms to stimulate complementary external

innovation on top of an existing corporate innovation such as a platform (Gawer, 2014; Gawer & Cusumano, 2008).

Table 2.1 Corporate Startup Engagement Models according to Innovation Flow Direction

	<i>Outside-In Flow</i>	<i>Inside-Out Flow</i>
Equity involved	<p>External Corporate Venturing</p> <p>Scouting and acquisition of external ventures to gain strategic insights of adjacent market and eventual financial returns</p>	<p>Corporate Acceleration</p> <p>Nurturing and market validation of promising new business models and non-core innovations.</p>
No Equity involved	<p>Start-up Program (Corp Accelerator)</p> <p>Sourcing of external start-ups to promote corporate innovation</p>	<p>Start-ups Platform</p> <p>Spur complementary external innovation scale an existing corporate innovation</p>

Source: own elaboration based on Weiblen and Chesbrough, 2015

Recent years have seen the rise of new ways in which established firms engage with a larger number of new ventures, through a lightweight governance process that enable agile and faster modes of working (Weiblen & Chesbrough, 2015). As a result, new models and hybrid approaches of corporate venturing and acceleration have emerged in the last 10 years. Given the limited research on open innovation in start-ups and SMEs (Van de Vrande, De Jong, Vanhaverbeke, & De Rochemont, 2009), further research is sorely needed to uncover new patterns of corporate new venture cooptation (Brandenburger & Nalebuff, 2011) in these networked and entrepreneurial ecosystems (Autio, Nambisan, Thomas, & Wright, 2018), and thus, to explain how open innovation processes are similar - or different - in such emerging settings (West et al., 2014).

Next I turn to discuss the initial extant corporate and industrial acceleration research stream vis-à-vis the organizational streams reviewed in this Chapter to identify key gaps and further situate the contribution of the subsequent chapters of this PhD Thesis.

2.8 What’s the Corporate Accelerator a case of?: a new structure and process for fast innovation exploration

Since 2005 there has been a global proliferation of seed independent accelerators (Pauwels, Clarysse, Wright, & Van Hove, 2016) aimed at creating start-up companies. Accelerators are

temporary organizations designed to accelerate successful venture creation by providing specific focused education, networking and mentoring services to start-ups' cohorts during an intensive program of limited duration ending in a graduation day (Susan L Cohen, Bingham, & Hallen, 2018; Hochberg, 2016; Pauwels et al., 2016). There are approximately 579 seed accelerator programs worldwide, which have invested approximately USD\$ 206,740,005 in 11,305 startups, according to existing global indicators.⁴

Extant recent research into seed independent start-up accelerators has paved the initial way to understand this burgeoning phenomenon in practice yet still under-theorized.

First, existing research has identified key differences between types of accelerators (public/private; generic/sector specific; venture capital/corporate/university affiliated) and their respective offerings in terms of sector focus, mentoring support, funding provision, reputation and "validation of legitimacy". These provide guidance for entrepreneurs when selecting an accelerator that meets their needs (Drori & Wright, 2018). Thus, research has identified the different business elements and design parameters (Amit & Zott, 2012) of an accelerator programme that are of relevance to start-up ventures at different stages of development (Pauwels et al., 2016). Specifically, it has distinguished between (i) the generic domain knowledge relevant for beginner entrepreneurs from (ii) the aspect that concerns expert "soft" skills that subsequently become important, regarding teaming, networking, pitching, leadership and dealing with the growth of ventures (Drori & Wright, 2018). However, the needs of ventures differ according to their growth stage (Vohora, Wright, & Lockett, 2004), which questions the use of standardized tools such as the lean start-up methodology (Felin, Gambardella, Stern, & Zenger, 2019). In addition, the ventures' different needs uncover the design choices—mentoring timing, disclosing and program standardization—that accelerators can make to address new ventures' bounded rationality (Susan L Cohen et al., 2018).

Second, recent research into the accelerators' impact on the performance of new ventures has found that through accelerator feedback effects, accelerator ventures shut down earlier and more often, raise less funding conditional on closing, and seem to have more efficient investments

⁴ Based on estimates by the Global Accelerator Report 2016 by GUST, retrieved on 2018 and 2020 here: http://gust.com/accelerator_reports/2016/global/

compared with non-accelerator companies (Yu, 2020)

Third, research provides insights into how to coordinate an accelerator's stakeholders like sponsors, partners, investors and portfolio companies within a networked form of governance, highlighting the multiple challenges arising when designing and managing the selection of stakeholders (Drori & Wright, 2018). The main stakeholders of an accelerator determine to a large extent its expected outcomes (e.g. matchmaking, investment return, social impact, etc.) as this has an impact on the learning process of the unit (Pauwels et al., 2016).

Finally, this networked governance approach has been used to devise a model of industry-led consortium accelerator management, dividing the design of such units into four stages (Garcia-Herrera, Perkmann, & Childs, 2018b), as I further detailed in Chapter 3.

Picking up this seed accelerator phenomena and the lean entrepreneurship practice (Blank, 2013; Blank & Dorf, 2012; Ries, 2011), large corporations have sought to benefit from the “start-up way” (Ries, 2017) by setting up corporate accelerators, which are built similarly to provide an entrepreneurial context, yet operate largely within the confines of sponsoring organizations.

Corporate accelerators are a new organizational interface aimed to promote entrepreneurial innovation in established firms as well as to increase the exploration speed through experimentation with new business models, technologies and new ventures outside the core—but bound by strategic objectives—of the firm. These interfaces within firms are designed to enable *bottom-up* and *outside-in* innovation to validate and create sustainable new businesses by inviting and mentoring external ventures within the sectors where these firms operate. The corporate accelerator is, then, a new organizational interface through which large firms attempt to stimulate entrepreneurial innovation, alongside more traditional vehicles such as R&D units, skunk works, ambidextrous designs, corporate venturing, spinouts and open innovation programs. These latter organizational designs for innovation exploration have been previously discussed as a background against which I will specify corporate accelerators' distinctiveness and novelty as well as current gaps to fill and puzzles to solve in the subsequent chapters of this PhD Thesis.

Corporate accelerator research is in its infancy. A search using the keyword “corporate accelerator” in peer-reviewed articles in the EBSCO bibliographic database—including Business source Ultimate and EconLit—yielded 35 results, including Proceedings papers and newspaper articles, which I will delete for the next search round. A search using the keyword “corporate acceleration” did not yield any meaningful result. I also did a search with the keyword “corporate

incubator” in the same database and it yielded 41 results. In addition, a search using the keyword “corporate incubation” obtained 13 results. This is expected as the incubator/incubation research started in 1984 with the publication of the results of Business Incubator Profiles: A National Survey (Temali & Campbell, 1984). This was followed by two extensive literature reviews on the incubation landscape in the eighties (Campbell & Allen, 1987; Kuratko & LaFollette, 1987).

According to a recent systematic review of business incubation literature, there are 38 studies that can fully fit this categorization of incubators as “an enterprise that facilitates the early-stage development of firms by providing office space, shared-services and business assistance” (Hackett & Dilts, 2004, p. 55). However, this categorization corresponds to the first generation of incubation models, introduced in the late eighties and early nineties focused on the provision of physical space and general business resources (Phan, Siegel, & Wright, 2005). Business incubation or incubator research is not relevant for this present review nor this overall Thesis and, therefore, will not be included for two reasons: on the one hand, it is focused on this first generation of business support and, on the other, it does not include the corporate incubation dimension. Thus, I only include the results of the queries based on the terms “corporate accelerator” or “corporate incubator/incubation”. I review below the main articles that resulted from this last query.

By and large, the initial corporate accelerator research is descriptive, phenomenon-driven and oriented to provide taxonomies and types of these novel organizational forms.

Scholarly research on corporate accelerators started in 2016 with Kohler’s description of different corporate start-up engagement methods, the specificity of corporate accelerators and the four principles to take into account for effective corporate accelerator design: i) proposition, ii) process, iii) people and iv) place (Kohler, 2016). Based on 40 semi-structured interviews with managers of corporate accelerators and participating start-ups, this paper derives managerial recommendations regarding i) the value proposition of the corporate accelerator (innovation goals; alignment of goals; focus on specific verticals), ii) the acceleration process (compressed innovation circle; balance structure with flexibility; provide relevant training; simplify procedures; collaborate with accelerated startups); iii) involving the right people (carefully selection of startups, find champions to play a dual role, get executives committed, ensure corporate alignment, provide internal and external mentors, foster networking within and outside the accelerator, make the accelerator part of its ecosystem), iv) the place, that is, where to locate it (inside, outside, independent or virtual) and how to design its physical space in order to grant autonomy with

meaningful interactions, partner with experts, enhance online inter-personal interactions, and nurture serendipity (Kohler, 2016).

Along the same lines and based on 13 cases of corporate accelerators located in Germany, Kanbach and Stubner (2016) identify the primary (financial vs. strategic) and secondary objectives (promote entrepreneurship spirit and PR/marketing) as well as two configurational dimensions, i.e., program focus and program organization (Kanbach & Stubner, 2016) The program *focus* comprises: the locus of opportunity (internal vs. external), the strategic logic (exploration vs. exploitation), industry focus, equity involvement and venture stage. As for the program organization, the variables to consider are the participation of an external partner, the connection to the parent company (integrated vs. independent) and the leadership experience (internal vs. external). Out of these 8 program focus/organization categories, this paper proposes four archetypes of corporate accelerators: 1) the *listening post*, 2) the *value chain investor*, 3) the *test laboratory*, and 4) *unicorn hunter* (Kanbach & Stubner, 2016)

Table 2.2 Corporate Accelerator Typology

Corporate Accelerator Type	Listening Post	Value chain investor	Test Laboratory	Unicorn Hunter
Objective	Understand Trends and developments and initiate relationships (Strategic)	Identify, develop and integrate new products (strategic)	Create a protected environment to test internal ideas (strategic)	Invest in promising startups to earn a premium (financial)
Strategic Focus Locus Opportunity Industry Focus Equity Venture Stage	Exploration External Related to parent No Very early	Exploration External Strongly related parent Yes Later stage	Exploration Internal & External Low related Yes Early stage (idea)	Exploitation External Broad focus Yes Early & Later

Source: adapted from Kanbach and Stubner, 2016

Though descriptive, this typology is useful and relevant for the goals of this Chapter as an antecedent of the core contributions of the present Thesis. First of all, two of the variables are indeed related to the previous discussion on organizational designs, strategic management, and ambidexterity: the strategic focus as being either exploration or exploitation and the locus of the opportunity as being internal, external or a combination. Second, this typology also proposes the value chain investor, which is another label for the type of corporate accelerator studied in detail

throughout this thesis: the industry-led accelerator. However, this typology has limitations. As I will show in Chapter 3, 4 and 5, corporate accelerators, in particular, industry-led value chains ones can be strategically oriented by not only exploration but also exploitation. Similar to corporate venture units (S. A. Hill & Birkinshaw, 2014), corporate accelerators can present an ambidextrous orientation at the unit level in that accelerator and R&D managers engage both explorative and exploitative external ventures to learn, adopt and eventually integrate. Furthermore, as some of my empirical cases studies show, because value chain industrial accelerators increasingly select later stage ventures – scale-ups – their strategic focus leaned towards exploitation: solve a specific problem based on use-cases, add a module to an existing function, and improve operational efficiency and safety. In addition to the simultaneous ambidextrous orientations, this typology and, in particular, the industrial value chain investor characterization falls short to analyze the value creation and capture processes at play as well as to identify potential conflicts and tensions in this very process. I fill these important gaps in Chapters 4 and 5.

Drawing on corporate accelerator case studies and an open innovation framework, Richter, Jackson and Schildhauer (2018) devise an actionable model that distinguish the essential and non-essential features of corporate accelerators in terms of the strategic direction and enabling mechanisms (Richter, Jackson, & Schildhauer, 2018). Based on the strategic objectives of either the firm or business unit, this paper analyses the resources (process and funding initiated by the established firm), procedures (content, duration and form of program), its level of structural separation and connection to the firm's core, the roles (company champions and responsible person), its relationships with the external environment as well as metrics and outputs. Echoing the previous two papers, this practitioner-oriented paper also provides recommendations for corporate acceleration design and management. Despite its insights and practical relevance, the enabling mechanisms are under-theorized and the difference between the essential and non-essential features of corporate accelerators needs further clarification. I clarify and induct the value creation mechanism in terms of novel corporate entrepreneurial capabilities in Chapter 4.

Using the open innovation framework and case studies data from 12 corporations, 3 corporate accelerator programs and 12 startups, Jackson and Richter (2017) explore the constraining and competitive contradictions that arise in corporates and accelerated ventures relationships (Jackson & Richter, 2017). This paper suggests that there are deep behavioral values,

perceptions and mental models that trigger “situational logics of competition and elimination” that might be addressed by considering power relationship, timing, images of the emerging future(s), risks, desirability of conflict, lines of communication and the actual purpose of development methodologies (Jackson & Richter, 2017). Using this inspiration and observed patterns in my data, I uncover cooperative logics and novel tensions between the incumbents and new ventures in industry-led accelerators, and propose a framework for their mitigation in Chapter 5.

Within the corporate entrepreneurship stream and using an inductive theory building multi-case study, Shankhar and Shepherd (2018) develop a two-pathway process model of corporate accelerator comprising three stages—sourcing selection, acceleration and community formation—that advance knowledge about how do corporate accelerators work (Shankar & Shepherd, 2018).

This paper is relevant for the field – and for this Thesis - as it moves beyond typologies and descriptions to inductively theorize about the mechanisms through which corporate accelerators actually “accelerate”. In particular, Shankhar and Shepherd identify two distinct ways through which corporate accelerators implement the three-stage process of sourcing selection, acceleration, community formation: accelerating *strategic fit* between the corporate and the startup or accelerating *venture emergence* through the connection to its larger ecosystem. The strategic fit-oriented corporate accelerator is aimed at speeding up the new venture’s fit with the parent company’s business units measured in proof-of-concepts, partnerships or vendor contracts. The venture emergence-oriented corporate accelerator supports startups in their search for product-market fit, acquisition of users/customers and building of investor readiness, measuring impact by the accelerated startups’ portfolio valuation and number of exits. This paper shows that the choice of corporate acceleration pathway depends on two factors. On the one hand, it is influenced by the parent company’s *strategic posture*, i.e., shaping, adapting and reserving the right to play (Courtney, Kirkland, & Viguerie, 1997). On the other hand, the choice of acceleration pathway was influenced by the *investment time horizon*.

Finally, this paper extends the literature on corporate entrepreneurship beyond internal/external venturing (as discussed above in this Chapter) by suggesting a new form of “corporate venture nurturing” that is distinct from previous organizational designs and put into practice through these novel acceleration mechanisms (Shankar & Shepherd, 2018).

2.9 Organizational structures and processes for timely internalizing external innovation

This review chapter has covered a lot of ground by reviewing different research streams and specific studies informing organizational designs for innovation exploration. The aim was to discuss and integrate somewhat independent and disconnected streams that might inform corporate and industrial acceleration research as well as open up avenues for further study by revealing significant gaps and under-theorized mechanisms to be addressed in this present PhD Thesis.

We reviewed specific organizational designs for innovation exploration, including informal ones such as “bootlegging” (Criscuolo et al., 2013) and “communities-of-practice” (J. S. Brown & Duguid, 1991, 2017). These practices can source corporate accelerators with creative underground and deviant entrepreneurial inputs to expand the firm’s internal exploratory innovation funnel. Yet, the question that arises is: How can corporate accelerators sense, scout, select and nurture those secret, non-canonical practices and illegitimate rejected ideas? By becoming too official and too visible, i.e., institutionalized, corporate accelerators may run the risk of losing access to these internal underground sources of innovation. This might also give rise to conflicts and tensions, as I explore in Chapter 5.

The extant research on corporate accelerators takes for granted that these units are programmed for exploration. According to Kanbach’s and Stubner’s (2016) corporate accelerator typology, the strategic logic of the *listening post*, *value chain investor* and *test laboratory* is exploration (Kanbach & Stubner, 2016). However, previous research on organizational ambidexterity and corporate venture (CV) units, found that CV units are likely to endure if they develop an orientation towards both explorative and exploitative innovation streams, i.e., an ambidextrous orientation towards incremental and radical innovation opportunities (S. A. Hill & Birkinshaw, 2014). If we translate this finding to corporate accelerators, it might be the case that in order to sustain these units over time, a unit-level ambidextrous approach is needed. This ambidextrous approach means that a corporate accelerator would sense, scout, select and nurture ventures that bring in not only potential architectural, radical or ecosystem innovations but also modular and incremental ones.

Yet, how is the corporate accelerator different from previous organizational designs for innovation exploration such as spinouts, skunk works, bootlegging, corporate venture units, and open innovation programs?

I answer this question by means of a table (see Table 2.3) that positions the corporate accelerator within more fundamental streams of management scholarship by specifying its core elements and differences as well as relating it with previous organizational designs for innovation exploration. This is a core contribution of this chapter, and to my knowledge, it is the first attempt to define such novel positioning in the field.

Table 2.3 Categorization of Organizational Designs for Innovation Exploration

	R&D Unit	Spin-Out	Skunks Work	Ambidextrous Design	Internal Corporate Innovation Unit	External Corporate Venture Unit	Open Innovation Program	Corporate Accelerator
Key structural Feature	Internal	External	Autonomy within structure	Internal	Internal	Internal	External	Hybrid
Resource flow	Inside-Out	Inside-Out	Inside-out	Intra-org design heterogeneity	Inside-Out	Outside-In	Outside-In	Outside-In Inside-Out
Relation to parent company	Direct	Indirect	direct	Direct	Indirect	Direct or Indirect	Indirect	Indirect
Type of innovation	Incremental Architectural Radical	Radical Architectural	Arch Incremental	Incremental Architectural Radical Disruptive	Incremental Architectural	Radical Architectural Disruptive	Incremental Architectural	Incremental Modular Architectural Radical
Entrepreneurial Autonomous Initiative	Low	High	High	Medium	Low	Low to Medium	Low	Medium to High
Reporting	Senior Team	Senior team	R&D	Linkage through senior team	Innovation Manager	Manager who report to Senior Team	Innovation Manager	Managing Director or Intrapreneur in Residence
Mode of adaptation	Structural Separation	Structural Separation	Temporal Switch and Behavioral	Behavioral integration or temporal alternation	Behavioral or Temporal	Structural	Behavioral Temporal	Temporal Alternation & Behavioral
Duration (clock-time)	Multi-year Budget	Per contract	Per project	Variety	Project-based yearly	Year budget & Investment Plan	Cycles	3-4 months
Main Temporal dimension or dichotomy	Clock vs event	Internal vs external pacing	Internal pacing	Internal vs external pacing	Clock time	Events-paced External Pacing	Cyclic	Accelerated clock-time
Search Horizon	Distant	Local and distant	Distant	Local and distant	Local	Local and Distant	Local	Local and distant
Alignment vs. novelty	Alignment	Novelty	Novelty	Balance	Alignment	Both/balance	Novelty	Combination

Source: own elaboration, 2017-18

On the horizontal axis we have put the different organizational designs: Research and Development Units (Gertner, 2012; Subedi, 2014), Spin-outs (Agarwal et al., 2004; Govindarajan & Trimble, 2005a), Plural Ambidextrous Designs (Andriopoulos & Lewis, 2010; Bradach, 1997;

Sutcliffe, Sitkin, & Browning, 2000; M. Tushman et al., 2010), Internal Corporate Innovation Units (Adams, Bessant, & Phelps, 2006; Andrew & Sirkin, 2003), Skunk works (Fosfuri & Rønde, 2009), Corporate Venture Units (M. Maula, Autio, & Murray, 2005; M. V. Maula, 2007; Rice, O'Connor, Leifer, McDermott, & Standish-Kuon, 2000), Open Innovation Programs (H. Chesbrough & Bogers, 2014; Henry William Chesbrough, 2003; West et al., 2014), including start-up and platform programs (Weiblen & Chesbrough, 2015).

We propose the following variables on the vertical axis to categorize the different organizational designs for innovation exploration: main structural feature, resource flow direction, strategic relation to parent company and/or industry, type of innovation pursued, line of reporting, mode of adaptation in the organizational ambidexterity continuum, main temporal dimension (or dichotomy), search horizon, and the control (alignment) vs. creativity (novelty) tension.

Research on functional or Cross-Functional Teams, is broader on scope and does not directly relate with the research question guiding this review. Teams are not exclusively related to organizational innovation exploration. Teams—whether from the external ventures or established companies—do participate in corporate accelerators but they are neither at the level of this present review analysis nor at the level chosen in the subsequent chapters. Innovation outposts are such a new phenomenon, with practically no scholarly treatment and, more importantly, it is not clear whether its main objective is business intelligence and technology scouting, or public relations and marketing.

To keep this categorization relatively parsimonious, I did not specify the different corporate accelerator models (Chapter 3) nor the value creation process, capability building mechanisms (Chapter 4) and incumbent – new venture relationships and tensions (Chapter 5), unleashed in industry-led accelerators.

In sum, Table 2.3 facilitates the distinctive theorization and empirical research about corporate accelerators vis-à-vis other organizational designs for innovation exploration. Its distinctiveness is also observed in the extant scholarly definition that defines corporate acceleration as “*a corporation's capability to catalyze a (new) venture's access to customers, investors, technologies, social networks, and mentors in a shorter period so as to change either its rate of scale or its strategic direction.*” (Shankar & Shepherd, 2018, p. 12) First, its distinctiveness is observed in the relationship with new ventures, which is much more complex and varied than in the case of CV units or other internal initiatives (spin-outs, skunk works) as it includes mentoring,

access to customers, investors, champions, technologies, and social networks to change course or accelerate its learning path. Second, the corporate accelerator—like the independent start-up accelerator—performs its core validation and acceleration function by time compression in a limited chronological time (Qin et al., 2019), usually between three and four months, comprising packed days of training, mentoring and networking. This creates a sense of urgency and eventually a change in speed. The time compression and change of speed thereof is unique and distinctive to the corporate accelerator as it is not present in previous organizational designs for innovation exploration.

2.10 Time out and time in

A final consideration concerns time, which is subtle but critical throughout this review. We discussed time when looking at the structural dilemmas organizations face when confronted with (dis)continuous technological change: whether having two temporal orientations simultaneously in different units integrated at the senior level (M. Tushman et al., 2010; M. L. Tushman & O'Reilly III, 1996) or performing temporal switching successively according to specific defined periods (Birkinshaw et al., 2016) or even by becoming complex adaptive systems with flexible semi-structures, linking past, present and future (S. L. Brown & Eisenhardt, 1997).

Both in the skunk works model of innovation and, especially, in the bootlegging activities of R&D scientists discussed previously (Criscuolo et al., 2013), temporal orientations are critical. In fact, having a dedicated separated physical space—and skunk time thereof—plays an important role to nurture these radical innovation explorations. Furthermore, underground bootlegging activities can be successful—in high performing environments—because they explicitly *delay* their assessment and evaluation of creative deviant ideas by the “official” organization (senior managers) until further business or technology validation is achieved. The temporal divergent orientations (orientation towards present vs. future-future) among relevant actors involved in these activities perform an important yet under-theorized function.

In both start-up accelerators (Susan L Cohen et al., 2018; Drori & Wright, 2018; Pauwels et al., 2016; Shankar & Clausen, 2020) and corporate accelerators (Gutmann, Kanbach, & Seltman, 2019; Kohler, 2016; Moschner, Fink, Kurpjuweit, Wagner, & Herstatt, 2019; Shankar & Shepherd,

2018), time is implicit in the very concept of acceleration. Yet, time is not sufficiently present or unpacked in the extant research, mainly because there is only one dimension of time in the analysis.

A scholarly analysis of time and its different dimensions/tensions is missing in these phenomenon-driven research outputs on corporate accelerators. Probably this gap and missing dimensions have to do with the pre-eminence in social science in general, and organization science in particular, of only one time dimension, i.e., clock-time (Deborah G Ancona, Goodman, Lawrence, & Tushman, 2001; Crossan, Cunha, Vera, & Cunha, 2005; e Cunha, 2004; Ellwood, Grimshaw, & Pandza, 2017; Orlikowski & Yates, 2002; Sonnentag, 2012). By and large, management science and innovation studies have neglected the other temporal dimensions, i.e., clock-time vs. event-time, internal pacing vs. external pacing, linear progression vs. cyclic progression (Deborah G Ancona et al., 2001; Dougherty, Bertels, Chung, Dunne, & Kraemer, 2013; Ellwood et al., 2017; Sonnentag, 2012), which can trigger tensions among agents with different temporal orientations (Ellwood et al., 2017; Reinecke & Ansari, 2015). I elaborate on novel incumbent vs. new ventures tensions—including temporal desynchronization—in chapter 5.

As a multi-level hybrid organizational form—comprising new ventures, large established firms and the accelerator interface—corporate accelerator research presents an ideal opportunity to unpack the “acceleration” construct by shedding light on the temporal dimensions and tensions at play in these settings. Studying the *temporal orientation divergence* of agents is key to both understand and measure corporate new venture engagement: “[the] tensions caused by innovation actors holding different temporal orientations are a source of slowness in innovation work that has not been addressed in this literature.” (Ellwood et al., 2017, p. 5) In addition, this multi-level organizational setting comprising the ventures’ time, the large corporates’ time, the accelerator’s time and even the value chain’s time is also suitable to deepen our understanding of internal/external speed change and synchronization across different organizational systems or sub-systems, i.e., *entrainment*.

The notion of *entrainment* has been borrowed from engineering and biology (Aschoff & Wever, 1981) and brought into organization science to be defined as the synchronization of the tempo and/or phase of two or more activities within a system (Deborah Ancona & Chong, 1996; Deborah Gladstein Ancona & Chong, 2003; Harrison, Mohammed, McGrath, Florey, & Vanderstoep, 2003; Standifer & Bluedorn, 2006). We do not know enough about “temporal fit”, that is, the state of synchronization or alignment between the organizations’ and their

environments' activity cycles. In the context of corporate accelerators, the new ventures' temporal fit with their parent company and its potential ecosystem is an important contingency survival factor because temporal misfit can lead to inefficiencies, low performance, and the potential death of ventures and large organizations alike over time (Pérez-Nordtvedt, Payne, Short, & Kedia, 2008).

Bringing time and its somewhat elusive dimensions to corporate acceleration research can deepen the current understanding of the phenomena and open up new avenues for further research: What are the temporal dichotomies and time-pacing tensions that are present in corporate accelerators, especially in industry-led ones? How is temporal fit achieved between new ventures (start-ups and scale-ups), parent/sponsor companies, and the value chain in the context of industry-led corporate accelerators? How does temporal misfit manifest in these settings? These are key questions that emerge when we bring time at the granular level to bear in this novel multi-level organizational design for innovation exploration. In Chapter 5 we empirically investigate the tensions—including temporal ones—between incumbents and new ventures in the context of industry-led corporate accelerators.

2.11 Positioning Corporate Acceleration Research: from Structures and Processes to Organizational Capabilities and Industrial Ecosystem Architectures

As I will analyze in detail in Chapter #3, the industry-led corporate accelerator is a new organizational form where value chain incumbents seek to proactively and cooperatively adapt to the emerging industry architecture by scouting, selecting, learning from, nurturing, and engaging with new entrepreneurial ventures (Garcia-Herrera, Perkmann, & Childs, 2018a; Hochberg, 2016). The industry-led accelerator is a novel organizational design for co-accelerated and cooperative exploration of the industrial architecture's emerging futures. That is, this industrial accelerator works through the simultaneous interplay between competition and cooperation (Hoffmann et al., 2018) between incumbents and new ventures and among incumbents themselves, who explore new alternatives yet they want to retain their dominant position in the industrial architecture (Michael G Jacobides, MacDuffie, & Tae, 2016), especially when it comes to access to core assets. Competition can be fierce among incumbents and between these and new accelerated ventures to

keep control or access to core knowledge assets. Industrial acceleration collaboration, in turn, tends to happen around the exploration of complementary assets (D J Teece, 1986; David J Teece, 1992), that is, exploration of new module additions or substitutions, that could improve efficiency in operations at the firm or supply chain level. In this process of cooperative co-acceleration, where both incumbents and new ventures are being prompted to learn and to adapt to the new environmental disruptive conditions, uncertainty emerges. As uncertainty over future developments makes it difficult to distinguish between potential competitors and collaborators and recognize who to work with and how in order to proactively adapt to and even drive the disruption (Cozzolino & Rothaermel, 2018; Katila, Rosenberger, & Eisenhardt, 2008). Therefore, cooperative tensions arise between incumbents and new ventures in industrial accelerators, which I further analyze in Chapter 5 and propose an identification and mitigation framework to orient managerial/founder practice in these contexts.

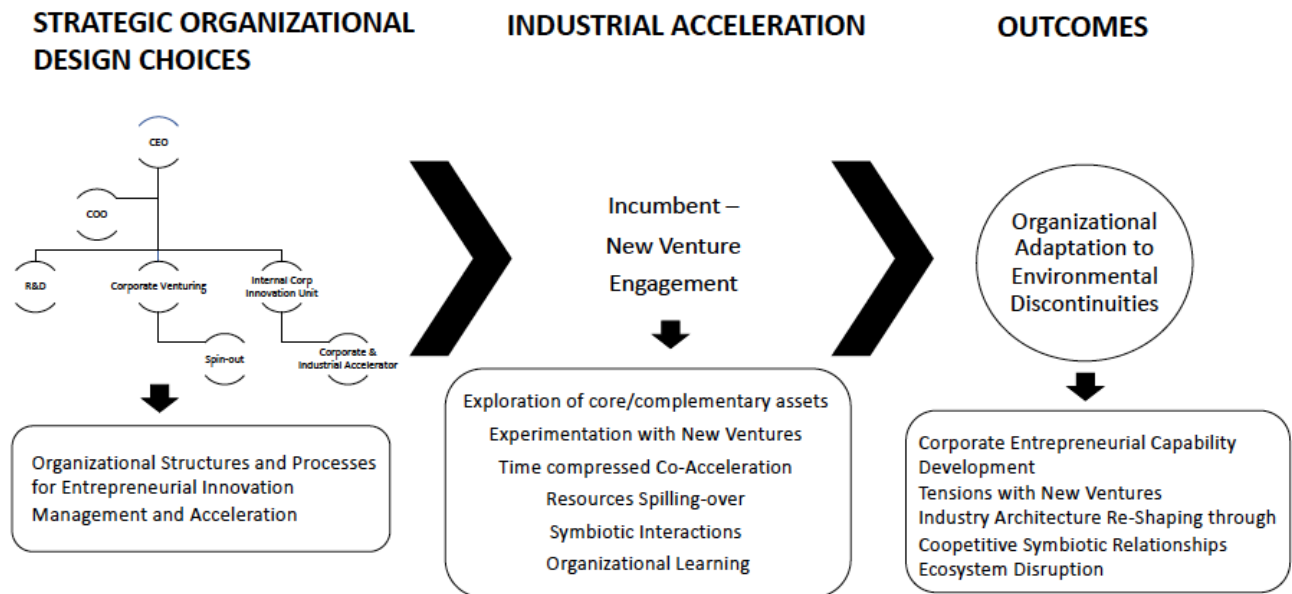
Another uncertainty derives from the “spilling over” context of industry-led accelerators. That is, a novel technology or business model coming from a selected external new venture is not exclusive for a specific incumbent but open for exploration and eventual appropriation by several ones. Furthermore, the results of corporate experimentation with external ventures may unintentionally leak out to other value chain incumbents or new ventures participating in the industry-led accelerator. This uncertainty over the value capture of the industrial accelerators’ outputs reveals a puzzle: how do firms internally absorb the entrepreneurial external knowledge and capture value from these new technologies, business models and lean methods when there are significant spillovers? I address this puzzle through an inductively derived process model of co-accelerated corporate entrepreneurial capability building, including its enabling mechanisms, organizational learning processes and core outcomes in terms of routines change.

By studying a novel inter-organizational interface comprising the accelerator, new ventures and established firms, I will bring further granularity to the understanding of how new corporate entrepreneurial capabilities are initiated and developed through sequences of organizational learning enacted during short-term, yet cumulative relationships over the years, with several external new ventures, i.e., small asymmetric ‘partners’. In doing so, I will extend and complement prior research on strategic alliances (Grant & Baden-Fuller, 2004) and relational capabilities (Dyer, Kale, & Singh, 2001; Moeen & Mitchell, 2020) by analyzing resource exchanges among these non-equals that I refer to as “whales, dolphins and sharks” using a marine biology metaphor

as anticipated in the Introduction. These relational capabilities are developed at the same time that incumbent – new venture tensions emerged in industrial acceleration contexts where new functional architectures are competitively explored, tested and eventually implemented. Furthermore, to explain this cooperative industrial acceleration re-shaping process, in Chapter 5, I outline an initial ecological theory of the symbiotically-based relationships and mechanisms between incumbents and new ventures as they interact and exchange resources in a changing and to-be-disrupted industrial ecosystem at the module, function and role levels.

To sum up and to situate my Thesis’ contributions, I offer in Figure 2.2 a framework to position the industrial acceleration process vis-à-vis the strategic organizational design choices and the potential outcomes at the firm and industry level. This framework builds on the literatures reviewed in this Chapter and situate the main gaps, puzzles and issues to be addressed in the following empirical chapters.

Figure 2.2 Framework to Position Industry-led Corporate Acceleration Research



Chapter 3

**INDUSTRY-LED CONSORTIUM ACCELERATORS:
WHAT ARE THEY AND HOW DO THEY WORK?
THE CASE OF OCCEAN ACCEL**

3 INDUSTRY-LED CONSORTIUM ACCELERATORS: WHAT ARE THEY AND HOW DO THEY WORK?: THE CASE OF OCCEAN ACCEL **

Following the previous literature review and positioning of corporate and industrial acceleration research, in this Chapter I empirically induct and analyze the working principles of a revelatory industry-led corporate accelerator to further ground this doctoral research and its positioning to understand the underlying dynamics, the impacts and outcomes.

In this empirical chapter, I focus on a promising model of corporate and industrial acceleration, i.e., the industry-led consortium accelerator, by asking the following research question: *How do industry-led accelerators enable external new ventures to engage with value chain incumbents and create value for the corporates, ventures and the sector as a whole?* To address this research question, I used an inductive framework-design approach based on the single longitudinal case of this revelatory industry-led accelerator operating in a major European port maritime complex. Using this case, I inductively derived four steps to explain how industry-led accelerators work. Generally, they i) define a broad innovation remit through an inter-company collaborative approach, ii) generate an innovation funnel to attract/select external innovation streams (start-ups and scale-ups) that fit the innovation remit, iii) connect corporate partners, through flexible matching, with external new ventures for further validation and, finally, iv) select start-ups/scale-ups for corporate engagement through short-term POC/pilots and roll-out deployment contracts, as well as potential acquisitions or investments to ensure scaling.

3.1 Introduction

Several sectors and industries around the world are experiencing pressure to adapt to new environmental conditions: disruptive technologies and AI, changing consumer needs, energy transition, digitalization, new regulatory standards, global competition (e.g. China). Whether it is food, finance, insurance, health, logistics, energy, companies operating in these sectors have started to jointly establish new approaches to collectively accelerate entrepreneurial innovation to

** This chapter is based on a paper co-authored with Markus Perkmann and Peter Childs, that was presented at the DESIGN2018 Conference in Dubrovnik, May, 2018 and at the R&D Management Conference in Milan, July 2018.

cope with those unprecedented challenges. One of these new approaches is the industry-led corporate accelerator.

Being large and successful at one point in time is no guarantee of continued firm survival (O'Reilly III & Tushman, 2013). A McKinsey study of the life span of firms in the S&P 500 showed that in 1935, the average company was 90 years and that by 1975, that number had fell to 30 years. In 2005 it was estimated to be only 15 years (Foster & Kaplan, 2001). As extensively discussed in the previous chapter, several organizational designs for modular/architectural/radical innovation exploration have been implemented to solve this survival challenge: skunkworks (Criscuolo et al., 2013), communities of practice (J. S. Brown & Duguid, 1991), ambidextrous designs (M. Tushman et al., 2010), spin-outs (Agarwal et al., 2004; Govindarajan & Trimble, 2005a), corporate venture units (Robert A Burgelman, 1983; Dushnitsky & Lenox, 2005; Wadhwa & Kotha, 2006) and, open innovation programs (Henry William Chesbrough, 2006; West et al., 2014). As positioned in the previous chapter, an even newer and increasingly popularized organizational design is the corporate accelerator (Heinemann, 2015; Kohler, 2016; Winston Smith, 2019), including industry-led or consortium models (Garcia-Herrera et al., 2018b; Hochberg, 2016; Moschner et al., 2019), which I analyze in detail in this chapter.

Since ca. 2010 and coinciding with the global diffusion of the lean start-up practice (Blank, 2006, 2012; Ries, 2011) as well as the proliferation of start-up seed accelerators (Pauwels et al, 2016), a new organizational interface, the corporate accelerator, has been initially designed to increase the exploration speed through experimentation with new business models, technologies and start-ups outside the core—but bound by the strategic objectives—of the firm. This new interface within large firms has been set to enable *bottom-up* and *outside-in* innovation to co-create sustainable and scalable new businesses. Large corporations have sought to benefit from entrepreneurial innovation by providing a start-up context, yet operating largely within the confines of the organization, a sector or within the innovation ecosystem initiated by a focal firm (Dattée et al, 2018).

Yet, as with seed accelerator programs in general, there is also an important gap about the working, models and impact of corporate accelerator programs. Recent research has initially advanced models and typologies of corporate accelerators programs (Hochberg, 2016; Kanbach & Stubner, 2016; Moschner et al., 2019), but there is little knowledge about the process through which external new ventures are selected and enter a sector to engage with the organizational

mainstream of large firms. Furthermore, we do not yet know *how* these new acceleration interfaces are integrated, first, with industrial consortia and second, with focal firms to enable faster exploration of entrepreneurial innovation, and, ultimately, create and capture value for both the industrial consortium and individual firms alike.

Therefore, in this chapter we focus on a promising model of corporate and industrial acceleration, i.e., the industry-led consortium accelerator by asking the following research question: *How do industry-led accelerators enable external new ventures to engage with value chain incumbents and create value for the corporates, ventures and the sector as a whole?*

To address this research question, we use an inductive framework-design approach based on a single longitudinal case of a revelatory industry-led accelerator operating in a major European port maritime complex.

3.2 Methodology and Data Sources

Investigating a poorly understood, dynamic, under-theorized and temporal phenomenon like corporate accelerator design calls for an inductive research design (Strauss & Corbin, 1990).

To address the following research question: *How do industry-led accelerators enable external new ventures to engage with value chain incumbents and create value for the corporates, ventures and the sector as a whole?*, this paper uses an inductive framework-design and theory building approach based on a revelatory longitudinal single case (Eisenhardt, 1989; Yin Robert, 1994). In terms of research design, even though there are three embedded units of analysis—i) the *new ventures*, ii) the *accelerator* and iii) the *established firms* supporting the industry-led accelerator—the accelerator interface is the focal unit of analysis for this chapter. We follow an opportunistic and flexible data-driven approach, which will advance theory and framework-design based on systematic iterative dialogue with the longitudinal case, which I have been studying for almost four years.

We conducted extensive interviews with the industry-led accelerator staff, the value chain incumbents, accelerated new ventures of 2016, 2017 and 2018 cohorts, and other stakeholders of this leading European port maritime complex. We triangulated semi-structured interviews with archival data and participant observation in training and mentoring interactions, roadshows, demo days, selection days, and advisory board meetings (see Table 3.1). We use pseudonyms to refer to industry-led accelerator, value chain incumbents and new ventures operating in this Port complex.

Table 3.1 Sources of empirical data for Chapter 3

DATA SOURCES	Number
Archival data comprising company reports and presentations, financial information, and publicly available information	20
Semi-structured interviews of senior executives and R&D and innovation managers, mentors, intrapreneurs, accelerator staff and co-founders and employees	70
Observations of accelerator’s scouting and selection of start-ups (pre-program) and observation of the program’s acceleration, validation, design, and corporate engagement activities (during the program)	10
Observation of mentoring sessions, roadshows and demo days, and initial corporate start-up engagement activities	8
Participatory observation of accelerator’s advisory board meetings and graduation ceremonies with corporate start-up contracts as well relevant events such as the international maritime fair and the CEO platform	3

3.3 Models of corporate acceleration

Although a relatively recent organizational and industrial phenomenon, there is already relevant differentiation to date in terms of corporate accelerators’ design, working functions and governance. As mentioned, fueled by the global proliferation of seed accelerators (S. Cohen, Fehder, Hochberg, & Murray, 2019; S. Cohen & Hochberg, 2014; Pauwels et al., 2016) and lean entrepreneurship practice (Blank, 2013; Ries, 2011), corporations have set up either internal, hybrid, powered by or industry-led accelerators, potentially superseding more traditional ways of promoting corporate entrepreneurial innovation through R&D labs, skunk works, internal corporate innovation or corporate venture units. Based on the type of mentoring, networking, resources, deal, firms’ and industrial ecosystem’s involvement, our research has identified four (4) main models of corporate accelerators, as showed in Table 3.2.

Table 3.2 Classification of Corporate Accelerator Models

	<i>Exclusive in-house</i>	<i>Hybrid in-house</i>	<i>“Powered by”</i>	<i>Industry-led out-house</i>
Selection	<i>Only internal projects initiated by employees</i>	<i>Internal projects and external start-ups</i>	<i>Start-ups scouted and mentored by firm and accelerator</i>	<i>External start-ups collectively scouted, selected and mentored</i>
Mentorship by VPs, C-level and R&D + i executives	√	√	√	√
Networking with investors and ecosystem key players			√	√
Fixed short-term & cohort-based programs between 3 -6 months	√	√	√	√
Provide stipends (15K – 50K)			√	√

Take a non-controlling equity (b/w 6% and 8%)		√	√	Yes and no
Funded by one corporate	√	√	√	
Objectives derived from companies' strategic challenges	√	√	√	
Objectives driven by collective shared vision or industrial challenges				√
Examples	BMW's Accelerator, ING's Studio and UBS' Innovation Lab Bosch	Telefónica's Wayra and Airbus' Bizlab	Barclays', Shell's, Microsoft's and Disney's corporate accelerators	OceanAccel, HighTechXL AIA-Konica Minolta Digital Health Accelerator Logistics Accelerator by Kaleido, Lufthansa Cargo, MAN and Fiege.

Source: own elaboration partly based on Heinemann, 2015

The main two differences of the industry-led accelerator are funding and objectives. As shown in Table 3.2, funding usually comes from a group of established firms operating along the value chain and/or a public-private consortium guided by a shared vision at the industry architecture or regional level. Our research has uncovered that to launch and sustain this cooperative endeavor it is easier when there are no direct competitors in this effort. However, provided there is a cooperative agreement, competitors can also participate together in an industry-led accelerator, unfolding cooperative dynamics, as we shall discuss in Chapter 5.

3.4 The industry-led corporate start-up accelerator: the case of OceanAccel

When uncertainty, technology or unprecedented change—think new regulatory frameworks, energy transition, digitalization, AI or sustainability challenges—affect a sector, an industry-led accelerator can be an effective tool to co-create solutions for firm- and industry-level challenges by attracting entrepreneurial talent and leveraging collective intelligence (Woolley, Aggarwal, & Malone, 2015).

Two technological discontinuities prompted the collaborative creation of OceanAccel, the world's first Port maritime accelerator: digitalization and energy transition. In this case, instead of an individual company exploring new technologies and business models, it was the regulator—the ROYAL PORT—who acted as an enabler and orchestrator to craft a shared vision of the challenges facing the sector and invite relevant value chain incumbents to collectively scout, select, mentor,

and learn from entrepreneurial ventures to re-think sector architectures — templates that define the division of labor among a set of co-specialized firms — in maritime, logistics, energy, petrochemical and refinery sectors. This industry-led accelerator focuses on the following technologies that may impact both core and complementary technologies: (1) robotics and automation; (2) network platforms; (3) simulation and VR; (4) the Internet of Things and big data analytics, and (5) energy efficiency and environmental awareness.

OceanAccel was co-founded and is currently supported by its corporate partners—public and private entities—through a three-year subscription model. Its main founding partner is the ROYAL PORT, supported by two dredging companies headquartered in this complex and a tank storage global company as well as other global players present in the value chain, a leading Port-related Investment Fund, the City Council, the regional airport, and the main University. The participation of these local players—the Council, University and Airport—reflects the additional objective of this industry-led accelerator: to transform this port city into a global hub by attracting entrepreneurial talent in the above technologies that can be applied to the port maritime sectors.

In terms of competitive and cooperative dynamics, one corporate partner in the tank storage services explicitly requested exclusivity while two competitors in the dredging business decided to join, which speak of the overall collaborative approach of this type of industrial accelerator.

OceanAccel is a non-profit organization that operates under a mixed model with for-profit subsidiaries that manage the funding deals (equity, convertible note or loan agreements) with every start-up or scale-up. OceanAccel's board comprises partner firms' C-level executives, serial entrepreneurs, and reputable public figures. As shown in Table 3.3 below, OceanAccel's value proposition is twofold. On the one hand, new ventures receive direct mentoring by potential lead corporate customers, who, in turn, help shape and customize the ventures' solutions to the particular needs of key players in the value chain. In addition, new ventures get training in business model validation, intellectual property, finance, 'Doing business in the Region', pitching, proof-of-concept (POC) and pilot acceleration, and corporate engagement. The selected ventures receive a living stipend for 3 months and a shared office space where they co-locate with the rest of the yearly cohort.

As for the corporate partners, OceanAccel enables them to learn important new skills by their participation in the industry-led accelerator. These skills comprise effective scouting of new technologies and business models; insights regarding new enabling and disruptive technologies;

lean entrepreneurship practices such as quick validation of value propositions and MVPs; and inspiration to fuel internal innovation initiatives and promote entrepreneurial attitudes within their corporate contexts. Through their active participation, corporate partners also gain an opportunity to shape and steer OceanAccel’s activities by selecting start-ups and scale-ups that might achieve strategic fit (Shankar & Shepherd, 2018) or bring in relevant modular and complementary assets. The overall purpose of OceanAccel is to allow corporate partners to collectively re-think and steer the changing industry architecture emerging out of the ongoing—and uncertain—digital transformation and energy transition processes. This industry-led accelerator has recently established similar programs in Singapore and Antwerp — with a focus on scale-ups — to expand its global reach in terms of technology scouting and disruption scenarios and promote sector-wide innovation acceleration by engaging new corporate partners.

Table 3.3 Organizational and Financial Structure of Industry-Led Consortium Accelerators

Structure	Description/Number
Type of Organization	Usually a Non Profit that may or may not have for-profit subsidiaries
Business Model	Corporate Funding and Governmental/City/Region Funding.
Governance	Board, including representatives of corporate partners, reputable public figures and industry stakeholders
Duration of Program	3 months plus 100 days of contracts & deals follow-up
Start-up Deals	Convertible Note or 8% equity, whose potential returns will be later re-invested into the program. There are also only-program commitment options.
Corp Partners Founders	At least two non-competitors
Main Value Proposition for Start-ups	Direct access to launching customers; Active support by mentors; Office space for six months; Extensive program on business model, finance, investment, pitching and deal making; between USD15K-USD\$50K as compensation for housing, food and services.
Value Proposition for Corporates	Technology scouting; Start-ups’ roadshows to inspire and fuel internal innovation; Help to bridge organizational silos; Participation in the Advisory Board to ‘steer’ the accelerator to key needs; problem-solving through proof-of-concepts and pilots
Value Proposition for the Industry and/or Region	Bring Innovation and generativity to a sector; develop an industrial architecture; attract entrepreneurial talent to an Industry/Region/City

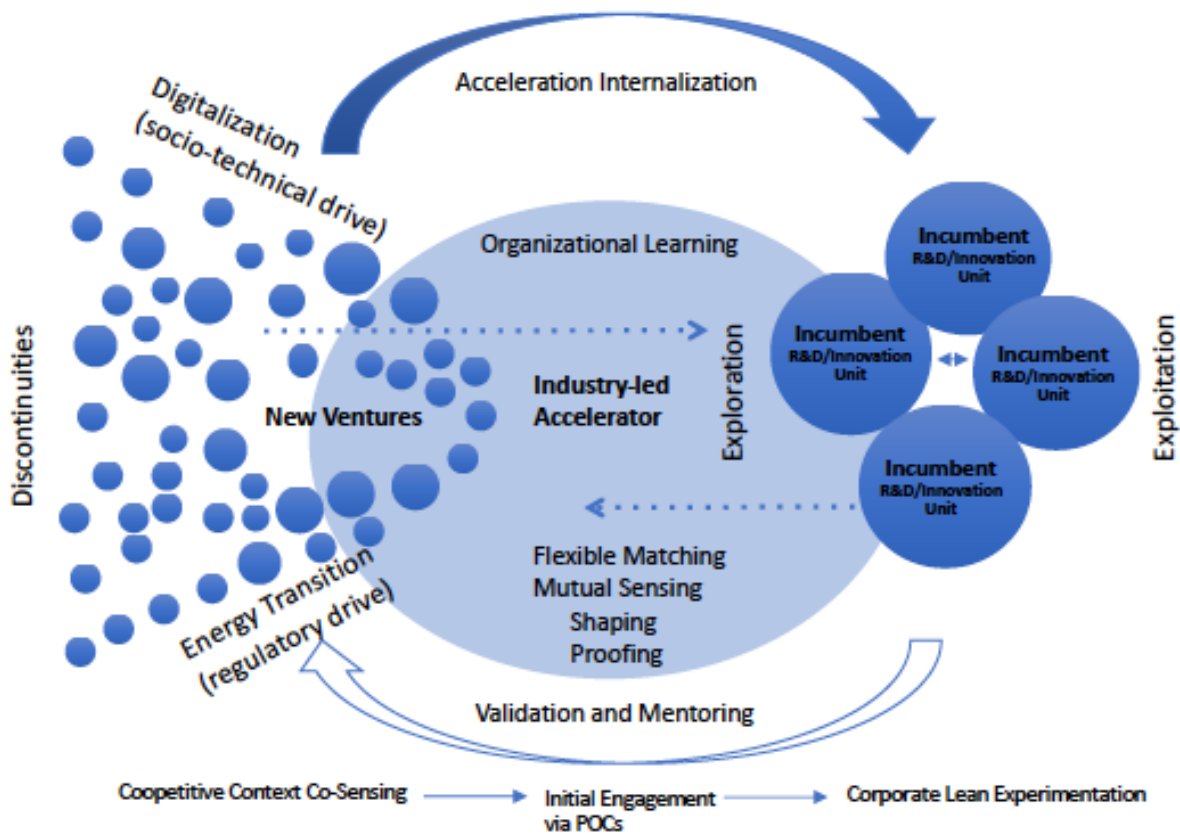
Source: own elaboration, 2018

3.4.1 OceanAccel’s Process: how does it work?

The overall acceleration process and related dynamics—which we will analyze in subsequent chapters—is described in Figure 3.1, including the two main discontinuities drivers behind this

industry-led accelerator, i.e., digitalization and energy transition; the broad organizational learning processes, comprising mutual sensing, flexible matching, shaping and concept proofing between corporates and new ventures. On the one hand, there is validation and mentoring for the new ventures provided by the corporates' R&D/Innovation and Business Units; on the other hand, there is lean processes adoption and internalizing, as I shall analyze in detail in Chapter 4.

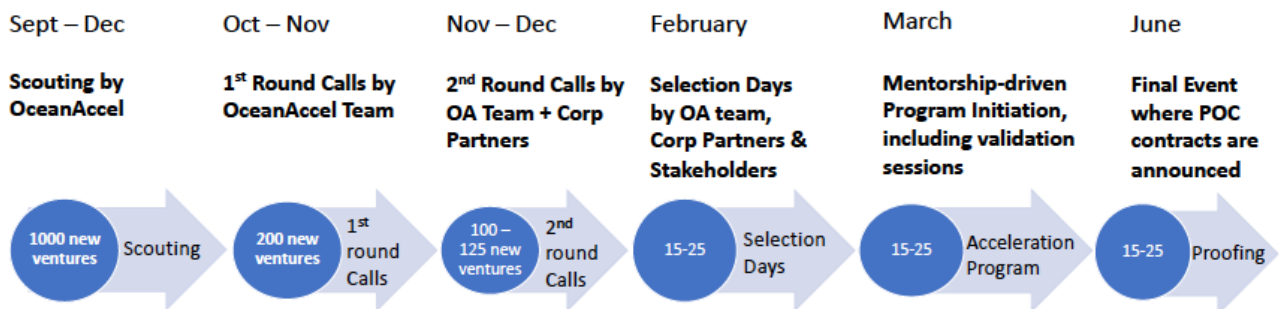
Figure 3.1 Industrial Acceleration Process



Through scouting of up to 1000 local and overseas start-ups performed remotely and face-to-face, 30 start-ups are invited to selection days for an intensive week of initial industrial engagement. In this pre-acceleration phase, the start-ups search and validate problems and opportunities and their current MVPs and business models within corporate “use-cases”. These selection days comprise two days of preparation (demoing, pitching, etc.) and two full days of presentations, Q&As, sitting with corporate experts, networking, and even initial conversations to

explore “proof-of-concepts”. As Nikunj Parashar, CEO of start-up Sagar Defense/Oceanos of OceanAccel’s 2017 cohort commented: *“Selection days were a massive learning experience: 180 people interviewed us, asking good straight and deep questions: finance, marketing, management, technology. These were VPs and C-Level executives with whom you usually cannot fix appointments with a time lag shorter than three months.”* Selection days lead to exploration of proof-of-concepts and to learning by start-ups and corporates alike. This initial contact allows establishing a baseline from where the search for a problem-solution fit will take place during the 3-month business-to-business (B2B) validation process. At the end of Selection Days, the OceanAccel’s corporate partners committee announces the 10-15 finalists, who will then start the mentored acceleration program in March and end it in June with a final event called Shakedown where proof-of-concepts (POCs), i.e., corporate start-up initial engagements, are announced. See the yearly acceleration process in Fig. 3.2.

Figure 3.2 The yearly Industry-led Process: scouting, selection, mentoring and validation



3.5 Value creation and capture by industry-led accelerators

The first key strategic question at the firm level is the following: why should a firm co-fund or join an industry-led accelerator instead of setting an internal exclusive one fully aligned with its core strategy?

Our research has, initially, uncovered three main reasons: i) to be more effective and comprehensive in the scouting of new technologies and business models, ii) to learn from entrepreneurial innovation, that is, from start-ups’ lean and agile processes aimed at quick validation of new business propositions and new technologies, iii) to get inspiration to fuel internal

innovation initiatives and promote the entrepreneurial spirit. In Chapters 4 and 5, I further elaborate on the reasons why corporations have joined and sustained this industry-led accelerator.

The second strategic question is: How does the industry-led accelerator specifically create value for its corporate partners and the industry at large?

First, by organizing a collective vision about the challenges facing the industry. Although each company might have its own frames and interpretation (Kaplan, 2008) of the key challenges that are facing in the short and long-term horizons, an industry-led accelerator puts forward a collective vision. Second, an industry-led accelerator creates value by bringing in external innovation that can complement firm-level innovation and address their pains/needs identified through “use-cases”. That is, this type of accelerator creates a funnel for innovation supply based on broadly defined ecosystem-level and specified firm-level challenges. Third, the industry-led accelerator scouts innovation inputs (start-ups and scale-ups) based on the ecosystem’s general challenges and defined firms’ needs. Finally, the accelerator facilitates strategic fit, that is, it scouts and selects new ventures, whose value propositions’ meet the problem domains of corporate partners or relevant industrial stakeholders.

To enable strategic fit between the external venture and focal corporates, the industry-led accelerator uses a *flexible matching* approach, that is, new ventures can search for a match within the participating firms: ventures are not allocated to a fixed corporate partner to validate its business model, rather they have the chance to explore different corporates to engage with and hopefully agree on a proof-of-concept (POC) during or after the 3-month acceleration programme. In this model of acceleration, start-ups and scale-ups can further validate their propositions and actually end up engaging with more than one partner, even competitors.

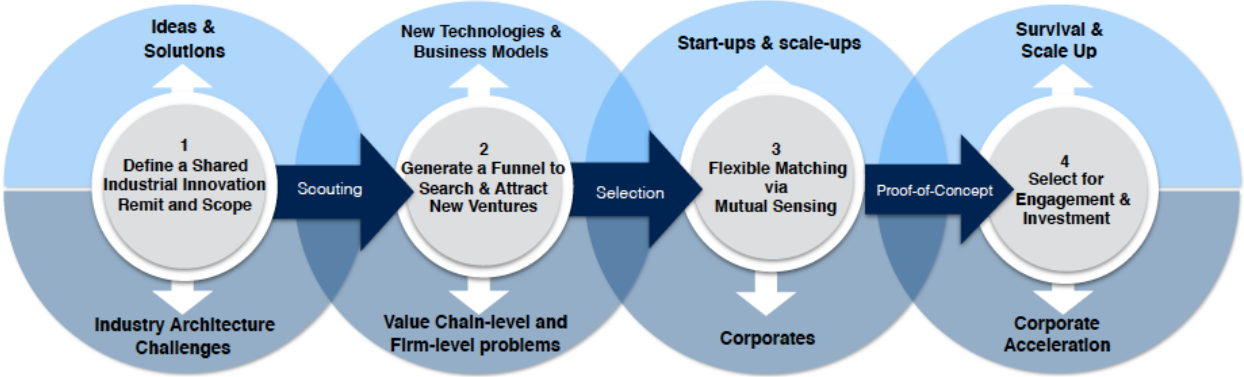
Finally, to capture the value of entrepreneurial innovation—processes, inspiration, ideas—that has been scouted, selected and mentored, our research has uncovered that corporates redesigned their internal R&D/Innovation functions, as I will analyze and discuss in Chapter 4.

3.6 The four steps for Industrial Corporate New Venture Acceleration

Based on our longitudinal research on OceanAccel, we have inductively developed four steps to explain how industry-led accelerators work, as shown in Figure 3.3 below: i) define a broad innovation remit through an inter-company collaborative approach, ii) generate

an innovation funnel to attract/select external innovation streams (start-ups and scale-ups) that fit the innovation remit, iii) connect corporate partners, through flexible matching, with external new ventures for further validation and, finally iv) select start-ups/scale-ups for corporate engagement through short-term POC/pilots and roll-out deployment contracts as well as potential acquisition or investment to ensure scaling. Throughout this 4-step process, corporate founders or enablers—which could be governmental institutions—perform a continuous orchestration of a shared vision and broadly defined innovation remit of the focal industrial value chain or emerging ecosystem.

Figure 3.3 Operating Principles of Industry-led Accelerators: a four-step Framework



The first step comprises organizing of a collective vision about the challenges facing the industry and the definition of a broad innovation remit/scope, which resonates at the firm level. Although each company might have its own cognitive frames of key challenges going forward, an industry-led accelerator put forward an inter-organizational approach—a shared vision—to embrace individual firms, even competitors within an industry or a region.

The second step comprises the generation of an innovation funnel to signal, scout, select and, ultimately, attract external start-ups/scale-ups that fit the innovation remit at the sector and firm level. The accelerator's partner companies are actively involved in the scouting and selection of these external incoming innovation streams.

The third step comprised mutual sensing between the established firms and the external ventures. As mentioned previously, to facilitate problem-solution fit, the industry-led accelerator uses a flexible matching approach, that is, selected new ventures search for a match within the corporates' problems domains: these ventures are not allocated to a fixed corporate partner to validate its business model and customize their technology; rather they have the chance

to explore different corporate partners and potential paths to engage with during the program. During this 3rd step, there is both ventures' nurturing and shaping by the corporate mentors of the incoming external streams to accelerate strategic fit, as I shall empirically analyze in Chapter 4.

The fourth and final step is completed by the selection of start-ups/scale-ups for corporate engagement through short-term pilots and rollout deployment contracts, which enables not only ventures' scaling within the focal value chain but also corporate innovation acceleration.

How do managers and entrepreneurs alike enable this engagement process? First, a *shared semantic* is needed to agree upon, visualize and measure the innovation process. *OceanAccel* and its corporate partners uses the *demo, proof-of-concept, pilot, implementation and scale* semantic that everyone in the Port industrial ecosystem understand. A demo is the presentation of what a certain value proposition or start-up technology is capable of doing outside the implementation context; a proof-of-concept is a demonstration in the actual corporate context of such start-up solution during a very limited time period that ends with an assessment; a start-up pilot is a full innovation project paid for and implemented at the business unit, which at this point takes control over it. After the successful evaluation of a pilot, the start-up's technology can be fully deployed, scaled and orbited within the focal ecosystem. These progressive validation steps enable industrial engagement with external incoming innovation streams previously scouted and selected.

The *demo/proof-of-concept/pilot/implementation/scale* framework provides a shared language to allocate corporate resources, engage with external explorative innovation streams as well as to assess start-up progress, success and overall impact. Industry-led accelerators along with their corporate partners and relevant stakeholders may develop a dashboard to monitor corporate start-up engagement over time. An initial framework (Canvas) to guide acceleration/ managerial/ founder practice is proposed in Chapter 6.

To answer our research question about the ways in which industry-led accelerators enable new ventures to enter and engage with the incumbents and enable value creation at the venture, firm and ecosystem level, I next analyze each of the four corporate new venture engagement steps in greater detail, using illustrations from the *OceanAccel* case.

3.6.1 Define a shared industrial innovation remit and scope

The first step comprises organizing of a collective vision about the challenges facing the industry and the definition of a broad innovation remit/scope, which resonates at the firm level. Our research shows that in the very early stages of convincing value chain players to co-launch and co-fund an industry-led accelerator, the role of ambidextrous C-suite executives (Probst, Raisch, & Tushman, 2011) is critical in both the symbolic and material support. In the case of *OceanAccel*, it was the ROYAL PORT's Chief Financial Officer who played a pivotal role in taking the first step to set a shared vision and to trigger the value chain's key players to join the innovation journey even when the road ahead was not clear. This Port's CFO recalls how the new cooperative innovation initiative started: *"In hindsight, it seems very structured but when I was starting, I was finding my way through the fog (...) My first step in 2012 was a 3-hours meeting in a boat with 15 CEOs and Board Directors where we asked ourselves 'Do we want to innovate, why, should we? The outcome was that there is indeed a need in the port but also that we should not copy other regions."* This collective *visioning* exercise was complemented by a strategic roadmap set forth in the *Port Vision 2030* document (Havenbedrijf Rotterdam, 2011). The industry-led accelerator has to be uniquely authentic to attract talent, gain legitimacy and, ultimately, make a difference in the global scene. In the case of *OceanAccel*, it had to find its 'own way', not the Silicon Valley one.

A shared vision towards a new industrial architecture (Michael G. Jacobides et al., 2006) is not enough to enable the transition from a vertically integrated value chain of stand-alone firms to an industrial ecosystem (Hollen, Van Den Bosch, & Volberda, 2015), where both entrepreneurial and innovation ecosystems can emerge across large focal firms and networks of entrepreneurial complementors (Autio & Thomas, 2019). Rather, one of the key initial functions of an industry-led accelerator such as *OceanAccel* is to generate a funnel for continuous incoming external innovation to address needs at both the ecosystem-level (sustainability, gas emissions, port scheduling, value chain digitalization, etc.) and at the firm-level (asset maintenance, operators training, productivity, fuel efficiency, compliance to regulations, etc.)

An industry-led accelerator creates value by bringing external innovation that can contribute to solve value chain challenges as well as to complement firm-level innovation and modular requirements. That is, this model of accelerator co-creates a remit for innovation supply

based on ecosystem-level and firm-level challenges. This approach resembles a new generation of open entrepreneurial innovation research, which has recently moved beyond the dyadic interaction between two firms, to collaborations with external networks, platforms, ecosystems and communities (H. Chesbrough et al., 2006; West & Lakhani, 2008; West et al., 2014)

3.6.2 Generate a funnel to search and attract external entrepreneurial streams

This second step comprises the generation of an innovation funnel to signal, scout, select and, ultimately, attract external start-ups/scale-ups that fit the innovation remit at the sector and firm level. The industrial accelerator's partner companies are actively involved in the scouting and selection of these external innovation streams, i.e., new ventures. To unlock the entrepreneurial spirit in efficiency-oriented industries, it has been important to not only have a shared vision but also a global outlook. As *OceanAccel*'s Managing Director put it, *“though this is a renowned European hub and almost everyone speaks English, it is still in many senses, too locally and inward-looking. That’s why we need to bring the best start-ups of the world here.”* To achieve this global outlook, *OceanAccel* both scouts and selects new ventures using a ratio of 20% to 80% between local and overseas ventures.

Client discovery within the industrial ecosystem starts during selection days. Corporates already know about the initial value proposition of the incoming new ventures. Therefore, sensing of potential corporate start-up engagement begins during the selection phase through initial exploration of proof-of-concepts (POCs). As the COO of UK venture *Maritime Monitor*, explains: *“An initial agreement to work in the tank facilities of the Port was established during the selection days [February]”*. This initial contact allows establishing a baseline, from where search for *problem-solution fit* will take place during the official acceleration process, i.e., between March and June, as per the acceleration timeline of Figure 3.2. As the Director of Digital Innovation of *TANKTECH* puts it: *“Starting on the very selection days, we work with start-ups exploring proof-of-concepts within the domain of our collected use cases as these entrepreneurs are open to look at problems and they do not want to push a solution and just sell licenses...in a way, it is easier to work with a start-up than with an IBM.”* Even in efficiency and safety-driven industries such as the maritime one, senior leadership and innovation managers of large incumbents are realizing the value of working with and learning from new ventures in novel and different ways than the

corporate venture capital units had in the past (Dushnitsky & Lenox, 2005; Hogenhuis, Van Den Hende, & Hultink, 2017; Hora, Gast, Kailer, Rey-Marti, & Mas-Tur, 2018).

The industry-led accelerator's innovation funnel is also designed in a way that external new ventures can search for business model validation and industrial fit within the value chain. Contrary to the idea that accelerators need to select and invest only in start-ups with a very clear value proposition and *ex-ante* product-market fit, our research suggests otherwise. Because start-ups are validating their business models within a specific industrial value chain, it is desirable to have a value proposition flexible enough to be shaped and customized according to the needs of the value chain incumbents. Start-ups offering solutions based on mainstream technologies such as drones, virtual and augmented reality are *shaped* during the acceleration program in order to address the needs of one or more players, which were not completely transparent at the outset. On the opposite, if start-ups come with a rigid business model, the industrial *shaping* and venture *pivoting* possibilities are reduced and, thus, chances of product-market fit failure, increase.⁵

Two examples from *OceanAccel*'s 2016 start-ups cohort illustrate this mechanism. On the one hand, *AquaSense* started as a promising multi-sensor autonomous platform over a drone with 10 functionalities but during the acceleration program and due to corporate mentors from different companies, they realized their intended solution was "*too complex, too expensive to develop and with too much risk*". Instead, *AquaSense* pivoted and then focused on-just-one functionality: jetty inspections. Then, it managed to do a POC with one of the main accelerator's corporate partners during the remaining of the acceleration program. Interestingly enough, the same corporate innovation director of this contract who had referred to this inspection start-up as being "*a lot of everything is a lot of nothing*" finally agreed to be its very first customer. Initial industrial search turned into problem-solution fit through *just-in-time* mentoring.

On the other hand, *PortGateway*, a port scheduling scale-up with an operating cloud-based service and valid product-market fit in the U.S. and Sweden, was not able to adjust its value proposition or to customize its working technology to this major European port. The *PortGateway*'s founder recalls this situation: "*I wish I had been exposed to the accelerator earlier in the process. I do not have a lot of room to change direction at the moment. I am still flexible*

⁵ In Chapter 4 we further elaborate on *shaping* as a novel experimentation-driven entrepreneurial capability phase developed by incumbents throughout this industrial acceleration process.

and agile, but I have customers and capabilities that have to maintain and deliver. Had I previously known what I learned in OceanAccel I might have done things differently from the beginning.” In certain circumstances, not being able to agilely change course of action in both the business model and the underpinning technology might result in customer development failure.

3.6.3 Flexible Matching through Mutual Sensing

Our research suggests that the industry-led corporate accelerator requires a good degree of transparency of the value chain challenges and corporates’ pains to enable fit with incoming modular, incremental, architectural or radical innovation (Garcia Herrera & Autio, 2020; R. M. Henderson & Clark, 1990) streams that are collectively scouted and selected. To enable strategic fit between corporates and external new ventures, a minimum level of trust and openness is needed in the program.

Industry-led accelerators such as *OceanAccel* use two mechanisms to facilitate strategic fit: first, flexible matching and second, mutual sensing. As for flexible matching, selected new ventures can validate and match their solutions with more than one corporate partner. Therefore, flexible matching facilitates contract scalability within the industrial value chain in that corporates do not collaborate with new ventures under the assumption of exclusivity. To allow seamless flexible matching, the selection of non-competing ventures and a low level of competition among the accelerator’s corporate partners are required as these new ventures can be shaped and nurtured via corporate mentoring without major conflicts and competing demands for resources. New ventures, then, can establish proof-of-concepts and pilots’ contracts with different value chain players. Flexible matching increases the odds of recurrent and scalable engagement within the focal value chain and later in other port maritime industrial ecosystems.

Corporates that participate in *OceanAccel* fulfill two conditions. First, they know—or are willing to know—across organizational boundaries what their most pressing latent and manifest problems are. They enter the program with an initial list of use cases. It is not trivial to know what is really going on at different levels in an organization, as a former HP’s CEO once famously put it: *“If HP knew what it actually knows, HP would be three times more profitable (Davenport & Prusak, 1998).* Second, corporates need to open-up these problem domains so that the industrial accelerator can scout and select external new ventures, accordingly, and subsequently, the ventures

themselves can search *inside* the corporates to validate their problems' hypotheses by matching with their customizable solutions.

Therefore, in this process, mutual sensing takes place: on the one hand, corporates sense problems internally and collect those *use cases* to present to potential solvers: the external new ventures. On the other hand, new ventures, once selected into the program, search within those *use cases* and across organizational levels to narrow down their search and match possibilities. Sensing, then, works both ways.

3.6.4 Select for Engagement and Investment

The final step of the industrial acceleration process is to select start-ups/scale-ups for short-term proof-of-concepts (POCs), pilots and rollout deployment contracts as well as eventually for acquisition and investment to enable not only ventures' scaling but also corporate innovation acceleration by specific learning mechanisms that I explore in Chapter 4.

As an equity holder, OceanAccel—and the firms backing it—have a legitimate interest in the new ventures' survival and scalability. That is why industry-led accelerators promotes a recurrent engagement in the focal value chain aimed to expand new external markets for alumni ventures through their corporate partners' global presence.⁶

If and after the *pilot phase chasm* is crossed, implementation contracts can be scaled up throughout the focal value chain during the *post-acceleration* phase—which usually ranges from 100 to 160 days—to consolidate the business model, to do additional tests or pilots and secure implementation contracts and, thus, develop recurrent customers. New ventures can then scale beyond the initial focal value chain and address new global interconnected markets: '*If you make it here, you can do it in any port of the world*', as one OceanAccel's start-up founder once put it. An industry-led accelerator enables the exploration of problem-solution fits in similar contexts by transferring the client discovery and validation process. The global presence of the accelerator' corporate partners is a key gateway to successfully scale and achieve fit beyond the focal value-

⁶ As mentioned in the Table 3.2, not all industry-led accelerators take equity from the participating ventures.

chain. During 2018 and 2019, OceanAccel started programs in Singapore and Antwerp to scale new ventures search and testing of validated solutions, and thus, drive sector-wide innovation.

Finally, the corporate new ventures dynamics required to launch and sustain an industry-led accelerator can enable the transition from a vertically integrated value chain of stand-alone firms towards a horizontal entrepreneurial ecosystem that leverages both digital and spatial affordances (Autio et al., 2018). Such transition would be possible not only because of the horizontal knowledge sharing between start-ups and scale-ups but rather by the transformation of value chain incumbents into active entrepreneurial agents that co-scan the environment, co-create value and realize innovations together with new ventures.

In the next chapter, I analyze how established firms—beginning with their R&D/Innovation Units—have initiated the development of new experimentation competences, i.e., co-accelerated corporate entrepreneurial capabilities through their four-year long engagement process with the industry-led accelerator in this port maritime ecosystem.

Chapter 4

**HOW DO WHALES BECOME SHARKS?:
A NEW PROCESS MODEL TO DEVELOP
CORPORATE ENTREPRENEURIAL CAPABILITIES**

4 HOW DO WHALES BECOME SHARKS?: A NEW PROCESS MODEL TO DEVELOP CORPORATE ENTREPRENEURIAL CAPABILITIES ⁷

In the previous chapter I empirically and inductively derived the core working principles of OceanAccel, a leading port maritime industry-led accelerator. I developed a coherent four-steps framework to clearly understand how these collaborative organizational units work to explore, sense and adapt to upcoming technological discontinuities through novel ways of engagement with external new ventures.

In this Chapter I turn the focus to the outcomes and effects on the incumbents' side of the very engagement with both the industry-led accelerator and the new ventures. Thus, I explore the outcomes of this industrial engagement through the lens of capability development.

The question of how firms continuously develop and renew their capabilities is at the core of strategic management. Given the current pace of technological disruption, this question is even more compelling in both theory and practice. Based on an inductive longitudinal study of multiple cases, this paper develops a process model to theorize about corporate entrepreneurial capability building in established firms through the engagement with industry-led accelerators. The process model comprises four capability-building phases: i) co-scanning and attracting streams, ii) strategic fit sensing, iii) shaping streams and iv) internalizing and re-designing structures. In so doing, we advance a novel mechanism-based explanation of how R&D units and corporate innovation units of established firms develop entrepreneurial and experimentation capabilities through a novel four-phases process engagement with industry-led accelerators and new ventures to enhance their core dynamic capabilities and further adaptation to technological discontinuities.

This process model is inductively developed through four longitudinal, theoretically sampled cases of established firms in the maritime, logistics, dredging and energy sectors, which have launched and co-sustained an industry-led accelerator in a leading European Port maritime

⁷ This chapter is based on a paper co-authored with Markus Perkmann and Peter Childs, which has been accepted for presentation at the 36th EGOS Colloquium in Hamburg, July, 2020. An earlier version was presented at the 2018 R&D Management Conference "R&Designing Innovation: Transformational Challenges for Organizations and Society", June, 30th – July 4th of 2018 in Milan, Italy. A shorter version has been nominated for the Best PhD Paper at the 2020 SMS Annual Conference. I am grateful for the feedback by participants at the 2018 R&D Management Conference, at the Imperial College Business School's Doctoral PDW in March 2020 and at the 36th EGOS Colloquium's Sub-Theme 24 Entrepreneurship In and Around Organizations in July of 2020.

complex. This research contributes to the corporate entrepreneurship and venturing, organizational learning and dynamic capabilities streams by solving the puzzle of how new lean entrepreneurial capabilities are initiated through the symbiotic interaction between corporates and new ventures in industry-led accelerators. This process model can be utilized to augment R&D/innovation functions and enhance the entrepreneurial orientation of large, established firms.

4.1 INTRODUCTION

The question of how firms continuously renew and develop their capabilities in order to adapt and sustain their competitive advantage in changing environments is at the core of strategic management. Being large and successful at one point in time is no guarantee of continued survival. Many organizational designs have been implemented in an attempt to adapt to technological discontinuities and, thus, survive in the long run: e.g., R&D units, skunkworks (Criscuolo et al., 2013), communities of practice (J. S. Brown & Duguid, 1991), ambidextrous designs (M. Tushman et al., 2010), spin-outs (Agarwal et al., 2004; Govindarajan & Trimble, 2005a), corporate venture units (Robert A Burgelman, 1983; Dushnitsky & Lenox, 2005; Wadhwa & Kotha, 2006) and open innovation programs (Henry William Chesbrough, 2006; West et al., 2014). An even newer and increasingly popularized organizational design is the corporate accelerator (Heinemann, 2015; Kohler, 2016; Winston Smith, 2019), including both industry-led and consortium models (Garcia-Herrera et al., 2018b; Hochberg, 2016).

All these organizational units are designed to increase corporations' innovativeness, which is the single most important predictor of their long-term survival. However, they also present important challenges in terms of how to integrate them into the core strategic roadmap of firms (Weiblen & Chesbrough, 2015). Though this organizational design literature has done a notable job of identifying these various structural solutions, the frequency of these solutions, their boundary conditions and their performance implications over the medium to long term still need to be empirically assessed (Ahuja et al., 2008). Furthermore, firms are continually experimenting with new organizational designs to realize the full potential of architectural and radical innovation and, thus, sustain their performance and adapt to technological discontinuities. One of the current experimentations in organizational designs for innovation exploration – still in an era of ferment (Anderson & Tushman, 1990; Eggers & Park, 2018) – is the corporate accelerator.

Coinciding with the global diffusion of lean entrepreneurship practice (Blank, 2013; Blank & Dorf, 2012; Ries, 2011), as well as the proliferation of start-up seed accelerators (S. Cohen et al., 2019; Pauwels et al., 2016) designed to accelerate learning and mitigate bounded rationality in new ventures (Susan L Cohen et al., 2018), the corporate accelerator emerged across industries and has become increasingly popular (Heinemann, 2015; Kohler, 2016). Between 2012 and 2015, more than 105 corporate accelerators (CAs) were launched globally by firms across multiple industries (Ream & Schatsky), and nearly a quarter of the 500 biggest global companies now have such programs (Bonzom & Netessine, 2016).

The corporate accelerator is a new organizational interface through which large firms have begun to attract, validate, nurture and catalyze entrepreneurial ventures (Gutmann et al., 2019; Kanbach & Stubner, 2016; Kohler, 2016; Moschner et al., 2019) with the ultimate goal of benefitting themselves through either venture emergence or strategic fit (Shankar & Shepherd, 2018). This new interface of corporate nurturing – alongside corporate venturing and renewal – can be structured to promote intrapreneurship (Antoncic & Hisrich, 2001; Parker, 2011; Shane, 2012) as well as to increase the exploration speed through experimentation with new business models, technologies and start-ups outside the core, but bound by the strategic objectives, of the firm. This new interface has been recently set to enable *bottom-up* and *outside-in* entrepreneurial innovation to validate either external start-ups or internal ventures via mentoring, education, networking, seed funding and firm-specific resources (Kohler, 2016). Large corporations have sought to benefit from entrepreneurial innovation by providing a “start-up” context, yet operating largely within the confines of the organization or a particular sector or region, or within the innovation ecosystem initiated by a focal firm (Dattée, Alexy, & Autio, 2018).

Corporate accelerators (CAs) work in a similar way to independent accelerators (Yang, Kher, & Lyons, 2018), while being operated partially or fully by incumbent firms (Kohler, 2016) or a consortium of firms (Garcia-Herrera et al., 2018b; Hochberg, 2016). Similar to independent accelerators (Pauwels et al., 2016), CAs select partner ventures to enter into the program based on applications received, which often involves a panel of expert judges and requires several rounds of interaction (Shankar & Shepherd, 2018). After its inclusion into a CA, new ventures are provided with multiple types of resources, such as office space, seed funding, lean start-up training and help with vital connections to future investors, customers and complementors (Kohler, 2016).

Formal interaction with the CA is limited to a fixed period until they graduate from the program (Kanbach & Stubner, 2016), but it can be extended further, as alumni ventures develop contract-based services or investments with the corporate sponsors.

Given the rapid emergence of CAs across multiple industries, academic research has begun to examine this interesting and potentially important phenomenon (Gutmann et al., 2019; Kanbach & Stubner, 2016; Kohler, 2016; Moschner et al., 2019; Shankar & Shepherd, 2018). However, because such research is in its embryonic stage, many gaps exist in our understanding of how these programs add value to parent or sponsor firms or consortia. Prior research (Shankar & Shepherd, 2018) suggests that parent firms often seek strategic, innovation-related outcomes from their CAs, such as gaining access through a window into new technologies and business models and/or developing an ecosystem for their own products (Kanbach & Stubner, 2016).

For CAs, expectations of financial returns are secondary since the equity positions taken are small, if at all. In having a primary strategic objective, CAs differ from independent accelerators that primarily seek financial returns to sustain their business model. However, it is yet unclear how and when parent or sponsor firms achieve such outcomes from the relatively short, arms-length relationships that their CAs have with their partners. Since most CAs are relatively new, even when compared to independent accelerator programs, many of these programs may not have yet realized the objectives for which they were set up, making it difficult for research to examine their performance. While a few studies have focused on different corporate motivations to initiate a CA (Gutmann et al., 2019; Jackson & Richter, 2017; Shankar & Shepherd, 2018), there has been little examination of common practices that these programs employ to fulfill the objectives of their parent and sponsor firms in diverse industries.

Furthermore, many firms which start a CA often employ other approaches to partnering with entrepreneurial ventures (Bonzom & Netessine, 2016). In particular, these firms are likely to have more established and traditional approaches to forming such partnerships, often collectively termed ‘corporate venturing’ (Sharma & Chrisman, 2007; Sykes & Block, 1989). Corporate venturing can further be categorized as *internal*, when employee ideas for new ventures or initiatives are nurtured within the firm (Robert A Burgelman, 1983; Day, 1994), or *external*, when firms forge partnerships with independent ventures (Dushnitsky & Lenox, 2005). Both internal and external venturing enable more direct contact with innovative ideas, usually over a longer

period, and have well-documented impacts on firm innovation (S. A. Hill & Birkinshaw, 2008; Wadhwa & Kotha, 2006). Since CAs are also being established to achieve similar outcomes (Shankar & Shepherd, 2018), it is not well understood how these programs actually add value to a firm over and above that already added by more standard corporate venturing approaches.

In sum, as a novel and burgeoning, yet under-theorized phenomenon, there are very important gaps and unknowns about why and how established firms are creating and capturing value distinctively through different models of corporate accelerators.

In this chapter, I focus on how value is created through the initial development of entrepreneurial capabilities and routines in corporate R&D/Innovation units through engagement with corporate accelerators, and, in particular, with industry-led accelerators, where a consortium of firms collectively search for, select, mentor and learn from external new ventures through an explorative short-term and time-compressed engagement process (Garcia-Herrera et al., 2018b; Hochberg, 2016). Extant research on corporate accelerators does signal indirectly to how new entrepreneurial capabilities are being developed and brought into established firms, yet their underlying learning mechanisms are not fully elaborated, so an important gap remains. Compared to the stream on corporate venturing, learning and capabilities, the industrial and corporate acceleration research stream is very much in its infancy. Therefore, I ask the following research question: How do corporate R&D/innovation units develop new entrepreneurial capabilities and routines through their engagement process with industry-led accelerators?

In industrial accelerators, there are two additional puzzles to solve: first, how do firms internally capture value by developing corporate unit-level capabilities from external entrepreneurial ideas, technologies and lean methods when there are significant spillovers; i.e., a novel technology or business model coming from a selected external new venture is not exclusive for a specific corporate but open for exploration and eventual appropriation by several corporates. Second, the results of corporate experimentation with external ventures may unintendedly leak out to other value chain corporates or new ventures participating in the industry-led accelerator.

The most counter-intuitive finding in this industrial ‘spilling-over’ accelerator originally designed to accelerate external new ventures is that the accelerator’s corporate partners themselves are being accelerated through the internalizing of lean entrepreneurial capabilities and routines. How? The answer to the research question and related puzzles is the inductively derived process

model of co-accelerated corporate entrepreneurial capability building, including its enabling mechanisms, organizational learning processes and core outcomes.

I contribute to the stream on capability initiation and development vis-à-vis capability lifecycles, and the overall conversation on corporate renewal through enhanced dynamic capabilities. To date, the dynamic capability trans/formation stream has been theorized at either the established firm or the new venture level. By looking at a novel inter-organizational interface comprising the accelerator, new ventures and established firms, we bring further granularity to understanding how new corporate entrepreneurial capabilities are initiated and developed through sequences of organizational learning enacted during short-term, yet cumulative relationships over the years, with several external new ventures, i.e., small asymmetric ‘partners’. In doing so, I discuss and extend prior research on alliances and relational capabilities by analyzing resource exchanges among non-equals in industrial acceleration contexts. Finally, I discuss and position this process model of co-accelerated corporate entrepreneurial capability-building as an untapped source and additional layer for dynamic capability enhancement that may enhance adaptation to technological discontinuities.

I will next provide an overview of the extant relevant theoretical background. I will then describe the methods and empirical context by highlighting its distinctive aspects and then I proceed to induct the process model of corporate entrepreneurial capability building and its associated phases. I conclude by discussing the implications for (dynamic) capability building and for corporate and industrial acceleration practice.

4.2 THEORETICAL BACKGROUND

The dynamic capabilities stream has looked for over twenty years into the underlying organizational processes and routines as well as into the learning mechanisms behind sustained competitive advantage (David J Teece et al., 1997; Winter, 2003; Zollo & Winter, 2002). This influential research stream has given considerable attention to fast and situated decision-making, experiential learning, as well as early testing of alternative products, processes and multiple courses of action (Eisenhardt, 1989; Judge and Miller, 1991; Wally and Baum, 1999; (Eisenhardt & Tabrizi, 1995; Ott, Eisenhardt, & Bingham, 2017). Fast decision making, alliancing, product development and experimentation are examples of such key dynamic capabilities (Eisenhardt & Martin, 2000). R&D functions (Lin, Wu, & Lin, 2008; Pisano, 2000), corporate venturing (Roseno, Enkel, & Mezger, 2013; Vanhaverbeke & Peeters, 2005) and open innovation programs (Cheng & Chen, 2013; Robertson, Casali, & Jacobson, 2012) are also examples of dynamic capabilities that contribute to organizational agility (D. Teece, Peteraf, & Leih, 2016).

Consistent with the triple taxonomy of *sensing*, *seizing*, and *reconfiguring* (David J Teece et al., 1997), ambidexterity has been proposed as a specific dynamic capability because “*the ability of a firm to simultaneously explore and exploit enables a firm to adapt over time.*” (O’Reilly III & Tushman, 2008). Ambidexterity requires a coherent alignment of competencies, structures and practices to engage in exploration, a contrasting alignment focused on exploitation, and a senior leadership team with the cognitive and behavioral flexibility to nurture both. In other words, organizational ambidexterity *becomes* a dynamic capability if both exploration and exploitation activities are strategically integrated and orchestrated through a set of values, shared vision and governance process.

Thus, organizational ambidexterity is a dynamic capability, which enables to simultaneously exploit and explore (O’Reilly III & Tushman, 2013), and thus, tries to resolve the fundamental tension in organizational learning (March, 1991) as firms renew themselves and adapt to changing environments. Recent work has also suggested that organizational structures for innovation need to distinguish between incremental (exploitative) and radical (explorative) innovation streams as a structure appropriate for one may not be ideal for the other (Benner & Tushman, 2003; Smith & Tushman, 2005; M. Tushman et al., 2010). However, organizations may need to conduct both types of activities through different organizational designs, for instance, R&D (explorative, distant, radical), CVC units, and/or corporate accelerators (local, exploitative or a

combination), and try to orchestrate all of them at a higher strategic level. Several organizational solutions have been identified and implemented to address this problem of local vs. distant search in organizational learning (Katila & Ahuja, 2002; Rosenkopf & Almeida, 2003; Rosenkopf & Nerkar, 2001).

Building on the ambidexterity literature, three distinct modes of adaptation have been devised for firms to choose from and to implement when confronted with technological discontinuities in their environment, and thus, to reconcile these conflicting demands of exploitation and exploration: structural separation, behavioral integration and sequential alternation (Birkinshaw et al., 2016). Structural separation places exploration and exploitation activities into different organizational units. Behavioral integration is about bringing the conflicting activities together in a single unit by designing a supportive behavioral context. And sequential alternation comprises the deliberate switching between exploration and exploitation over time.

First, the structural separation and parallel structures mode is concerned with structural ambidexterity, including those semi-structures that enable organizational units to alternate between both requirements (S. L. Brown & Eisenhardt, 1997) and complex structures that combine organic and mechanistic structural elements (Adler & Borys, 1996; Sheremata, 2000). Much of the existing literature equates structural ambidexterity with spatial separation at the business unit or corporate level. In addition to the spatial separation that have dominated organizational ambidexterity research, some previous studies have described an alternative path to structural ambidexterity by the use of parallel structures that allows people to switch back and forth between two or more types of structures, depending on their specific task (Bushe & Shani, 1991; McDonough III & Leifer, 1983). Second, behavioral integration has been defined as “*the behavioural capacity to simultaneously demonstrate alignment and adaptability across an entire business unit*” (Carmeli & Halevi, 2009; Gibson & Birkinshaw, 2004; Wang & Rafiq, 2014), which can enable contextual ambidexterity in the context of stretch, discipline, support, and trust. Finally, the third mode of adaptation to enable ambidexterity is through sequential alternation and temporal switch, that is, the succession of exploitation-focused periods followed by exploration-focused periods of time at the functional, corporate innovation unit or program level.

Instead of a set of generic dynamic capabilities that can be applied to different settings (Eisenhardt & Martin, 2000; David J Teece, 2018; David J Teece et al., 1997), these three modes

of adaptation are associated with specific capabilities that firms develop to effectively adapt and renew themselves in the face of technological discontinuities, depending whether the firms have accentuated structural separation, behavioural integration or sequential alternation (Birkinshaw et al., 2016). In an effort to bridge the ambidexterity and dynamic capabilities streams through a multi-case study of leading firms in different industries, Birkinshaw and colleagues (2016) found three specific firm-specific capabilities to deal with the conflicting simultaneous demands of both exploration and exploitation. Nestlé, which, by and large, has chosen a structural separation approach, developed a *resource-linking* capability for managing the interplay of sensing in exploration-oriented units and seizing in exploitation-oriented units. GSK, in turn, which emphasized behavioral integration, built a *context-shaping* capability to enable operating unit managers sense and seize opportunities at the same time. BMW, which has pursued sequential alternation, developed a *focus-shifting* capability that let managers move from seizing to sensing and back again over multiple years. Their chosen mode of adaptation and these related capabilities were congruent with their organizational background as well as their vision, organizational culture, and people development models (Birkinshaw et al., 2016). The proposition that each mode of adaptation enables a specific capability set that is idiosyncratic to each firm is compelling for both theory and practice. However, further research needs to validate this proposition, its boundary conditions and explore whether these capability sets—resource-linking, context-shaping and focus-shifting—can emerge and be nurtured through different organizational designs, and more importantly, whether they can be simultaneously in interplay.

Though the structural separation mode has been the more frequent to establish traditional corporate venturing programs (Basu, Phelps, & Kotha, 2016), these programs can operate under one of these three modes of adaptation, depending on the environmental discontinuity pace and heritage of the firms in terms of resource allocation to both explorative/distant and exploitative/proximal innovation streams. In order to understand how (new) entrepreneurial capabilities can be initiated, developed, recombined and/or enhanced through corporate and industry-led accelerators, I next review the extant literature on corporate venturing, learning and capabilities.

4.2.1 Corporate Venturing and Capabilities: what we know & do not know

Corporate venturing is the pursuit of entrepreneurial opportunities within established companies through a “set of organizational systems, processes and practices that focus on creating businesses in existing or new fields, markets or industries—using internal and external means” (Narayanan et al., 2009, p. 59). Corporate venturing can be viewed as a learning process in which established firms learn to operate in a new business area and builds new capabilities or reconfigures existing ones to do so. This learning process and entrepreneurial renewal is often viewed as a solution for combating organizational inertia (Floyd & Wooldridge, 1999; Sykes & Block, 1989).

Corporate venturing refers to units controlled by a parent company with the purpose of developing new business opportunities for financial and/or strategic gain (Birkinshaw, 1997; Block & MacMillan, 1993; Robert A Burgelman, 1983; Dushnitsky & Lenox, 2005; Wadhwa & Kotha, 2006). Although all corporate venture capital (CVC) investments have financial motivations (Chesbrough, 2002), the strategic “window into emerging technologies” is generally recognized as being among the most important objectives of this investment activity, in particular in technology-intensive industries. More recently, it has been showed that, in addition to the financial and strategic technological window, the exploration of potential ecosystem complementors around a focal product or technology is a new motivation for these corporate investments (Dushnitsky & Yu, 2019).

The extant literature on Corporate Venturing (CV) has proposed two main distinctions to study the relationship between the parent/sponsor company and the new venture. Firstly, CV may be regarded as internal where it develops an idea generated within the parent company and as external where it develops an idea sourced from outside the firm (S. A. Hill & Birkinshaw, 2008; Narayanan et al., 2009). Secondly, there is an additional distinction to categorize forms of internal corporate venturing: dispersed and focused modes (Birkinshaw, 1997). Dispersed internal CV describes venturing activities originating via employees across different organizational units, that is, business creation activities performed by individuals or teams within the mainstream divisions of the parent company. Focused internal CV, in turn, involves a specially designed organizational unit mandated with building new internal businesses for the parent company. Focused units can also be outward looking, that is, specialized units to search for external ventures to acquire, invest and/or integrate them. Finally, consortium-based entrepreneurial and corporate venturing describes collaborative investment initiatives where a group of corporates participate jointly in

strategic areas where the returns will be shared or captured accordingly to their input (Munisi & Sengoku, 2013).

Given that some firms use CV to explore and develop technologies that differ from what they do and exploit, CV units may not fit tightly with their parent either financially and strategically (Thornhill & Amit, 2001). Due to the need for emerging ventures to develop their own entrepreneurial practices without the constraints and control protocols of their parent companies, these ventures usually have greater autonomy than existing business units through structural separation. However, this can affect the fit between corporate ventures and the remaining of the parent organization as well as the capabilities' transfer from one domain to the other (Narayanan et al., 2009).

The CV literature has described both successful (R. Kanter, 1985) and unsuccessful (H. Chesbrough, 2000) corporate venturing practices. Several attempts have been made to identify key success factors (Block & MacMillan, 1993; Siegel et al., 1988), where success has, by and large, measured commercially and financially. Prior research also found that the creation of radical innovation hubs and corporate venture units helped corporations escape the inertia of existing business units (Leifer, 2000). Yet, such studies have not been conclusive (Susan A Hill et al., 2009). Given the range of strategic benefits associated with CV (e.g., learning and capability building), a more nuanced and encompassing view of the corporate venturing outcomes is needed: "Clearly, there is a need to study the non-financial goals of CV programs." (Narayanan et al., 2009, p. 69). I next discuss some key non-financial and capabilities-related elements of corporate venturing to position our study and address the gap(s) in corporate acceleration research.

Burgelman's pioneering work (1983, 1991) only indirectly addressed the renewal of capabilities when exploring the engine of corporate entrepreneurship prompted by those autonomous strategic initiatives of individuals at the operational levels as "one of the most important resources for maintaining the corporate capability for renewal through internal development" (Robert A Burgelman, 1983, p. 241). Yet, his core contribution was the creation of an interorganizational framework to describe the strategy-making, resource allocation process and the corporate ventures' outcomes rather than exploring the capability building process in itself (Burgelman, 1991; Keil, McGrath, & Tukiainen, 2009).

More recent work has looked into the relationship between corporate venturing and *de novo* capabilities through organizational learning mechanisms. Keil studied two broad learning

processes that enable large firms to create and develop ventures together with external partners through venture capital investments, alliances, and acquisitions, i.e., external corporate venturing (Keil, 2004). On the one hand, firms acquire knowledge about how to manage external corporate ventures through acquisitive learning. This knowledge builds the basis for the external corporate venturing capability formation. Yet, this knowledge is not well adapted to the specific organizational context: it is not sufficiently firm specific or situated. It is only through a second complementary learning process, learning-by-doing, that this venturing knowledge is effectively adapted to the specific organizational context and, thus, a new organizational capability is built (Keil, 2004). For instance, acquisitive learning, i.e., learning from external sources, plays an important role during early stages of capability formation. Therefore, learning-by-doing and acquisitive learning are complementary rather than competing mechanisms. An interesting parallel can be found between the way businesses learn and the recommendation given by Childs (2019) on the importance of implementing an interplay between behaviourism, humanism, cognitivism and constructivism in educational practice, blending, for example, active learning with goal setting (Rodgers & Bremner, 2019)

Previous studies have emphasized learning from experience either through skill formation or through articulation and codification of knowledge (Zollo & Winter, 2002). While these processes are important, more recent work has focused on developing a *de novo* capability, suggesting that capability building is more complex. To understand the complexity behind new capability building, transformation and transfer in the context of internal corporate venturing, Keil and colleagues (Keil et al., 2009) use the capability life cycle approach (Helfat & Peteraf, 2003) to refer to the evolving stages of a given capability: a founding phase, where the initial keystones of a capability are established; a development phase, where the capability is enhanced; and a maturity phase, in which the capability building finishes. In this capability building process, there is also transformation via branching, i.e., where capabilities can move in six potential ways: retirement, retrenchment, renewal, replication, redeployment and recombination (Helfat & Peteraf, 2003; Keil et al., 2009). Using this capability lifecycle frame, Keil and colleagues found evidence for the transformation and transfer of nascent or incomplete capabilities, even when the internal corporate ventures have been discontinued. They also show that internal corporate ventures work as fertile grounds to initiate *de novo* capabilities and that internal simultaneous selection for both ventures and capabilities influence each other and co-evolve over time (Keil et al., 2009).

Corporate venturing capabilities can also be developed outside the organizational boundaries through investment in and experimentation with external start-ups through a learning and awareness process that has been termed *disembodied experimentation* (Keil, Autio, & George, 2008). Disembodied experimentation facilitates awareness of gaps in the capability base of a corporate and enables to overcome inertial restraints by influencing the decision to invest in new capability development. Disembodied experimentation is a learning and knowledge brokering process (Hargadon & Sutton, 1997), where large firms—through a specialized unit or function—actively engage “in developing, experimenting with, and learning novel technical and related business practices; a form of experimentation outside organizational boundaries” (Keil et al., 2008, p. 1477). Through disembodied experimentation, the corporate’s representative maintains at least a semi-active presence in both contexts and consequently, he/she is able to operate as a knowledge broker who transfers knowledge from the external emerging practice context to the internal corporate context.

Participation in distant or semi-distant domains of emerging practice—start-ups or scale-ups, for instance—enables to become cognizant of emerging capability needs, and thus, it may prompt the decision to invest in it or at least do pilots, so to address those identified gaps. This is important because research on managerial cognition has shown that awareness and understanding of capability needs are central for soliciting an organizational response to disruptive discontinuities (Kaplan, Murray, & Henderson, 2003; Tripsas & Gavetti, 2000; Vecchiato, 2017)

External disruptions may require firms to recognize capability needs that originate in distant domains, making it difficult for large firms to develop a coherent understanding of how to respond to the incoming diffused threat or disruption (Gilbert, 2006). Limited to the learning boundaries of their established known practice (Scarbrough et al., 2004), established firms may find it challenging to tap into and make sense of, semi-distant or distant knowledge related to the disruption. In this context, established firms might need to internalize new knowledge organically (e.g. internal investment or venturing) or inorganically (e.g. acquisition) to develop new capabilities (Keil et al., 2008). Or actually corporations may launch cooperative industrial acceleration initiatives to sense emerging disruptive futures and thus develop novel entrepreneurial capabilities, as I shall show in this chapter.

4.2.2 Corporate Accelerators, Learning & Capabilities: what we (do not) know

As an increasing popularized yet underexplored new phenomenon, the extant research on corporate accelerators has been largely focused on descriptive analysis, typologies/models and design parameters for their effective implementation. In order to differentiate corporate accelerators from other forms of new venture engagement, Kohler proposes four guiding principles to orient their design: i) proposition, ii) process, iii) people and iv) place (Kohler, 2016). When considering process and people, Kohler's paper indirectly touches on a few capability building recommendations—e.g. balancing structure with flexibility through a compressed innovation circle, finding networked champions who can play a dual role to ensure corporate startup alignment and connect to the broader ecosystem—yet the mechanism(s) of how corporates learn/develop new (entrepreneurial) capabilities and change their innovation routines through the engagement with accelerated start-ups are still missing. Prior research has also analyzed corporate accelerators' primary objective—financial vs. strategic—and secondary one—entrepreneurial spirit enhancement and reputation—as well as the program focus and organizational configurations to propose four corporate acceleration models: the *listening post*, the *value chain investor*, the *test laboratory* and the *unicorn hunter* (Kanbach & Stubner, 2016). In the categorization of these models, there is an implicit reference to organizational capabilities. For instance, the listening post is a corporate accelerator that “sense” trends and developments in the environment with an “exploratory strategic focus” on very early stage external ventures. The value chain investor, in turn, is a type of corporate accelerator, which is strongly related to the parent companies aimed at identifying, developing, and integrating new complementary products and services being introduced by later stage ventures along their value chain. Usually, the objective is to develop and maintain strong relationships with the most relevant startups beyond the program's 3-4 month duration. (Kanbach & Stubner, 2016). The test laboratory is an experimentation-oriented corporate accelerator aimed to rapidly validate/invalidate exploratory ideas and early stage intrapreneurial ventures in a protected environment. Finally, the unicorn hunter is a type of corporate accelerator that searches and invests in promising new ventures to earn a premium using a financial exploitative focus.

In a similar vein, Moschner and colleagues (2019) further develop the typology of corporate accelerators, along with a categorization of their objectives, design parameters and possible outcomes to better understand this new area of research as well as to orient practitioners

regarding which type may best fit their organizational and environmental conditions: in-house, hybrid, powered by and consortium accelerators (Moschner et al., 2019). This useful categorization of the corporate acceleration landscape is similar to our own (Garcia-Herrera et al., 2018b), yet it does not address the specific learning and capability development mechanisms that are enacted through the different types of corporate accelerators. Nor it addresses the ways in which knowledge and resources flows from external ventures to corporations and vice-versa.

Prior research has initially studied the enabling mechanisms for both effective design and implementation of corporate accelerators to improve the innovativeness of established firms. Though Richter et al (Richter et al., 2018) propose a novel actionable model based on Intervention (the corporate accelerator)—Determination (the enabling mechanisms such as TMT support, experienced mentors and clearly defined metrics)—and Outcome (changes to the innovation capacity of established firms, e.g., enhanced learning, new products and services), the theoretical elaboration of how those *essential* enabling mechanisms *actually* work—at the strategy, resources, structure, roles and environmental levels—to produce desirable outcomes in organizational capabilities, is still under-developed.

In terms of process modeling of how corporate accelerators do work and add value to both established firms and new ventures, recent research has looked into their specific mechanisms. Shankar and Shepherd (2018) identify two distinct ways through which corporate accelerators implement their core three-stage process of sourcing selection, acceleration, community formation: either accelerating *strategic fit* between the corporate and the startup or accelerating *venture emergence* in a specific market (Shankar & Shepherd, 2018). The strategic fit-oriented corporate accelerator is aimed at speeding up the new venture's fit with the parent company's business units measured in proof-of-concepts, partnerships or vendor contracts. The venture emergence-oriented corporate accelerator supports startups in their search for product-market fit, acquisition of users/customers and building of investor readiness, measured by the accelerated startups' portfolio valuation and number of exits. The choice of corporate acceleration pathway depends on two factors: the parent company's strategic posture, and investment time horizon (Shankar & Shepherd, 2018). This paper is relevant for the field as it moves beyond typologies and descriptions to inductively theorize about the mechanisms through which corporate accelerators actually do “accelerate” and nurture through strategic fit or venture emergence. Yet, the learning mechanisms and new corporate capability building behind these two pathways can be

further elaborated. In fact, these authors referred to the following future research opportunities at the end of their study: “How do corporations learn from Corporate Accelerators (CA) programs? In what ways is the learning from CAs transferred back to the parent corporation? How do CAs impact the corporation's entrepreneurial orientation? What are the intervening mechanisms in this relationship?” (Shankar & Shepherd, 2018, p. 16) This Chapter precisely addresses how established firms’ entrepreneurial orientation, capabilities and routines are shaped by their engagement with both the industry-led corporate accelerator and the new ventures.

Very recent research has uncovered CAs-specific processes that are distinct from more traditional corporate venturing, namely, unique partner profiles, active nature of partnerships, and involvement of mainstream employees (Basu et al., 2018). At the same time, this research has identified two broad processes through which corporate accelerators are integrated with, and do support, other venturing programs despite their distinctness: sharing of partnership opportunities and facilitation of entrepreneurial interest (Basu et al., 2018). These findings show how both the distinctness *and* integration of CAs with pre-existing corporate venturing programs are key for these new programs to add value to parent firms. Further, this new piece of research explicitly connects the CA-specific processes with a particular dynamic capability, i.e., organizational ambidexterity. That is, while internal and external venturing programs focus on generating structural ambidexterity, CAs can provide complementary benefits through enhancing the contextual ambidexterity (Birkinshaw & Gupta, 2013) of mainstream employees that are exposed to the CA (Basu et al., 2018).

Finally, in terms of organizational learning, search behavior and accelerator designs, recent work has looked into how the design parameters of these emergent organizational sponsors can mitigate the new ventures’ bounded rationality. In the context of seed start-up accelerators (Hochberg, 2016), Cohen and colleagues found that the following core design choices—concentrated consultation with mentors (as opposed to spaced out), transparent disclosure of relevant knowledge with stakeholders and standardized program activities—are associated with broader and less biased search, and ultimately, with better performance (Susan L Cohen et al., 2018). Though not completely transferable to the context of corporate accelerators, where sponsors have a direct involvement, these findings are relevant for the study, design and nurturing of these novel organizational forms by potentially shaping knowledge creation and sharing between

corporate sponsors and ventures, and eventually, enhancing organizational capabilities and learning processes (Argote, 2011).

In sum, extant research on corporate accelerators does signal indirectly about novel entrepreneurial capabilities and routines are that being brought into established firms, yet their underlying mechanisms are not fully elaborated, and so, important gaps remain. Compared with the prior research on corporate venturing and capabilities, the corporate acceleration stream is still in its infancy. I plan to initially address this important gap by asking the following research question: How do corporate R&D/Innovation Units develop new entrepreneurial capabilities and routines through their engagement process with industry-led accelerators?

4.3 RESEARCH SETTING AND METHODS

This chapter uses an inductive theory-building and longitudinal multiple case research method (Eisenhardt & Graebner, 2007) in a Port maritime complex comprising four theoretically sampled cases of established firms operating maritime, logistics, energy, and refinery sectors. Investigating a poorly understood, dynamic, under-theorized and temporal phenomenon like corporate and industrial accelerators calls for an inductive research design (Corbin & Strauss, 1990). In addition, multiple cases allow variance in terms of outcomes of interest and enable more parsimonious theoretical constructs. Though this overall research uses a nested research design, comprising three embedded units of analysis: i) the industry-led accelerator, ii) the new ventures, and iii) the established firms sustaining the accelerator, our focal unit of analysis is the R&D/Innovation Units of these large firms. We use primary qualitative and archival data from the industry-led accelerator, the four established companies and fifteen accelerated new ventures from the 2016, 2017, and 2018 cohorts. The main data sources are semi-structured interviews and archival data plus several participatory observations of collective scouting and selection of new ventures, corporate mentoring sessions, lean entrepreneurship training, internal corporate innovation workshops, field visits to corporate start-up pilots, networking events, and participation in an advisory board meeting of the industry-led accelerator by the first author of this paper. We complemented this dataset with information from a maritime logistics R&D Center, a leading university incubator, a regional investment agency, and a VC Fund operating in the European port complex. We conducted extensive interviews over three years with these stakeholders, especially

the accelerator staff, senior executives, and R&D/Innovation managers of these four corporates—including two competitors. The data sources are detailed in Table 4.1.

Table 4.1 Sources of Empirical Data Sources of Chapter 4

Data source	Number
Archival data comprising company reports and presentations, financial information, and publicly available information	20
Semi-structured interviews with senior executives and R&D and innovation managers, mentors, intrapreneurs, accelerator staff and co-founders and employees	80
Observations of accelerator’s scouting and selection of start-ups (pre-program) and observation of the program’s acceleration, validation, design, and corporate engagement activities (during the program)	10
Observation of mentoring sessions, roadshows and demo days, and initial corporate start-up engagement activities	8
Participatory observation of advisory board meetings and graduation ceremonies and relevant events such as the international maritime fair and the CEO platform	3

As mentioned in the Introduction above, our gateway into these value chain corporates was the industry-led accelerator that we will label with the pseudonym OceanAccel. OceanAccel’s value proposition is twofold. On the one hand, new ventures receive direct mentoring by potential lead customers, who, in turn, help shape and customize the ventures’ solutions to the particular needs of the value chain incumbents. On the other hand, OceanAccel’s corporate partners learn about start-up/scale-up scouting; about enabling and disruptive technologies; lean entrepreneurship practices such as quick validation of new value propositions and MVPs; do get external inspiration to fuel internal innovation initiatives and promote entrepreneurial attitudes within their own corporate contexts. Through their active participation in the industrial acceleration initiative, corporate partners also gain an opportunity to re-think, shape and steer OceanAccel to bring in relevant core and, especially, complementary assets to continue capturing and appropriating value as the industry architecture is reshaped by both digitalization and energy transition. OceanAccel has recently established similar programs in Singapore and Antwerp—with a focus on scale-ups—to expand its global reach in terms of technology scouting and testbeds and promote sector-wide innovation by engaging new corporate partners.

My focus here is not the participation of these four corporates in this industry-led accelerator nor their specific relationship with the new ventures, which I will address in Chapter 5. Rather I focus on the mechanisms through which firms have initiated and developed entrepreneurial capabilities through their R&D/Innovation functions over three years, not three months, which is the chronological duration of the acceleration program. In a way, the engagement

with this industry-led accelerator constitutes an “exogeneous shock” that took place in 2016 when these established firms operating in a traditional sector lagging behind in terms of corporate innovation decided to co-launch this multi-stakeholder program. By and large, this collaborative industrial value chain acceleration program enabled these established firms to become further familiarized and engaged with entrepreneurial experimentation.

As for the four founding corporate partners behind OceanAccel, see Table 4.2 for their background information. Each of these four corporate partners has a C-level executive in the industry-led accelerator’s Advisory Board. OceanAccel is actually controlled by a Foundation, where the ROYAL PORT’s CFO - the main sponsor/parent corporate partner—sits on the Board.

Table 4.2 Maritime industry corporates behind OceanAccel

	<i>TANKTECH</i>	<i>ROYAL PORT</i>	<i>VOX</i>	<i>SATELLITE</i>
Sector	Independent tank storage of bulk liquid products and gases. Operation of global network of terminals.	Sustainable development, management and operation of the port. Safe and smooth handling of shipping.	Dredging. Off-shore wind. Off-shore oil and gas.	Dredging. Off-shore. Towage and salvage.
Founded	1616	1872	1868	1910
Ownership	Public company	Municipality (approx 70%) and government (approx 30%)	Majority family owned	Public company
Employees	5 782	1 150	4 816	10 700
Sales, M€	1 306	750	1 713 (2016)	2 342

The ROYAL PORT’s business logic (model) has evolved between 2003 and 2018 from a land-lord regulator to an enabler/orchestrator of a new industrial ecosystem to even an entrepreneurial regulator who also competes in the marketplace with products and services—mainly digital ones, unleashing unseen tensions with both its corporate clients and the incoming new ventures that are being attracted through the industry-led accelerator, whose main sponsor has been the very ROYAL PORT. This new business model has prompted the evolution from zero-sum contract-based supplier relationships of previously stand-alone firms to an emergent industrial ecosystem of collaborators, co-competitors and complementors to create added value: “No longer can port authorities focus primarily on renting out terrain for business use where productivity and cost

minimization are the sole goals while not taking into strategic account the environmental consequences of such a way of working.” (Hollen et al., 2015, p. 81).

The last 15 years in this very Port complex demonstrate the importance of investing in the co-creation of industrial ecosystems (Baas & Huisingsh, 2009; Hollen et al., 2015) These industrial ecosystems can be understood as networks of legally autonomous firms—usually physically interconnected by pipelines—that use one another’s residual energy and chemical effluents as input for their own production process (Ayres & Ayres, 2002; Doménech & Davies, 2011; Ehrenfeld & Gertler, 1997; Walls & Paquin, 2015). By converting by-products into product streams for other firms, added value is created. However, established firms in ports are usually reluctant to further develop industrial ecosystems (Baas & Huisingsh, 2009) because substantial investments are generally needed in physical infrastructure – such as in pipeline networks and complementary-specific assets – to enable the flow of residual energy or other by-products from one plant to another. In addition, the creation of industrial ecosystems implies increased inter-firm interdependence (Ehrenfeld & Gertler, 1997), which established firms tend to avoid as firms with limited experience in satisfactorily managing interdependent relationships may encounter difficulties to receive the potential returns (Hollen et al., 2015). Digitalization, especially the Internet of Things (IoT) only accelerates the pace of interdependency across this port maritime industrial ecosystem by the increasing visualization and sensing of real-time information from physical assets, networked pipelines and different resources flows.

4.4 DATA ANALYSIS

I began by writing multiple cases narratives primarily at the corporate level, including interview, observational, and archival data (Eisenhardt, 1989; Yin Robert, 1994). We triangulated the data, emphasizing themes supported by different data collection methods. The transcribed cases were about 10 to 25 pages long, including quotes and timelines. Appendix A presents an empirical descriptive account, i.e., case narratives of the four corporate cases with regards to their R&D/Innovation strategy, innovation management processes, and internal entrepreneurial

practices vis-à-vis the engagement with both the industry-led accelerator and new ventures. I include the summary Table 4.3 with the main findings of Appendix A. ⁸

Table 4.3 Comparison of R&D/Innovation & Entrepreneurial Engagement Processes

	TANKTECH	ROYAL PORT	VOX	SATELLITE
<i>C-Level involvement in OceanAccel</i>	Yes	Yes	Yes	No
<i>Employee Mentoring for OceanAccel</i>	High	Medium to High	Medium to High	Medium
<i>Type of Innovation pursued</i>	Incremental and Architectural	Incremental and Architectural	Incremental	Incremental, Architectural & Radical
<i>R&D and Entrepreneurial Innovation Processes & Structures</i>	New Digital Innovation Dept New Corporate Venture Capital Unit	Game Changers 2.0 and new Digital Business Solutions Department (DBS)	Early stage of a small Corp Innovation R&D (CIRD) and new OI program with Start-ups	Traditional R&D and developing Entrepreneurial Innovation Process (Innovation Challenge & Jump)
<i># of Ocean Accel Ventures engaged (2016-2019)</i>	46	25	15	10
<i>Time for Proof-of-concept (POC)</i>	3-6 months	6-9 months	More than 9 months	6-9 months
<i>Organizational Adaptation to external disruption</i>	Low to medium	Low (structural separation)	Low	Medium
<i>New Ventures of inside-out Corp Entrepreneurial Innovation (so far)</i>	1	3	1	0

From the emerging themes, we generated tentative relationships between constructs, which we refined by revisiting each case and looking for patterns across cases. This iteration between theory and data helped us sharpen theoretical relationships between constructs and underlying theoretical arguments (Eisenhardt, 1989). We confronted the data structure with the emerging

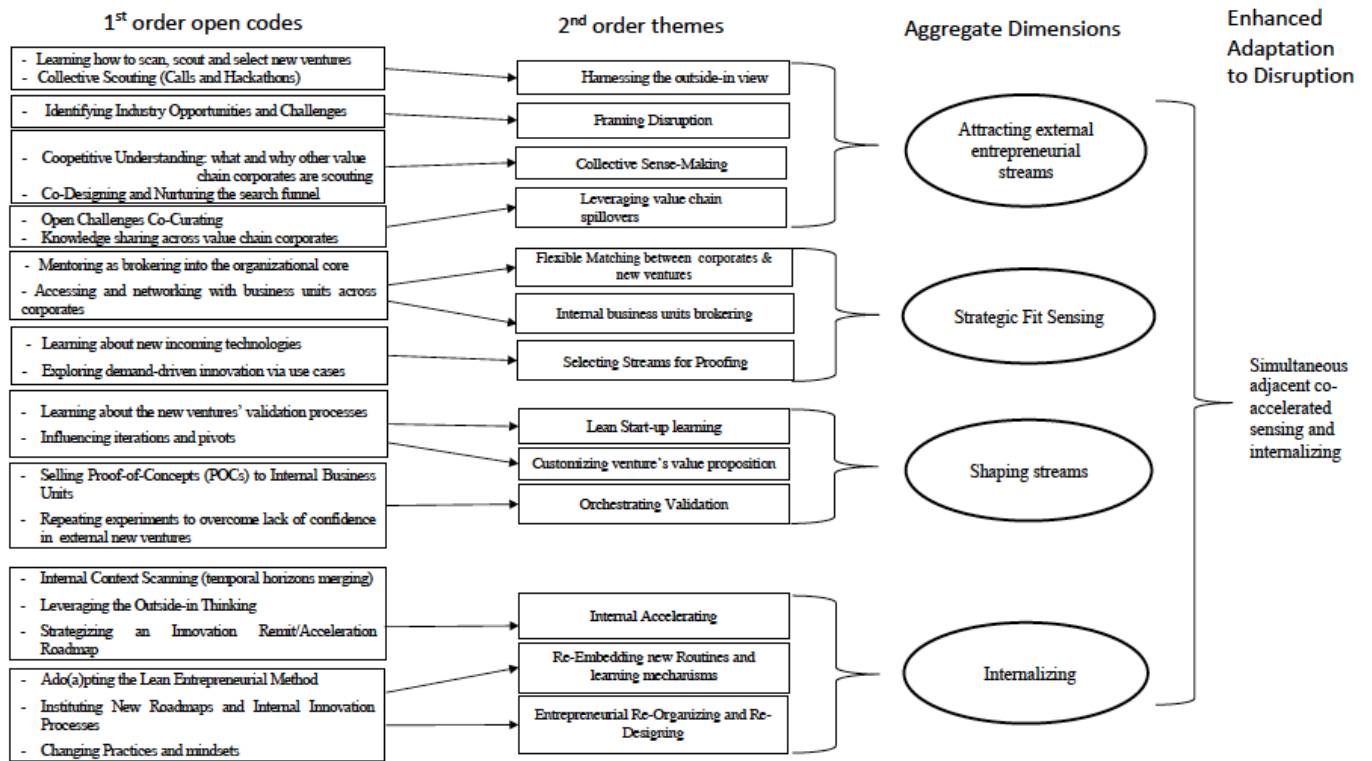
⁸ I originally put this Appendix about the Empirical Cases as a preceding Chapter but decided to move it to Appendix A to focus on the core empirical chapters and contributions of my PhD Thesis.

theoretical constructs, adjust its level of theorization at the 2nd order themes and aggregate dimensions to achieve an adequate parsimonious framework.

As the theoretical framing emerged, we related it to the extant literature to strengthen the internal validity of findings and sharpen the construct definitions, including the process model of corporate entrepreneurial capability building in four phases. In the analysis process, we realize that this corporate entrepreneurial capability building was a systemic process with feedback loops and internal-external interactions involving the industry-led accelerator, the incoming selected new ventures, the internal business units—including our focal unit of analysis, i.e., the R&D/Innovation functions - and other firms in the value chain participating of this proactive yet controlled self-disruption initiative.

For the emerging construct regarding the process of how corporates collectively and individually adopt and adapt the lean entrepreneurship method, and ultimately, develop internal entrepreneurial capabilities, we followed the method used in Corley and Gioia (2004) and described by Gioia and colleagues (Gioia, Corley, & Hamilton, 2013). This process led to an initial list of first order of open codes that came out of the data, which then became second order themes and subsequently the aggregate dimensions of the process model. As I iterated between coding and data collection, my theorizing started to focus on the mechanisms that firms use to co-scan and co-frame the external entrepreneurial environment, and to collectively harness and individually appropriate these external entrepreneurial streams. Then, I realized these firms perform strategic fit sensing through flexible matching based on their use-cases. The firms subsequently shape those external streams to enable and accelerate strategic fit, while learning about new technologies and entrepreneurial methods along the way. Strikingly, I observe then that these learning mechanisms – sequences - led to the *internalizing* of those entrepreneurial innovation streams, giving rise to new corporate routines and capabilities. See the data structure in Figure 4.1 below.

Figure 4.1 Data Structure for Chapter 4 on corporate entrepreneurial capability building



This data structure was the basis for further theorization and induction of our process model vis-à-vis the specific enabling mechanisms, organizational learning sequences, knowledge exchanges, capabilities and the to-be-explained outcomes.

4.5 Enhanced Adaptation through Corporate Entrepreneurial Capability Building: Overview of the Process Model

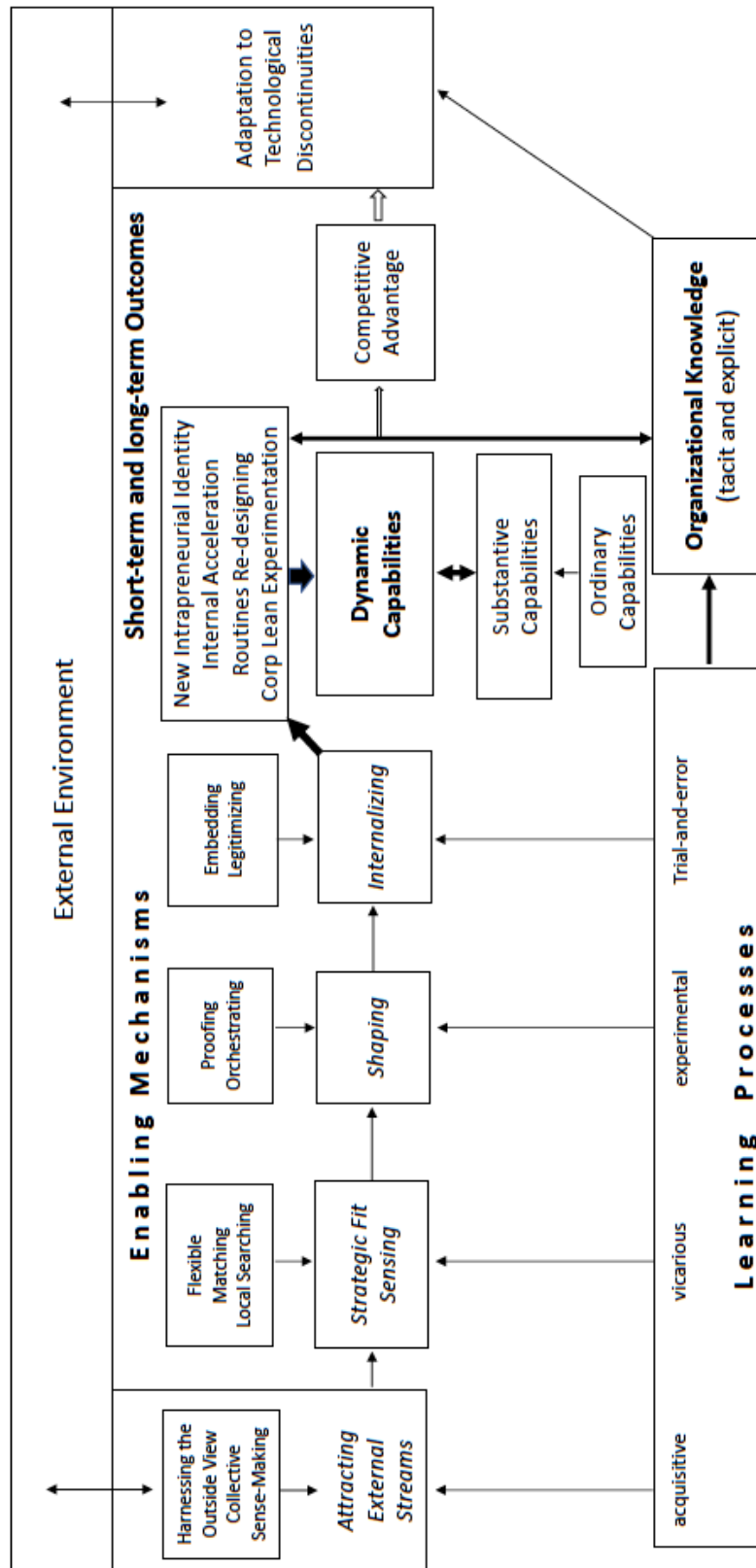
Through our analysis, I devise a novel process model of corporate entrepreneurial capability building that I label *simultaneous adjacent co-accelerated sensing and internalizing*. I contend that this process enacts a new mode of enhanced adaptation to disruption. This process is *simultaneous* because it happens externally and internally at the same time. That is, corporates perform parallel activities and complement the internal R&D/Innovation work with that of the engagement with the industrial accelerator and the new ventures. This engagement and learning thereof feedbacks to the “internal” work, as we shall see, given that the same staff perform both activities. This process of adaptation to disruption is *adjacent* because it operates through search

for market/technological solutions that are neither very distant nor immediate proximal. This process operates at the intersection between external distant entrepreneurial streams and local corporate use cases, so that a connection to the organizational core—e.g., internal business units—is feasible. This process of adaptation is *co-accelerated* because it happens through collaborative time-compression (Qin et al., 2019) and change in speed via (dis)entrained engagement with new ventures, and sometimes with other firms via joint proof-of-concepts (POCs). Yet, the subsequent internalization process goes beyond the initial time-limited and time-compressed acceleration period. This process model also comprises a collaborative *sensing*—even coopetitive, i.e., through a competition and cooperation interplay (Hoffmann et al., 2018)—of opportunities and threats, where value chain firms together scout, select, nurture and learn from external ventures in the face of changing industry architectures (Michael G Jacobides et al., 2016). Finally, this process model comprises the last phase of entrepreneurial internalizing and redesigning of capabilities and routines of the corporate R&D/innovation functions.

Thus, the four phases of the process model of corporate entrepreneurial capability building are the following: i) attracting external entrepreneurial innovation, ii) strategic fit sensing, iii) shaping and iv) internalizing.

The first phase of *Attracting streams* is enabled by harnessing the outside view through acquisitive learning and collective sense-making of distant knowledge. The second phase of strategic fit sensing of POC opportunities with external ventures is facilitated by flexible matching and local search within corporate use-cases. There is underlying vicarious learning triggered by the symbiotic engagements with the new ventures. The third phase comprises the shaping of those engaged external streams by value customization via concept proofing and internal business unit legitimization. External engagement takes place and corporates learn experimentally about how to design and run small-scale POCs. The fourth observed phase of internalizing is about re-embodiment of lean experimentation into newly adopted entrepreneurial routines, e.g., new R&D/innovation accelerated processes and novel ways to conduct internal experiments as well as engage external ventures. Trial-and-error is the underlying learning process that enables this fourth phase.

Figure 4.2 A Process Model of Corporate Entrepreneurial Capability Building



The core outcome of this process model is the triggering of internal changes and routine/capability development, i.e., *internalizing*, due to *attraction*, *strategic fit sensing* and *shaping* of external entrepreneurial streams. During the second phase of sensing through flexible matching, the enabling mechanism is local search within corporate use-cases to produce proof-of-concept (POCs) opportunities in collaboration with internal business units. The third phase is to shape those streams through concept proofing, i.e., basic short-term experimentation and piloting, i.e., advanced experimentation to accelerate strategic fit (Shankar & Shepherd, 2018). Corporate lean iterative experimentation is enabled and takes place in this third phase. Corporate R&D/Innovation and internal business units alike learn how to do—or get better at—concept-proofing by engaging selected small non-equal “partners” in experimentation. Finally, during the fourth phase, corporates internalize those experimentation practices and methods learned via the interaction with the accelerator and ventures through learning re-embodiment. This re-embodiment occurs through trying newly lean adopted processes and internal accelerating routines: new entrepreneurial capabilities are being developed, enhanced and brought into the organizational core through the R&D/Innovation Units. This internalizing phase subsequently specializes the broad process of scoping external knowledge and improves the way and how the attracting streams phase is performed. At a more granular level, each phase of the co-accelerated corporate entrepreneurial capability process can be analyzed and dissected in terms of its core parameters: key activity, people, resources, governance and temporality. See Table 4.4 below.

Table 4.4 Parameters of Corporate Entrepreneurial Capability Building Process

CORPORATE ENTREPRENEURIAL CAPABILITY	ACTIVITY	PEOPLE	RESOURCES	GOVERNANCE	TEMPORALITY
<i>1. Attracting streams</i>	Outside-in Flow	Start-ups Scale-ups	Scouting and Collective Sense-Making Funding	R&D/Innovation Units plus Accel plus other Corps	Continuous but concentrated in 5 months (Sept-Jan)
<i>2. Strategic fit sensing</i>	External Engagement	Internal Mentors	Time Mentoring	R&D/Innovation Units	3-4-month acceleration period
<i>3. Shaping streams</i>	Proofing Simulating Failing	Internal Brokers	POC funding Business Unit ‘handing over’	R&D/Innovation Units plus Business Units	3-4 accel period plus post acceleration
<i>4. Internalizing</i>	From stage-gate to lean start-up Internal Accel Customizing	From the R&D/Innovation Units to other Business Units Intrapreneurs	TMT support new organizational designs	R&D/Innovation Units plus Business Units	Ongoing over the years

Empirically, I found that this 4-phase process model explains the observed entrepreneurial capability internalization and redesign of R&D/Innovation routines in each of the four longitudinal case studies: the Corporate Innovation Research and Development (CIRD) and the Open Innovation start-up Program in VOX, the Digital Innovation Unit in TANKTECH, the new internal accelerated game-changers program at the ROYAL PORT, and the internal acceleration company-wide program at SATELLITE. The industry-led corporate accelerator has triggered the development of internal entrepreneurial capabilities as well as the re-design of core R&D/innovation routines of these established firms in the port maritime complex.

In summary, opportunities are co-explored with a group of corporate partners, then, these opportunities are internally sensed and dyadically (in)validated and, subsequently new organizational routines are put in place to harness the lean entrepreneurship approach. Thus, capability value is created. These new routines and capabilities might, in turn, not only enable better co-attracting, strategic fit sensing and shaping of external accelerated streams but also prepare established firms for their own experimentation and intrapreneurial initiatives. And thus, these corporate entrepreneurial capabilities may add a new layer and enhance dynamic capabilities to further adaptation to technological discontinuities.

These century-old ‘whales-like’ corporates – who used to move slowly given their inertia - have enhanced their entrepreneurial orientation and capabilities. In a way, they are becoming ‘sharks-like’ corporates who now may quickly adapt to the successive environmental waves.

4.6 CORPORATE ENTREPRENEURIAL CAPABILITY BUILDING: EMPIRICALLY DETAILING THE 4-PHASES PROCESS MODEL

In what follows, I offer empirical accounts for each of the four phases of corporate entrepreneurial capability building as well as its enabling mechanisms and underlying learning sequences. I use converging evidence across the four longitudinal cases.

4.6.1 ATTRACTING

In this phase, corporates through their R&D and Innovation Units collaboratively co-scan the environment to attract external new ventures that can bring new technologies to address key challenges facing both the value chain—digitalization and energy transition—and the particular

established firms supporting the industry-led accelerator. In our setting, there are 10 challenges: offshore wind's noise reduction, emissions measurement and reduction, modularizing of specialized robotics, flexible flood barriers, economic circularity, air quality, energy efficiency, automation of technologies and sensors, cyber security, digitalisation of logistics via Internet of Things (IoT) and blockchain. These challenges are decomposed according to the very specific technical aspects of those challenges.

In this phase, the industrial accelerator performs a series of activities, together with the corporates, to scan and scout incoming new technologies that might address the above technical challenges: *"we want to leverage the whole busy world out there"* (COO, VOX). However, in this context, this is a co-sensing and co-scanning exercise, that is, it is designed, performed, and assessed with other firms—including competitors—in the focal value chain. Though it might complement internal R&D/innovation work, this is a cooperative search and attraction of external new ventures. There is an underlying process of scoping external knowledge, enabled by two mechanisms: collective sense-making, including framing disruption and harnessing the outside-view, which comprises not only the external ventures but also the very value chain/industry corporates. These enabling mechanisms for Attracting Streams, in turn, include tactics such as: learning open guidelines for new venture scouting, a funnel curation, and an important time commitment by the corporate partners' innovation units' staff. The mechanism of harnessing the outside-view, including its co-sensing and collaborative learning dimension is well illustrated by the following quote: *"I'm much more interested that our people talk to TANKTECH and how they are doing innovation, to Shell, to Thales [other industrial accelerator's corporate partners]. That is also the outside view"* (PV, COO, VOX, 2018).

A critical sub-phase to effectively attract external entrepreneurial streams is learning how to scout new ventures. Corporate R&D and Innovation Units learn how to co-sense, co-scan and co-scout external new ventures (start-ups and scale-ups). The industry-led accelerator introduces their corporate partners into new venture cooperative scouting: *"of course, we went around and helped them because scouting is a process that you have to learn together with a fresh set of 15 eyes"* (NN, Scouting Manager, OceanAccel). The industry-led accelerator's staff do teach a formal scouting session, including themes such as What scouting is, How do you scout, what start-ups look like for OceanAccel, which are a good start-ups for OceanAccel, How do they fit into our program? And then, these R&D/innovation managers start to scout: geographically, by challenges,

around some technological hubs: *“If you're looking at energy ventures, you will look in Houston, if you are looking into cybersecurity, you search in Israel”* (NN, OceanAccel, 2017). Regarding the scouting guidelines, the search process is open-ended in that the accelerator staff does not tell the corporates what they could or couldn't look for as they have to choose for themselves, according to their interests, expertise and company challenges. To prevent duplication and keep everyone on track, the accelerator staff provide a scouting database. This database—an online editable sheet—contains basic information regarding the venture: sector, the website, contact details and brief description of the company. Every time a corporate representative finds an interesting new venture, they check the sheet to make sure that start-up is not already on the list. To improve the scouting's outcomes, the accelerator's staff leverages experts from around the value chain: *“we asked what are your cyber security challenges and tell us exactly, for example, cyber security for asset management and that makes it much more specific, and helps us in our search”* (NN, 2017).

From the perspective of the corporate themselves, this initial phase is about becoming involved with the search process, and with the incoming new ventures, which they will mentor and subsequently explore proof-of-concepts with: *“we've involved in the startup scouting and selection process. We involved people so that they can get to know the startups, get interested and feel a sort of ownership if those startups make it to Selection Days”* (PV, VOX, 2018). They will be the entrepreneurial streams to be selected for POC exploration, fit sensing and shaping.

4.6.1.1 Co-designing the scouting funnel: cooperative search and projecting fit

The industry-led accelerator designs and populates, together with their corporate partners, a search funnel through which scout and attract external new ventures. There are a series of activities/tactics to ensure the industry-led corporate accelerator is able to attract relevant/suitable new ventures for the focal value chain. The process model is based in this very critical first phase.

The scouting tactics referred to both rule-based and emergent procedures. That is, on the one hand, there are standard protocols for scouting that being taught using existing databases and prior experience by the accelerator staff. On the other hand, there are emergent techniques that are pioneered and tested by the corporates themselves: *“they were very creative and thought to look for startups looking for employees, that was an interesting idea from one of our corporate partners,*

she looked on LinkedIn for job postings” (NN, 2017). This is particularly relevant for start-ups that are becoming scale-ups and are recruiting for job positions. The corporate partners’ emergent scouting practice was an unexpected tactic that appeared during the cooperative sessions and was shared across participants and later included in the accelerator’s guidelines.

The funnel co-design is supported by explicit (rule-based) cooperative search by the corporate partners, including activities such as Scouting Hackathons and telephone calls. This is an integral part of building an Attracting Capability, where the corporate R&D/Innovation staff get involved not only in scouting but also in the decision-making regarding which new ventures are invited/accepted or not. There is learning on new venture scouting and attraction heuristics.

The scouting hackathons is a co-curated hands-on search program where fifteen corporate representatives come together for a full day (9am to 5pm) under the guidance of the accelerator’s staff to scout both start-ups and scale-ups following prescribed steps and using different tools (the pre-existing new ventures database, the current value-chain/ecosystem challenges, accelerator’s staff presentation and specific corporate challenges). These hackathons are structured as follows: a short comprehensive explanation at the beginning of the day, a little session in the middle of it, constructive feedback among participants, and the corporate partners sharing different techniques and ideas. Given that it is possible to know through the online database who exactly found what and see how relevant startups are, the accelerator staff gives a bottle of wine for the person who finds most new ventures in a given day: *“this is a fun activity where everybody is happy and engaged hacking (scouting) start-ups and scale-ups”* (NN, 2017). There is variation in the scouting hackathon performance and outcomes, depending on the corporates’ representatives prior engagement with external new ventures, and more importantly, on previous hackathon learning experiences: *“the people who had actually previous experience with scouting had the best results on their second time around, the third time around, so just by doing it you learn how to do it efficiently and effectively”* (NN, Scouting Manager, OceanAccel).

This collaborative exercise also allows for corporates’ representatives free time to experiment with scouting tactics that are subsequently shared among the group. The outcome of this collective intelligence exercise is usually between 60 and 80 new ventures that are added to the database, which enlarge the pool from which to select and to invite new ventures.

These hackathons are complemented by scouting done by the accelerator staff: *“Actually the whole team is helping with scouting this year. We designated a few days that we’re all*

searching together. If we have a lead on something, we'll progress with that, if they can connect with the start-up to get a first-round call with them.” (NN, 2017). As soon as the scouting database gets populated with newly identified ventures, the next activity is to organize telephone calls with them: first-round and second-round calls. As it is the case in industry-led accelerators, these calls are also conducted cooperatively together with corporate partners’ representatives.

Calls with new ventures are held in two groups, comprising partners’ R&D/Innovation Unit managers and the accelerator staff. It comes to 16 calls a day held simultaneously. Depending on the turnout of the day, between 4 and 10 people sit around a table with a screen and laptop to call the start-ups or scale ups. During the first-round calls of 30 minutes, the industry-led accelerator’s stakeholders get to know first-hand and ask questions to the new venture’s founders about their product or proposition, which sometimes can be difficult to assess: *“Tech software platforms are difficult to judge even if you see them. It's tough.”* That is why it is critical the involvement of subject-matter experts to assess the potential of new emerging technologies and platforms as well as their fit with the corporate’s technical domains and use-cases.

For that reason, the industry-led accelerator organizes 2nd round Calls to further assess the current venture status, corporate fit and overall potential of the external new ventures to tap into opportunities and address the aforementioned challenges. For instance, in these 2nd round calls, the accelerator asks for additional information, including current contracts—if any—,funding, investment, whether the ventures are early-stage or late-stage, i.e., start-up or moving into a scale up condition based on defined parameters: *“We know where they are, and how they fit into the program”* (NN, 2017). This is especially relevant given the fact that since 2019 the accelerator has set a specific track for scale-ups. With the system in place, the industry-led accelerator is able to conduct 64 2nd rounds-calls based on 16 calls each day for 4 days.

4.6.1.2 Collective sense-making

A critical enabling mechanism of the *attracting* phase is collective sense-making (Maitlis & Sonenshein, 2010; Weick, 1995). The decision to invite or not the scouted new ventures to Selection Days, and ultimately, to the program is a collective decision by the industry-led accelerator. The decision is neither taken by the accelerator staff nor by a particular corporate R&D/Innovation Unit but rather as a consortium of members who may have different preferences

and reasons for the decision. At the end of each calling day, there is collective sense-making performed by the corporate partners and the accelerator staff. The assessment outcomes possibilities are: “Yes” (the venture will be invited to join the program), “No” (the venture won’t be invited) or “Maybe” (the venture may or may not be invited to join, and further assessment and discussion is required).

This cooperative corporate sense-making give additional insights to the accelerator staff to improve its co-scanning and co-sensing function through a better understanding of the particular challenges the corporates are facing. The collective sense-making enables better scouting, i.e., attraction of external entrepreneurial streams with more chances of industrial fit.

The data reveals that the corporate partners obtain value from the continued interaction with the new ventures from the initial scouting up to Selection Days, when the final new ventures’ cohort that will join the program is chosen and announced: *“It was rather easy and valuable, they [accelerator staff] arranged the speed-dating and yeah, from speed-dating on, we, as VOX decided which companies were the most interesting and then we got ready for it”* (PG, VOX, 2017). Selection Days are the last instance for the corporate partner to understand the value they can get from the external ventures: *“It was perfect because in a short period of time you really understand the concept, really understand the person behind it, is that the right person to put some time in and to invest some time?”* (PG, VOX, 2017). New accelerated ventures work as a new source to learn about how to engage with these different small organizations. In fact, this has prompted the corporations to search into the outside world in new ways: *“They say ‘oh I really need a solution to this’ and let me see if I can find a startup that has something similar. So now they have a better understanding of how to go about doing that.”* (NN, 2017). Learning how to scout, co-scan and attract new ventures from the entrepreneurial external environment to address the corporates’ problem spaces is a newly developed capability observed in the case studies.

Collective sense-making creates value through an extended and ongoing involvement with the accelerator and its attraction function: *“the partners have gained quite a lot of value from the program as they extended not only their influence but their participation in the program from September onwards, not only in February (Selection Days) or March (kick-off of program).”* (NN, OceanAccel, 2018). This is illustrated by the innovation managers of the industry-led accelerator’s founding partners: *“That’s why we are all so committed to have an early involvement in the process*

of OceanAccel. To learn from each other in a better way but also to better understand what kind of opportunities the startups will bring.” (MvK, VOX, 2018).

Corporate partners can identify which ventures they are going to work with, and potentially explore early proof-of-concepts (POC) and pilot agreements: *“Actually when they get into to program, the POC can start the first day of the program”* (Idem). Cooperative scanning and attracting of external entrepreneurial ventures antecede the second phase of this novel corporate capability building process, namely, engaging in strategic fit sensing, which I analyze next.

4.6.2 STRATEGIC FIT SENSING

In this second capability building phase, corporates continue to scope external knowledge through their R&D/Innovation Units, which operate as brokers who facilitate matching between internal business units’ issues and the external scouted new ventures that were selected by the industrial consortium. The enabling mechanisms of strategic fit sensing are flexible matching and local search, i.e., the different R&D/Innovation Units expect some matching between internal business units’ problem-spaces and the incoming ventures’ solutions. It is flexible matching because one venture’s solution can be matched with more than one corporate in an industry-led accelerator, including a competitor. Flexible matching is paired with local search (Rosenkopf & Almeida, 2003) in that corporates need to search within their problem spaces across business units.

The mechanism works as follows: on the one hand, corporates present use-cases for new ventures to address through their new technologies; on the other, new ventures reveal (some) their solutions and business models to enable matching. This implies the opening-up of business models (Cozzolino, Verona, & Rothaermel, 2018) and technical domains by both parties, facilitated by corporate mentoring that enables external ventures to gain access into organizational knowledge via internal business unit brokering. Flexible matching in an industry-led consortium accelerator also allow for triads to collaborate in testing a novel unproven solution: for instance, a new venture can arrange a POC with two corporates and reduce the testing costs as well as assess the impact together.

This type of industrial accelerator facilitates a general expectation of knowledge-sharing enabled by inter-organizational trust (Poppo, Zhou, & Ryu, 2008) between different parties, including corporates - new venture dyads or triads who sense each other in search of strategic fit. I next analyze each one of the sub-phases and activities of this strategic sensing fit phase.

4.6.2.1 Inter-organizational brokering

The industry-led accelerator allocates corporate mentors to the incoming external new ventures through matchmaking, considering mentors' preferences and expertise. That is, depending on the type/sector/technology of the new ventures, corporate lead mentors are assigned to them. Lead mentors are corporate partners' representatives who have technical and/or business experience in the domain of external ventures, usually from the corporate R&D/innovation units. Besides coaching the new ventures and providing business and/or technical advice, lead corporate mentors have a key brokering function: they connect external new ventures with the corporate's internal business units, which may be interested in testing the new ventures' solutions.

Through the trust-based and somewhat symbiotic relationship between corporate mentors and founders where they exchange resources through mentoring, the new ventures gain access to valuable organizational resources, including business units' staff who "own" the relevant use-cases: *"We invite the start-ups to connect with our people around the table and through mentoring we give them an entrance to all the knowledge that we have"* (Innovation Coordinator, SATELLITE, 2019). It is through mentoring and internal corporate networking that the individual-level learning moves to organizational-level learning through a series of sequences: *"It is the fact that the mentor facilitates that the group of company experts is looking at this proposition"* (Ibid). The R&D/Innovation Staff invite the respective business units and operations people to engage in discussions with the start-ups. The function of the R&D/Innovation Staff and Corporate mentors has also to do with helping to overcome the organizational devil's advocate position of business units that may claim *"but we have tried this 10 times before, why would it work now? The problem already exists for 10 years now. This new thing won't work. End of discussion."* Therefore, the R&D/Innovation Unit performs an internal coaching and facilitation function: *"We as R&D and the mentors have a very important role asking the business units: Why? What do you see as the actual problem? Maybe this would work under certain conditions? So, really having the conversation in the most open and opportunistic way instead of just shutting the door."* (Innovation Coordinator, SATELLITE, 2019). Through this brokering, the external new ventures are able to cross the organizational "firewall" and become connected to the business units, including the internal devil's advocates who may have a say in the approval of a proof-of-concept (POC) in the next phase.

New ventures access the incumbents' core -business units- through mentoring and organizational networking and, thus enable the way for a key activity to be performed in this phase: new business model opening-up and exploration via demand-driven innovation.

4.6.2.2 Opening up new business models

Due to digitalization and energy transition, corporates in port maritime industries are facing new disruptions and, thus, potential and actual business model changes. For instance, for VOX, an established world leader in the dredging business, the new offshore wind division has equaled very fast the size of the dredging business: *“The dredging business has been our bread and butter for 150 years...in the last five years, our offshore wind division is almost the same size as dredging division. So, basically we have become an utility energy company”* (COO VOX, 2019). Established companies need to explore new business models and ways to adapt to new scenarios. In particular, dredging companies, whose core revenue stream has been to build islands out of sand are now confronted with the real possibility of floating islands made of different materials, which is a threat for the current processes and assets utilized in the traditional sand-based islands. Senior executives at both dredging companies under study have embraced new innovative thinking and new business model exploration because *“if you're part of the potential disruption, then the new business could be that we build floating islands in the future. It's still adjacent business for us. But it could be totally different business”* (COO, VOX, 2018). Therefore, it is now imperative to embrace those new developments, which are entering—and eventually eating—the core and, thus, explore and validate new potential adjacent business models.

An industry-led accelerator provides a safe source of jointly curated external new ventures to explore these emerging futures. This new business model exploration is demand-driven: *“It all starts with use-cases, collecting use-cases from the business: what is happening at the terminal, what is their day-to-day operational problems and challenges?”* (Innovation Manager, TANKTECH, 2017). For a business-to-business (B2B) industrial accelerator, the fact that corporate partners have identified and can share use-cases turns out to be very valuable to attract external new ventures: *“you find a lot of start-ups that are craving for use cases, so they're eager and enthusiastic to work with us in the various challenges we have”* (Ibid, 2017). These challenges also provide focus and a solid base against which to iterate their solutions and business models:

“Those use cases give an opportunity to make the real shiny diamond, a sweet spot, where the start-up can excel.” (Ibid).

During the Strategic Fit Sensing phase between corporates and new ventures via demand-driven business model exploration, a question regarding value capture emerges in our case studies: what’s the return on investment (ROI) and how do we earn money with this new novel solution offered by the new venture? The answer to this question proves difficult for new ventures when sensing different stakeholders of a particular corporate: *“The problem of that start-up was a lack of business needs because it didn't solve a VOX's problem. They were nice, doing fancy things. But, how are we going to earn money with their knowledge? There was not clear business need. No one was prepared to pay for the next phase...”* (PG, VOX, 2018). There is a trade-off between the amount of exploration and start-up validation that corporates want to pursue, and the allocation of actual resources that specific business units are committed to spend.

The R&D/Innovation Units makes the initial connection with the incoming new ventures through co-scanning and initial mutual sensing, but the specific business and engineering units are the ones in charge to validate further engagements. For instance, as one R&D Manager at VOX says: *“Everybody is talking about autonomous vessels, but on the other side how do we earn money, is it really economically profitable?”* (PG, VOX, 2017). The expectation of financial returns appears as a barrier for radical business model exploration: on the one hand, the solution has to be applicable to a technical/business domain, and on the other, there has to be an expected measurable return in the short-term: *“That’s why it’s important that every idea has to be feasible and needs some short-term returns because nobody in this company is going to invest in technology that might be applicable in ten years.”* (Idem). Therefore, the standard rationale in this context is to ask for, approve and measure based on “what’s the business case?”, i.e., what's the problem that the new venture can solve? by quantifying the idea, either via cost reductions, increase in revenues or regulatory compliance.⁹ Even for scale-ups that have a working further validated technology, the business case approval can prove challenging: *“Ondavia of the 2018 cohort is really ready but the business need for us still has not been identified. So, we can accelerate to the next phase when*

⁹ An illustration of successful mutual sensing based on demand-driven business model exploration between VOX and a new venture includes the case of Njord filtration “because now in the EU it's very important to be sustainable and this is a technology that makes it possible to reduce the emissions from the engines in the short-term” (PG, VOX, 2017)

there is a concrete problem. But at this moment there is no problem yet” (RB, VOX, 2018). I analyze in Chapter 5 some of the consequences of these delayed validations or rejections in terms of incumbent – new venture tensions and mitigations.

In the case of SATELLITE, the R&D Unit has explicitly tried to push a different explorative entrepreneurial mindset to assess those adjacent or distant opportunities: *“As a R&D department, we were feeling uncomfortable with that because we know that effectively you will kill every disruptive idea if you ask for the business case.”* (R&D Director, SATELLITE, 2018). This R&D Unit learned a new innovation approach from a University’s Entrepreneurship Centre and from the very industry-led accelerator: *“That’s when we started talking to the Erasmus’s Centre of Entrepreneurship (ECE) and we learned from OceanAccel, and we brought it all together and developed this philosophy of the core, adjacent and transformational based on the 3 temporal Horizons”* (Idem.) The 3 Horizons is a framework popularized by McKinsey & Co (Baghai, Coley, & White, 2000), and was adopted by SATELLITE using the insights from the Industry-led Accelerator: the Horizon 1 is about the Core, the Horizon 2 is about Adjacent market opportunities and the Horizon 3 is about Radical (Transformational) Innovation distant opportunities: *“You need a balance between the three, if you only do core, it won’t bring you to the long term. But if you only do transformational, you aren’t going to win your project tomorrow.”* (Innovation Coordinator, SATELLITE, 2018). This balanced approach of combining exploitative work at the core and explorative transformational work resonates with the organizational ambidexterity stream (Birkinshaw & Gupta, 2013; Birkinshaw et al., 2016; O’Reilly III & Tushman, 2013; M. Tushman et al., 2010) discussed previously in this Chapter and in Chapter 2.

To accelerate strategic fit sensing through flexible matching, corporates organize not only start-up roadshows or demo-days but rather company-wide open challenges sessions, where different internal business units present their problem-spaces to elicit ventures’ awareness regarding possible ways to address them with their customizable value proposition: *“That’s the only purpose of today: to define needs. How can you solve one of our key problems and then just discuss [sense each other] because we cannot say our problems, because we don’t know their solution, so we need to interact to find the connection. That’s why we have rather large internal groups that we have connected to start-ups and they are going to join the discussion, including founders, mentors and business unit managers”* (MVK, VOX, 2018). The objective is to learn, build a relationship and identify POC opportunities: *“To learn from each other in a better way but*

also to better understand what kind of opportunities the start-up will bring. And based on that, we exchange technology information and start building up a kind of relationship” (RB, VOX, 2018).

After this strategic fit sensing phase enabled by flexible matching with the accelerator’s corporate partners and by local search within use-cases across internal business units, we next turn to analyze the next third phase in this process of co-accelerated corporate entrepreneurial capability building: the shaping of external streams to achieve actual fit, which is enabled by two mechanisms, namely, value customizing via concept proofing and internal business unit legitimizing.

4.6.3 SHAPING

Effective sensing paves the way for the Shaping phase, which begins through small-scale, cheap, time-limited and time-compressed proof-of-concepts (POC) and, subsequently, larger pilots. During this phase, there is a progressive value shaping enabled via the revealing of key affordances and needs of both corporates and new ventures. The following quote illustrates this point: *“As for GreenSeaGuard and Magnetik—2017 accelerated ventures--, we have given them valuable feedback of what we need. They think they have the solution, but they are not completely aware of the issues we have or we do not have.”* (SS & SVR, SATELLITE, 2017). As the ventures progress from the environmental periphery to the organizational core of business units through corporate mentoring and internal brokering, ventures become aware of corporates’ problem spaces, and thus, are able to shape their value proposition and customize their technologies—especially if these are at the MVP level—to meet those newly disclosed requirements.

Several instances across our cases illustrate the value shaping as a core element to facilitate proofing and experimentation: *“we want to do a pilot with start-up FEO-AR but there is not going to happen very fast because they need to change their value proposition to meet our needs. That’s exactly the discussion we had with them.”* (R&D Manager and Mentor, SATELLITE, 2017) New ventures need to customize their solution to satisfy the particular technical/business requirements of the corporates that are being sensed: *“If they have a solution, and we need it a bit different, we will ask them ‘Can you do it a bit different so it fits our needs’?”* (CIRD, VOX, 2018). This is usually a very straightforward discussion as one of the main objectives of industry-led accelerators—including OceanAccel—is to do business with both the start-ups and scale-ups.

However, shaping enacts a novel entrepreneurial capability not only for the new ventures—which are asked to iterate or “pivot” during this shaping phase—but also for the very corporates themselves, who are learning vicariously about experimentation as sponsors and engaged mentors of these accelerated ventures. Corporate mentors engage on a weekly basis to help the ventures design an experiment (POC) that can be approved and legitimized by the respective internal business units.

The corporate mentoring function enables inter-organizational brokering, mutual sensing and knowledge sharing, and ultimately, as a conduit to shape the ventures’ value proposition to effectively achieve solution-problem fit: *“The role of the mentor is to coach start-ups to identify the needs within the market and we are part of the market, so we also provide our own needs that might be either coincident or deviant with the overall market”* (SATELLITE, R&D Dept, 2017). In the case of deviance with regards to the market, that would mean that new ventures would be coached to satisfy a specific need within a use-case of the focal corporate, which is actually providing mentorship. In other words, through corporate mentoring, ventures’ value proposition can be shaped to enable focal fit.

In addition, we have discovered that the flexibility and shapeability of venture’s proposition/technology can be a positive factor to enable the very corporate-venture fit via concept proofing: *“Their uniqueness is the flexibility as Sagar Defence—of the 2017 cohort—is very flexible and not too expensive, so that might be a unique selling point if they are really able to make his concept of ‘a boat in a box’ to turn a regular vessel into an autonomous vessel, I see a lot of opportunities”* (PG, CIRD, VOX, 2017). Due to this flexibility factor, this particular venture was able to rapidly secure corporate funding to do a proof-of-concept (POC). In contrast, *PortGateway—of the 2016 cohort—a digital platform for vessel scheduling with pre-existing operations in smaller ports had already defined its core technological functionalities and could not adapt those for larger complex ports: “I wish I had been exposed to the accelerator before, I don't have a lot of room to change direction at the moment...had I learned what I learned here I might have done things differently from the beginning, but I'm not in a position to throw out what we've done as I am currently delivering to smaller clients.”* (Founder CEO, PortGateway, 2017). This scale-up had to stop its piloting in this focal port maritime complex because it was not flexible enough to be shaped to meet the expected requirements.

Even if the ventures' propositions are too broad, this shaping mechanism can afford focus because *"a lot of everything was a lot of nothing, so our use-case of jetty inspection gave start-up AquaSense, an aquatic drone technology from the 2017 cohort—the direction they need to develop further their proposition"* (Innovation Manager, TANKTECH, 2017). The corporate innovation unit of TANKTECH helped the venture to progressively focus on a key problem space discovered through selectively disclosing (Alexy, George, & Salter, 2013) their strategic use-cases, so that this venture can focus on a relevant one and, together with the corporate digital innovation unit, co-design a proof-of-concept experiment.

4.6.3.1 Concept Proofing: co-designing an experiment

I have observed in this Port maritime complex that external ventures are a key resource for planning and designing a POC experiment: *"We do all the proof-of-concepts with external parties. This comes back to why OceanAccel"* (Innovation Manager, TANKTECH). The reason for not doing it internally is basically the resources, especially time: *"if you would do the POCs in-house, you immediately run against resources issues, everybody is busy. And then the POC will take forever."* (Idem) Concept proofing has to be done in a lean time-compressed manner. That's why the industry-led accelerator is a well-suited setting for corporates to learn how to effectively set and conduct a POC.

The corporations—through their R&D/Innovation Units and their internal business units—learn about concept proofing and experimentation through four sources. First, via the industrial accelerator's guidelines and tools to set, run and assess POC, i.e., acquiring explicit knowledge from external sources through acquisitive learning¹⁰. Second, by observing how other corporate

¹⁰ The first author was present at OceanAccel's Innovation Ambassadors Session on Monday April 9th, 2018, whose aim was to design, set and execute a pilot via corporate startup engagement. It was led by OceanAccel's Director and the attendees were VOX, SATELLITE and the ROYAL PORT and the 2018 cohort of start-ups. The workshop comprised the presentation of a framework for problem/pain and solution fit and a project management dashboard for both startups and corporates. The startups left the room and went on to discuss POC opportunities with potential corporate partners, and then come back into the room for a short debrief. An accelerated venture—E-Concrete—presented the POC exploration lessons learned after meeting with ROYAL PORT's Innovation unit. At Shakedown, the final event held on June 2018, a POC contract was announced between E-Concrete and ROYAL PORT.

R&D/innovation units experiment and engage with new ventures. Third, through mutual sensing and symbiotic mentoring, where the corporate R&D/innovation staff learn vicariously about experimentation through a direct engagement and knowledge exchange with the ventures' founders. This learning and exchange of resources happen not only observing how new ventures iterate (minor adjustments to business model or MVP) or pivot (major adjustments) but also engaging in the co-design, execution and assessment of POC experiments. Fourth, there is organizational learning through the corporates' own internal innovation initiatives such as employee intra/entrepreneurial training, leadership and executive education programs.

The POCs are usually coordinated and funded initially by the R&D/Innovation Units in collaboration with the business units. POCs usually last between 6 and 8 weeks, and they are done in parallel to the standard day-to-day processes, so that the operational interference is minimal. After these 6-8 weeks, there is a minimum viable product (MVP), availability of a demo plus new data that can be shown, but *“you pull all the plugs and everything is back to normal again”* (Idem).

In the case of TANKTECH, the cost of POC is between 20K and 40K and is funded entirely by the Digital Innovation Unit. In terms of the outcome, the delivery is a one-page infographic, describing what was the business challenge, what was the solution tried out, and what were the tested hypotheses. In terms of POC measurement, they assess 5 impact areas: safety, productivity, energy, supply chain efficiency, and customer intimacy.

As for VOX, this dredging company—though less advanced in concept proofing—has also recently started a series of initial experimentations to test new solutions, emerging technologies and processes with external ventures bringing the *outside-in view* to cope with technological discontinuities. The engagement with the industry-led accelerator has proven to be critical to learn and to try new lean experimentation approaches while engaging with the external new ventures: *“It's inspiring where you can see it's working on a small scale and will help them to make a pilot for us to quickly test if what they know is suitable for us.”* (PG, VOX, 2017).

The process for getting proof-of-concepts approved is similar to VOX's internal projects, for example, if an employee has an idea within his/her roadmap, she can apply for a small funding—20K Euros—to test it. Similarly, when a POC opportunity with an external start-up or scale-up has been identified, the approval follows an analogous procedure: *“It's the same, you need some stakeholders interested and prepared to pay for and then it's ok that you get the money and you can do your things, it's rather pragmatic”* (Idem). To ensure further validation and “buy-

in” by the internal business units, this R&D/Innovation Unit promotes that more than one department can look at the opportunity and support the POC. Then, based on the result of the POC, the new venture might get a contract or an agreement to move from a small-scale POC into a Pilot that can be further integrated in current systems and operations: *“that's the way we really pull it from their idea into our company into a shared solution”* (Idem).

Through the industry-led accelerator, these corporations – through the R&D/innovation units - have used acquisitive, vicarious and experiential learning to co-sense, co-design and co-execute small time-limited POC experiments with the ventures. Through this engagement, there has been knowledge sharing and resource exchanges between these very non-equal partners. The next activity in this experimentation-driven shaping phase is to further validate the POC with internal business units, which may or may not allocate resources for a larger pilot and, subsequently, deploy it at scale, if the required conditions are met.

4.6.3.2 Internal Business Unit Validating and Orchestrating

The R&D/Innovation Units are responsible for co-scouting, co-selecting and initiating the mutual sensing process with the incoming external ventures. But to integrate new solutions and technologies—for example, virtual reality (VR) for crane operators’ training or AI/autonomous technologies for standard vessels—into daily operations, they need the internal business units. The R&D/Innovation staff and ventures’ mentors need to, along with the ventures themselves, sell the validated POC internally through another round of customer development: *“After that, it is up to the business, where the use case came from, to say this is very nice, I would like to have that. I want to do a pilot. So, they need to allocate resources and they need to make a project that they run and start implementing: it is basically the handover from the innovation area to the business unit, where we will be more in a facilitating role”* (MN, Innovation Manager, TANKTECH).

This is a critical phase that has to do, ultimately, with the internal scaling of experimentation (Thomke, 2020). For VOX, every POC with external ventures starts with the idea of subsequent scaling-up and impact in their own innovation process: *“Our idea is to come up with upscaling to create some scale advantage, but to achieve that we need some successes. I think we have learned that there's a lot of teams and things to learn any further”* (RB, VOX, 2018). In other words, they

have learned that there are much more to be learned from that busy outside world, and to be internalized to create and capture value: *“That's where it becomes more difficult and that's why we want to organize the final ‘embedding phase’ so that this whole spectrum is well served.”* (PG, VOX, 2017). In this organizational learning process, we observe that our case studies have initiated a phase of internal capability development to mirror what they have learned from that busy outside world, in particular the accelerator and the working principles of the new ventures. The ‘embedding’ phase is about initiating and enhancing further corporate entrepreneurial and experimentation capabilities to be able to better absorb the external knowledge (W. M. Cohen & Levinthal, 1990; Zahra & George, 2002), and thus, cope with incoming disruptive challenges and opportunities. I next analyze this very last and critical phase.

4.6.4 INTERNALIZING

Throughout this process, the firms have learned about new core/complementary incremental/radical technologies, and lean start-up—the process of accelerated learning through business model validation—through disruption co-scanning, attracting external entrepreneurial streams as well as strategic fit sensing and value shaping via concept proofing. Firms have been exposed to and learned—through different learning mechanisms—about lean entrepreneurship and its highly iterative design heuristics, which tend to come into conflict with the pre-existing stage-gate oriented legacy program and innovation management processes.

The most striking finding across our cases is that corporates internalize the lean entrepreneurship processes, and re-design their internal R&D/Innovation functions to better absorb external entrepreneurial streams, leverage their own internal collective intelligence and, ultimately, further their entrepreneurial orientation (Foss & Lyngsie, 2014) towards the exploration and exploitation of new opportunities triggered by disruption. In short, firms have mirrored the industry-led accelerator, internally. To effectively do so, they have initiated and developed new entrepreneurial routines, starting from the R&D/Innovation units to the rest of the organization.

4.6.4.1 Internal Acceleration and Context Scanning: “Three Merged Horizons”

Corporates have learned how to identify new technologies and links with external new ventures to explore opportunities. Given the environmental uncertainty, this explorative sensing is

also done internally at each one of our corporate cases: *“So we don't have a roadmap in detail in which you can define exactly upfront this is our target in phase 1 and this is our target in phase 2.”* (R&D Manager, VOX) They use start-ups from OceanAccel and elsewhere to sense the emerging futures and explore possible distant knowledge that can be adopted and applied locally, given current corporates' problem spaces and use-cases.

This internal exercise on present/future disruption sensing is framed under the Three Horizons Framework (Baghai et al., 2000) popularized by *McKinsey & Company* to depict both the technology and market uncertainties as well as key innovation processes that have to be managed concurrently. Originally, the framework works as follows: Horizon 1 is concerned about performance improvement and incremental innovation; Horizon 2 is about R&D work on adjacent technologies and business models; and Horizon 3 for radical innovation exploration, where there is high uncertainty in terms of both technologies and markets.

Yet, empirically, in this internal exercise of present/future disruption sensing, corporates realized that actually the Horizon 3 is not that far away: *“That's a beautiful thing of just thinking in that Horizon 3. It's not a long shot. For example, artificial intelligence could be in Horizon 3 if you think in some crazy thing. But artificial intelligence is just what needs to be the core of your business. What we're doing now with augmented reality for the operators on the hoppers is Horizon 3. It is some years ahead, but you can immediately pull it down”* (SH, R&D Manager, SATELLITE). As an internalizing driver, the Horizon 3 framework operates as a device to trigger action in the present: *“the biggest advantage of Horizon 3 is to quickly spin people who struggle for 5 years with a problem and now they say OK: we should just go, start and do things.”* (SH, R&D Manager, SATELLITE).

This illustrates a more profound converging pattern. The different temporal Horizons have merged into an extended one due to the disruption pace and technological advancement. On the original framework, it used to be the case that a relative delivery time was assigned to each of the Horizons. For example, some organizations defined Horizon 1 as new features that could be delivered in the short term of three to 12 months; Horizon 2 as business model extensions that will be ready in between 24 and 36 months; Horizon 3 as creating new disruptive products or business models in a period of 36 to 72 months. This chronological time-based definition made sense in the 20th century when new disruptive ideas took years to research, engineer, and deliver.

While traditional analysis suggests that Horizon 3 disruptive innovations take years to develop, in today's world this is no longer the case. The three Horizons are no longer bounded by time: today, disruptive Horizon 3 ideas can be delivered as fast as ideas for Horizon 1 in the existing product line (Blank, 2019). Examples abound across industries where new entrants have challenged incumbents bringing Horizon 3 type of solutions to Horizon 1 in very short periods of time (Ansari & Krop, 2012). Even at the current disruption pace (M. Iansiti & K. R. Lakhani, 2020; Webb, 2020), some Horizon 3 technologies can take long periods of development. However, the trap of the Three Horizon framework is not recognizing that many disruptions can be rapidly implemented today by repurposing existing Horizon 1 technologies into new business models or by accelerating the adoption of distant technologies (Blank, 2019). Industry-led accelerators can enable this repurposing.

This *merged* Horizons situation is experienced by the corporate R&D/Innovation units under study: *“every roadmap is far ahead, it has an initiative for the far future but also has an initiative for the short term, for example, when the energy transition is completed, what will the off-shore division do? There are some actions that can be done today to prepare for that scenario”* (CIRD Staff, VOX). This applies not only for incoming technologies but rather for mindsets: *“The technology itself is not disruptive. It is the application of the technology what it is new. It is the operational mindset that's disruptive for a maritime sector”* (R&D Senior Manager, SATELLITE, 2017). I analyze next how the external sourcing of ideas, technologies and practices become embedded into the organizations, affording changes in the way corporate R&D/Innovation is performed.

4.6.4.2 External Sourcing and Changing Mindsets

The entrepreneurial sourcing of external accelerated ideas and ventures triggered changes in the four corporate cases: *“They challenge us to look at our own Value Proposition and changed how we think about our problems and the possible ways to solve them”* (Innovation Coordinator, SATELLITE, 2019). The external sourcing of ideas/technologies/ventures has been enabled by the corporates' business models opening up (Cozzolino et al., 2018), and more generally, by an open sharing approach, which is well captured in the following quote: *“You should never make the mistake of saying 'We don't share anything, we will do it internally.' I'm really for the 'open kimono*

approach' to share your knowledge, connect through learning agility to different industries, different people because at the end, the solution will be better. And you will get the entrepreneurship here as well" (COO, VOX, 2018). This opening up to external entrepreneurial sources—processes and people—has allowed new mindsets to emerge: *"I think the main value of OceanAccel is how does a process of disruptive ideas work within a network and with an entrepreneurial look at it. Because we're an R&D Department, we have very bright people, but I think we lack the entrepreneurial mindset. If you go into a recruitment process of a new R & D member, you're not going to be test on your entrepreneurial skills. If you're a sales manager, then you are tested on your entrepreneurship skills. How smart are you with selling your product? It's not a question you get when you enter an R&D job interview. But I think that's what we lack the most."* (R&D Engineer, SATELLITE, 2017).

The internalizing phase has to do with precisely *adopting* and *adapting* the lean start-up method not only to upgrade the stage-gate process but also to promote entrepreneurial attitudes and mindsets: *"So we did a little start-up exercise of three months, where eight to ten people come together, including an advisory board. We're going to do an exercise on social innovation, and social impact of our work. Our key question is: what does social innovation mean in 2050?"* It is also possible to observe a type of Horizon 3 question that is being addressed through this entrepreneurial exercise. Yet, the initial response is brought to Horizon 1 because there is a method to deal with it: *"As long as there is a process that helps with this kind of things and it's not the way they used to do it here...because that's the scary thing. Let them do. We're not used to it. And it seems to land in this organization."* (R&D Engineer, SATELLITE, 2018). There is a new process in place, yet they are just getting started with many unknowns: *"We're just in the beginning"* (Idem). In terms of capability lifecycle (Helfat & Peteraf, 2003), the evidence reveals the capability initiation stage.

The internalizing phase resembles a trial-and-error learning process, where the new lean entrepreneurship iterative heuristics enters into conflict with the pre-existing stage-gate process (Cooper, 2008): *"Keep on pushing, keep on pushing, keep on pushing and they will pull down some ideas"* (R&D Engineer, SATELLITE, 2018). This internalizing of lean experimentation method requires important adjustments to actually be implemented and spread across business units. First, the lean method has to be adapted to the particular industrial and firm-level context: *"As an R&D Department, we were feeling uncomfortable with that because we [now] know that*

effectively you will kill every disruptive idea in this way [asking for the business case]. And that's when we started talking also to ECE [University Entrepreneurship Center], we learned from OceanAccel, we had our own ideas... And we brought it all together and we developed this new philosophy". Second, the R&D/Innovation Unit staff has to disseminate their message across different business units and convince senior management of the new experimentation-driven and accelerated learning approach: *"We now taught the Board and others in the company: don't ask a business case here. Don't do it. Of course, you must be able to defend it but there should be no business case"* (Chief Manager R&D SATELLITE, 2018). This is the beginning of a transformation in how entrepreneurial innovation is supported and assessed. I contend this is the founding stage of a new (entrepreneurial) capability lifecycle (Helfat & Peteraf, 2003).

In VOX I observe a very similar pattern of internalizing and new routine embedding. The most striking findings are new company-wide innovation process they recently put in place due to the awareness and learning afforded through the participation in OceanAccel and engagement with new ventures. One of these programs is the EXELLERATE program.

In order to be prepared for the upcoming technological discontinuities—digitalization and energy transition—that might change not only how VOX performs a function (operations) but also what type of company is (identity), VOX faces a key imperative: to connect its Corporate Innovation Research and Development (CIRD) unit with other parts of the company to have a distributed system where somewhat isolated units are strategically connected through a common innovation doctrine. To address this challenge, VOX has set “roadmaps” as bundles of ideas that together can achieve a shared objective. Within each roadmap, there can be several maps. These roadmaps can be filled with either *outside-in* ideas from external innovators and start-ups or *inside-out* ideas, where internal employees invent new things and eventually develop new offerings that may be integrated into the business units. This new road-mapping Process is called EXCELERATE, i.e. a combination and complementation of two words: to excel and accelerate.

VOX’s approach proceeds from ideas to POCs and to the final “embedding phase”, i.e., where not only VOX’s internal stakeholders have accepted the solution but the external clients too. Using two *outside-in* roadmaps that are related to their main markets, i.e., dredging and marine construction and off and on-shore wind. As a contractor, this is where VOX looks for customer values and for what clients want. Through a networks' roadmap VOX staff tries to have relations with as many people as they can to learn about new customer values. VOX’s CIRD started to

collect ideas from all over the company and then figured out if and how they fit in one of these roadmaps. If not clear, CIRD's role is to try to help them to connect to a roadmap and to start up by going through the funnel.

OceanAccel—both the ventures and the value chain corporations—has been instrumental to design these new organizational processes aimed at improving their “outside-in thinking”, and ultimately, augment their collective intelligence (Woolley et al., 2015). There is a strategic mandate for VOX to become much better in “outside-in thinking.” Partly due to their engagement with OceanAccel and other corporates, and the scanning of hundreds of new ventures, they have realized that there are many things that have been developed outside, for example, on data management or sustainability issues: *“there's a whole world busy with that and we were always quite traditional, so that we said OK, we want to investigate that ourselves”* (MP, 2018). Therefore, it used to be the case that only if developed internally, it can be trusted. To a certain extent, this is still the case, as discussed in Chapter 5.

It is not a coincidence that VOX has combined the concepts *accelerate* with *excel* (*excellence*), one of the core values of the company. By leveraging the outside-view, VOX has been learning about entrepreneurial acceleration for over four years now. And the corporates are now learning-by-doing in this internalizing phase. Thus, VOX has initiated a lean entrepreneurial capability through the engagement with OceanAccel and selected new ventures: *“To be honest we don't have a lot of experience with that. Last year's edition we signed, I think, for the first time four or five agreements (POC). We really had intention to come up with a little bit of 'trial and error'.* (CIRD Staff, VOX, 2017). There is a strategic drive to implement new processes and routines that facilitate learning-by-doing and trial-and-error experimentation to better absorb the explorative outside-view and become better at core exploitative work.

The engagement with the industry-led accelerator decomposed in the previous three phases has operated as a trigger to internalize acceleration practices, initiate new entrepreneurial capabilities and institute new R&D/Innovation routines, which subsequently affect how corporates further engage again with the industrial acceleration process, i.e., co-attracting, sensing and shaping those external streams, as new organizational capabilities had been enhanced.

One outcome of this internalizing phase is the transition from a traditional closed R&D approach to an open entrepreneurial innovation one, where opportunities are co-scouted and exploited in collaboration with external ventures. In the four longitudinal cases we have observed

that this original engagement mode with the accelerator was taken further, specified for particular problem-spaces or even scaled within a global network. For example, VOX, after two years of acceleration learning afforded via the participation in OceanAccel and the configuration of the CIRD unit, decided to embrace their network of providers using a similar open entrepreneurial innovation approach, i.e., by opening up their problem-spaces and use-cases and asking these providers for solutions accordingly.

External venture engagement is a capability—domain/problem specification, external (new ventures) and internal search of problem-spaces, matching and proofing—learned at OceanAccel that was subsequently internalized and deployed by VOX to engage and (try to) co-innovate with a larger network of providers and partners. To effectively deploy this capability, VOX had to bring new staff to the R&D/Innovation Unit, redesign some of their procurement routines as well as to involve the new young talent of the Company—the Young VOX, a new internal group of young professionals that offers periodic get-together and workshop, including entrepreneurship—to embrace this new philosophy and practice.

4.6.4.3 New (internal) organizational acceleration designs

The internalizing phase was also verified by the redesign of existing innovation processes or implementation of new ones, most notably, start-up engagement programs or intrapreneurial challenges that mirror—in one way or another—the industry-led accelerator.

VOX launched its first Innovation Challenge in November of 2018, two years after their engagement with OceanAccel was initiated. This Innovation Challenge was organized to celebrate VOX's 150th anniversary and as a quest to enter into new partnerships with start-ups that are making key contributions to addressing society's most pressing problems such as the reduction of carbon emissions, energy storage and digitalization. Even though VOX has been one of the very active founder of OceanAccel, with mentors that can influence the scouting funnel and selection of new ventures they want to work with, VOX decided to organize its own Entrepreneurial Innovation Challenge. Using OceanAccel's lessons, VOX wanted to have their "own", i.e., their own scouted external start-ups that precisely fit their innovation remit, and that VOX—through the CIRD Unit and related internal business units—can exclusively nurture and eventually bring closer to the organizational core through POC, partnerships, or investments. This is congruent with

the open entrepreneurial innovation stance pioneered through the interaction with OceanAccel, yet in this case VOX further appropriate the model, according to its their specific strategic priorities.

Furthermore, VOX hired the former founding Managing Director of OceanAccel in early 2019 to lead the Digital Transformation initiative, whose focus is to establish a framework for digital transformation and demonstrate its value in terms of cost savings and improved client service. This new practice comprises 9 intrinsically motivated intrapreneurs and reports directly to the Chief Operations Officer (COO).

The first phase of this Digital Initiative has been to develop the framework, and the second phase will be to demonstrate to the organization its value by matching those identified use cases with internally and entrepreneurially developed digital solutions: *“the plan is to build the capability internally so that each business unit is able to build digital applications to improve their work”* (former MD OceanAccel and current Digital Officer at VOX, 2019). This new digital practice has grown from one external consultant to a 9-people unit fully backed as a strategic priority by the Top Management Team (TMT) in less than a year. For the internalizing argument elaborated in this section of the chapter, the following quote is illustrative: *“It feels like building my own OceanAccel within VOX. During these 6 months I will learn more about VOX, how do they react to new ways of working as I am bringing agile and lean start-up, how is the quality of the data, and how quickly can we move”* (Idem, 2019). In its quest to leverage collective intelligence and the ‘outside-view’, VOX is not only guided by the inspiration from Ocean Accel and the external accelerated ventures but rather by designing—and investing in—a new organizational unit aimed to address the upcoming digital opportunities and challenges. And, in so doing, VOX has started to develop novel entrepreneurial capabilities internally.

This internalizing and redesigning pattern is also observed in SATELLITE, the ROYAL PORT and TANKTECH. Using OceanAccel as a direct source of inspiration, SATELLITE redesigned their own company-wide Innovation Challenge competition and created an internal acceleration program in June 2019. As per Ocean Accel’s Director recommendation, the SATELLITE’s R&D Unit contacted the former Head of the first industry-led accelerator in this European country, which actually served as the model for OceanAccel. This former Head advised SATELLITE to redesign their existing Innovation Contest and transformed it into an Internal Accelerator program. They adapted the lean start-up methodology for internal validation and acceleration. Instead of looking for validation in external customers or clients, this lean

entrepreneurship adaptation prompted SATELLITE employees to “*get off their chair and look around inside the building*” for latent opportunities and support for their own ideas and initial problem hypotheses. Complementing the “Get out of the building” *motto* popularized by Steve Blank regarding the key initial discovery step of the customer development process (Blank, 2013; Blank & Dorf, 2012), the “Get off and look around *inside* the building” is a specific adaptation of the lean entrepreneurship method for internal corporate acceleration.

This internal accelerator started with 108 ideas submitted by teams after massive publicity and internal communication. 20 final ideas were subsequently selected and, finally, 7 winners were announced in a big event named after Ocean Accel’s massive closing event. These 7 ideas will be further validated and accelerated for 3-6 months based on specific milestones to be delivered. SATELLITE’s R&D staff are straightforward when explaining the relationship between OceanAccel and SATELLITE’s JUMP, their newly redesigned internal accelerator: “*This would not have happened without our involvement in Ocean Accel, if we weren’t on the program for all these years*” (Innovation Coordinator, SATELLITE R&D). Yet, both programs—the industry-led and internal one, do not compete and rather complement each other: “*The outside-view is needed to reframe and challenge what we do and how we look at our problems.*” (Idem). While SATELLITE increased their involvement in OceanAccel in the 2016-2019, they learned vicariously about entrepreneurial acceleration, and used this knowledge to internally redesign their company-wide innovation initiative. The aim is to initiate and develop intra/entrepreneurial capabilities that may create value further down the road—either by using them on exploring new adjacent/distant opportunities (Horizon 2-3) or applying them in the exploitation of current business models (Horizon 1).

4.6.4.4 Redesigning the entrepreneurial innovation program at ROYAL PORT

The *Game Changers* internal innovation program—launched in 2014 as a capability training to enable new ways of thinking and doing innovation work—had been re-structured in 2019 based on the OceanAccel principles. The original *Game Changers* program lasted 9 months with 2 days-a-week commitment for 30 participants. Though the results were satisfactory for this innovation program that has reached almost 15% of the company, the assessment was that the resources—financial and human—can be spent differently. Leveraging Ocean Accel’s lessons

learned, the ROYAL PORT's Innovation Unit pivoted towards a lighter, shorter and lean program, focused on the opportunity itself rather than in teaching methodologies and tools. The newly redesigned *Game Changers* Program is a fast track Opportunity Acceleration Program of 10 weeks with 3 module days and coaching in between. The ROYAL PORT's Innovation Unit scouts for ideas that are already active, not completely new ones. Under the new scheme, they did 2 fast-track programs in 2019 and they are in the process of further assessment and acceleration of the most promising ones. This ROYAL PORT Unit used the same innovation external facilitators involved in the previous longer *Game Changers* programs for these two initial fast track opportunity acceleration ones. Yet, given that this Unit has built capabilities along the way—via their 4-year engagement with OceanAccel and a 5-year development of the internal *Game Changers* program—they will facilitate the 3rd and next editions of the fast track program on their own, i.e., without the aid of the external innovation consulting firm.

The effect of Ocean Accel on internalizing and redesigning structures is clear, yet the actual impact remains to be seen as the corporate entrepreneurial capability building takes time. The impact will be observed in two sets of outcomes: first, in the realization of new intrapreneurial ventures, and second, in the spread of lean entrepreneurial innovation methodologies, that ultimately, may transpire as new organizational capabilities are deployed not only in corporate venturing initiatives but also in more standard exploitative work. For instance, the reflexive practice in hindsight of one of the first intrapreneurs of the ROYAL PORT's *Game Changers* program is illustrative: *“the lean and design methods were definitely useful in terms of the dig deeper approach that helps you to go beyond the obvious, and also the speed of the POC validation but of course this will depend on what you do”* (Game Changers Participant and Internal Venture co-founder, ROYAL PORT, 2019).

4.6.4.5 Emerging Intrapreneurial Identities

In this internalizing phase of the capability building process through coepetitive industrial acceleration, there is an additional component: identity. As OceanAccel's corporate partners R&D/innovation units become familiarized and further adopt the lean entrepreneurial method through start-up engagement programs, redesigned internal innovation programs or newly created digital units, an intrapreneurial identity starts to emerge. The following quote by VOX's COO is

particularly illustrative in this regard: *"Bloody hell, This is interesting, our employees have been the mentor of those start-ups company at Ocean Accel. And then these young people suddenly said, 'Well we want to have our own start-ups within VOX, we can do it ourselves'. And that's an interesting turning point"* (VOX, COO, 2018). This newly emerging intrapreneurial attitude can further enhance the organizational capabilities because cognitive capabilities are not only about 'how to do' things but also 'how to be' and, more importantly, 'how to become' (Bruner, 1990, 2006). The engagement with the industry-led accelerator and the entrepreneurial 'outside-view' for over three years has triggered changes in VOX's attitudes: *"it's happening, it is possible. Now the attitude has changed the company. Bloody hell, this can happen. They see that some simple small company can do it [autonomous vessels] within our organization. The mindset is totally changed"* (COO, VOX, 2018).

This emerging intrapreneurial identity is triggered by learning processes that connect a relevant segment of employees with external entrepreneurial ventures that are sensed, shaped, disregarded or re-appropriated, in ways that challenge the corporate status-quo and trigger an intrapreneurial identity: *"yes, we can build something like this"*. The emerging intrapreneurial identity is enabled by a mechanism of learning-by-doing via trial and error.

In terms of capturing value from these newly attitudes, capabilities, and intrapreneurial identities¹¹, the corporates' senior leadership know about the difficulty in measuring them, yet deeply aware of their critical relevance as intangible assets for corporate renewal and survival given the upcoming technological discontinuities: *"You could say these are small phases but there are big changes in the mindset of our people due to having the Outside-in View. I cannot put that on paper by saying: look, as a result of this, we earn so much money. But people are suddenly looking to do something else and they say "bloody hell, it's possible. Let's go for it". That is the innovation attitude I want to have in the company and it is value which I cannot monetize. But I'm convinced is the new attitude that will bring the company to the next level"* (COO, VOX, 2018).

A converging pattern is observed in SATELLITE, ROYAL PORT and TANKTECH. It is not trivial to adopt the lean start-up method for companies with legacy stage-gate processes,

¹¹ I am mindful that changes in organizational cultures and associated identities take usually longer than the period of time considered in this study to fully substantiate (Corley & Gioia, 2004). We are witnessing the beginning of it in this setting.

deficits in experimentation and high thresholds to trust in new yet unproven external technology. A component of the intrapreneurial identity is resilience and its learning mechanism is trial and error, as evidenced in the case of SATELLITE: *“Keep on pushing, keep on pushing, keep on pushing and they [the intrapreneurs] will pull down some ideas and implement them in the core of the company. That's a mechanism that can be strengthened within SATELLITE. We're just in the beginning.”* (R&D Engineer, SATELLITE, 2018).

To initiate and nurture corporate entrepreneurial capabilities, and, ultimately, enable a legitimate intrapreneurial identity not only resilience is needed but boundary-spanning brokers: *“The trick is that you can do all kinds of exercises in the 10% [distant, peripheral Horizon 3], and they can stay there, but you need to give people some arrows connecting to the core.”* (R&D Engineer, SATELLITE, 2019). In other words, to effectively sustain this initial entrepreneurial capability development, connections to both internal business units' decision makers and top management team (TMT) are needed.

Legitimizing, trial-and-error and an intrapreneurial identity source the corporate entrepreneurial capability building process, which is initiated and developed from the firms' periphery towards the organizational core in industrial acceleration contexts.

4.7 DISCUSSION

I have analyzed the detailed process by which firms cooperatively engage with an industry-led accelerator, whereby they learn about new emerging/disruptive technologies, sense strategic fit through flexible matching, perform concept proofing and value shaping as well as internalize the lean entrepreneurship method and, in so doing, redesign internal R&D/innovation structures and, ultimately and most importantly, build initial corporate entrepreneurial capabilities along the way. I have addressed this chapter's research question regarding how corporate R&D/innovation units develop entrepreneurial capabilities through their engagement with industry-led accelerators by inductively deriving a four-phase capability-building process model, as detailed above.

I contribute to the corporate entrepreneurship stream through this empirically-grounded theorization of how (dynamic) entrepreneurial capabilities are developed: neither at the established firm nor the new venture level (Zahra, Sapienza, & Davidsson, 2006) but, rather, as both entities – and levels – interact and exchange resources through their participation in an industrial accelerator. Extant research on entrepreneurial dynamic capability formation has tended to focus

on either one of the two levels, but not on their relationships, nor on both levels simultaneously. As shown in Table 4.5, the dynamic capabilities stream has focused on either the established firm or the new venture level. Even though my unit of analysis in this chapter is the R&D/innovation units of established firms, I have added two important novel factors to the process model of co-accelerated corporate entrepreneurial capability-building. First, collaboration among corporates in Phase 1 when detecting and attracting streams via co-scanning, harnessing the outside view and collective sense-making mechanisms. Second, explorative and adaptive engagement with external new ventures through strategic fit sensing (Phase 2) and via value proposition shaping (Phase 3). Both novel factors are facilitated by the specific industrial accelerator’s engagement model.

Table 4.5 Selected past research on dynamic capabilities in new ventures vs. large firms

VARIABLE	NEW VENTURES	ESTABLISHED COMPANIES
Nature	(George, ZAHRA, Autio, & Sapienza, 2004) (Autio, George, & Alexy, 2011)	(Eisenhardt & Martin, 2000) (Geiger & Kliesch, 2005) (Winter, 2003)
Antecedents	(Arthurs & Busenitz, 2006)	(Blyler & Coff, 2003) (Verona & Ravasi, 2003) (Zollo & Winter, 2002)
Process	(George et al., 2004) (Autio et al., 2011)	(Boer, Drejer, & Mosey, 2005; George, 2005; Lampel & Shamsie, 2003; Lazonick & Prencipe, 2005; Salvato, 2003; Zollo & Winter, 2002)
Outcomes	(Arthurs & Busenitz, 2006) (Newbert, 2005) (Sapienza, Autio, George, & Zahra, 2006)	(Blyler & Coff, 2003) (Bowman & Ambrosini, 2003) (Kathleen M Eisenhardt & Martin, 2000) (George, 2005) (Lazonick & Prencipe, 2005) (Lenox & King, 2004) (Verona & Ravasi, 2003) (Keil et al., 2009)

By looking at the interface between large firms and new ventures being co-accelerated at the industry-led accelerator, we uncovered a process model of corporate lean entrepreneurial capability building through i) the collaborative – and cooperative – arrangement among the accelerator’s corporate partners, and ii) corporate new venture engagement through strategic fit sensing, value shaping and concept proofing. In our account, there are three entities that interface to make the industrial acceleration process work: large established firms, new ventures (start-ups

and scale-ups) and the accelerator itself. It is through this four-phase process that new entrepreneurial capabilities become collaboratively initiated, dyadically experimented and individually appropriated to enhance the capability (resource) base of an established firm.

Therefore, this is a novel process comprising time-compressed inter-organizational learning among non-equals and co-accelerated capability building that has not been theorized previously. Though it shares a few components, it is distinctively different from the capabilities and processes studied in the strategic alliance literature.

Alliance management was originally proposed as a capability based on a relational view of strategy (Dyer & Singh, 1998; Grant & Baden-Fuller, 2004; Ireland, Hitt, & Vaidyanath, 2002) different to that of the industry structure view (Porter, 1980) and the resource-based view of the firm (Barney, 1991; Rumelt, 1991; Wernerfelt, 1984). Its main contribution was to propose that inter-firm linkages at the dyadic or network level were untapped sources of resources, relational rents and, ultimately, competitive advantage (Dyer et al., 2001; Dyer & Nobeoka, 2000; Larsson, Bengtsson, Henriksson, & Sparks, 1998). Relational rents are possible when alliance partners combine, exchange, or co-invest in assets, knowledge and resources/capabilities; in so doing, they employ effective governance mechanisms that lower transaction costs and enable the realization of rents through a synergistic combination of assets, knowledge or capabilities. The determinants of relational rents are relation-specific assets (duration of safeguards and volume of transactions), knowledge sharing routines (absorptive capacity, transparency and free-riding discouragement), complementary capabilities (ability to identify strategic complementarities) and effective governance such as informal self-enforcement mechanisms (Dyer & Singh, 1998).

However, the premises upon which alliance management has been conceived as a strategic relational capability are very different from those of the corporate accelerator phenomena: long-term collaboration and resource exchanges among equals (Ireland et al., 2002). Even though there has been alliancing research on large and small firms – for example, large pharmaceuticals and small biotech firms – the average time span of a pharma-biotech drug discovery project collaboration is 10 years (Hoang & Rothaermel, 2005). By and large, the strategic alliances literature (Mindruta, Moeen, & Agarwal, 2016) has tended to focus on the long-term collaboration of similar-to-equal partners with a pool of resources to access and information on where to find complementarities, as opposed to very non-equal partners who engage in accelerated, time-compressed, explorative concept proofing and fit sensing during a three-to-six-month period, such

as the century-old established companies and new ventures in the industry-led port maritime accelerator under study.

Our setting is, in a way, a pre-alliance time-compressed acceleration context (Qin et al., 2019), where I have witnessed – in terms of the capability lifecycle (Helfat & Peteraf, 2003) – the founding and development stages of a novel initial corporate entrepreneurial capability, enacted at the level of the R&D/innovation unit, but in a symbiotic relationship with other value chain firms, selected external ventures and the industry-led accelerator itself. In this novel symbiotic relationship, which sometimes can be cooperative and subject to tensions of different degrees, as I shall analyze in the next chapter (#5), there are inter-organizational learning and resource exchange implications. I will briefly discuss these below.

The most counter-intuitive finding in this industry accelerator designed to accelerate new ventures is that the corporations themselves are being accelerated through the internalizing of lean entrepreneurial capabilities and routines. How is this possible? How does it work? How is this different? What's the novelty?

During the environmental co-scanning and streams attracting phase, firms become aware of new technologies through collectively-sensed challenges and the scouting of new ventures and, eventually, become aware of certain capability needs (Keil et al., 2008). During the strategic fit sensing and shaping phases, firms explore POC engagements through flexible matching and value customizing. They also directly interact through mentoring new ventures, co-designing and shaping their experiments to enable POC strategic fit and legitimizing their novel, yet unproven solutions across internal business units. Throughout this engagement process, firms learn and internalize the lean entrepreneurship method through different mechanisms. In my analysis of these different mechanisms, I contribute to the organizational learning literature (Argote, 2011, 2013; Huber, 1991; Levitt & March, 1988; March, 1991) and especially to the learning sequences sub-stream (Bingham & Davis, 2012) by specifying the organizational learning sequences underlying the process model of corporate entrepreneurial capability building.

In contrast to the usual treatment in the organizational learning literature (Argote, 2013; Levitt & March, 1988; March & Simon, 1958) in which experiential learning is usually viewed as a by-product of action, this process model of corporate lean entrepreneurial capability is underpinned by learning sequences, including both collective and self-conscious choices to co-scan, perform mutual sensing and co-design an experiment and, subsequently, use the results for

further design efforts (Levinthal, 2017). Furthermore, I have observed learning sequences underlying each phase of the corporate entrepreneurial capability building process. Although the organizational learning literature indicates that there could be potential ways whereby different learning processes – such as learning by doing or vicarious learning – might work together (Miner, Bassof, & Moorman, 2001), this literature does not suggest that learning sequences exist.

Before further discussing the learning mechanisms involved in the process model, a key definition is in order. Consistent with prior research, I define “learning” as a regular shift in behaviour or knowledge informed by prior action (Argote, 2011; Levitt & March, 1988; Miner et al., 2001). In this study, I have mainly observed and described shifts in both behavior (routines, processes) and knowledge and cognition (attitudes, mindsets). Following (Bingham & Davis, 2012), I identified both direct and indirect learning processes in this capability process model.

As shown in Figure 4.2, I found a sequence comprising acquisitive learning, i.e., learning from external sources in the attracting phase; followed by vicarious learning, i.e., learning from observing others’ experience in the Strategic Fit Sensing phase. Firms become inspired and learn vicariously from new ventures’ technologies and business models, as well as from their lean agile working practices. Vicarious learning is extended into the shaping phase, as corporates – the R&D/innovation unit in collaboration with specific business units – decide, approve and co-design a POC experiment with the new venture. Instead of a by-product of the organizational action, the shaping phase is an explicit conscious action to customize the value proposition while experimenting to achieve ‘fit’, or in organizational learning terms, a ‘satisficing’, above the aspiration level of performance (Cyert & March, 1963). In this shaping phase of corporate new venture dyadic experimentation, the underlying core learning process is experimental learning, understood as controlled situations that organizations use to test causal propositions and create new knowledge (Cook & Campbell, 1979). Firms—through their R&D/innovation units—want to obtain new knowledge through the result of the experiments, including ventures’ initial hypothesis and those shaped by the corporates themselves. The experimental learning underlying the shaping phase of our capability-building process is congruent with those described in the extant literature. First, it involves low-cost experiments (S. L. Brown & Eisenhardt, 1997; Thomke, 2003, 2020) – that is, the very definition of a proof-of-concept (POC) and, second, the new knowledge obtained from experimental learning, if useful, can be incorporated into firm activities (Pisano, 1994).

Strikingly, the outcome of this co-accelerated experimental learning during the shaping phase is the *internalizing* stage. The new knowledge generated by small-scale experimentation is enabled by both a combination of vicarious and experimental learning, whereby exchange moves bidirectionally between corporations and new ventures. Ventures validate their MVP and core building blocks of their business models, whereas corporations test certain causalities, validate potential adjacent/local solutions for their use cases and, finally, start to develop new organizational capabilities. This co-accelerated dyadic corporate new venture interaction is a novel source of capability development.

During the internalizing phase, where the lean start-up method is absorbed through new procedures, routines and an emerging intrapreneurial identity, the underlying learning mechanism is trial-and-error. Trial-and-error learning is the process by which firm executives undertake a course of action and the consequences of that completed action lead to a change in action or knowledge base (Baum & Dahlin, 2007; Greve, 2003; Schön & Argyris, 1996). Trial-and-error follows acquisitive, vicarious and experimental learning sequences. After learning about lean start-up throughout the industrial acceleration process, including several dyadic small experiments with external ventures for over four years, corporations have designed and implemented new internal entrepreneurial routines.

Given the tensions identified in incumbent new venture relationships during accelerated disruption and the difficulty to scale outside-in streams into the organizational core, the firms under study have initially developed internal entrepreneurial capabilities.¹² During several unsuccessful trials and POCs with external ventures, firms became aware of potential solutions and, in most cases, did not finally engage these ventures for larger pilots. So, the corporations decided to build the capabilities themselves, leveraging the many lessons learned.

My work extends previous work on experimentation (Thomke, 2020), capability development (D. Teece et al., 2016) and organizational learning in the context of corporate venture

¹² See Garcia-Herrera, C. and Autio, E (2020) *When Old 'Whales' Meet New 'Dolphins': A Coopetitive Model for Incumbent – New Venture Relationships During Architectural Disruption*, Working Paper presented at EGOS2019, SMS2019 and ICBS PDW (Feb 27th 2020) for an analysis of incumbent/new ventures tensions in acceleration contexts and the proposed coopetitive framework for tensions' anticipation and mitigation. Also see next Chapter 5.

capital (Keil et al., 2008), as well as on capability creation and transformation in internal corporate venturing (Keil et al., 2009).

Through disembodied experimentation, organizations learn through an agent who participates through investments in emergent practice (new ventures) outside the organizational boundaries, relatively unbound from the constraining effect of established mental models and dominant logics within the parent corporation, “*rather than merely observing and learning vicariously, active participation allows the representative to build both tacit and codified knowledge that resides in the new start-up context*” (Keil et al., 2008, p. 1485). The corporate representative agent operates as a knowledge broker who can transfer knowledge from the external start-up context to the incumbent context through two mechanisms: first, the focal incumbent’s agent receives, interprets and codifies the external knowledge and, second, the agent transfers tacit knowledge learned in the external entrepreneurial context and then makes it explicit and available to other members of the parent organization through externalization (Keil et al., 2008; Nonaka & Takeuchi, 1995). In disembodied experimentation, it is usually a singular representative agent who engages in external emergent practices and then tries to codify and transfer such tacit knowledge to wider internal contexts. Research in the areas of knowledge management (Carlile, 2004; Von Krogh, Ichijo, & Nonaka, 2000) and absorptive capacity (Todorova & Durisin, 2007; Zahra & George, 2002) has looked into the various difficulties involved in transferring tacit knowledge across boundaries, from the outside to the individual to the team and, eventually, to the organizational level.

In the present process model, experimentation is much more embodied and cooperative. It follows a novel trajectory: from corporate *spectators* who co-scan and co-select ventures from the external environment to *actors who* symbiotically mentor them and co-design low-cost experiments. And, subsequently, these corporates re-embody this process learning into new and redesigned organizational routines.

This much-embodied and progressive, engaged learning – acquisitive, vicarious and experimental – led to the *re-embodiment* of entrepreneurial and experimentation capabilities acquired throughout the corporate new venture engagement into the organizational structures, as evidenced in the four longitudinal case studies. Though during co-attracting, fit sensing and experimental shaping, firms do also become cognizant and aware of capability needs – as in the

disembodied experimentation story – it is during the final internalizing phase that the trigger for corporate entrepreneurial capability initiation and further development is stronger.

The awareness of capabilities voids (Keil et al., 2008) and organizational blind spots (Scharmer et al., 2002) is co-accelerated through the cooperative relationship with other corporates – during the attracting phase – and the experimental engagement with external ventures – during the strategic fit sensing and shaping phases. A rather embodied awareness leads to co-experimentation within the organizational boundaries, including internal business units and, then, to internalizing and capability initiation at the R&D/innovation unit level.

This process model also complements and extends prior work on capability creation, evolution and transformation (Helfat & Peteraf, 2003; Keil et al., 2009; D. Teece et al., 2016). This research stream has looked into how new capabilities are initiated, developed, retrenched, redirected, terminated and, eventually, transformed. I added further granularity and a multi-level lens – an outside-in triadic relationship among accelerator, incumbent and new venture – to explain the (dis)match between local (use cases) and proximal/distant knowledge (external ventures). I also added granularity to explain the resources exchange and knowledge transfer among new ventures, R&D units and internal business units through co-experimentation, value shaping and internalizing of new routines.

In the context of internal corporate venturing, Keil and colleagues found evidence for the transformation and transfer of nascent or incomplete capabilities, even when the internal ventures have been discontinued. They also found that internal corporate ventures work as fertile grounds to initiate *de novo* capabilities (Keil et al., 2009).

In the present process model, firms are challenged in the way they approach the problem-solving of their use-cases during the small-scale and time-limited experimentation with external new ventures. Corporate R&D and business units learn vicariously and experimentally from new ventures' agility and from the experiments themselves.

Notwithstanding the unsuccessful scaling of POC into pilots and, more generally, the difficulty to widely and continually source the firms' problem-spaces with external entrepreneurial streams, the firms repurpose and redirect those startup engagement and POC-level experimentation capabilities towards internal routines. Accelerated corporate start-up engagement capabilities are redirected and transformed to form the basis of newly redesigned corporate R&D/innovation routines, and, ultimately, seed initial corporate entrepreneurial capabilities.

Given the path-dependency of capability development and time requirements, the redirection of a capability “*appears to be one of the central mechanisms through which capability development is steered and later capability transformation is prepared*” (Keil et al., 2009, p. 614). In lean start-up terminology, the proofing pivot is a source of capability development and transformation, where early unsuccessful experimentation with external ventures paves the way to internalize proofing and experimentation capabilities into the established firm. In the context of corporate accelerators, including industry-led ones, there is more than one singular representative agent – the broker R&D/innovation unit and business unit, which owns the use-case – who engage in small-scale yet embodied co-experimentation. Thus, there is more critical mass at both the R&D/innovation and business units for entrepreneurial capability absorption and initiation.

Finally, I contribute to the conversation between dynamic capabilities and the entrepreneurial orientation of the established firm (Foss & Lyngsie, 2014; David J Teece, 2016; Zahra et al., 2006) by revealing new external sources of not only ideas but rather capabilities that are transferred, internalized, recombined and redeployed internally. There are two key questions that transpire in my previous analysis: first, are these initial co-accelerated corporate entrepreneurial capabilities really dynamic capabilities? And, second, does the fact of starting an internal accelerator or re-designing an R&D/innovation function actually improves the corporate capabilities given the inertia?

Regarding the first question and, as discussed previously, the stream on capabilities introduces four elements that have come to be confounded in the literature: (1) the ability to perform a function, i.e., an ordinary capability; (2) the capacity to solve a problem, i.e., a substantive capability; (3) the incidence of quickly altering problems, i.e., an environmental characteristic; (4) the ability to modify the way the firm addresses its problems, that is, a higher-order dynamic capability to alter capabilities (Zahra et al., 2006).

The evidence across all cases points in the direction of corporate lean entrepreneurship as a new dynamic capability layer rather than a specific focalized problem-solving substantive capability. Even though it can aid specific problem-solving, the data presented reveals that the accelerated new venture engagement and internalizing of lean experimentation heuristics is a new capability that challenges standard program management and stage-gate innovation processes.

Furthermore, it is a novel capability that has enabled both R&D/innovation and business units at the established firms under study to adopt a broader view, embracing deviance and failure

by experimental and trial-and-error learning, even triggering a new intrapreneurial identity. As evidenced, the new corporate entrepreneurial capability is verified not only in attitudes, discourses or the amount of new venture engagements, but rather in new strategic entrepreneurial orientations (Foss & Lyngsie, 2014) and procedures instituted at each of the four corporate case studies.

I have observed the founding and development stages of the capability lifecycle (Helfat & Peteraf, 2003). This novel co-accelerated corporate entrepreneurial capability adds to the sensing and reconfiguring functions of the dynamic capability set (David J Teece, 2012, 2016; David J Teece et al., 1997). Dynamic capabilities can be organized into three clusters of activities and adjustments: (1) identification and assessment of opportunities (sensing); (2) mobilization of resources to address opportunities and to capture value from doing so (seizing); (3) ongoing renewal (transforming). Thus, dynamic capabilities are ‘strategic’ and distinct from both ordinary capabilities and substantive capabilities. Therefore, in dynamic capabilities logic, it follows that firms can maintain and extend a competitive advantage by layering dynamic capabilities on top of ordinary and substantive capabilities (David J Teece, 2012). As observed, lean entrepreneurial capability has been initially layered on top of ordinary capabilities and, especially, on substantive capabilities in both R&D/innovation and business units through increasing degrees of external venture engagement, iterative experimentation and subsequent entrepreneurial internalizing.

The evidence reveals that the lean start-up method has been learned in sequence, i.e., acquisitively, vicariously, experimentally and through trial-and-error. This method has been initially applied to not only distant explorative opportunities (POC) but also to exploitative ones, including scaling and roll-outs of pilots through the involvement of internal business units, supported by the TMT. Therefore, this novel lean experimentation/acceleration capability is initially entering the organizational core by adding a new (co)sensing, seizing (shaping) and transforming (internalizing) layer. Thus, I contend that this co-accelerated corporate lean entrepreneurial capability has the potential to renew the resource base and, in particular, existing dynamic capabilities, by furthering higher-order functions such as sensing and transforming. Teece himself has elaborated on the connection between entrepreneurial competences and dynamic capabilities at the established firm level:

Dynamic capabilities help the organization to develop conjectures, to validate or reject them, and to realign assets as required. Dynamic capabilities, particularly those resting on entrepreneurial competences, are important to the market creating

(and co-creating) processes associated with capitalist economic systems (...) An important managerial function—perhaps the most important—is to achieve semi-continuous asset orchestration and renewal, including the redesign of routines (...) to maximize complementarities inside and outside the enterprise. (David J Teece, 2012, p. 1396).

My process model of co-accelerated capability building is a new, untapped source to advance entrepreneurial management in the modern corporation.

To preliminarily address the second question posed above regarding internalizing change, entrepreneurial adaptation and the inertia of established firms, I propose a process model of co-accelerated corporate lean entrepreneurial capability within a comprehensive framework comprising core learning process, organizational knowledge, ordinary/substantive capabilities, dynamic capabilities, performance and adaptation (See Figure 4.2). I will need, however, another four years or more to distill the lasting impact of these newly acquired corporate entrepreneurial capabilities on performance, and ultimately, on adaptation to technological discontinuities.

4.8 CONCLUSIONS, LIMITATIONS & FURTHER RESEARCH

Through an inductive and longitudinal multiple case research study of four corporates operating in a revelatory port maritime complex, I have devised a novel process model of corporate lean entrepreneurial capability initiation in industrial acceleration contexts. In so doing, I have filled an important gap in the emerging corporate and industrial acceleration research by bringing both a process and capability lens to analyze the internalization of the lean start-up method.

I have positioned corporate accelerators – in particular, industry-led ones – as distinctive multi-level organizational forms in their own right and as priceless settings to explore the exchange of resources and capabilities among corporates, new ventures and the accelerator. In particular, this study brings novelty in that it analyzes the co-accelerated corporate entrepreneurial capability, not at “either” the established firm “or” the new venture level but, rather, at the level of its enactment, i.e., during the processual corporate new venture engagement. I have specified the learning mechanisms and sequences involved in this process model of capability building and have differentiated them from those operating in the corporate venture capital and alliances streams. I

also have grounded the process model in the capability lifecycle (CLC), not at the team level but rather at the R&D/innovation unit level. In so doing, I was able to read the redirection – and sometimes, termination – of experimentation capabilities enacted at the corporate new venture interface (proof-of-concept, pilot) as the transformation or, furthermore, as the internalization of such capabilities: new rough gems are created out of external ashes.

Finally, I contend that my inductively derived process model of co-accelerated corporate entrepreneurial capability can not only augment the R&D/innovation functions but, also, add a layer to existing core dynamic capabilities – especially sensing and transforming – to accelerate context co-scanning, enable routines redesigns and systematize how firms scale experimentation to test alternatives futures and, ultimately, adapt to technological discontinuities.

Like all studies, mine has limitations that suggest opportunities for future research. To more accurately portray capability building across the four identified phases over multiple accelerator and new venture engagements, I restricted the analysis to four large established firms over four years. Although I found intriguing patterns, more work is needed to examine capability development, new venture engagement and what I refer to as internalizing, across a larger number of established firms and across a wider range of industries engaged in a similar model of induced acceleration, given the pressures of disruption and sustainability. I will also need another 4–5 years to assess the impact of the internalizing and redesigning phase on corporate-wide dynamic capabilities and its contribution – if any – to performance and adaptation to technological discontinuities.

Though centuries old and through this industrial acceleration process, these ‘whales-like’ firms are just initiating their journey onto this new lean entrepreneurial capability building process to eventually become ‘sharks-like’ firms (Katila et al., 2008). Several unknowns remain, such as if and how it would work at the granular level, once this new heuristic is fully embedded in the R&D/innovation units and across business units up to the TMT. As recently put by a leading scholar in organizational search in an article on the decoupled academic sources of the lean start-up approach: *“How, and to what degree, can large firms approximate an incentive structure similar to that of lean startups is a fascinating open question”* (Contigiani & Levinthal, 2019, p. 561). I have started to address this very question.

Chapter 5

When ‘Whales’ Meet ‘Dolphins’: A Coopetitive Model for Incumbent – New Venture Relationships During Architectural Disruption

5 WHEN ‘WHALES’ MEET ‘DOLPHINS’: A COOPETITIVE MODEL FOR INCUMBENT – NEW VENTURE RELATIONSHIPS DURING ARCHITECTURAL DISRUPTION¹³

5.1 Introduction to Chapter 5

As I analyzed in the previous chapter, incumbents regularly engage the new venture community in an effort to respond to technological disruptions and identify capability gaps, learn new technologies, and explore diversification opportunities (Henry W. Chesbrough & Teece, 1996; Cozzolino & Rothaermel, 2018; Keil et al., 2008). Unfortunately, such engagements often fail due to coopetitive tensions that arise when diverging interests and unanticipated developments undermine original goals of the engagement (Cozzolino & Rothaermel, 2018; Hoffmann et al., 2018). A collaboration started with the best of intentions may devolve into a spider’s trap for the new venture, or alternatively, the incumbent may discover it has offered the new venture a cuckoo’s nest, helping grow a competitor that may exclude it from the new industry architecture (Ansari, Garud, & Kumaraswamy, 2016; Michael G. Jacobides et al., 2006; Katila et al., 2008). In this Chapter, I explore how such tensions arise and how they could be mitigated in the context of a recent new venture engagement form: an industry-led corporate accelerator whose mission is to help self-disrupt the current industry architecture in the face of digital transformation.

Coopetitive tensions have emerged as a subject of study in game theory (Brandenburger & Nalebuff, 2011) and open innovation (Henry W. Chesbrough & Teece, 1996; Laursen & Salter, 2014). These tensions arise when technological disruption opens up the prospect of many alternative futures that may emphasize different capabilities, assign different roles to industry participants, and create different control points for value appropriation (Ansari et al., 2016; Dattée et al., 2018; Snihur, Thomas, & Burgelman, 2018). As the collaborating parties learn more about possible futures, conflict among these may cast a shadow on the engagement at present and promote opportunistic behaviors by the collaborating parties (Di Lorenzo & van de Vrande, 2018; Heide & Miner, 1992; Katila et al., 2008). This creates a dilemma, since in order to make any

¹³ This chapter is based on an paper co-authored with Erkkö Autio already accepted and presented at the 35th EGOS Symposium in Edinburgh, SMS2019 in Minneapolis and presented at the AOM2020 Virtual Annual Meeting. We are grateful for the helpful comments by participants at EGOS, SMS, ICBS PDW and AOM2020’ reviewers.

future happen and avoid being sidelined by third-party disruptors, some collaboration and co-specialized investment by multiple parties is usually required. Either the coopetitors swim together or they sink together. This dilemma can give rise to a finely choreographed dance among the collaborating parties, as they seek to persuade others to move towards desired futures while trying to steer away from undesirable and unknown ones (Dattée et al., 2018; Khanagha, Ansari, Paroutis, & Oviedo, 2020).

Coopetitive tensions among collaborating businesses have been studied predominantly from the perspective of two or more incumbents that have broadly equal power, with the focus being on radical technological disruptions, rather than architectural disruption (Bouncken, Gast, Kraus, & Bogers, 2015; Dorn, Schweiger, & Albers, 2016). This leaves two important gaps in research on incumbent – new venture coopetition in the digital age. First, in coopetition between incumbents, coopetitive tensions can be attenuated with structural separation of cooperative and competitive activities into different organizational units (Bengtsson & Kock, 2000; Robert A. Burgelman, 1983; Stadtler & Van Wassenhove, 2016). Such separation is typically not possible in incumbent-new venture engagements due to the small size of the new venture. This complicates the engagement for new ventures, which are already at a disadvantage due to the power difference relative to the incumbent (Markman & Waldron, 2014). Second, even in research focusing on coopetitive tensions between incumbents and new entrants, the focus has been almost exclusively on radical technological innovation, which, while obsolescing current competencies, nevertheless does not alter the sector's architecture of relationships between actors (Cozzolino & Rothaermel, 2018; Cozzolino et al., 2018; Katila et al., 2008). There has been little research on incumbent – new venture engagement in situations where the industry architecture is potentially in flux, thereby raising the stakes for the incumbent, whose position in the new architecture may be undermined (Ansari et al., 2016).

To address these gaps, I focus on tensions characteristic of a recent, rapidly popularized engagement mechanism, the industry-led corporate accelerator (Garcia-Herrera, Perkmann, & Childs, 2018a; Hochberg, 2016). A key motivation behind such accelerators is co-discovering an industry architecture that is better suited to the emerging digital reality – while also securing a position for the incumbents in the new industry architecture through internal and external adaptation. While many of the classic tensions between incumbents and new ventures undoubtedly feature also in corporate accelerators, an additional source of tension arises from the fact that

ventures in industry-led corporate accelerators may discover business models that potentially undermine the incumbent's or third parties' position in the industry architecture. The gaps highlighted above are particularly manifest in corporate accelerators, which attract early-stage new ventures who usually cannot compensate for power imbalances by playing one incumbent against another, and who usually (although not exclusively) compete with digital technologies that have the potential to alter the received industry architecture.

I adopt a multiple case study design to explore these issues in the context of an industry-led corporate accelerator, OceanAccel, whose mission is to proactively disrupt the industry architecture in maritime logistics, energy, and petro-chemical refinery sectors. Focusing on incumbent – new venture dyads in the accelerator, we draw on a biologically-inspired theoretical framework that distinguishes between mutualistic (both parties benefit), commensalistic (one party benefits significantly more than the other), parasitic (smaller party benefits at the expense of the larger), and predatory (stronger party benefits at the expense of the weaker) relationships. We use this framing to induct a process model of incumbent – new venture tensions and associated mitigation strategies and likely outcomes.

With this research design, I pursue three objectives. First, we explore cooperative tensions that arise in incumbent – new venture engagements in situations where the new venture may threaten to disrupt the sector's established industry architecture. Second, we explore how those tensions might influence the outcomes of such engagements in terms of the incumbents' actions and new ventures' reactions. Third, we develop a process model to theorize about these tensions and associated response and mitigation strategies along three dimensions: type of appropriability, type of asset relationship (i.e., core vs complementary), and temporal orientation (present vs future). By addressing these three objectives, we both shed light onto a novel form of incumbent response to disruption and illuminate cooperative tensions and associated resolution mechanisms in incumbent – new venture engagements when industry architecture is in flux.

This being an inductive multiple case study, I next develop the conceptual toolbox, highlighting distinctive aspects of architectural disruption, characteristics of incumbent – new venture relationships, and potential implications of the architectural disruption for incumbent – new venture dyads. I then describe the methods and empirical context and highlight its distinctive aspects. Drawing on data based on incumbent – new venture dyads, I then induct the process model

for coopetitive symbiotic engagements. I conclude by discussing implications for theory, empirical research, and managerial practice.

5.2 THEORETICAL BACKGROUND

The bulk of the literature on technological disruptions has focused on radical innovation that obsolesces the incumbent's existing core technology by a superior substitute technology (Katila et al., 2008; Keil et al., 2008; Narayanan et al., 2009). However, this research has tended to overlook any architectural disruption of the industry's structure of co-specialized relationships among agents, assets, and value-creating functions (Eggers & Park, 2018; Michael G. Jacobides et al., 2006; Kumaraswamy, Garud, & Ansari, 2018). This is an important gap, given how digitalization¹⁴ can reduce transaction costs, increase flexibility in collaborative relationships, and support the conversion of value-creating functions into algorithmic form – all trends with potentially transformative implications for the industry architecture (Ozcan & Eisenhardt, 2009; Yoo, Boland Jr, Lyytinen, & Majchrzak, 2012). Such disruptions may be particularly challenging for incumbents, as they require often complex negotiations and explorations with external stakeholders to co-discover a new industry architecture (Dattée et al., 2018; Michael G. Jacobides et al., 2006).

Due to their internal rigidities and focus on optimization, industry incumbents are seldom the most likely candidates to lead industry change. Instead, they seek to adapt by engaging with new ventures operating at the cusp of the disruption. Previously studied engagement mechanisms include corporate venture capital funds (e.g., the Intel 64 fund), in-house incubation programs, in-licensing programs, and strategic acquisitions (S. A. Hill, M. V. J. Maula, J. M. Birkinshaw, & G. C. Murray, 2009; M. V. J. Maula, Autio, & Murray, 2009; Park & Steensma, 2012; Weiblen & Chesbrough, 2015). With these, incumbents hope to recognize new capability development needs (Keil et al., 2008), identify potential acquisition targets (Ceccagnoli, Higgins, & Kang, 2018), drive industry consolidation (Ozcan & Eisenhardt, 2009), build ecosystem momentum around new platforms (Di Lorenzo & van de Vrande, 2018; Hannah & Eisenhardt, 2018), and in-license new

¹⁴ The process of rendering digital technologies infrastructural by embedding them into business and society (Tilson et al, 2011).

technologies (Cozzolino & Rothaermel, 2018). Such engagements often fail, as unanticipated developments and conflicting interests create cooperative tensions in the relationship between the incumbent and the new venture due to risks of misappropriation, potential competitive threats from the new venture, and unwelcome competitive entry by the incumbent into the emerging domain (Hannah & Eisenhardt, 2018; Katila et al., 2008; Zhu & Liu, 2018).

Incumbent – new venture relationships in industry-led corporate accelerators differ from previously discussed engagement mechanisms in three important ways. Where the conventional tend to be long-term, underpinned by formal contracts or cross ownership, and focus on technology substitution rather than industry architectural change, industry-led corporate accelerators tend to exhibit more short-term engagements where the goals of the collaboration tend to be more loosely defined and where the entry of the new player may prompt a change in industry architecture. Although the participation of the new venture in the corporate accelerator is typically underpinned by contract between the two, the relationship between the new venture and the corporates behind the accelerator is typically defined by open-ended mutual understandings. This open-endedness echoes the dominant modus operandi of independent venture accelerators, where the whole purpose of the accelerator experience is not so much about developing a fully formed, preconceived idea into fruition as it is to discover and evolve a scalable venture concept during the accelerator engagement itself (Susan L. Cohen, Bingham, & Hallen, 2019). While such open-endedness provides welcome flexibility to accommodate emerging developments, it also opens up the potential of cooperative tensions, should initial assumptions be undermined by subsequent developments.

As such, cooperative relationships between incumbents and new ventures have been studied for some time, including from the perspective of the new venture (Ansari et al., 2016; Ansari & Krop, 2012; Katila et al., 2008; Ozcan & Eisenhardt, 2009). Ansari et al (2016) distinguished between three types of cooperative tensions: intertemporal (relating to potential future developments); dyadic (operating in the dyad between the incumbent and new venture), and multilateral (operating through cross-dyad interactions). Regarding the navigation of such tensions, Ozcan and Eisenhardt (2009) studied how new mobile gaming ventures employed behavioral strategies such as providing proof of milestone achievements and dangling the prospect of potential lock-out to entice incumbents to join alliances that altered the industry architecture. Ansari et al. (2016) provided a rich description of how TiVo successfully employed behavioral,

technical, relational, and normative maneuvering and continual adjustments to overcome strong, even hostile opposition from threatened incumbents to gradually effect a new industry architecture where the roles and business models had been considerably altered to fit the new digital reality. In both cases, the new ventures succeeded because they were able to play many incumbents against one another, thereby identifying points of weak resistance to gain initial entry into the sector and promote a sense of urgency among the incumbents by reinforcing a sense of inevitability of the oncoming disruption and entice incumbents to sign up for it or risk missing the industry bandwagon. In our context of an industry-led corporate accelerator, the limited number of corporate hosts reduces opportunities for such behavioral maneuvering and forces the new ventures to find alternative ways to mitigate and overcome cooperative tensions with the incumbent.

Before discussing our empirical context, I review relevant theory on technological and architectural disruption. I then identify four modes that the ‘symbiotic’ relationship between an incumbent and new venture may assume – mutualistic, commensalistic, parasitic, and predatory. Finally, given that incumbent – new venture dyads echo (from the incumbent’s perspective) relationships between core and complementary assets, I elaborate on the different ways of how the relationship between core and complementary assets may be affected by architectural change.

5.3 Types of Disruption

I begin by constructing an organizing typology of technological disruptions. I distinguish between the impact the technological advance has upon (from the incumbent’s perspective) core technology and complementary assets, on the one hand, and the impact of that advance upon the sector’s architecture of value-creating functions and ecosystem roles, on the other (Figure 5.1). This allows us to characterize four types of innovation and associated disruption: incremental, radical, business model innovation, and ecosystem innovation.

Figure 5.1 Organizing framework for the study of the impact of technological disruptions on incumbent – new venture relationships

		Core technology and or complementary assets	
		Reinforced	Changed
Architecture of supply- and demand-side relationships and functionalities	Reinforced	Incremental innovation (not associated with disruption)	Radical innovation (associated with modular additive or modular substitutive disruption)
	Changed	Incremental business model innovation (associated with architectural recombination disruption)	Radical business model innovation, ecosystem innovation (associated with role additive, role altering, and role substitutive disruptions)

Incremental innovations build on existing technologies and complementary assets, and they reinforce the industry architecture. This is an area where the incumbent has a natural advantage and should face few challenges from new ventures. Radical innovation, on the other hand, undermines core technologies, complementary assets, or both, but it does not alter the structure of relationships between agents, assets, and value-creating functions. This situation has received the most attention in the literature, and this is an area where incumbents may engage the new venture community to learn from, develop, or acquire the new technology. The incumbent should enjoy reasonable latitude doing so, given that although the new technology may undermine core knowledge and complementary assets, it nevertheless does not alter the focal firm’s configuration of value-creating relationships with others (although those others may be replaced by substitutes). Teece’s (1986) portrayal reflects this situation.

The other two other types of innovation in the framework alter the focal firm’s or sector’s current architecture¹⁵ of relationships between agents, assets, and value-creating functions. This

¹⁵ We use the term ‘architectural disruption’ in reference to a sector’s architecture of co-specialized relationships among agents, assets, and value-creating functions (Jacobides, 2006). We add the notion of value-creating functions to capture digitally enhanced servitization, which is an important outcome of digitalization. The classic notion of ‘architectural innovation’, as elaborated by Henderson & Clark (1990), referred to the component architecture of complex technological systems such as

dimension of our framework recognizes that digitalization greatly increases the ease with which value-creating functions can be coded, accessed, combined, and recombined within industrial systems (Tilson, Lyytinen, & Sørensen, 2010; Yoo et al., 2012). Such changes may prompt follow-on changes in participant roles and their interactions, and they may shift the value-creating system's bottlenecks and associated control points for value appropriation (Dattée et al., 2018; Garud & Munir, 2008; Snihur et al., 2018).

Depending on whether or not the technological disruption also substitutes core or complementary assets in addition to disrupting the industry architecture, our framework distinguishes between business model innovation and ecosystem innovation. Business model innovation represents an architectural change whereby the relationships between value-creating functions and associated ecosystem roles change, but those functions themselves continue to be performed with received technologies. Although business model innovation does not undermine the incumbent's existing technological competencies, it may render the incumbent's relational capital and its configuration of external interactions obsolete by reorganizing the incumbent's relationship with other agents, assets, and value-creating functions. Examples of business model innovation include, e.g., forward and backward integration (e.g., bringing downstream or upstream assets and functions in-house), outsourcing (e.g., externalizing distribution activities), and associated adjustments in the way these are priced and transacted. As an illustration, IKEA innovated a business model whereby constituent modules of furniture are sold through large, IKEA-owned warehouses, and final assembly is externalized to the customer. IKEA did not introduce any radical technological novelty to achieve this change, only innovative changes in the design of modular furniture so these could be stored and transported on standard-sized pallets. However, relative to the furniture industry's established industry architecture, IKEA's model radically reorganized upstream manufacturing operations and side-stepped third-party furniture stores downstream (Hedman & Kalling, 2003).

When architectural disruption combines with the transformation of underlying technologies, the business model innovation becomes more radical, as the transformation may fundamentally alter how value-creating functions are performed. This is the domain of ecosystem

photolithographic equipment. The Henderson & Clark's type of architectural innovation could obsolete the incumbent's internal technological competencies but would not alter external relationships with agents, assets, and value-creating functions.

innovation, where the internal challenge of building new technological competencies (this includes the tricky challenge of determining which competencies need to be built) is compounded by the challenge of re-organizing external and internal interactions. This latter challenge involves overcoming inertia in established legacy relationships and orchestrating momentum around new ones: a particularly difficult proposition in ecosystem situations where many relationships are not underpinned by formal supplier contracts (Michael G Jacobides, Cennamo, & Gawer, 2018).

Summarizing, the architectural dimension of disruption is significant and very different from the incremental-radical dimension. Whereas most studies on radical innovation have focused on product technologies (e.g., the substitution of matrix printing technology with laser-based technology) and tend to be end-customer facing, architectural innovations tend to influence the industry's supply chain configuration and therefore require mobilization of or renegotiation with third parties in the supply chain. Therefore, whereas the end user tends to be the ultimate arbiter of the success of radical innovation, supply chain participants play a more important role in determining the success of architectural innovation. This makes architectural innovations inherently more inertial – a characteristic further reinforced by the fact that industry architectures form over time through complex negotiation among industry participants, technologies, and external bodies such as regulatory and financial institutions (M. G. Jacobides, 2005). They tend to be highly path-dependent due to the accumulation over time of co-specialized investment by industry participants, as they optimize their interactions to reinforce coherence and minimize transaction costs (Michael G. Jacobides et al., 2006). While inertial, the resulting industry architecture can therefore also be rapidly disrupted, if transaction costs change radically, or new generic technologies emerge that enable broad-ranging re-think of optimal configuration of a given sector's value-creating functions. This is what we see happening in many sectors with the relentless onslaught of digitalization (M. Iansiti & K. Lakhani, 2020).

The question for incumbents in many industries, including the port maritime logistics sector, is not whether the sector's industry architecture is going to be disrupted, but rather, when and how. We next consider potential forms that architectural disruptions may assume and how they may affect the relations between incumbents and new ventures.

5.4 Mutualistic, Commensalistic, Parasitic, and Predatory Relationships During Architectural Disruption

Although the relationship between ‘core’ and ‘complementary’ assets and technologies has long been an interest for researchers since Teece’s (1986) milestone, most treatments of this relationship have not been very nuanced, typically only distinguishing between ‘upstream’ and ‘downstream’ complementary assets (Cozzolino et al., 2018; Eggers & Park, 2018; Roy, Lampert, & Stoyneva, 2018). As this analysis requires a more nuanced distinction, I highlight two aspects of this relationship. The first is the distribution of benefits in the relationship, and the second is how the relationship between incumbent and new venture may be altered during an architectural disruption.

The relationship between incumbents and new ventures parallels that between core and complementary technologies and assets. In an industry-led corporate accelerator, the incumbent represents the ‘core’, and the new venture represents the ‘complementary’. In this relationship, the benefits may be distributed in different ways between the two parties. In biological ecosystems, a distinction is made between four types of symbiosis among species that cohabit the same ecosystem: mutualism, commensalism, parasitism, and predation (Leung & Poulin, 2008). In a mutualistic symbiosis, both species benefit from their relationship. In our context, this relates to a situation where both the incumbent and the new venture successfully leverage the acceleration engagement to advance their business objectives. In a commensalist symbiosis, only one-party benefits, and impact on the other is neutral. In a parasitic relationship, one party benefits at the expense of the other, and in a predatory relationship, the more powerful party eats the weaker. Given that participation in the industry-led corporate accelerator is voluntary, it seems safe to assume that practically all engagements between incumbents and new ventures in the accelerator begin with an expectation of mutualism: both parties have to see an opportunity to derive value from the engagement, as otherwise they would have little reason to engage. However, not all engagements pan out as anticipated, as the vision regarding the new venture’s role in the industry architecture may evolve during the open-ended acceleration process.

To finalize our conceptual toolbox, I consider types of architectural disruption, as manifested in changes in supply-side relations. Specifically, I distinguish between additive and substitutive innovations in the context of core and complementary assets and technologies. Even when radical, the technological innovation may be additive or substitutive: it may either add a new component

to an existing technological system, or it may substitute an existing component (Toffler & Shapiro, 1985). Additive radical technologies are likely to be easier to adapt to, as they only require the focal firm or its collaborators to add new technological competencies to their portfolio, whereas substitutive technologies render some existing capabilities worthless and are therefore more likely to be resisted (Eggers & Park, 2018).

In the context of incumbent – new venture engagements, an additive transformation may add a new function to the existing architecture (role additive change in the architecture), sometimes with the outcome that other agents may need to realign their roles (role altering change). As no substitution is taking place, additive transformations tend to be either mutualistic or commensalistic. Substitutive transformations eliminate an existing technology or value-creating function and would therefore be parasitic for the incumbent when the substitution concerns a core technology, or for third parties in the ecosystem when the substitution concerns a complementary third-party technology. I therefore distinguish between core-substitutive and modular-substitutive transformations in industry architectures.

Finally, the architectural reorganization triggered by the substitutive transformation can end up eliminating the need for a given function altogether, a situation we label as ‘role circumventing change’, resembling ecological predation. An example of this kind of disruption would be a blockchain-based application eliminating the need for a middleman – say, a blockchain-based two-sided marketplace where the blockchain itself acts as guarantor of the mediated transactions.

Having developed my conceptual toolbox, I next describe the research setting, which is the same as for the previous two chapters, yet I follow a different research design and methodological treatment.

5.5 RESEARCH SETTING, METHODS AND DATA SOURCES

As mentioned, the empirical setting I selected is a revelatory industry-led corporate new venture accelerator, that I label OceanAccel, in a leading European port complex. This accelerator was co-launched by port maritime industry incumbents to catalyze innovation in the maritime logistics sector and to ultimately disrupt the port maritime industries. This is a collective effort to engage entrepreneurial ventures for a re-think of how this sector works, including how value is created and captured in the sector. Given the long traditions and long-established architecture of the sector, OceanAccel provides an ideal context for the study of tensions that may inhibit incumbents and

their associated value chains from proactively driving technology-induced industry transformations. It is also an ideal setting to simultaneously study both competition and cooperation among incumbents and between incumbents and new ventures.

Two technological discontinuities prompted the creation of OceanAccel: digitalization and energy transition in maritime, logistics, energy and petro-chemical-refinery sectors. OceanAccel specifically focuses on technological discontinuities in: (1) robotics and automation; (2) network platforms; (3) simulation and VR; (4) IoT and big data analytics, and (5) energy efficiency and environmental awareness. The associated disruption scenarios include but are not limited to: i) increasing digitalization and transparency of the supply chain that might eliminate brokers and freight forwarders intermediaries; ii) the energy transition towards cleaner sources will undermine legacy assets based on fossils fuels (e.g., oil pipelines, storage and refinery facilities); iii) new algorithmic and automation technologies that might render obsolete legacy workforce at the operators and middle-management levels. This is an asset-driven industry with heavy equipment, machinery, vessels and physical port maritime infrastructure. However, both digitalization and energy transition are impacting both core technologies and complementary assets in this industrial complex, and thus, unleashing novel tensions among incumbents, regulators and, especially between incumbents and new ventures.

OceanAccel was founded by the four incumbents I analyzed in Chapter 4, i.e., ROYAL PORT, TANKTECH, VOX, and SATELLITE. ROYAL PORT was the main initiator and it is the Port Authority running this European maritime hub complex. ROYAL PORT's business model has evolved between 2003 to 2018 from that of a landlord regulator to becoming an ecosystem orchestrator and an entrepreneurial regulator that also competes in the sector with mainly digital products and services. TANKTECH is a 400-year old global storage company that has invested heavily into digitalization during recent years. VOX and SATELLITE are both leaders in dredging and off-shore energy and compete against one another in many sectors.

OceanAccel's value proposition is twofold. On the one hand, new ventures receive direct mentoring by potential lead customers, who, in turn, help shape and customize the ventures' solutions to their particular needs. On the other hand, OceanAccel's corporate partners learn about new venture scouting, about enabling and disruptive technologies, and about lean entrepreneurship practices. In addition, they gain inspiration to fuel internal innovation initiatives and promote entrepreneurial attitudes among their employees. OceanAccel has recently established similar

programs in Singapore and Antwerp to expand its global reach in terms of technology scouting and promote sector-wide innovation. Every year, OceanAccel scouts up to 1000 start-ups, of which 30 are invited for an intensive 2-3 days of industrial pre-engagement and ultimate selection of 15-20 new ventures to a 3-month acceleration program from March through June. The program culminates in a massive event called *Shakedown* where proof-of-concepts are showcased and contracts with incumbents announced.

Given our embedded research design and focus on cooperative tensions between incumbents and new ventures, our unit of analysis is the incumbent-new venture dyad. See Table 5.1 for background information on the four incumbents, Table 5.2 for the 17 new ventures, and Table 5.3 for the 24 incumbent-new venture dyads during OceanAccel’s acceleration programs in 2016, 2017, and 2018. Of the four incumbents, ROYAL PORT, TANKTECH, and VOX had a C-level executive in OceanAccel’s Advisory Board.

Table 5.1 Incumbents behind OceanAccel

	TANKTECH	ROYAL PORT	VOX	SATELLITE
Sector	Independent tank storage of bulk liquid products and gases. Operation of global network of terminals.	Sustainable development, management and operation of the port. Safe and smooth handling of shipping.	Dredging. Off-shore wind. Off-shore oil and gas.	Dredging. Off-shore. Towing and salvage.
Founded	1616	1872	1868	1910
Ownership	Public company	Municipality (approx 70%) and government (approx 30%)	Majority family owned	Public company
Employees	5 782	1 150	4 816	10 700
Sales, M€	1 306	750	1 713 (2016)	2 342

The 17 new ventures were selected from the 2016 - 2018 cohorts following theoretical sampling criteria to develop mid-range theory on incumbent – new venture cooperative relationships in industry-led corporate accelerators. Both incumbents and new ventures were studied longitudinally for over three years, starting in December 2016 up until March 2020.

Table 5.2 Selected New Ventures from Ocean Accel's 2016-18 cohorts

	<i>Venture Type Cohort Ownership</i>	<i>Product or Service</i>	<i>Type of Disruption</i>	<i>Appropriability Conditions of Solution</i>	<i>Core Tech or Complementary Assets</i>
PortGateway	Scale-up Aug Cohort 2016 OA* owns 8%	Data services for vessel scheduling	Role Altering	Strong	Core
FiberSail	Start-up Cohort 2016 OA owns 8%	Sensing system to monitor and analyze offshore windmill blades	Role Additive	Strong	Complementary
AquaSense	Start-up Cohort 2016 OA owns 8%	Unmanned Inspections of complex structures	Role Additive	Weak	Complementary
RanMarine	Start-up Cohort 2016 OA owns 8%	Remote controlled autonomous aquatic drones to extract unwanted material and gathering water data	Module Additive Role Additive	Weak	Complementary
FEO-AR	Start-up Cohort 2017 OA owns 8%	Software-as-a-service platform for AR app for maintenance, inspection, and others.	Module Additive Role Additive	Weak	Complementary
GreenGuard	Start-up Cohort 2017 OA owns 4%	Engine emissions monitoring device and service for ship operators	Module Additive Role Additive	Strong	Complementary
Magnetik	Scale-up Cohort 2017 Convert Loan	Magnet anchoring to replace temporary scaffolding welds	Module Additive Role Additive Impact 3 rd Parties	Strong	Complementary
Parable	Start-up Cohort 2017 OA owns 8%	VR platform for on-the-job immersive training.	Module Additive Role Additive	Weak	Complementary
Radiant Fleet	Start-up Cohort 2017 OA owns 7%	Data platform for crew management	Module Additive Role Additive & Altering, Impact 3 rd Parties	Weak	Core
Oceanos	Scale-up Cohort 2017 OA owns 4%	Unmanned sea vehicles for sea observation and monitoring.	Module Additive Role Additive	Strong	Core
Njord Filter	Start-up April 2017 OA owns 7%	Fuel conditioning, treatment, filtration and emissions	Module Additive Role Additive	Strong	Complementary
MedAssist	Start-up April 2017 OA owns 8%	Remote medical assistance for offshore crews	Module Additive Role Additive	Weak	Complementary
CargoLedger	Scale-up Cohort 2018 Convert Loan	Blockchain application for maritime data logistics	Module Additive Role Additive & Altering, Impact 3 rd Parties	Strong	Core

* OA stands for Ocean Accel, the industry-led accelerator

Ionada	Scale-up Cohort 2018 Loan	Dry injection desulfurization service for ships. Cleans ship emissions.	Module Additive Role Additive	Strong	Complementary
E-Concrete	Scale-up Cohort 2018 Loan	Concrete solutions for environmental purposes	Module Additive Role Additive	Strong	Complementary
DockTech	Scale-up Cohort 2018 Convert Loan	Data and sensor services to monitor and predict water conditions along shipping routes	Module Additive Role Additive	Strong	Complementary
Ondavia	Scale-up Cohort 2018 Convert Loan	Laboratory-grade chemical fast, easy and DIY testing for a wide range of compounds	Module Additive Role Additive	Strong	Complementary

5.6 Data Collection and Analysis

I use primary qualitative and archival data from the accelerator, incumbents, and a maritime logistics R&D Center, a leading university incubator, a regional investment agency, a VC Fund specializing in ports, and the accelerated new ventures operating in the European port complex. We conducted extensive interviews over three years with all stakeholders, especially the accelerator staff, senior executives, and R&D and innovation managers of the four key incumbents as well as the accelerated new ventures. See Table 5.3 for data sources.

I use an inductive embedded research design. The unit of analysis is the incumbent - new venture dyad. Each dyad constitutes an experiment to test and further develop our theory using a replication logic and variance among cases (Yin Robert, 1994). I am interested in cooperative tensions as well as tactics to mitigate and deflect such tensions. The bulk of the data was collected between December 2016 and June 2018. During the 2017 and 2018 programs (March through June), I observed core activities involving the accelerator staff, the incumbents, and new ventures on a weekly basis, including new venture training, corporate mentoring to founders and proof-of-concept validation sessions. During the first half of 2019, several follow-up interviews were conducted to further understand the cooperative tensions and clarify constructs and relationships in our model. I digitally recorded all the interviews, of which 80% were conducted in person and 20% remotely. The interviews lasted between 45 and 90 minutes and were fully transcribed by two research assistants and software Trint. Observations of meetings, mentoring sessions, training and events were also recorded and live notes taken. Each interview transcript was approximately 15

pages long. I used NVivo for the initial coding and online sheets to analyze the incumbent - new venture dyads in detail.

Table 5.3 Data Collection and Sources for Chapter 5

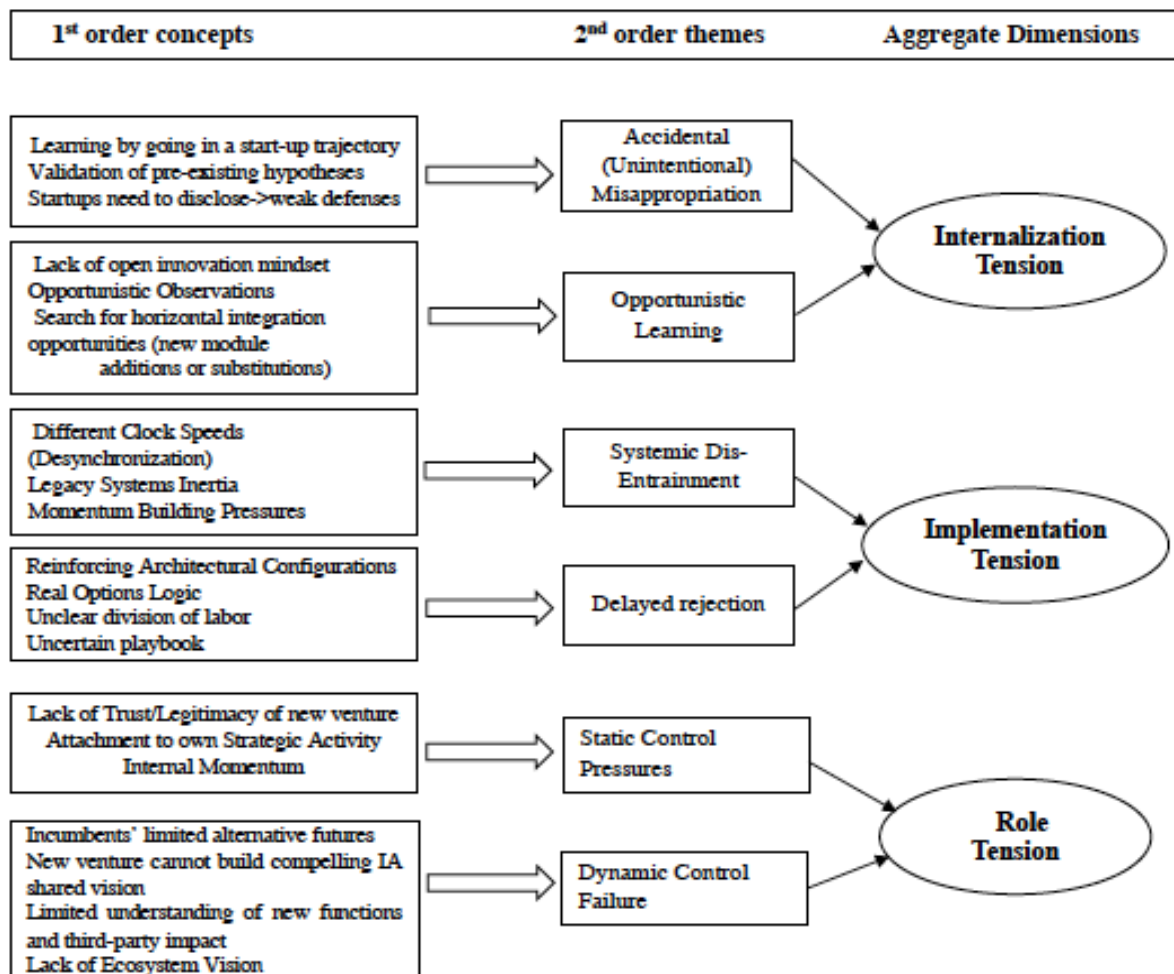
Period of Data Collection	January 2017 through March 2020
Data Sources	1) Semi-structured interviews, 2) Observations of industry-led accelerator’s scouting, selection and mentoring of new ventures, training, roadshows at corporate premises, 3) Participation in advisory board meeting, industry events and graduation/demo days
Total # of Interviews	85 Incumbent Firms: 30 Interviews in 4 Firms New Ventures: 34 Interviews in 17 Ventures Industry-Led Accelerator: 10 Interviews Industrial Ecosystem Stakeholders (VC Firm, R&D Center, University Incubator, Regional Business Association): 11 Interviews
Type of Informants	Executives from the Incumbent firms such as the CEO, CFO and COO as well as the R&D General Manager, the Digital Innovation Officer, Innovation Engagement Leaders, Innovation Coordinator, R&D Engineers, Chief Scientist, Head of Corporate R&D and Innovation, Innovation Manager, Senior Digitalization Officers, Intrapreneurs, Program Management Heads, Deputy Innovation Officers; Staff from the Industry-led Accelerator such as the Managing Director, the Director, the Scouting Officer, the Investment Lead, Mentoring Lead, and the Community Engagement Leader; Founders and the CEO, CTO and CFO as well as Business Development Staff from all new ventures
Events and meetings attended for data collection	Ocean Accel Training for new ventures, Ocean Accel advisory board meetings, Incumbent - New Venture mentoring session, Corporate Start-up Engagement facilitation sessions, new ventures’ roadshows at incumbent premises, graduation ceremonies/demo days and industry-wide events such as the international maritime fair and the CEO platform annual meetings

I used our rich data to write multiple case narratives primarily at the incumbent and start-up levels (Eisenhardt, 1989; Yin Robert, 1994). I triangulated the data, emphasizing themes supported by different data collection methods. The transcribed cases were about 10 to 25 pages long, including quotes and timelines. From the emerging themes, I generated tentative relationships between constructs, which I refined by revisiting each case. This iteration between theory and data helped us sharpen theoretical relationships between constructs and underlying theoretical arguments (Eisenhardt, 1989). Given the focus on cooperative tensions that emerge due to digital and energy transition disruptions, I also tracked relevant technology and acceleration initiatives in the port maritime industry globally. As the theoretical framing began to emerge, I related it to the extant literature to strengthen the internal validity of our findings and to sharpen our construct definitions.

5.7 Evidence and Results

To develop the model, I followed the method used in Corley and Gioia (2004) as further elaborated by Gioia et al. (2013). This method yielded an initial list of first-order codes emerging out of the data, which were then collated into second-order themes and subsequently to the aggregate dimensions of our model. As I iterated between coding and data collection, the theorizing started to hone in on three cooperative tensions between incumbents and new ventures: internalization tension, implementation tension, and role tension. This iterative analysis resulted in the data structure presented in Figure 5.2.

Figure 5.2 Data Structure of Chapter 5



5.8 Internalization Tension

The internalization tension arose as incumbents explored use-cases for the new ventures'

technologies. Given the inertial long-established architectures of this sector, the incumbents' informants declared as being "too much inward focused" and to lack an open innovation mindset. Therefore, incumbents – through their R&D/innovation units - started to engage with new ventures through the industry-led accelerator in an attempt to "learn by going with the start-up trajectory", i.e., learning about new technologies and business models brought by the new ventures, while searching for a proof-of-concept (POC) based on identified corporate problem spaces, i.e., use-cases. Through mentoring and the co-design of POC experiments along with the new ventures, the incumbents tend to validate pre-existing hypothesis by externalizing customer discovery. Through this engagement process, new ventures need to disclose their technologies to prompt customization – if needed - and effect match with the incumbents' problem spaces and use-cases. As the new ventures uncovered novel implementations of emerging digital affordances, these often-proved tempting for the incumbents. New ventures were in the acceleration program for three months and to advance their entrepreneurial innovation projects they typically required disclosure: in order to adopt a novel architectural industrial arrangement, the participating stakeholders needed to be aware of and understand it. We observed how the new ventures lacked effective defenses (time, funding, IP) to delay full disclosure or to avoid contact with powerful yet sometimes opportunistic incumbents. Such time-compressed and open-ended engagements could trigger accidental misappropriation practices: "*Thank you start-up Z for all your insights but we can do this internally and cheaper*" (R&D Manager, SATELLITE); or, "*Bloody hell: This new technology is interesting, and our guys now want to have their own internal start-up*" (COO, VOX). Misappropriation efforts were often undertaken subtly, unintentionally and they could even occur accidentally, while incumbents searched for horizontal integration opportunities via new module additions or substitutions offered by new ventures.

Only in situations where the novel arrangement could be implemented without adaptive action by incumbents could the ventures attempt to insulate themselves against subtle and accidental misappropriation by selectively limiting disclosure. (Alexy et al., 2013).

I identified the main driver of the internalization tension: the degree to which the new venture's invention was module additive or module substitutive in the industry architecture. I found that module substitutive inventions tended to generate higher tension than did module additive inventions.

The SATELLITE – Parable dyad illustrates the internalisation tension. Start-up Parable,

from the OceanAccel 2017 cohort, develops immersive learning solutions for safety training with the use of Virtual Reality (VR) platform for on-the-job training aimed at operators of different industrial equipment. SATELLITE was initially exploring similar solutions for their staff and the R&D Lead Engineer came across Parable: *“I like OceanAccel because it validates my sense of seeing technology or markets: basically, I get validation from them, they confirm me in my thoughts on how we should do it”* (R&D Manager, SATELLITE). SATELLITE’s R&D staff invited Parable for several meetings to demonstrate their technology in front of them and relevant business units, including internal developers. SATELLITE’s staff realized the potential value of the venture’s modular offering but finally decided to develop it internally on cost grounds: *“since we have trainers here too, let them do the learning curve thing and we can have that product because within a corporate like this, we rather spend money inside the company than outside as internal money is cheaper than external money”* (R&D Engineer, SATELLITE). Procurement and internal resource allocation procedures might also influence the choice of who to experiment with.

In sum, opportunistic learning and accidental (unintentional) misappropriation by the incumbents enact the internalization tension that might force the venture to wait indefinitely, compromising its survival, as the incumbent continue to learn and try internal developments.

5.9 Implementation Tension

The internalization tension coincided and interacted with another tension: that of implementing the novel arrangement. This tension concerned the implementation of a novel arrangement following a proof-of-concept: its pace, urgency, and actual realization. It was ultimately driven by a temporal desynchronization between the new venture operating at the technology frontier and incumbent operating legacy systems. In other words, by different clocks speeds of the incumbent’s inertia and the new venture’s speed. Operating within two different technology regimes gave rise to momentum building pressures and to diverging temporal orientations and lack of synchronicity thereof, a situation known as systemic dis-entrainment (Deborah Ancona & Chong, 1996; Deborah Gladstein Ancona & Chong, 2003; Pérez-Nordtvedt et al., 2008). In order for the new venture to secure a position for themselves in the new industry architecture, it was important for them to be among the first to implement the new arrangement, as new architectural configurations tend to reinforce themselves over time and erect entry barriers to late entrants (Ozcan & Eisenhardt, 2009). However, the incumbents did not necessarily share

the same sense of urgency, recognizing that the same reinforcement mechanisms might work against them, too. Amid the uncertainty of the new industry architecture's division of labor, incumbents continued to explore potential alternative futures at their own pace, while delaying actual commitment to the new solution advocated by the new venture. In doing so, they bought themselves a valuable real option to delay adoption. In many observed engagements, conversations continued for over a year or even two years—*“this start-up is still in our radar”*—but no pilot tests or implementations were confirmed. We observed no clear guideline or mitigation from the industry-led accelerator's playbook to address the recurrence of delayed rejections. We illustrate this tension with two incumbent – new venture dyads.

TANKTECH engaged *AquaSense*, a new venture from OceanAccel's 2016 cohort that offered remote inspections of critical port assets with a drone technology and associated 3D modeling services for engineering support. TANKTECH's innovation unit staff helped *AquaSense* to narrow the scope of both the business model and technology. This dyad engaged in a proof-of-concept (POC) for jetties inspection, and TANKTECH facilitated the involvement of a third party, Kite, to improve the drone technology. Though the POC was successful, TANKTECH wanted to continue exploring possibilities and different technologies—e.g., combinations of camera and sensors for data analytics. They conducted many proof-of-concepts with floating and diving drones until 2019: *“This has been interesting... A lot of learning about inspecting jetties in real time. You need to do multiple tests (proof-of-concepts) with many providers. We are currently doing yet another proof-of-concept with a diving drone venture of the OceanAccel 2019 program”* (Innovation Manager, TANKTECH). Therefore, even though this was a non-disruptive niche technology that offered potential to improve the asset maintenance function required by the incumbent, they were still exploring possible engagements with alternative providers and exploring future scenarios without committing resources to their collaboration with pioneer *AquaSense* while keeping the conversation open. *AquaSense* had to play the waiting game and in the meantime upgraded its inspection technology with a data analytics component while having to explore new engagements with other ports to keep itself in business. A very similar pattern of postponed engagement was observed between *AquaSense* and ROYAL PORT.

Oceanos is an Indian-based company that designs and develops unmanned autonomous ocean vehicles for real-time observation and monitoring of unpredictable sea conditions. Such vehicles can be used to create an ocean data network. *Oceanos* therefore was an infrastructure

enabler with a complementary technology for maritime infrastructure and dredging companies, port authorities, and the military. It was offering a modular additive and role additive solution, although in the long run it had the potential to disrupt survey vessels and crew management functions. It engaged with VOX through lead corporate mentoring and a subsequent proof-of-concept project, which helped to focus and adjust the value proposition and technology to match the requirements of a dredging company. After a successful proof-of-concept and declared enthusiasm of both parties¹⁶, the pilot decision was delayed and ultimately abandoned: “*There was a lot of excitement, but the product was not ready for the market.*” (R&D Manager, VOX). There was no clear need nor a business case for an autonomous vessel pilot. VOX decided to keep their options open and to continue their technology exploration through the scanning of outside-in ventures enabled by OceanAccel and its corporate partners, including VOX.

The drivers of the implementation tension are usually module and role additive disruptions, and the tension could be high due to the delayed rejection and lack of commitment of by the incumbent, in spite of its initial enthusiasm and the urgency felt by the new venture. We observed that incumbents pursue a real options logic, that is, often continued their exploration of alternative solutions while keeping the engagement option alive for the future. The venture, in turn, was forced either to play the waiting game or move to another market, if possible.

Throughout my observation, thus, the incumbents behave more like ‘whales’, rather than ‘sharks’, as suggested in previous literature exploring incumbent – new venture tensions in the context of corporate venture capital (Katila et al., 2008). Instead of gobbling up the new ventures, the whales moved selectively and slowly. Postponing commitment to any given solution, the whale-like incumbents adopted a ‘wait and see’ posture. Observed delaying tactics included delayed rejection, selective revealing (Alexy et al., 2013), partial openness, and other tactics that sought to drive cooperative and opportunistic learning simultaneously. Collectively, such tactics gave rise to a phenomenon we labeled *accidental misappropriation among non-equals*.

The new ventures were reminiscent of ‘dolphins’ in their relationships with incumbents. Recognizing that successful positioning in the new industry architecture required speedy implementation, the new ventures were ready to rapidly adjust and tinker with their technologies,

¹⁶ I was present in two mentoring sessions, including a demo in a lab, between *Oceanos* and VOX.

MVPs and business models. These dolphin-like ventures needed to make early moves in order to secure and defend a position in the new architecture. They wanted things to happen quickly, while it was more advantageous for the incumbents to wait and see, and eventually decline tangible commitments once the situation had cleared (e.g., in the form of supplier contracts). This put the new ventures in a catch-21 situation, as for them the best way to secure a position in the new architecture was early commitment, while the incumbent acquired a valuable real option by delaying commitment. In terms of collaborative and competitive learning, the incumbents and start-ups needed one another, but the internalization and implementation tensions meant that the future industry architecture might not accommodate both.

5.10 Role Tension

Whereas the internalization and implementation tensions may and often do occur in more conventional, incremental and radical disruption situations, the role tension is more specific to architectural disruption. We observed this novel tension when the new ventures threatened to displace an incumbent's position in the industry architecture by introducing, altering or circumventing a core value-creating function. This tension emerged either through the attempt of the new venture to drive the formation of a new ecosystem with the new venture aspiring to a central role in it, or simply through an attempt to modify the existing industry architecture by adjusting, usurping, or possibly sidelining the roles of the existing occupants, on the other.

This tension appeared the least frequently in our dataset, for two reasons. First, although the incumbents needed to learn about emerging disruptive technologies, they tended to avoid selecting ventures that could potentially disrupt them – which also constrained their ability to fully embrace potential disruptions. Instead, the incumbents preferred to select ventures that they could do concept-proofing within the short term, usually within a 3-6-month period, provided the internalization and implementation tensions are overcome. New ventures bringing radical innovation and distant knowledge might also not get selected due to a lack of both temporal and strategic fit with focal incumbents (Shankar & Shepherd, 2018). Second, there was a substantial size, scale, scope, and capability asymmetry between the new entrants and incumbents (Markman & Waldron, 2014) that made it challenging for the new ventures to radically substitute or alter existing roles in this asset-intensive sector.

Even in conditions of controlled disruption and “safe test entry” into a regional industry architecture where key stakeholders select and hold equity of a promising new entrant, it is not easy nor trivial to substitute a core data or energy transition function. Incumbents are keen to explore new platform applications but are also dead set to maintain their dominant position. This tension is aggravated by the possibility of spillovers beyond the incumbent-new venture dyad that might have a potentially uncontrolled impact on third parties operating along the port maritime value chain.

Given the stringent safety requirements in this asset-intensive sector, as well as the considerable downside risks should the core technology fail, the incumbents “*really need to believe that the new technology actually works. Actually to do a pilot is a bigger step for us. We really need to believe in the company and the product*” (R&D Manager, VOX, 2018). I observed a lack of trust in new ventures, when it came to core assets and functions offered by them. Even though they had been scouted and selected to bring disruption by the incumbents using a rigorous criterion, new ventures lack enough legitimacy to be considered an equal.

The asset-intensive and safety-oriented incumbents expected a level of product or service beyond an MVP, which was a big ask for the new ventures. This tension caused major delays in the proof-of-concepts, and also, prompted the incumbents to increasingly scout for more mature ventures, i.e., scale-ups with better readiness to engage the old “whales”. Thus, a major driver of the role tension arose from static control pressures, triggered by the incumbents’ attachment to their own strategic activity and the challenge of building internal momentum to further validate, trust and deploy new external technology.

The role tension was enacted when these static control pressures clashed with the dynamic control failure on the incumbent side in the future-oriented and uncertain ecosystem game (Dattée et al., 2018) regarding the new industry architecture and new positions in it. Where the new ventures sought to exercise dynamic control over collective visioning of the future industry architecture by conducting repeated experiments yet without building a compelling shared vision, the goal of the incumbents was to strengthen their own position in the new industry architecture by perpetuating the relevance of their legacy assets – a static control strategy. This clash between static control pressures and dynamic control failure and the consequent strategic adherence of incumbents towards a narrow future based on the present versus new venture orientation towards multiple alternatives futures echoed an internal tension inherent in OceanAccel’s objectives.

OceanAccel was set up to enable incumbents to engage new ventures for collective exploration and potential internalization of emerging disruptive technologies and for effecting matching adjustments in the sector architecture. But, emerging technologies remain, by definition, in an era of ferment (Anderson & Tushman, 1990; Eggers & Park, 2018), which meant that the number of alternative futures overwhelmed the rational, linear decision-making implied by static control orientation (Dattée et al., 2018), which ultimately hinders an ecosystem vision. In order to reduce uncertainty, dynamic control was required in the form of collective exploration of alternative futures, changes in incumbents' core functions and potential third-party impacts in the industrial architecture. But to discover those futures required commitments that could undermine the static control OceanAccel was originally set up to secure. This paradoxical tension hampered effective exploration to discover whether the novel arrangement would be additive or substitutive, and whether it would rearrange the functions or positions of third parties in the established industry architecture.

The dyad *ROYAL PORT* vs. *PortGateway* illustrates the role tension. *PortGateway* is a new venture that offered synchronized vessel scheduling for ports, pilots, and agents. It offered a digital scheduling platform for an industry that still relies on paperwork, telephone, and analog processes. It explored proof-of-concepts with both TANKTECH and the ROYAL PORT. *PortGateway* was selected as an inspiring venture that aimed to re-think a central role regarding port scheduling services: “*I really liked their philosophy that booking a port call should be as easy as booking a hotel room through the web.*” (JG, ROYAL PORT, Senior Digitalization Lead). Even though *PortGateway* was deemed a successful new venture with installations in a couple of small ports in the U.S., the problem was that: “*...this European port was much more complex, and you really need different parties to work together, you need a strong partner in the Port that can persuade the others to adopt the solution. It is not only the technical side—of course Prontex¹⁷, has very nice technical features—but rather at the institutional side*” (Ibid.) But in the end, nothing happened, as evidenced by *PortGateway*'s Founder and CEO: “*I'm pretty much done here in terms of the port, because we went through several rounds of discussions and they decided to go a different direction and build the capabilities I have, themselves.*” It is somewhat paradoxical that

¹⁷ The ROYAL PORT's own solution developed at the very same time of this proof-of-concept exploration with this start-up.

PortGateway was scouted to achieve fit with the regional industry architecture and later rejected on grounds of a different system scale and complexity: “*They said a hard no, and we invested a lot of time and they were doing it on their side with two million dollars in front of us*” (*PortGateway* CEO). Given the central role of a digital scheduling platform in this industry architecture, the incumbents—in this case the very Port regulator—decided not to outsource or contract the software-as-a-service of this external accelerated new venture, but actually built it internally given its strategic importance to navigate the current wave of digitalisation and cope with architecture-altering tendencies.

I have analytically distinguished and illustrated each one of these three tensions. I have also observed that these tensions can coexist in certain dyadic engagements, depending on the disruption sources. In our sample, more than 70% of the selected new ventures introduced new complementary modular additions, modular substitutes, and role additive functions, all of which could potentially give rise to internalization and implementation tensions, as shown in Table 5.4. Only a few ventures sought to introduce role altering, role substituting, and role circumventing functions. All of these solutions have been either delayed, predated, or rejected by the incumbents. Table 5.4 summarizes the tensions, tension drivers, the tensions’ temporalities, possible third-party impacts, and the outcome of the incumbent - new venture engagement.

Though my focus was on cooperative tensions, such outcomes were not inevitable. I also observed several cases of mutualistic fit, where the incumbent - new venture dyads were able to reduce the internalization and implementation tensions to a minimum (e.g., dyads 11, 16, 22, and 23 in Table 5.4). In these cases, the ‘whales’ were able to lift the ‘dolphins’ synchronically and, thus, mutualism was achieved.

Table 5.4 *Incumbent – New Venture Dyads according to Tension, Driver, Impact & Outcome*

Dyad #	Incumbent	New Venture	Tension(s)	Tension Driver	Temporality	Third-party impact	Outcome
1	ROYAL PORT	PortGateway	Internalization Role	Module Add Role Substit	Active but temporary	Potentially Yes	Incumbent develops internally
2	ROYAL PORT	FiberSail	Internalization	Role Adding	Not Active but future	No	Engagement Delayed
3	ROYAL PORT	AquaSense	Implementation	Module and Role Adding	Not Active but future	Yes	Further proof-of-concepts needed
4	ROYAL PORT	RanMarine	Implementation	Module and Role Adding	Active but temporary	No	Further proof-of-concepts needed

5	ROYAL PORT	Cargo Ledger	Role Internalization	Role Substit	Present	Yes	Exploration, no commitment
6	ROYAL PORT	DockTech	Internalization Implementation	Module and Role Adding	Not Active but future	Yes	Engagement delayed
7	TANKTECH	PortGateway	Internalization Implementation	Module substituting	Active but temporary	Yes	Further proof-of-concepts needed
8	TANKTECH	AquaSense	Implementation	Module and Role Adding	Active but temporary	Yes	Further proof-of-concepts needed
9	TANKTECH	FEO-AR	Internalization	Module Adding	Not active but future	Yes	Further proof-of-concepts needed
10	TANKTECH	GreenGuard	Implementation	Module and Role Adding	Active but temporary	No	Extra validation needed
11	TANKTECH	Magnetik	Fit	Role Add & 3 rd party Altering	Future	Yes	Move to Pilot and deployment
12	TANKTECH	CargoLedger	Role	Module Add and Role Altering	Present	Yes	Commitment postponed
13	SATELLITE	Parable	Internalization	Module and Role Adding	Active but temporary	No	Incumb develops internally
14	SATELLITE	FEO-AR	Internalization	Module Adding	Active but temporary	No	Incumb develops internally
15	SATELLITE	Oceanos	Internalization	Module and Role Adding	Not active but future	Yes	Incumb Absorb Knowledge
16	SATELLITE	MedAsist	Fit	Module Adding	N.A.	No	Move to Pilot and roll-out
17	VOX	Oceanos	Implementation	Module and Role Adding	Not active but future	Yes	Incumb Absorb Knowledge
18	VOX	Parable	Internalization Implementation	Module and Role Adding	Active but temporary	No	Further proof-of-concepts needed
19	VOX	GreenGuard	Internalization	Module Adding	Not active but future	No	Engagement Delayed
20	VOX	CargoLedger	Role	Role Altering	Not active but future	Yes	Exploration, no commitment
21	VOX	E-Concrete	Implementation	Module and Role Adding	Active but temporary	No	Engagement delayed
22	VOX	Njord	Implementation (Fit)	Module and Role Adding	Active but temporary	Yes	Move to Pilot and deployment
23	VOX	MedAssist	Implementation (Fit)	Module Additive	N.A.	No	Move to Pilot and deployment
24	VOX	Ondavia	Implementation	Role Additive	Future	Yes	Wait and See
Triad #1	VOX & SATELLITE	Ionada	Implementation Internalization (Fit)	Module and Role Adding	Active but temporary	Yes	Move to Pilot and deployment

5.11 Incumbent - New Venture Coopetitive Relationships: Drivers, Mechanisms and Outcomes

I now compile the observations in a framework of coopetitive tensions between incumbents and new ventures during architectural disruption. Our framework consists of three dimensions: (1) the nature of the architectural disruption (e.g., core knowledge addition, complementary asset substitution); (2) the appropriability regime (weak or strong) at the venture level; (3) the temporal focus (present vs. future). In our framework, we also include the maturity of the new venture.

Prior research on corporate accelerators and external venturing arrangements has tended to focus on start-ups as a homogenous group without distinguishing, for instance, between start-ups and scale-ups. Whereas start-ups are still searching for a robust and scalable business model, scale-ups have found one that they seek to scale. I do this distinction for two reasons: first, OceanAccel itself makes that distinction and operates two parallel tracks, one for start-ups and one for scale-ups. To be selected on the start-up track, the venture had to have a prototype or a Minimum Viable Product (MVP) that is ready to market within 12 months after validation. To be selected on the scale-up track, the venture had to have current clients and revenues or investments of over EUR 500 000, be willing to streamline their products with focal incumbents and grow their network of corporate clients globally. Due to being more advanced, scale-ups tend to have better defense mechanisms to delay engagement and avoid full disclosure, if needed, and thus defend against potential misappropriation. I assume that, by and large, start-ups operate under weaker appropriability conditions than scale-ups, given the defenses and better protection mechanisms of the latter due to validated business models.

Figure 5.3 Incumbent - New Venture Tensions: drivers, mechanisms and outcomes

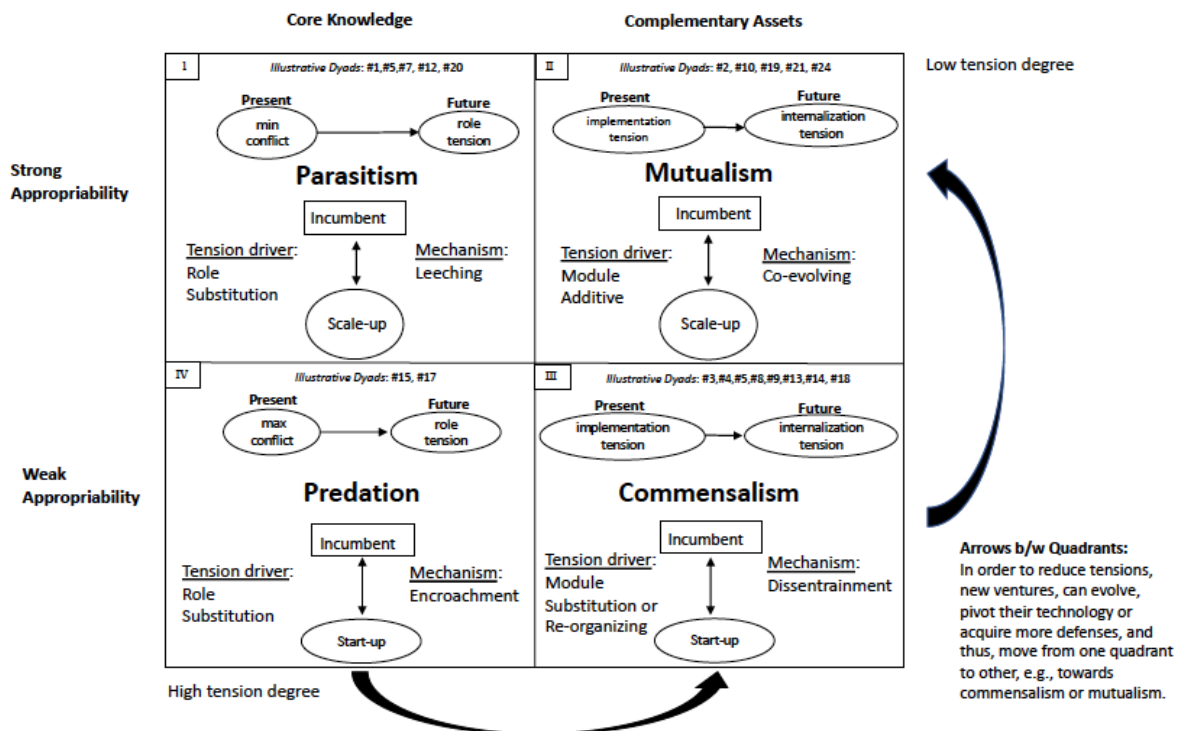
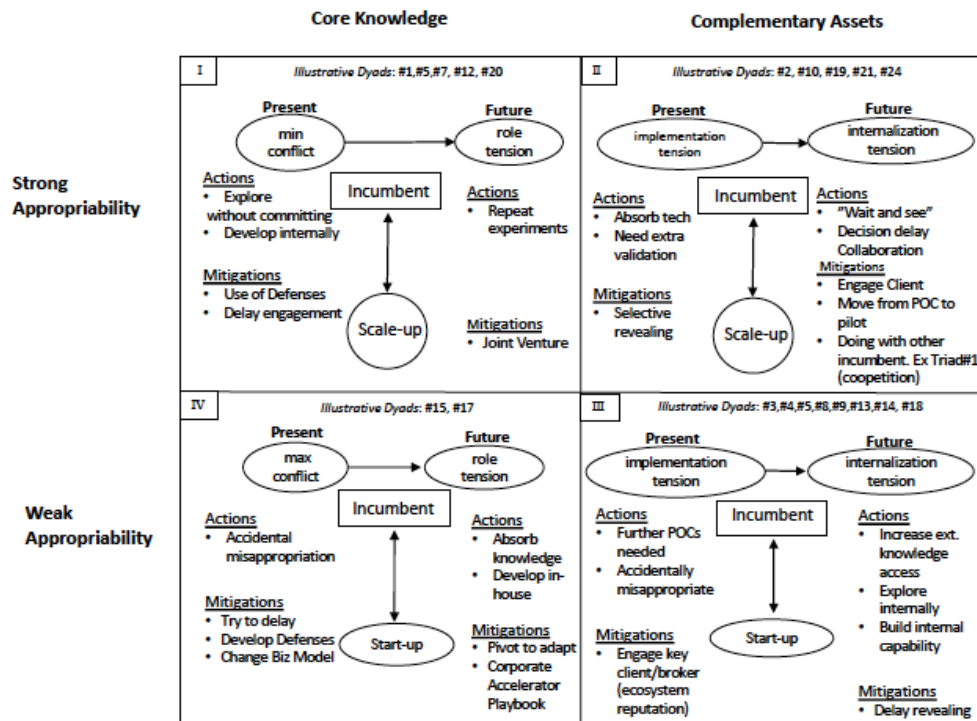


Figure 5.4 Framework for Incumbent Action - New Venture Reactions and Mitigations



5.11.1 Quadrant III: On Organizational Commensalism Dynamics among non-equals

The most common engagement observed in OceanAccel was one where the incumbent engaged a new venture to explore complementary applications of a new technology to service a specific niche in the sector's supply chain. To create and capture value from new digital technologies, the maritime incumbents adopted an open innovation approach to access to external knowledge sources: "We're looking for the outside-in view" (COO, VOX). This pattern is also present at TANKTECH where "We do all the proof of concepts with external parties" (Innovation Manager, TANKTECH) and at SATELLITE, where "we regularly invite external people who are already doing blockchain for quite some years" (R&D Manager, SATELLITE). Such applications could be specialized applications of a generic digital technology — mainly IoT, data analytics, predictive maintenance, virtual reality and blockchain — or a specialized application of a niche technology in a narrow supply chain niche. Examples of the former include sensor applications (AquaSense) to anticipate maintenance problems in key port and terminal assets such as jetties as well as to provide virtual and on-the-spot training to equipment operators using virtual and

augmented reality (FEO-AR and Parable). Examples of the latter include, remote controlled and unmanned aquatic drones to clean the water ways and provide data analytics of the environmental conditions in real-time (RanMarine).

Given the complementary nature and niche orientation of such engagements, they all started with a strong expectation of a mutualistic relationship building on a modular-additive or a modular-substitutive amendment to the sector's supply chain.

The dyad Cargo Ledger – ROYAL PORT illustrates this initial mutualistic expectation. Cargo Ledger is a scale-up that offers an innovative blockchain application for logistics data with “no-touch-orders”, increased control and visibility via track-and-trace from source to consumer. That's why ROYAL PORT became interested in this novel solution –role additive and altering with potential impact on third parties – to streamline their logistical operations and approached Cargo Ledger very early on: *“An initial agreement to work with the Port's clients transactions was established during the selection days”* (CEO, Cargo Ledger, 2018). For ROYAL PORT's Innovation Manager this seemed a very valuable opportunity at the outset because of the proposed solution and way of working: *“Starting on the very selection days, we worked with Cargo Ledger exploring proof-of-concepts within our logistics use cases as they were open to really look at the problem and not just sell licenses...in a way, it is easier to work with this type of venture than with an IBM.”* (Innovation Manager, ROYAL PORT, 2018)

In many cases, the expectations of mutualism materialized, and a new adjustment to the sector's complementary asset structure was realized as envisioned: TANKTECH engaged Magnetik, a 2018 scale-up providing magnet anchoring system to efficiently replace temporary scaffolding welds, and introduced Magnetik's technical specifications for new contracts along the tank storage' value chain. In so doing, TANKTECH's dominant position in the logistics architecture enabled a new venture to add a technological module and alter an existing role, and thus potentially disrupt the scaffolding market. Due to this incumbent-new venture 'engagement fit', Magnetik was the first OceanAccel's accelerated venture to receive substantial investment.

However, not all engagements met initial mutualistic expectations. Problems arose mainly for three reasons.

First, as accounted earlier, the engagement started at an early stage of the application development, and the anticipated outcome was subject to initial, often uncertain assumptions. In order to advance the project and prepare ground for its adoption by stakeholders of the sector's

supply chain, the new venture had to continuously interact with these to keep them informed, and receive feedback for necessary adjustments. On occasions, those insights and learnings proved tempting for the incumbent. Even though the appointed liaison person -usually within R&D and/or the innovation function - might not seek to misappropriate the new technology, sometimes other business units of the incumbent firm would find the application or technology so attractive and compelling that they started efforts to replicate it internally. Unlike more established ventures who already have built traction into their external relationships, new ventures would have few technical or social defences against such parallel learning efforts (Hallen, Katila, & Rosenberger, 2014; Zott & Amit, 2007).

Second, in situations where the new module would substitute an existing function or alter an existing role in the supply chain, there could be resistance against that adoption by the third party. That resistance could be verified by incumbents' reliance on legacy systems.

Third, as observed earlier, most engagements were subject to a systemic dis-entrainment problem, where the incumbent gained a valuable real option by postponing the adoption of the new technology, while the new ventures were hard pressed to push ahead in order to build momentum to drive the adoption of their application. Incumbents' procurement protocols played a central role in delaying the new technological adoption and triggering dis-entrainment.

Combined, these challenges drove both internalization and implementation tensions in the engagement and tilted the relationship towards commensalism and even outright predation, if the incumbent ended up developing its own replication of the new venture's proposed solution.

Overall, in the dataset, I identified five engagement incumbent – new venture dyads that achieved “fit”, that is, where tensions were reduced to zero or there were no tensions at all. Similarly, five dyads reduced their tensions satisfactorily and ended up in a mutualistic relationship. As for the present commensalistic quadrant – where only one-party benefit at the expense of the other, which remains neutral - I identified eight dyads: #3, #4, #5, #8, #9, #13, #14, #18 of Table 3. These dyads represent a commensalistic dynamic in that the stronger parties, i.e., the “whales-like” incumbents benefit more than the “young dolphins-like” start-ups, which are less resourceful given their asymmetry in terms of defenses and overall resources.

I observed an interesting pattern between tensions concerning the present and the future. In terms of the present time, the implementation tension tended to impose: who would implement the novel arrangement in the form of a proof-of-concept or pilot and when? Incumbents tended to

postpone to the future the decision of running a proof-of-concept with the external start-up to further learn about the implications of the novel arrangement and the start-up's capabilities to deliver the novel solution. Given the potential of changes in the industry architecture, incumbents tend to require further testing and proof-of-concept experimentation before committing to a particular course of action. I observed the incumbents perform several small-scale experiments at the proof-of-concept level with various start-ups before committing and overcoming the trust threshold in the proposed novel arrangement.

Over the longer term, the internalization tension tended to become more prevalent. During the process of explorative engagement with start-ups, the incumbents sometimes delayed the implementation of any given arrangement while developing a parallel application internally. However, these incumbents did not behave as dangerous "sharks" but more like "whales" who internalized the novel arrangement (technologies and/or business models) through accidental and even intentional misappropriation.

The industry-led accelerator was not in a position to control such (non) accidental misappropriation of insights, ideas, and solutions from the new ventures: "*This is the whole trick of being in this program. I like to see what start-ups do and then reflect on our own business. Everyone does that, right?*" (R&D Engineer, SATELLITE). "*Usually you do not need 100% of the start-up solution but the 20%, or it could be the 70% but the other 30% you can just get it away*" (Innovation Coordinator, SATELLITE).

New venture strategies to mitigate these tensions included the allocation of up-front resources to commit to a proof-of-concept, the establishment of social or technical defenses (Hallen et al., 2014), including selective revealing (Alexy et al., 2013), the engagement with a key incumbent broker with good reputation to do concept-proofing, and the selection of scale-ups with stronger defensive mechanisms and clear roadmaps for corporate engagement. I next turn to Quadrant II to consider the relationships and tensions arising between scale-ups and incumbents operating under a strong appropriability regime in complementary assets of the industry architecture.

5.11.2 Quadrant II on Organizational Mutualism Dynamics

Quadrant II of the framework comprises dyads where the new venture explores innovation in complementary assets under a relatively strong appropriability regime. This is usually the case

with a little bit more mature ventures who have validated their business models and are in the process of scaling up. Compared to start-ups, scale-ups have more defenses against misappropriation, including better ability to delay sharing sensitive details of their technologies. In total there were five such dyads in this quadrant: dyads #2, #10, #19, #21 and #24, and the triad #1 in Table 3 (24% of the total number of dyads observed).

Given the relatively strong defenses by new ventures in this quadrant and its focus on complementary assets, this quadrant was the most likely to witness successful conclusion of projects that benefited both parties – i.e., a mutualistic outcome. Of the dyads we observed, five achieved an outcome that was considered successful by both parties by the time our observation period ended. Examples of successful ventures included FiberSail and GreenGuard, a solution to predict maintenance of wind energy blades and engine emissions monitoring, respectively. These ventures were already relatively advanced by the time they entered the industry-led accelerator. This reduced uncertainty and the likelihood of unanticipated developments and allowed the parties to agree on realistic common goals for the engagement. In both cases, the application was clearly complementary to existing arrangements and, being of modular and role additive nature, did not undermine established industry architecture configurations

The majority - although not all - of the successful cases were with more mature ventures, consistent with the evolving preference of the incumbents. Over the three years of the operation of OceanAccel, the incumbents have increasingly requested to the accelerator staff to scout more mature ventures: *“Our company likes to work with people who have a track record... so we know what we can expect from the money we [put in]”* (Innovation Coordinator, SATELLITE, 2019). Although this preference helped defuse internalization and implementation tensions, it also meant that the incumbents were backtracking from the original goal of the OceanAccel of proactively disrupting the maritime logistics and energy sectors, as OceanAccel was increasingly selecting projects that did not disrupt the established status quo. And even with less architecturally disruptive engagements, the implementation tension still occasionally arose: *“Ondavia from the 2018 cohort is really ready but the business need for us still has not been identified. So, we can accelerate to the next phase when there is a concrete problem. But at this moment there is no problem yet”* (RB, VOX, 2018). The lack of a business case, i.e., an ex-ante agreed metric to trigger implementation, could also give rise to implementation tension, if the engaging parties were unable to develop a shared understanding regarding such a metric during the engagement.

The complementary nature and the relative absence of tensions in this quadrant also allowed three-party engagements, where the new venture worked closely with two competing incumbents. For example, SATELLITE and VOX – two competitors in the dredging and maritime energy sectors – conducted a collaborative proof-of-concept with the scale-up Ionada, which develops patented exhaust gas cleaning and emissions reduction systems for the marine and power generation industries. VOX did the proof-of-concept test, and SATELLITE provided the measurement tools, and the two incumbents jointly performed the testing of the dry injection desulfurization scrubber.¹⁸ This cooperative engagement among incumbents was possible because it did not alter the incumbents' relative competitive positions, and it validated green solutions required by international emission regulations in the context of complementary modular assets: “*If there is [implications for our] competitive advantage, then yes, we are protective. [In this case] Why not join forces? If it would work on their vessels, it will work on our vessels, and we both will benefit, and the world will benefit from it*” (Innovation Coordinator, SATELLITE, 2019). Incumbent collaboration in the absence of competitive disparity was adopted as a general rationale for SATELLITE's approach to deal with their use-cases and OceanAccel's scale-ups: “*let's first talk individually to them [competitor] and if there is interest in the same scale-up and we see that there is no competitive advantage in the use-case, so let's share them and cooperate!*” (Innovation Coordinator, SATELLITE, 2019). Such a mutualistic engagement would not occur in Quadrant I or IV, where parasitic or even predatory dynamics dominated.

In those dyads where tensions were observed, mitigation strategies by the new ventures included: promoting cooperative proof-of-concepts of modular and niche technologies to share costs for mutual benefit; put agreements in place to avoid misalignment of expectations such as the one referred above between competitors; rapidly engaging a customer in the focal value chain to avoid decision delays, and “signal out” and try to move fast from proof-of-concept to pilot.

¹⁸ Regarding the cooperation mindset and approach, they referred to as “com-colleagues”, where there is always hate and love, as they compete for key contracts but “in the world market, we are best friends because we are fighting against the Belgians” (Innovation Coordinator, SATELLITE, 2019)

5.11.3 Quadrant I on Parasitic Dynamics

Quadrant I covers engagements with new ventures exploring applications in the domain of the incumbent's core knowledge under relatively strong appropriability conditions. Positioned in the incumbent's core knowledge domain, this quadrant exhibited role tensions where the new application proposed to substitute or circumvent functions traditionally performed by the incumbent. Of the tensions observed by us, the role tension was the most acute, as it was felt most intensely by the incumbent – unlike the internalization and implementation tensions, which are most acutely felt by the new venture. Role tension arises when there is an effort by new entrants to redefine the current industry architecture in such a way as to alter the incumbents' position in this industry architecture so that some incumbents might lose dominance, market share, or even be completely locked out (Ansari & Krop, 2012). This tension would be driven by the aspiration of the new venture to create a new ecosystem with downstream complementors, or to significantly modify the existing value chain with the current occupants. The parasitic dynamics of Quadrant I included actions and reactions by “killer whales”, who defended their position and resources, and “experienced dolphins” who tried to take over functions previously performed by the incumbent. This quadrant included dyads #1, #5, #7, #12 and #20 in Table 3 (20% of all dyads).

Although OceanAccel was purported to facilitate proactive, controlled disruption of the sector value chains, incumbents were less likely to actively scout Quadrant I -style disruptors. Nevertheless, such engagements featured in OceanAccel. The resulting role tension was stronger in Quadrant I (scale-ups) than in Quadrant IV (start-ups) because of the stronger appropriability regime enjoyed by the former. A dramatic manifestation of this tension occurred with a scale-up that offered a digital solution for vessel scheduling—a key function in the Port complex.

I observed how his scale-up was “*bullied away*” by one of the main incumbents. The scale-up's application was a software-based vessel scheduling platform that was already in operation in a couple of smaller and less complex ports. During the proof-of-concept engagement, this scale-up had to reveal the internal working principles of its platform in order to demonstrate interoperability with the incumbent and pave the way for piloting the platform with a few focal incumbents. Through their interaction with this scale-up, one of the focal incumbents decided to develop their own digital platform solution, given its strategic importance to this incumbent.

The ‘parasitic dolphin’ was invited to the accelerator to navigate the complex dynamics surrounding the ‘whale’, but ultimately the ‘big whale’ took over the core assets of the bay and

excommunicated the ‘dolphin’. In this application domain, there would be space for just one operator. Whales can become “killer-whales” when it comes to the preservation and control of core resources and technologies.

Observed actions by incumbents in Quadrant I included: exploration without commitment of resources and delay of commitment, given the high stakes involved in core knowledge assets. Although less likely to scout scale-ups that might disrupt them, the incumbents might still do so to learn evolving disruptive technologies and to proactively explore potential threats of the role altering, role substitution, or role circumventing kind.

Observed mitigating actions by scale-ups in our sample included the development of defenses—e.g., a partnership with key broker in the value chain and improving the protection of the technology— as well as the establishment of a joint venture with one or two incumbents to co-develop systemic solutions, where all relevant stakeholders could participate through a shared role or a function that was split and performed by more than one agent.

5.11.4 Quadrant IV on Potential Predatory Dynamics

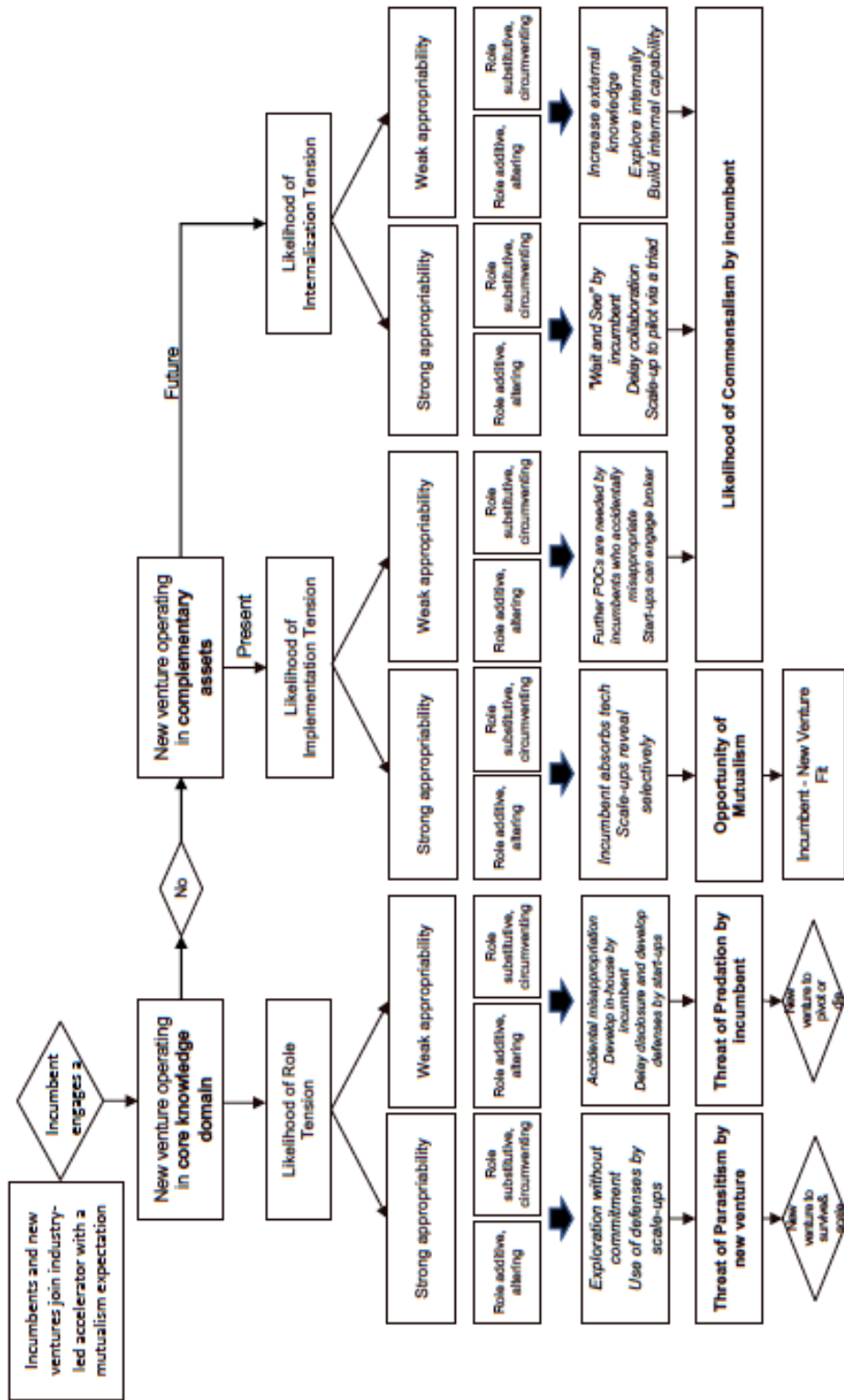
The final, Quadrant IV of the framework covers incumbent engagements in the core knowledge domain with new ventures operating under weak appropriability conditions. This was the rarest type of engagement in this empirical context, with only two out of 25 engagements, #15 and #17, falling into this category. This small share reflects the combined effect of potentially intense role tension and the weakness of the defenses of the start-up against predatory misappropriation. In asset-intensive industries such as the port maritime sector, the challenges for start-ups that try to displace incumbents are very demanding, and any weakness by the start-up against misappropriation constitutes a severe vulnerability. In both dyads observed in this quadrant, the incumbent predatorily absorbed the new venture’s knowledge, and no long-term collaboration materialized.

In the two engagements in Quadrant IV, the incumbents sought to learn and internalize emerging technologies through accidental and even explicit misappropriation. Although the start-ups tried to delay revealing of their core knowledge until a product-market fit had been established (e.g., in the form of a supplier contract or pilot with a focal incumbent) and defenses had been developed against misappropriation, these attempts proved futile. This forced the start-ups to pivot their business models away from core knowledge domain of the incumbent towards a more

complementary relationship. In addition, the parties could try and mitigate the role conflict by explicitly agreeing on an upfront proof-of-concept, joint testing, and confidentiality clauses.

Figure 5.5 summarizes the discussion of the four quadrants into a decision flow model, which summarizes starting conditions, likely tension types, and possible outcomes and mitigation strategies in different situations, echoing previous research practice (Michael G. Jacobides et al., 2006; D J Teece, 1986; David J. Teece, 2018).

Figure 5.5: A Process Model for Incumbent – New Venture Cooperative Symbiotic Engagements



This theoretical model highlights cooperative tensions and associated mitigation strategies between incumbents and new ventures, as they respond to institutional and technological change in the context of an accelerator set to proactively disrupt the current industry architecture. Industry-led accelerators have to cope with unpredictable institutional and technological change. This type of corporate accelerator can be initiated by incumbents during periods of ferment (Anderson & Tushman, 1990) and architectural fluidity, that is, before a new industry architecture has been set.

In our research setting, there were two key disruptive forces motivating this cooperative effort: digitalization and energy transition. These disruptive trends exhibit different temporalities and systemic pressures. Digitalization is a fast-paced technological phenomenon, which permeates almost all functions of the economy and society. On the other hand, energy transition is a regulatory-driven change that moves at a much slower pace due to legacy systems and lack of institutional incentives. In this context, I observed that OceanAccel was not a purely altruistic collaboration. Although new ventures were attracted to the accelerator by the prospect of gaining an advantageous position in the new industry architecture, the incumbent sponsors were by nature set at retaining a powerful position also in any new architecture that might emerge through the venture-led exploration. This basic tension assumed three manifestations, which I have called the *internalization* tension, the *implementation* tension, and the *role* tension. These are novel tensions unobserved in extant literature of corporate acceleration (Kanbach & Stubner, 2016; Kohler, 2016; Moschner et al., 2019; Shankar & Shepherd, 2018) and incumbent - new venture engagement (Eggers & Park, 2018; Weiblen & Chesbrough, 2015).

This framework extends previous frameworks in the literature that have considered the impact of technological discontinuities on core knowledge and complementary assets under strong and weak appropriability regimes upon cooperative dynamics between incumbents and new ventures (Cozzolino & Rothaermel, 2018). My framework extends this work by adding the additional dimension of architectural change in the form of incremental and radical business model innovation and ecosystem innovation. That way we are able to provide a richer and more granular picture of incumbent – new venture tensions when there is radical innovation (modular additive or modular substitutive disruption), incremental business model innovation (when functionalities does not change in the system but rather who performs them) and when there is radical business

model or ecosystem innovation, i.e., change both the ecosystem composition of functions (what is done and who does them).

Based on this typology of innovation types, I identified different types of associated disruptions – i.e., modular additive, modular substitutive, architectural recombination, and role additive, role circumventing, and role altering disruptions. My analysis shows that a more nuanced categorization of disruption types can provide important new insight into understanding the dynamics of incumbent – new venture relationships during times of technological disruption.

On the basis of our innovation typology and associated disruption types, I analysed incumbent – new venture tensions in an industry-led corporate accelerator, OceanAccel. I identified three basic tension types: implementation, internalization, and role tensions. Of these the role tension is a novel addition to the literature, as it is driven by potential alteration of the industry architecture in such a way as to threaten the incumbent.

Although I recognize the difficulty of predicting the outcomes of disruptive innovations within an ecosystem (Kumaraswamy et al., 2018), this is nevertheless a first attempt to map the actions and reactions of different stakeholders within an ecosystem in an attempt to drive controlled disruption of the industry architecture. One of core findings resonates with extant literature: “*disruptors, especially small startups, cannot wait for the process to settle down*” (Idem, 1029). Instead, they must react and mitigate in order to survive, and scale. This is in fundamental conflict with the static control orientation of incumbents, for whom the option to wait and see, at least seemingly, increases in value the more architectural the nature of the potential disruption. This is a fundamental, yet previously unrecognized paradox that hampers industry-led corporate accelerators.

I also contribute to a nuanced understanding of the ecological and compositional logics of accelerated industrial architectures facing disruption through our novel symbiotic modes of incumbent – new venture relationships. In so doing, I extend and complement the industrial symbiosis literature. Industrial symbiosis, as a domain of industrial ecology, looks at the process by which waste or by-products of an industry or industrial process become the raw materials for another. Industrial symbiosis engages traditionally separate industries in a collective approach to competitive advantage involving physical exchange of materials, energy, water, and/or by-products, leveraging the synergistic possibilities offered by geographic proximity (Chertow, 2000; Lombardi & Laybourn, 2012). Under this logic, industrial ecosystems can be understood as

networks of legally autonomous firms—usually physically interconnected by pipelines—that use one another’s residual energy and chemical effluents as input for their own production process (Ayres & Ayres, 2002; Doménech & Davies, 2011; Ehrenfeld & Gertler, 1997; Walls & Paquin, 2015). By converting by-products into product streams for other firms, added value is created. The last 15 years in this focal European Port maritime complex demonstrate the importance of investing in the co-creation of industrial ecosystems (Hollen et al., 2015).

I offer a rather novel and granular view of the different symbiotic modes and associated engagement mechanisms between incumbent and new ventures during technological yet controlled disruption: parasitism (leeching), mutualism (co-evolving), commensalism (dis-entrainment) and predation (encroachment). The highly cooperative logic among incumbents described in the industrial symbiosis stream is complemented with an account of the cooperative tensions among incumbents and new ventures, depending on the conditions of appropriability and disruption sources, at the core or complementary nature of the new ventures’ technologies.

In this study’s sample, the majority of the incumbent – new venture dyads are on the mutualism and commensalism quadrants. Though not generalizable to other settings, I contend that these maritime incumbents behave as ‘whales’ rather than as ‘sharks’, as previously theorized in the context of corporate venture capital through the lens of resource dependency (Katila et al., 2008; Pfeffer & Salancik, 2003). In this empirical context, there are bidirectional resource exchanges among the non-equals in each of the identified quadrants. In both the mutualist and especially in the commensalistic mode, the incumbents behave as ‘whales’ who ‘wait and see’ and accidentally misappropriate resources (ideas, business models, potential solutions and new business models) during the new venture open-ended engagement process.

Tensions’ degrees vary across quadrants and the different symbiotic modes of engagement: whereas in a mutualistic mode, the internalization and implementation tensions are driven by module addition, the tension degree is low given the co-evolutionary dynamics at play. In a predatory engagement, the tension driver is role substitution/altering, its main mechanism is encroachment and obviously the tension degree tends to be high. In the commensalistic engagement, where the tension driver is module substitution or re-organizing, one of the parties – usually the stronger - is benefited, while the other’s conditions remains neutral: a temporal desynchronization between the incumbent and the new venture (start-up), i.e., dis-entrainment, operates as the underlying mechanism.

Although I draw on biologically and ecologically inspired accounts to theorize about the relationships between incumbents and new ventures in changing and to-be-disrupted industrial architectures, this empirical context is not the natural world but rather the social one. Therefore, agents do not always repeat their biologically-driven instincts; rather they can learn, adapt, use tactics to defend their assets and move to more beneficial quadrants, as shown in Figure 5.3: for instance, new ventures can move from a hostile predatory scenario to a commensalistic one to even a mutualistic scenario. Using our marine biology-inspired metaphor, ‘whales’ can become ‘killer-whales’ to defend core assets and ‘young dolphins’ can also mature and acquire defenses to reduce the internalization and implementation tensions when dealing with those ‘whales-like incumbents’ in industrial acceleration contexts.

My frameworks have implications for academics and practitioners alike. For academics, this novel framework of innovation types and their impact upon incumbent – new venture engagement situations underscores the importance of extending research foci to considering the implications of architectural innovation on such engagements. Here, the conclusion resonates with Eggers et al’s (2018) work calling for a more comprehensive and less context-specific frameworks for the study of disruptive technologies on incumbent – new venture relationships.

The importance of illuminating impacts of architectural innovation is particularly underscored by the widespread transformative impact of the digitalization trend, which shows few signs of abating. For incumbents, my work underscores the importance of having a more nuanced awareness of the motivations why a given industry-shaping initiative is actually undertaken, where the sources of resistance (both internal and external) are likely to be found in different situations, and what the consequent pitfalls for managing new venture engagement initiatives might be. There are periods when it becomes fashionable for incumbents to engage with the new venture community through different mechanisms, as was the case of, e.g., corporate venture capital in the late 1990s and early 2000s (M. V. J. Maula et al., 2009).

Many such engagements are doomed to fail, in part because incumbents and new ventures fail to understand each other’s motivations and what drives their strategic choices. A better understanding of these issues could help incumbents to more effectively manage their engagements with the new venture community. For new ventures participating in such accelerators, this study serves as a healthy reminder that industry-led corporate accelerators are not altruistic initiatives: they serve to advance the founding incumbent’s interests, and this can, at

times, give rise to conflicts. My framework should help new ventures recognize when it might be profitable to participate in such engagements, and what and how to prepare for when engaging.

5.13 CONCLUSIONS

In conclusion, I have uncovered three novel tensions in incumbent – new venture relationships that may emerge during attempts to drive change in an industry architecture and identified associated mitigation strategies. Though digital transformation is an ongoing process with unintended and unforeseen consequences, in this setting, incumbents (still) control the value chain self-disruption at the niche, module and role levels: they still control what enters, what's nurtured in the accelerator, and what's is left out. The 'whales' are still in charge of the bay.

I explore the determinants of opportunistic behaviors and internalization and implementation tensions between incumbents and accelerated entrants: the extent to which the incoming disruption intends to add or substitute a module or a role, in which case, incumbents tend to subtly oppose adoption through different tactics. Two main incumbent responses to these tensions were identified: subtle accidental misappropriation and delayed engagement, which, in turn, refers to an observed temporal desynchronization - dis-entrainment - between incumbents and new ventures. By adding more granularity into this novel framework, I was able to specify with greater detail the drivers, degrees and likely outcomes of the tensions and thus, not only define my theoretical contribution but also inform managerial practice in corporate new venture acceleration contexts.

As for the uncovered three novel tensions – internalization, implementation and role – between incumbents and new ventures in industrial acceleration contexts, the key question regarding boundary conditions is whether the tensions apply only in corporate accelerator contexts or in incumbent new ventures engagements in general. My framework for tension identification and mitigation provides an answer by including hints into relevant boundary conditions; most notably, the appropriability conditions – weak or strong – of the technology/new venture and the type of incoming technology, i.e., core vs. complementary. These two dimensions will mediate the extent of applicability of the incumbent-new ventures tensions theory, including their drivers, instantiations and outcomes. For instance, I predict that a high degree of role tension is likely to happen when a start-up brings in a core technology under a weak appropriability condition, i.e., without solid defenses to protect their IP against misappropriation, and tries to engage an incumbent. Though this situation will hold and manifest more in corporate accelerators, it may

also happen outside these new organizational forms, such as external corporate venturing or open innovation programs. We may observe dolphins and whales outside protected bays.

Another boundary condition of the inducted tension theory and associated degrees is related to the identified disruption sources: modular-additive, modular-substitutive and architectural-recombination, and role-additive, role-circumventing and role-altering disruptions. This novel and more nuanced categorization of disruption types provides important new insights into understanding the dynamics of incumbent/new venture relationships during scenarios of technological disruption, comprising radical innovation (modular additive or modular substitutive disruption), incremental business model innovation (when functionalities do not change in the system but rather who performs them does) and radical business models or ecosystem innovation, i.e., both the ecosystem compositions of functions change (what is done and who does them).

This theory is parsimonious enough to be valid and plausible in different incumbent new ventures relationships during industry architecture re-shaping. I hope to inspire researchers to pay closer attention to disruptions arising from business model and ecosystem innovation in industrial acceleration contexts.

Chapter 6

MAIN CONTRIBUTIONS, CONCLUSIONS AND PRACTICAL IMPLICATIONS FOR VALUE CREATION AND CAPTURE THROUGH INDUSTRIAL ACCELERATION DESIGN

6 CONCLUSIONS, CONTRIBUTIONS AND PRACTICE IMPLICATIONS

In this final Chapter, I highlight the main conclusions and contributions of my PhD thesis as well as its boundary conditions and limitations, which open avenues for further research. I also include a final section with industrial acceleration guidelines and managerial practice implications.

6.1 Positioning of Corporate and Industrial Acceleration Research

First of all, this PhD thesis has positioned the corporate and industrial accelerator as a phenomenon in its own right at the intersection of fundamental research streams, including strategic management, organizational design, corporate entrepreneurship, innovation management and value chain and ecosystems (Figure 2.1). In doing so, I went beyond typologies and descriptions of the corporate accelerator organizational form to delve into a fascinating yet unexplored model: the industry-led corporate accelerator. Through a longitudinal in-depth study, I was able to uncover its underlying working dynamics, including how value creation and capture works, what are the learning and capabilities outcomes in established firms and the symbiotic relationships – including tensions – between incumbents and new ventures.

As discussed in Chapter 2 on the overall positioning, I have looked for proximal and distant sources for corporate and industrial acceleration research. I conclude it by distinguishing the corporate accelerator as a distinctive organizational design for innovation exploration along 11 variables, including the key structural feature, resource flow, relationship to parent-sponsor company, type of innovation, duration, temporality and search horizon, among others. Using these variables, I was able to differentiate the corporate accelerator from previous organizational designs for innovation exploration, such as spinouts, skunk works, bootlegging, corporate venture units and open innovation programs. Furthermore, I prepare the ground for a further specification and contribution in terms of the industrial acceleration model, which I analyzed in detail in Chapter 3 (4-steps framework) and, subsequently in Chapter 4 (corporate entrepreneurial capability building) and Chapter 5 (incumbent – new ventures relationships)

My proposed classification of corporate acceleration models extends prior categorizations (Hochberg, 2016; Kanbach & Stubner, 2016; Moschner et al., 2019) and further delves into the operating principles of a revelatory industrial accelerator based on an in-depth longitudinal single case, studied for over four years. To my knowledge, this is the first scholarly account of how an

industrial value chain consortium accelerator works. Based on a port maritime industry-accelerator, I have inductively developed the four steps of how industrial accelerators work: 1) define a shared industrial innovation remit and scope; 2) co-generate a continuous funnel to search and attract new ventures; 3) flexible matching via mutual sensing; 4) select for engagement and investment.

By empirically grounding our four-step framework of industrial acceleration work, we contribute to uncovering the operating principles of these novel hybrid organizational forms that intersect not only established firms and new ventures but also value chains, regions and emerging ecosystems through digital and spatial affordances (Autio et al., 2018).

In addition, I also started to open up the black box of the “acceleration” construct in terms of its temporal significance and implications for established firms, new ventures, accelerators and ecosystems. Moreover, in Chapter 5, I empirically observed acceleration at both the incumbent and new venture levels, especially their timescales’ differential and, thus, the resulting temporal misfit or dis-entrainment, which contributes to the implementation tension. Managing the elusive temporal dimensions – clock-time vs. event-time, internal pacing vs. external pacing, linear progression vs. cyclic progression – at play in corporate accelerators, especially industry-led ones, seems to be a fundamental design managerial issue necessary to enabling and sustaining symbiotic entrainment among established firms, new ventures and other stakeholders. This thesis has started to explore this very fundamental issue both theoretically and empirically.

6.2 Leveraging and Re-Appropriating Industrial Spillovers through the Development of Corporate Entrepreneurial Capabilities

Another key finding of this PhD Thesis is that industry-led accelerators not only validate, nurture and accelerate new external ventures, but also the corporations themselves. I derived a process model to explain this striking finding: corporate R&D/innovation units and business units learn through specific sequences – acquisitive learning, vicariously, experimentally and through trial-and-error – and develop novel entrepreneurial capabilities through four phases: i) co-scanning and attracting streams, ii) strategic fit sensing, iii) shaping streams and iv) internalizing and re-designing structures.

I contributed to the corporate entrepreneurship, dynamic capabilities and corporate acceleration streams by solving the puzzle of how new entrepreneurial capabilities are initiated

through the symbiotic interaction between incumbents and new ventures in industrial ‘spilling-over’ accelerators in a process resembling yet different to that of strategic alliances.

Given the tensions identified in incumbent new venture relationships during accelerated disruption and the difficulty to scale *outside-in* streams into the organizational core, these firms have initiated the development of novel entrepreneurial capabilities. During several unsuccessful trials and POCs with external ventures, these firms became aware of potential solutions and, in most cases, did not finally engage these ventures for larger pilots. So, the firms decided to build the capabilities themselves, leveraging the many lessons learned during the co-accelerated experimentation process.

Notwithstanding the unsuccessful scaling of POC into pilots and, more generally, the difficulty to widely and continually source the firms’ problem-spaces with external entrepreneurial streams, the firms repurpose and redirect those new venture engagement and POC-level experimentation capabilities towards internal routines. Accelerated corporate new venture engagement capabilities are redirected and transformed to form the basis of newly redesigned corporate R&D/innovation routines, and, ultimately, seed initial corporate entrepreneurial capabilities.

Thus, I contributed to the discussion about the lean startup method adoption in established firms (Contigiani & Levinthal, 2019; Joshi, Uhrdin, Su, Pandza, & Khanagha, 2020; Shepherd & Gruber, 2020), through the lens of the internalizing of experimentation heuristics at R&D/innovation units, following new venture engagement exploration. Corporate lean experimentation, once embedded beyond R&D/innovation units, is not a problem-solving substantive capability, but rather a new enhanced layer of dynamic capability, especially the sensing and transforming dimensions. In terms of managerial practice, this process model can be utilized to augment the R&D/innovation functions, to manage complementarities inside and outside firm boundaries and, if orchestrated by the TMT, it may enhance the entrepreneurial orientation of large established firms.

6.3 Symbiotic Modes of Engagement in Industrial Acceleration Contexts

Through the uncovering of novel tensions – internalization, implementation and role – that emerge in incumbent - new venture relationships in industrial acceleration contexts, I contribute to a nuanced understanding of these asymmetric engagements during architectural disruption.

Furthermore, the inductively derived cooperative frameworks and decision flow process, I uncover not only tensions but also latent compositional logics and resources exchange between incumbents and new ventures that may emerge during attempts to drive change in an industry architecture. These identified tensions and resources exchanges emerge when incumbents and new ventures engaged in exploration and experimentation of core technology vs. complementary assets under different appropriability conditions and temporal orientations.

Though digital transformation and energy transition are ongoing processes with often unintended and unforeseen consequences, in this empirical setting, incumbents (still) control the value chain self-disruption at the niche, module and role levels: they still control what enters, what's nurtured in the accelerator, and what is left out. I have explored the determinants of opportunistic behaviours and related tensions between incumbents and accelerated entrants: the extent to which the incoming disruption intends to add or substitute a module or a role, in which case, incumbents tend to subtly oppose adoption through different tactics. Two main incumbent responses to these tensions were identified: subtle accidental misappropriation and delayed engagement, which, in turn, refers to the observed temporal desynchronization between incumbents and start-ups, which seems to be a pivotal factor given the importance of accelerated learning in time-compressed settings. By adding more granularity into our novel 2x2 framework, I was able to specify with greater details the drivers, degrees and likely outcomes of the tensions and, thus, not only define our theoretical contribution but, also, inform managerial and founder practice during disruptions arising from business model and ecosystem innovation in industrial acceleration contexts.

In proposing my novel ecologically-inspired framework of the incumbent – new ventures symbiotic modes, e.g. mutualism, commensalism, parasitism and predation, I extend and complement the industrial symbiosis literature. Industrial symbiosis, as a domain of industrial ecology, looks at the process by which waste or by-products of an industry or industrial process become the raw materials for another. Industrial symbiosis engages traditionally separate industries in a collective approach to competitive advantage involving physical exchange of materials, energy, water, and/or by-products, leveraging the synergistic possibilities offered by geographic proximity (Chertow, 2000; Lombardi & Laybourn, 2012). Under this logic, industrial ecosystems can be understood as networks of legally autonomous firms—usually physically

interconnected by pipelines—that use one another’s residual energy and chemical effluents as input for their own production process (Ayres & Ayres, 2002; Doménech & Davies, 2011; Ehrenfeld & Gertler, 1997; Walls & Paquin, 2015). By converting by-products into product streams for other firms, added value is created. The last 15 years in this focal European Port maritime complex demonstrate the importance of investing in the co-creation of industrial ecosystems (Hollen et al., 2015).

The highly cooperative logic among incumbents described in the industrial symbiosis stream is complemented with a new account of the cooperative tensions between asymmetric incumbents and new ventures, depending on the conditions of appropriability and disruption sources, at the core or complementary nature of the new ventures’ technologies. This is a novel scholarly contribution at the intersection of corporate entrepreneurship, innovation management and ecosystems streams, i.e., corporate and industrial acceleration research.

Notwithstanding the tensions that arise in corporate new ventures relationships during architectural disruption in industrial acceleration contexts, value is created for and captured by both entities, let alone the potential externalities at the ecosystem level.

In the next section, I translate the above findings, frameworks and process models into a toolkit to orient industrial acceleration practitioners.

6.4 INDUSTRIAL ACCELERATION DESIGN: Guidelines and Practical Implications for Corporate, New Venture and Ecosystem Value Creation and Capture

In order to translate the above findings and frameworks and to orient managerial, founder and policy practices, I now present the Industrial Acceleration Design Toolkit (Canvas and Workshop) that combines and integrates 1) the industry-led accelerator four-step framework, 2) the process model of co-accelerated corporate entrepreneurial capability and 3) some aspects of the framework for incumbent new ventures tension identification and mitigation. In doing so, I bring together the core insights of the previous chapters and propose a new industrial acceleration design canvas to inform managerial/founder practices at the level of established firms, new ventures, corporate/industrial accelerators and value chains/ecosystems.

Why another Canvas? Academic teaching and the practitioner audiences in both the innovation and entrepreneurship fields have greatly benefited from Business Model Design

Validation and Hypothesis Testing through these low-cost and easy-to-use templates. I have been myself an instructor and facilitator of business model generation and innovation. In this capacity, I have witnessed first-hand the insightfulness and usefulness of these simple yet flexible validation tools, which are now widely used. Given this democratization, we have also observed the design, iteration and development of a plethora of new Canvas templates for different purposes following the pioneering work by Osterwalder and Pigneur (García-Muiña, Medina-Salgado, Ferrari, & Cucchi, 2020; Joyce & Paquin, 2016; Osterwalder & Pigneur, 2010; Wit & Pylak, 2020). Therefore, I believe there is an opportunity for yet another Canvas to orient practitioners when strategizing, designing and sustaining corporate and industrial acceleration initiatives. I have designed this new Canvas by translating the main findings of the previous chapters.

This new Canvas was originally structured on the four core value creation steps and actions performed by the accelerator, as analyzed in Chapter 3: 1) co-creating an industrial remit and funnel for entrepreneurial innovation supply based on broad value chain/ecosystem challenges and firm-level specific ones; 2) flexible matching and mutual sensing between established firms and new ventures, including both start-ups and scale-ups, which have different appropriability conditions and defenses against misappropriation by ‘sharks’ or ‘whales’, and therefore, present a differential for unfolding corporate new venture tensions, as discussed in the preceding chapter; 3) enabling strategic fit between corporations and new ventures through small-scale experimentation, which, in turn, triggers the corporate internalizing phase, as extensively discussed in Chapter 4; 4) scaling engagement and investment to ensure the scaling of pilots and roll-outs within the focal value chain/ecosystem through further contracts and/or investments.

To facilitate the Canvas use and following standard practice in Business Model Canvas design, I include questions for each box and triangles to orient users of the Industrial Acceleration Design Canvas, as shown in Figure 6.1. Therefore, the core questions for the value creation steps in the canvas are: 1) *What is the remit of the industrial accelerator and how will you attract new ventures?*; 2) *How are you going to match new ventures with corporations?*; 3) *How and with whom are you going to conduct experiments within your internal business unit?*; 4) *How are you going to select and scale the successful experiments?*

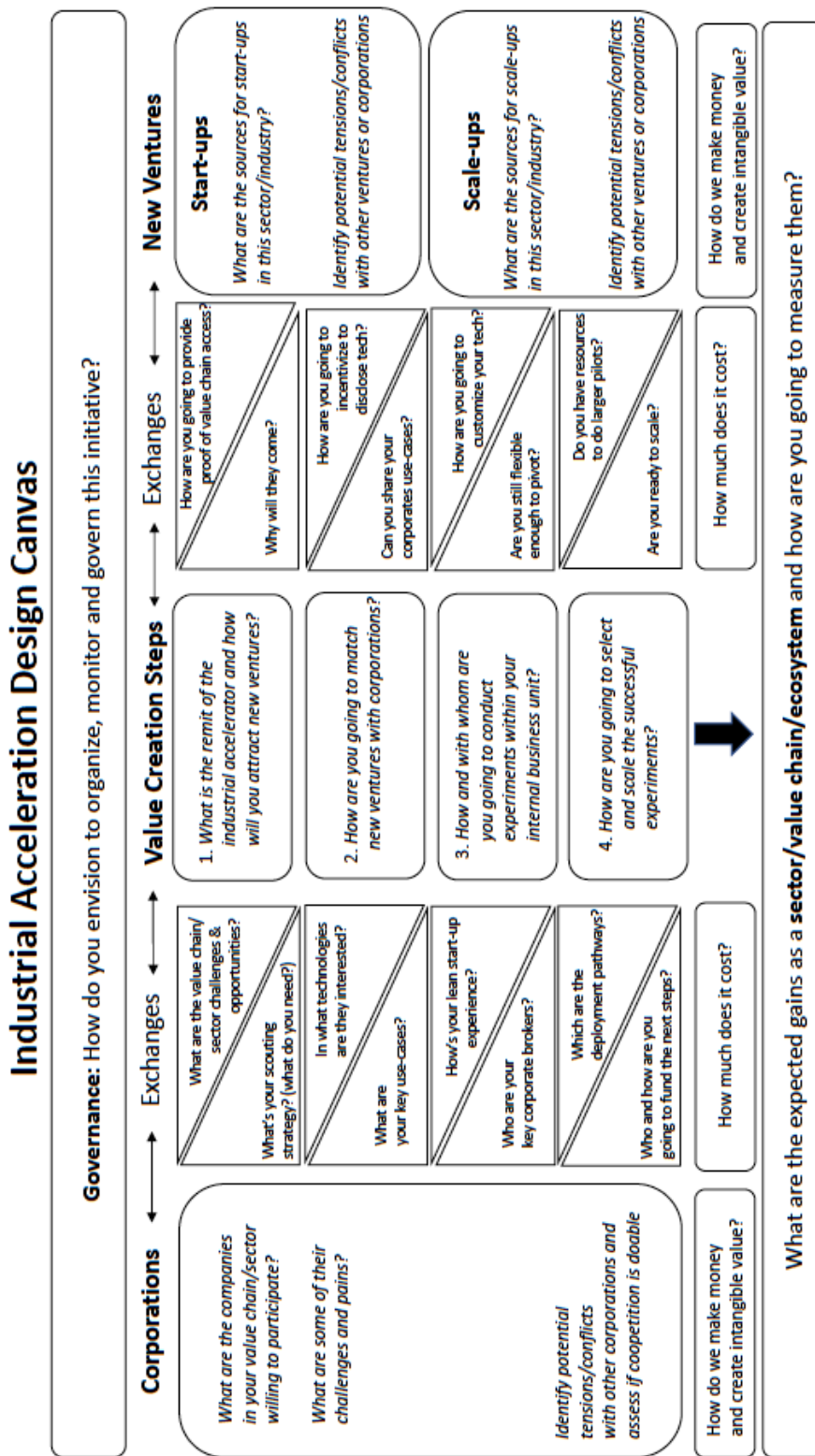
In the industrial acceleration design canvas, there are two main customers: the consortium of corporations on the left-hand side and the new ventures on the right-hand side.

Therefore, the four value creation steps are intended to add value, first, for both corporations and new ventures, and, second, to the sector/ecosystem, as potential positive externalities.

To keep the canvas parsimonious and easy-to-use in different contexts, I decided to leave out the granularity of the tensions identification, actions/reactions and mitigation framework presented in the preceding chapter but to include a core question for both start-ups and scale-ups regarding potential conflicts: *Identify potential tensions/conflicts with other ventures or corporations*. Correspondingly, I include a similar question in the corporations' box: *Identify potential tensions/conflicts with other corporations and assess if coopetition is doable*. In almost every cooperative endeavor—including industry-led accelerators—there are manifest and latent issues that have to be properly managed (Hoffmann et al., 2018) or, at least, made them visible.

Provided internalization, implementation and role tensions are identified and mitigated, an industry-led accelerator can create value for both corporations and new ventures, and ultimately, to the value chain/ecosystem as a whole in terms of technology adoption, capability development, talent attraction, workforce training, firms' reputation, among others.

Figure 6.1 Industrial Acceleration Design Canvas



As discussed in Chapter 5, I have introduced the novel distinction between start-up and scale-up and have positioned them accordingly in the quadrants of Figure 5.3, depending on the core knowledge/complementary assets and strong/weak appropriability variables. This venture distinction is important when planning, designing and running an industry-led accelerator and, specifically, managing the “exchanges” between the accelerator and both types of external entrepreneurial streams. More mitigations are needed to reduce the tensions between start-ups and corporations, especially if incoming ventures try to access the value chain/ecosystem with a core knowledge technology under weak appropriability conditions, in addition to be requested to fully disclose the operating principles of their intended substitution or addition.

There are two Exchanges Sections in the Canvas—between the corporations and the value creation steps and between the latter and the start-ups/scale-ups—in the form of triangles, indicating inputs and outputs via the position of the triangle whose vertex works as an arrow. I also include questions in the exchanges’ triangles to prompt thinking and canvas co-creation. For example, for the 1st value creation step, corporates are asked collectively (*What are the value chain/sector challenges & opportunities?*) and individually (*What’s your scouting strategy?, i.e., what do you need from the external entrepreneurial environment?*). Similarly, new ventures are attracted to the focal industrial accelerator (*Why will they come?*) and can access the value chain through the newly co-generated funnel in search of a POC. The industry-led accelerator has to signal and provide evidence that external new ventures can effectively access different “touchpoints” of the value chain, including specific valuable corporate domains (*How are you going to provide proof of value chain access?*)

New ventures can then increasingly disclose their technology and MVPs to search and try to match with corporate use cases, whose business models were initially opened-up. Ventures’ shaping and value customization subsequently take place to enable accelerated strategic fit via proofing, and, if successful, piloting, implementation roll-out and, eventually, scaling via investment can follow.

As mentioned, there are also exchanges between the corporations – especially their R&D/innovation units – and the accelerator, and through its very interface and the mentoring function, with the new ventures themselves. Similarly, as above, the exchanges section includes inputs – indicated by the direction of triangles’ vertexes – between the corporations and the value creation steps performed by the industry-led accelerator. For instance, during the co-creation of an

industrial remit and funnel for entrepreneurial innovation supply, corporations become aware of new disruptive technology through new venture scouting and collaborative sense-making ('the outside view') regarding the broad value chain/ecosystem challenges. Then, by identifying and sharing use cases, corporations engage in mutual sensing with selected new ventures through flexible matching aimed at enabling an experimental POC, which later can be further piloted on a large scale and scaled-up through a supplier contract or investment.

The progression of exchanges between the corporations and each of the four canvas' value creation steps/questions follows the process model of co-accelerated corporate entrepreneurial capabilities presented in Chapter 4. For example, I have highlighted that in the value creation Step #3 (*How and with whom are you going to conduct experiments within your internal business unit?*) regarding strategic fit via experimentation, one important input for the corporations is the transfer of entrepreneurial capabilities, especially of accelerated small-scale experimentation, i.e., proofing. However, this canvas has been designed to facilitate orderly multi-level value creation orchestration of agents (corporations, new ventures, accelerators, other stakeholders such as governmental or business associations) in industrial acceleration contexts specifically, and corporate start-up engagement contexts, more generally. As such, and for parsimony's sake, in this canvas, I do not delve into the corporate *internalizing* phase of the entrepreneurial capability building's process model discussed in Chapter 4.

The industrial acceleration design canvas includes a governance box at the top (*How do you envision to organize, monitor and govern this initiative?*) as well as the costs and revenues/intangibles involved when launching and sustaining such an initiative. In terms of governance there are different options, including a for profit consortium, non-profit foundation or public-private partnership initiated by a governmental institution. A non-for-profit arrangement comprising private and public entities is desirable to reduce the entry-barriers for both corporations and new ventures. Extant research and current practice in this area show that industry-led accelerators may have two or three tiers of corporate sponsors: the founding partners, the anchor partners and the ecosystem or network partners. Each tier of partners has specific responsibilities, rights and duties. Founding partners pay more, sit on the (advisory) board with a voice and a vote, and can steer the direction of the accelerator towards specific technological disruptions, markets, types of ventures (start-up or scale-ups) and new corporate sponsors.

Given the pace of technological disruption and uncertainties in corporate new venture engagement, informal self-enforcement governance mechanisms seem preferable over formal third-party enforcement governance mechanisms, not only for strategic alliances (Dyer et al., 2001; Dyer & Singh, 1998) but also for industry-led consortium accelerators.

Informal self-enforcement governance mechanisms does not mean “anything – including free-riders – goes” but rather the establishment of inter-organizational trust (Poppo et al., 2008) and a flexible baseline to allow for Tier 1 corporations to co-steer the industrial acceleration initiative. This flexible baseline includes the managerial freedom for the accelerator staff to improve, iterate and change the program as they see fit, based on the feedback from both corporations and new ventures.

The accelerator staff should develop a ‘playbook’ to anticipate and mitigate the internalization, implementation and role tensions identified in Chapter 5 and improve orchestration of value creation and capture by different stakeholders. In addition, cooperative tensions might emerge among incumbents and new ventures alike and, thus, a consideration of the core knowledge vs. complementary assets dimensions and strong vs. weak appropriability conditions of each new incoming venture might help to prepare the ground for fertile “exchanges” (mentoring, brokering, shaping via experimentation, pivoting, deployment and scaling) among different stakeholders and, thus, enable value creation at the corporate, venture and ecosystem levels.

Running industry-led accelerators costs money. Corporations, including governmental and/or business associations, are the main sources of funding to operate these programs continually. Using a three-year subscription model, corporations pay an annual fee of up to USD100,000, but that can vary depending on the sector and the tier level. This corporate funding is utilized to cover the main accelerator’s yearly operations, including its staff and the ventures’ stipend. Equally important is the time commitment from the corporate partners, especially from the R&D/innovation units for the different industry-led accelerators’ activities: scouting, selecting, mentoring, shaping and proofing. Therefore, there is a time commitment that goes well beyond the official three-month acceleration period.

Value capture and revenues can come from two sources. First, if the industry-accelerator receives equity in exchange of ventures being accepted into the program, exits at higher valuations could be a source of revenues down the road. When the industry-led accelerator is an investor in new ventures, it has an incentive to maximize the odds of their survival and scaling. However,

there are industry-led accelerators that explicitly do not use equity as a strategy to lower the entry barriers of incoming external ventures, multiply experimentation and further facilitate corporate new venture engagement and, thus, maximize the odds of not a singular exit but rather of sector-wide innovation acceleration. Revenues for the corporations can come from cost savings in new products and services that improve the efficiency and productivity of core equipment and complementary assets.

Second, value capture can come from intangibles and capabilities. As analyzed in Chapters 4 and 5, corporations capture value from the accelerator and the new ventures alike. Corporate R&D/innovation and business units do not only become inspired and accidentally re-appropriate the ventures' early solutions but, also, internalize the lean start-up method and, ultimately, initially develop novel entrepreneurial capabilities.¹⁹

Finally, in every industrial acceleration design, there are considerations for network externalities that affect the value chain and ecosystem levels. These externalities can be observed at – but are not limited to – the industry's technology adoption, local entrepreneurship measures (Gonzalez-Uribe & Leatherbee, 2018)²⁰, corporate innovation outputs, talent attraction to an industry/city/region or sustainability levels.

6.4.1 Guidelines: How to fill and use the Industrial Acceleration Design Canvas

Following the business model generation (Osterwalder & Pigneur, 2010) and the plethora of canvases that have been subsequently designed and utilized for different purposes, the proposed industrial acceleration design canvas is also a co-creation and validation tool. It is intended as a tool to help corporations' and/or industry/sector/governmental representatives think through and co-design a collaborative – even cooperative – industrial acceleration initiative. It could be also used more generally to plan for open entrepreneurial innovation projects and corporate new venture engagements. As in every canvas, this validation tool is aimed at helping to think through the emerging issues and tensions, value creation steps, customer segments, exchanges, governance

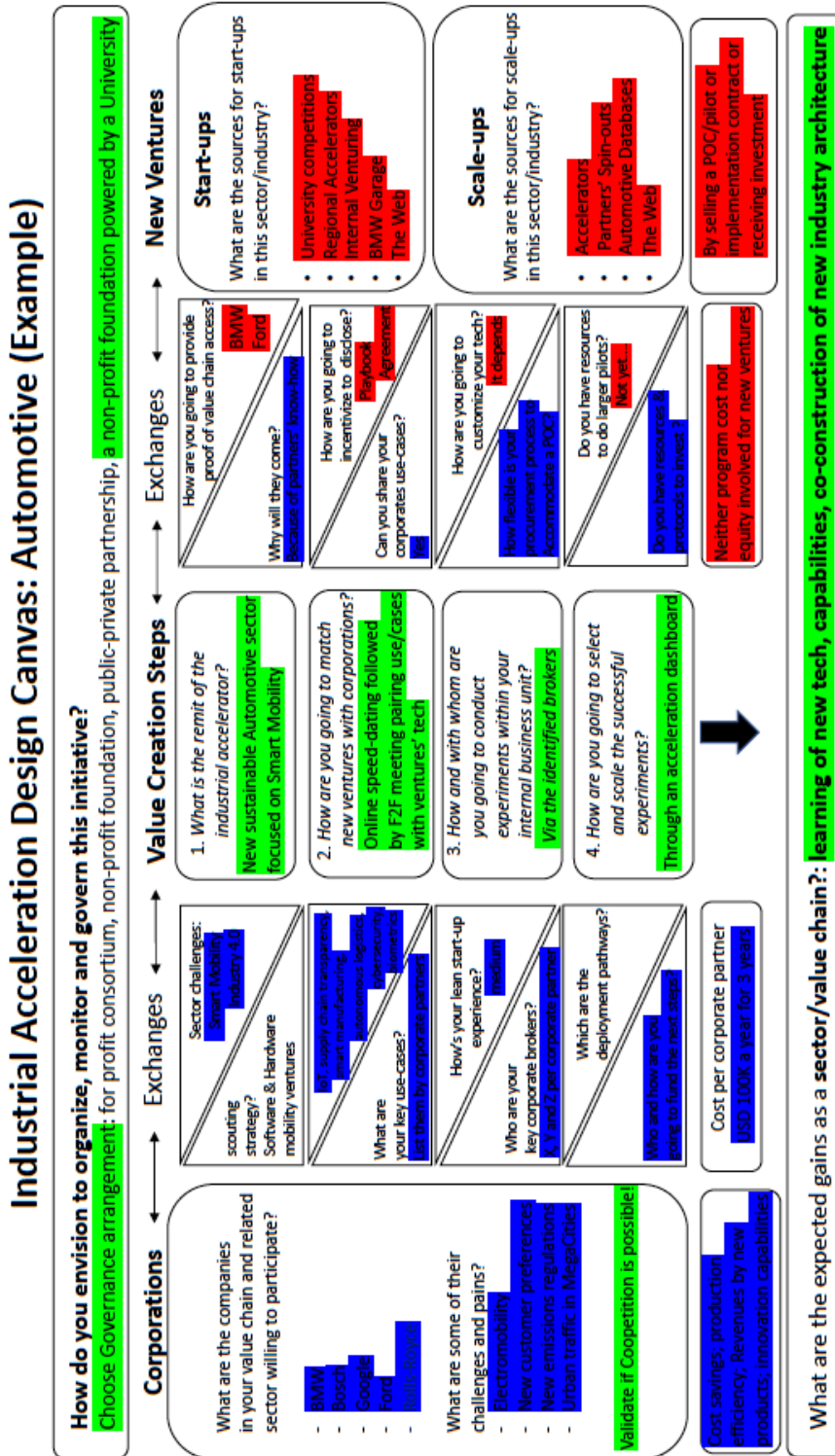
¹⁹ In our longitudinal multiple cases, the main realization of value creation and capture has been through capability initiation and development.

²⁰ This paper shows evidence on venture performance by a Government-backed start-up accelerator, not an industry-led one but it is included as a proxy for my externality argument of the canvas framework.

mechanisms and network/ecosystem externalities. Once the canvas is filled with the initial hypotheses and “guesses”, the users have to go *outside* or *look inside the building* – as discussed in Chapter 4 – for further validation clues. The users will record what has been invalidated and annotate new hypothesis based on the collaborative customer discovery.

To illustrate these guidelines, I include an example of how the industrial acceleration design canvas can be actually and preliminary filled-in to start the thought process required for establishing an acceleration initiative in the automotive/mobility sector. In Figure 6.2, there are the corporates’ inputs in color blue, the accelerator input/steps/questions in green and the new ventures’ input in red.

Figure 6.2 Industrial Acceleration Design Canvas: An Example



6.4.2 Industrial Acceleration Design Beta Workshop ²¹

This Canvas can be put into practice in a workshop to devise an industrial innovation acceleration strategy and action plan, including established firms, new ventures and other relevant stakeholders. Below I describe the components, materials and instructions for such a workshop.

6.4.2.1 Components

1–2 Facilitators

Participants: 5–25

Characteristics of Target Participants: professionals or researchers working in the same industry (supply chain) or adjacent industries; R&D/innovation staff looking to establish or re-engineer a corporate accelerator or a corporate new venture engagement program.

Materials: A room, one print-out of the canvas per five people, Post-it notes and pens

Duration: 2 hours

6.4.2.2 Instructions

1. The Facilitator will introduce the workshop, its underlying principles, the objectives and intended outcomes. The facilitator will also highlight why this is relevant in the current business environment, examples of industrial acceleration and opportunities to apply this novel framework. (10 minutes)
2. Break into groups of five, ideally with members of different firms within each group.
3. The facilitator will provide an overview of the industrial canvas (five min) and ask the participants to start filling it in, starting with the value creation steps (#1 to #4).
4. The facilitator will have some prepared questions and inspiration cards to break the ice and inspire participants to think outside of the box regarding the innovation remit and scope.

²¹ I planned for a beta workshop on March 20th 2020 to test the Industrial Acceleration Canvas, Instructions, and Participants' inputs. Due to the COVID-19 crisis, this workshop was cancelled, and it will be re-scheduled for later in the year as it requires face-to-face interaction among the participants engaged via the Canvas and related material.

5. One member of the group will take detailed notes. Everyone can put Post-its onto the canvas
6. One canvas can be used for start-ups and another for scale-ups, in order to be more precise in terms of the exchanges throughout the value creation process, if the group decides to address both
7. Each group will work on their dedicated initial canvas for 30 minutes with the facilitator(s) stopping by each group to check the progress and address any doubts.
8. The facilitator will then convene all of the groups and ask a representative from each to share their collective thinking and designing process, including key insights for the intended value creation processes. The facilitator and participants will comment and ask questions.
9. For the following 15 minutes, each group will continue to work together on their canvas, addressing comments and issues raised previous to the open collaborative session.
10. The next activity will be an internal cross-validation exercise (15 minutes). Groups will briefly present for five minute and exchange their canvas with another group, which will operate as an “external” validator of each one’s canvas. The group receiving the canvas may ask further questions to clarify, and then add, annotate and in/validate assumptions regarding each canvas’ boxes.
11. The external validator group will return the canvas to its original group (its owner), along with a few comments and a central statement summarizing their revision/validation.
12. Each group will address the feedback received on its original canvas by the external validator group (15 minutes).
13. Finally, each group will present their final industrial acceleration strategy and action roadmap, highlighting the intended value creation and capture steps, the key exchanges, the possible governance mechanism, and intended positive (and negative) externalities to all workshop participants.
14. The facilitator will ask for specific feedback (“I like, I wish”) regarding the thought and co-design process using this version of the canvas and this workshop format.

6.4.3 How can established firms capture value from an industry-led accelerator?

As a corporation, it takes leadership and commitment of resources – and especially time – to join and capture value through an industry-led accelerator. The question, therefore, is: how do established firms set up internal processes to both create and capture value through the industry-led accelerator? In other words, how do corporate partners enable the validation and acceleration of these external incoming ventures while also accelerating themselves?

This model of acceleration not only validates new ventures within the focal value chain/ecosystem, but also performs a fundamental action: it uses external new ventures to inspire, redesign and try to accelerate corporate innovation processes. This is the striking counter-intuitive finding extensively analyzed in Chapter 4, especially in what I refer to as “internalizing” vis-à-vis the co-accelerated corporate lean entrepreneurial capability-building process model.

Corporations need to perform and sustain various internal actions to create momentum and set the stage for incoming external innovation streams. Actions are required to capture the value of engaging with these innovation streams. Even in corporate contexts where there is an innovation vision from senior leadership, several decision-layers and related delays exist when trying to engage with new ventures: from demo to proof-of-concept to a pilot to, ultimately, scalable implementation or investments. In many observed instances, these are not only delays but, rather, chasms in the corporate innovation process, especially between proof-of-concepts, pilots and full rollouts. The decision and the budget are not clearly allocated among the corporate R&D/innovation unit and the internal business unit. At the end of the day, nobody is in charge of making the final decision and allocating the resources accordingly. Start-ups, then, become stuck after the demo or proofing phase. The “dolphins-like” ventures continue waiting for the “whales-like incumbents” to make a decision. The “whales” want to further validate the novel arrangement with follow-on internal developments or successive experiments with external ventures. Then, the “dolphins” de-accelerate; some have to swim to other bays while the “whales” decide what to do and whether they will lift or not the “dolphins”.

By and large, efficiency-oriented companies in traditional sectors such as the port maritime sector use the stage-gate product innovation process (Cooper, 2008), which does not facilitate engagement with start-ups. This linear stage-gate process is useful for managing internal

complexity, but it is not effective at dealing with external entrepreneurial innovation streams that are being mentored by the same people running the internal corporate innovation pipeline.

In the case of industry-led accelerators, a *hybridization* take place where the inside/outside border becomes blurred: the internal problems become opportunities for the new ventures, which in turn, and through corporate mentoring, are shaped and customize their value propositions to address those very problem spaces. That is, there is the direct involvement of corporate mentors to validate the new ventures' value propositions and to help them customize their technology to solve pressing problems at the firm and ecosystem levels. This symbiotic engagement becomes incompatible with the linear stage-gate process still prevalent in several large incumbents, including the four cases under study in the port maritime complex. The stage-gate process can further delay the overall acceleration process by adding additional decision-layers that consume time and decrease new ventures' momentum.

Given the above, the following managerial question arises: what can be done to manage this incompatibility and to solve this speed differential in order to enable better engagement with external new ventures?

As evidenced by the discovered pattern of corporate entrepreneurial internalizing, joining an industry-led accelerator creates the conditions to speed up firm-level innovation processes and corporate entrepreneurship practices. Based on our longitudinal research, we suggest the following actions to further enhance corporate entrepreneurial innovation acceleration.

First, this is an opportunity for large, established companies to move away from linear stage-gate models and start piloting new lean entrepreneurship practices with increased speed and room for experimentation. With this lean approach, large firms can reduce the cycle time of problem-identification, ideation, prototyping, validation/invalidation and implementation. The adoption of lean start-up methods by large firms is neither a straight nor an easy process, given the corporate controls, the existing decision-layers and the established procedures (Felin et al., 2019). However, there are already useful guidelines for experimenting with and implementing such new lean approaches in large enterprises (Blank & Newell, 2017; Ries, 2017). Furthermore, in the present research, I studied and showed evidence about how four large corporations engaged with the industrial accelerator adopted and internalized the lean start-up method, and in so doing, how corporations have created and captured value in terms of novel entrepreneurial capabilities.

Through its participation in the industry-led accelerator, these corporations not only scout new technology but also learn new acceleration and experimentation capabilities to further their adaptation to technological discontinuities.

Second, senior executives and managers can try ambidextrous organizational designs, where at least one unit is released from operational pressure. These units can focus on far ahead projects, i.e., exploration of highly uncertain radical innovation opportunities, including proof-of-concepts with the accelerated start-ups on even apparently contradictory strategic goals (Andriopoulos & Lewis, 2010; Smith & Tushman, 2005). However, these units require support from senior leadership, who will then integrate those efforts into the overall strategic roadmap.

Third, the accelerator's corporate partners can send their intrapreneurial teams to join the industry-led accelerators' cohorts to learn first-hand – together with external ventures – the sense of urgency, resilience, agility, experimentation and entrepreneurial capabilities required to survive and flourish in these industrial contexts.

6.4.4 Cooperatively navigating the waves of disruption: how to set a corporate consortium industrial accelerator

Given the increasing disruption and survival challenges faced in every industry, large firms can now experiment with a new organizational interface to further their strategic exploration efforts to remain competitive: the corporate accelerator. In this dissertation, I have focused on one of the more promising models: the industry-led consortium value chain one. Based on a revelatory accelerator, I have analyzed industrial corporate start-up dynamics orchestration through four value creation steps that can enable not only new ventures but, also, corporate and ecosystem innovation acceleration. I have devised a process model and a canvas to aid corporations, ventures and ecosystem stakeholders alike in this industrial acceleration design process.

My research suggests that senior leadership from at least two corporations or governmental entities are needed to collaboratively enact an industrial innovation remit and shared vision, comprising key opportunities and challenges ahead using a 5-to 20-year horizon. Then, the industry-led accelerator needs to address those opportunities and challenges by co-creating a funnel for external incoming entrepreneurial innovation streams, i.e., start-ups and scale-ups. The accelerator and its corporate partners have to enable the strategic fit between the external new ventures and the challenges/opportunities at the firm- and industry-level. On the one hand, this

requires the right scouting and sourcing of new ventures, and on the other, it requires that these incoming external ventures are able to search within the value chain to find a problem-solution match as early as possible.

As mentioned, this search and validation with incumbents operates under the flexible matching principle; i.e., new ventures can validate and pilot their solution with more than one corporate partner – even competitors – at the same time. During this fit sensing, shaping and value customization take place through small-scale experimentation, i.e., proofing.

A successful, industry-led accelerator operates under conditions of transparency and inter-organizational trust to allow for problem searching, attribution, aggregation, matching and monitoring over time. Acceleration is promoted not only at the new venture level, but also at the firm-level, to revamp linear stage-gate innovation processes towards open, lean, flexible ones that can enable, in turn, the overcoming of various corporate silos and chasms. Finally, horizontal knowledge sharing among corporations and ventures and, thus, spillovers and externalities can be facilitated by recurrent and scalable corporate new venture engagement and investments both within and beyond the focal industrial ecosystem.

6.5 BOUNDARY CONDITIONS, LIMITATIONS AND FURTHER RESEARCH

As with all studies, there are boundary conditions and study limitations.

Given the under-theorized nature and absence of comprehensive datasets of the corporate and industrial accelerator phenomena, we chose an inductive approach to study a revelatory research setting in a leading European maritime port complex, comprising the industry-led accelerator, the co-founding value chain incumbents and the accelerated new ventures. When viewed together, our findings, frameworks and inductively generated models – the four-step mechanism of industrial acceleration, the process model of corporate entrepreneurial capability building, the framework for incumbent - new ventures tension identification and mitigation, as well as the industrial acceleration design canvas – are not completely generalizable to other industrial settings, but bound by certain validity conditions of where and when they can work. I elaborate on those boundary conditions per chapter below.

Though we have focused on port maritime, dredging, energy and refinery industries, that is, heavy asset-driven industries, our frameworks can be applied to different industrial acceleration

settings, provided some conditions are met. First, there are environmental contingent conditions required to prompt industrial acceleration initiatives: incoming disruptions on the technology, economic or regulatory fronts affecting not one incumbent but several of them, or the whole industry, sector or region. High-velocity environments (Eisenhardt & Martin, 2000) – irrespective to the type of industry, e.g. high vs. low tech – are more conducive to the establishment of industry-led accelerators. By and large, the port maritime industry can be characterized as low-to-medium tech and has pioneered and sustained this collaborative acceleration initiative given two technological discontinuities facing as a sector: digitalization and energy transition. One might think that in high tech sectors, industry-led accelerators are redundant, due to the strong, long-established internal R&D/innovation capabilities. However, it seems that this is not the case across industrial acceleration settings. In the same country as the port maritime complex we have studied, 100 km away, there is another prominent industry-led accelerator for the high-tech industry built around a university-based science-driven innovation milieu. Similarly, in Stuttgart, Germany, the automotive sector – including companies such as Daimler, the University of Stuttgart, and PLUGandPLAY, Porsche, BASF and Bosch, among others – launched *STARTUPAUTOBAHN* in 2016, a cooperative industrial accelerator with over 20 partners, to explore and co-create – together with start-ups and scale-ups – the future of automotive/mobility, given the upcoming disruptions, including electromobility. This is not precisely a low-tech sector, which has sustained steadily this collective explorative acceleration initiative over the last four years.²²

Second, senior leadership at the corporate level is required to put these acceleration initiatives in motion. It seems trivial or even cliché to say, but it is what I have observed empirically by interviewing C-level executives and observing their actions over time. In addition to ambidextrous leadership (Probst et al., 2011) in each corporation, a minimum of two key value chain incumbents, – which may trigger additional corporate partners to join – are needed to get things started: they must define a shared industrial innovation remit and co-generate a continuous funnel to search and attract new ventures. That was the case at OceanAccel, where the CFO of ROYAL PORT played a pivotal role in transforming the Port Authority into an enabler,

²² I have initially engaged this automotive/mobility industrial accelerator in a recent research visit to do a potential comprehensive study, where to compare dynamics and adjust the boundary conditions under which the industrial acceleration phenomenon emerges and unfolds.

orchestrator and even an entrepreneurial regulator of the focal port maritime emerging ecosystem, where the industrial accelerator has played a fundamental function by bringing together key corporations, stakeholders and new ventures, driven by a shared industrial and regional vision.²³ This leadership boundary condition, including the role of public authorities, is also observed in the other leading port maritime industrial accelerator worldwide, PIER71 (*Port Innovation Ecosystem Reimagined at BLOCK71*), launched by the Maritime and Public Authority (MPA) of Singapore in collaboration with a few key corporations.²⁴

Third, the industrial accelerator's milieu also plays a role in enabling and putting these initiatives in motion. In our port maritime setting, although almost every corporation supporting the accelerator is a global company—including three out of the four incumbents under study—all of them are headquartered in the port maritime complex. That means that not only senior leadership is required but physical proximity to the 'industrial acceleration scene'. The same conditions seem to apply for the high-tech industrial accelerator 100 kms away, for the *localized* industrial acceleration initiatives in the automotive/mobility sector in Stuttgart and maritime one in Singapore.

In terms of the process model of corporate entrepreneurial capability, the boundary condition is associated with absorptive capacity and, especially, the maturity of the internal R&D/innovation units. In our study, all four longitudinal corporate cases have just recently started their R&D/innovation units, with the exception of SATELLITE, which has had a more traditional R&D unit for over 20 years, yet its entrepreneurial innovation engagement function is also very recent (3 years). As observed in Table 4.3 and Appendix A, the four corporations started their innovation units and/or appointed new staff about the same time that OceanAccel was being launched with their very corporate support. Therefore, small and new corporate R&D/innovation units were able to learn through different sequences and to develop new entrepreneurial routines and capabilities as depicted in the four-phase process model.

Given the low maturity level of these corporate R&D/innovation functions, I was able to observe the founding stage of a salient new capability being developed through relational resource

²³ See Appendix 8.4 for the empirical account of how ROYAL PORT has evolved its business logics from a landlord, to a governmental corporation, to an ecosystem enabler to even an entrepreneurial regulator.

²⁴ I had the chance to present my research insights to the MPA authorities and share my recommendations in how to set this type of industrial accelerator. I was invited twice and started to collect data for my next research project.

exchanges with other corporations that were on the same page, the accelerator itself and the external new ventures. The fact that our corporate cases were initiating their entrepreneurial innovation journeys makes the process model much more salient and visible. Therefore, a practical implication derived from the boundary conditions of this conclusion is that corporations operating in low-to-medium tech industries are likely to develop new entrepreneurial capabilities and routines if they were to actively participate—including R&D/innovation units and a few internal business units, all supported by the TMT—in an industry-led accelerator.

A condition that sets the boundaries of the logical validity of our process model is the extent to which R&D/innovation units co-experiment together with the internal business units and the external ventures. This inter-organizational experimental learning goes beyond the disembodied experimentation theorized previously in the context of corporate venture capital: a much more embodied co-experimentation practice is needed as an enabler and, ultimately, as a trigger of the corporate entrepreneurial capability building.

As for the uncovered three novel tensions – internalization, implementation and role – between incumbents and new ventures in industrial acceleration contexts, the key question regarding boundary conditions is whether the tensions apply only in corporate accelerator contexts or in incumbent - new ventures engagements in general. Our framework for tension identification and mitigation provides an answer by including hints into relevant boundary conditions; most notably, the appropriability conditions – weak or strong – of the technology/new venture and the type of incoming technology, i.e., core vs. complementary. These two dimensions will mediate the extent of applicability of our incumbent-new ventures tensions theory, including their drivers, instantiations and outcomes. For instance, we predict that a high degree of role tension is likely to happen when a start-up brings in a core technology under a weak appropriability condition, i.e., without solid defenses to protect their IP against misappropriation, and tries to engage an incumbent. Though this situation will hold and manifest more in corporate accelerators, it may also happen outside these new organizational forms, such as external corporate venturing or open innovation programs. We may observe dolphins swimming around whales outside protected bays.

As discussed, another boundary condition of our tensions theory is related to the identified disruption sources: modular-additive, modular-substitutive and architectural-recombination, and role-additive, role-circumventing and role-altering disruptions. This novel and more nuanced categorization of disruption types provides important new insights into understanding the

dynamics of incumbent - new venture relationships during scenarios of technological disruption, comprising radical innovation (modular additive or modular substitutive disruption), incremental business model innovation (when functionalities do not change in the system but rather who performs them does) and radical business models or ecosystem innovation, i.e., both the ecosystem compositions of functions change (what is done and who does them). This theory is parsimonious enough to be valid and plausible in different incumbent new ventures relationships during industry architecture re-shaping. Further research will have to determine if and to what extent they hold.

Finally, in the practitioner-oriented output presented above, I put together the lessons learned into a new industrial acceleration design canvas, along with guidelines, an example and a workshop. Their boundary conditions will be determined through practical iteration; that is, by actually co-filling and further validating this canvas and its boxes, flows and key exchanges. I could not run a co-creation session at this stage due to the recent Covid-19 outbreak, but I will have a wonderful opportunity to do so going forward. Through the initiative on corporate and industrial acceleration, specifically the international symposium that I co-conceived and co-organized at Imperial College in 2019 and will be running again in late 2020, I plan to test and iterate this very canvas with corporations, new ventures and stakeholders, which will involve industrial acceleration initiatives, such as the ones referred to above. I also expect to facilitate workshops in other industries undergoing transformation to aid the collaborative thought process and help to co-design and launch their own customized industrial acceleration programs.

I believe that the world after Covid-19 will present plenty of opportunities in this regard as many industries –and their large, medium and small firms—will have to learn to re-accelerate again and develop new capabilities to create and capture value in unexpected ways and thus we will need strong dolphins, whales and sharks. I expect to learn from practitioners about the boundary conditions of this initial toolkit – the canvas and the workshop – and to iterate it accordingly.

6.6 Avenues for Further Research

Further research in this area is promising. As a multi-level hybrid organizational form, comprising incumbents, new ventures (start-ups and scale-ups) and the accelerator itself, there are plenty of research opportunities. In addition to the avenues already mentioned above, I would like to comment on a few exciting areas in this acceleration space, on which I will continue to focus.

The first is the ongoing study of this focal port maritime ecosystem and of the “whales” as they further develop entrepreneurial capabilities to the point of becoming “sharks”.

Second, as mentioned, a comparative study with Singapore’s PIER71 is in order to assess the boundary conditions of our capabilities process models and tensions framework, including the sources and types of disruptions, as well as how the accelerator is organized and how its incentives are structured, e.g., equity/non-equity deals with new ventures.

Third, though this PhD has studied new ventures in relationship to both the incumbents and the accelerator, new research may ask how “young and older dolphins” swim with whales and with the soon-to-be-sharks if they are not lifted, and how they adapt, survive or die and scale in other waters.

Fourth, another relevant question might be how business model validation can be performed, accelerated and experimentation efficiently done in business-to-business (B2B) environments, where new ventures depend on the incumbent’s procurement approval and lengthy supplier pilots’ contracts; are there short-cuts out there? What are ventures’ new strategies and tactics to accelerate testing and cope with these bottlenecks?

Fifth, industrial accelerators such as OceanAccel, PIER71 and *STARTUPAUTOBAHN* have massive scouting databases, from which new ventures are selected and invited to join. We know that many are not selected, and many others declined for reasons related to resources, focus and location. With a regression discontinuity design of selected/not selected ventures in these industrial programs, it might be possible to measure the value added to the new ventures by both the acceleration program and engagement with corporate partners.

Sixth, as a social network analysis (SNA) researcher, I see several opportunities for mapping collaboration, engagement and investment ties across dyads, triads and multiple partners (Davis, 2016) in these multi-level industrial acceleration ecosystems.

Seventh, and finally, as we learn more about the dynamics of industrial acceleration across sectors, including value creation and capture, incumbent/new venture tensions and ecosystem externalities, design management research will be able to better understand the intended/unintended consequences of the processes, and thus, deploy new tools to guide policy/managerial/founder acceleration practices.

APPENDIX A

CORPORATE R&D, INNOVATION MANAGEMENT and NEW VENTURE ENGAGEMENT IN A PORT MARITIME COMPLEX

7 **APPENDIX A: CORPORATE R&D, INNOVATION MANAGEMENT and NEW VENTURE ENGAGEMENT IN A PORT MARITIME COMPLEX**

APPENDIX A (Chapter 7) presents an empirical descriptive account, i.e., case narratives of the four corporate cases with regards to their R&D/Innovation strategy, innovation management processes, and emerging internal entrepreneurial practices vis-à-vis the engagement with both the industry-led accelerator and new ventures.

7.1 **SATELLITE**²⁵

SATELLITE is a global maritime services provider, headquartered in The Netherlands, operating in the dredging, maritime infrastructure, including off-shore energy as well as towage and salvage. It was founded on 1910 and it currently employs 10,700 people in 90 worldwide branches. SATELLITE is a publicly listed company on Euronext Amsterdam with a turnover of 2,342 millions Euros.

SATELLITE is an asset-driven company, which main business model depends largely on vessels utilization. Vessels are extremely capital-intensive assets. For example, a hopper-dredger costs several hundreds million euros and has a lifetime of about 30 years. Such investments constitute a long-term commitment and create inertia to adapt to environmental changes and change of course of actions. At a more strategic level, SATELLITE is experiencing an initial transformation from a Dredging company into an Energy one given the increased weight/importance of offshore in its overall business. This constitutes a challenge for its core operations, the way the business is organized as well as for its Corporate R&D department and its organizational identity.

SATELLITE has had R&D activities since the early 1990s. The Corporate R&D Department currently comprised 20 people, organized at the corporate level, who provide services

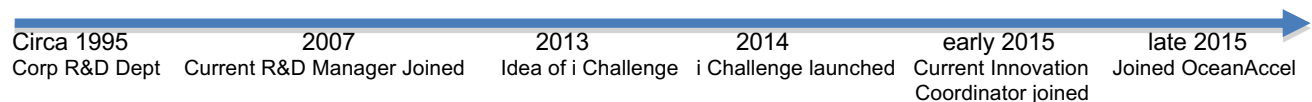
²⁵ Between June 16th, 2017 and June 15th, 2019, I conducted several interviews with the Corporate Research and Development Department's main Staff and participated in both start-up mentoring sessions and internal innovation challenges activities within SATELLITE such as the *SATELLITE Jump initiative* to foster intrapreneurship. The interviews were held at SATELLITE' Headquarters and conducted by myself and recorded with my phone. The Interviewees were: the General Manager (PhD), Corporate Research & Development Dept (almost 10 years with SATELLITE, previously at TNO, a research institution), the Innovation Coordinator, Research & Development (almost 4 years) and a R&D Engineer in charge of Disruptive Technologies as well as OceanAccel Mentor.

to the three divisions: Dredging, Off-Shore and Towage and Salvage. These 20 people are released from operational pressure and fully dedicated to the work within the Corporate R&D Department. This Department reports directly to the Board of Directors since the early 1990s. According to key strategic informants, they do have TMT support for these activities as the very fact there is a Department released from operational day-to-day work and reporting to the Board is an evidence of the importance of R&D and entrepreneurial innovation.²⁶ In fact, in this industry it is common to observe that R&D and incremental innovation activities—understood as problem-solving—do take place within the Engineering Departments. However, the time fully dedicated to R&D is usually limited by operational activities and engineering projects. In the case of SATELLITE, this Corp R&D Department have very well-trained professionals, whose time is fully spent on research. The internal challenge this Department face, though, is the distance to the daily core business.

7.1.1 Organizing R&D and Entrepreneurial Innovation

Though this Department is formally named ‘Corporate R&D’, it increasingly promotes entrepreneurial innovation activities both internally and externally. However, neither innovation nor entrepreneurship is present in their label, even though SATELLITE has defined three core competences every employee should have: Teamwork, Professionalism, Entrepreneurship. This is, of course, not only a matter of labels. This R&D Department has been lacking entrepreneurial skills and new lean start-up processes adapted to large firms. This is one of the reasons for re-designing and re-launching a company-wide innovation challenge, hiring an Innovation Coordinator and for joining OceanAccel. A simple stylized timeline of SATELLITE’ involvement in entrepreneurial innovation with the main milestones is shown in Figure 2 below.

Figure 7.1 SATELLITE Timeline: main R&D and Entrepreneurial Innovation milestones



Although this Department is an exception both in the dredging industry, there are important challenges regarding its functions and expectations from senior management. On the one hand,

²⁶ As per the involvement with OceanAccel, SATELLITE is not represented at the C-Level, which differs from the case of ROYAL PORT, TANKTECH and VOX. I have not seen SATELLITE’ C-Suite Executives at OceanAccel events or at its Advisory Board.

this R&D Department realized is lagging behind on entrepreneurial innovation mindsets and methods. On the other, senior management expects more work on radical innovation as well as exploration of potential threats coming from new radical technologies and business models.

7.1.2 Types and Horizons of R&D and Innovation at SATELLITE

As mentioned in relationship with the business model, SATELLITE' current core Innovation strategy is based on 2 trends (and technologies) that impact the breadth and depth of innovations on vessels.

1. The use of data services for optimization of fleet exploitation
2. Autonomy of Vessels

SATELLITE uses the Three Horizons Framework (Baghai, Coley & White, 1999) popularized by McKinsey & Company to depict both the technology and market uncertainties as well as the innovation processes that have to be managed concurrently. Therefore, SATELLITE has defined three Horizons of innovation where in the lower left corner is the Horizon 1 with core Development work, which is about optimization and there is little uncertainty both in the technology and market sides: "This is about doing better what we do now and actually that is not even research." The Corp R&D Managers even ask themselves whether this development/performance improvement work should be done within this Department or within each Business Units (Engineering Departments), where actually this type of work is often done through a project-by-project basis. Then, there is Horizon 2, where proper R&D work on adjacent technologies or business models is conducted. In this Horizon there is more uncertainty about these technologies and markets but there is enough knowledge—in other industries, for instance—to guide this exploration effort. 90% of SATELLITE' R&D activities is spent on Horizon 1 (development, optimization, performance improvement) and Horizon 2 (R&D work on adjacent technologies and business models). Finally, there is Horizon 3 for radical innovation exploration, where there is high uncertainty in terms of both technologies and markets. This is exploration about the unknowns. SATELLITE spends 10% of its time and budget on this type of exploration, and the Board is currently asking for more! For example, the types of questions that drive this exploration are the following: what if ports don't exist? what is the logistics of the future? what will be the impact of the new eco-cities?

Given the Horizon 1-2 orientation, the challenge for SATELLITE is to connect the explorative edge to the exploitative core by providing people with connecting arrows: *“If you keep on pushing, keep on pushing, they [employees, engineers] will pull down some ideas and just implement them in the core of the company. That’s a mechanism that can be strengthened. We’re just in the beginning.”*

This Corporate R&D Department is actually trying to change the company’s standard linear stage-gated approach to evaluate Horizon 3’s Entrepreneurial (Radical) Innovation ideas because Horizon 1 assessment questions such as: how much does it cost? what is the ROI? what’s the investment? does it work. Throughout this initial process, this R&D Unit has been learning about new methodologies to Entrepreneurial Innovation from the Erasmus University’s Center on Entrepreneurship (ECE), and particularly, from OceanAccel. And lately this Unit has been teaching the Board and others in the company about this new approach: *“Don’t ask for a business case here. Do not do it”*, where this Entrepreneurial R&D Unit (or intrapreneur herself) must be able to defend these ideas, but without a business case.

7.1.3 Entrepreneurial Innovation Activities

Following the strategic focus, organizational design and innovation/horizons framework, there are activities to foster entrepreneurial innovation within the company, including those in relationship with the external environment. These activities are led by this R&D Unit:

1. *Internal Scouting* (Talking to different Business Divisions): what do you see as trends? what is happening in the market 5-10 years from now? what do you see if you look further, across the horizons 2-3 of your current projects, what do you think you will need? The SATELLITE 2050 is an initiative to enable radical internal scouting in that it forces managers up to the Board to think radically and creatively about new emerging scenarios that might impact the core business by 2050.
2. *SATELLITE Innovation Challenge*: the objective is to get radical ideas, where everyone within SATELLITE can come up with their ideas. Then they are ranked, selected, and at the end there is an event, creating a lot of company involvement. If one person has an idea, another person may be able to contribute to that idea, so they bring people together and

create teams to develop further these ideas. As mentioned, they are now trying to move from a standard linear stage-gated process to an iterative and experimentation-oriented one.

3. *SATELLITE Jump*: a new process for continuous innovation to further validate and accelerate radical ideas. SATELLITE is in the process of setting an acceleration phase (3 to 6 months) for the most promising internal ideas. The OceanAccel program inspired SATELLITE Jump.
4. *External Sourcing*: To search for new technologies and opportunities outside the company by scouting startups. This is one of the reasons they joined OceanAccel. Start-ups constitute a new important factor for SATELLITE' organizational learning: "Stimulating an internal development by going into a trajectory with the start-up is quite relevant for SATELLITE".

7.1.4 Current Stage-Gate Innovation Process and Governance

1st Stage: Idea Assessment, which is a very quick scan

2nd Stage: Concept Development, which involves the identification of a business owner, the development of a project proposal and the consideration of a business case. These 3 items are mandatory.

3rd Stage: Presentation to Board of Directors for approval; R&D and Business Unit to do the work

The R&D projects can differ very much in size. Sometimes it is an idea, which needs to be tested in a project, and it can go very quickly. Sometimes, it can be a program that can last several years, so these phases can take much longer.

7.1.5 Sourcing of incoming exploratory streams and participation in OceanAccel

SATELLITE realizes it does not have all the required expertise for Horizon 2 and Horizon 3 projects. Therefore, it engages with external parties, including other R&D Centers, technology providers and start-ups. They applied the same linear staged-gate process for these engagements but, as mentioned, they realized it might not be the most appropriate given the technology and market uncertainties. So, they are in the process of learning about how to work and learn from start-ups.

SATELLITE' R&D Unit joined OceanAccel for three reasons:

1. To identify new technologies and links with the startups for new opportunities
2. To learn from the processes that startups go through while accelerating their businesses (they say this is a reason equally important). SATELLITE has stage-gated processes and sometimes these processes take a long time. So, by looking at startups and at how do they accelerate their company, they can learn how to apply it to their own initiatives. Therefore, learning is the second objective.
3. To get inspiration: SATELLITE has used OceanAccel as a source of inspiration for their employees by hosting start-ups roadshows at SATELLITE' premises, by mentoring them on a weekly basis and by participating in relevant OceanAccel activities.

7.1.6 Start-up Engagement

SATELLITE' R&D Unit has been actively talking to start-ups during the last three years. The number of start-ups with whom they have done proof-of-concepts is somewhere between 15 and 20 within the last 3 years. They said they are very open to talk to start-ups to see their offering and to see if there is a match to explore a pilot. SATELLITE' R&D Unit explores this possibility with a group of experts from the respective business unit and acts as a liaison. However, to actually do a pilot is a *bigger step* for SATELLITE: “we really need to believe in the company and the product”

As per the commitment with OceanAccel program for the first three years (2016-2019), it has been as follows:

1st year at OceanAccel (2016): SATELLITE was involved ONLY during Selection Days, that is, to select the incoming start-ups, which will participate in the OceanAccel three-month program

2nd year at OceanAccel (2017): SATELLITE became involved in the Scouting plus Selection Days and Mentoring (especially Sebastian Herion and Selinde)

3rd year at OceanAccel (2018): SATELLITE was involved in both scouting and selection of the start-ups but it changed its mentoring involvement. Instead of having Sebastian Herion and Selinde as the gate-keepers of the funnel into the company (Sebastian Herion was quite involved as a Lead Corp Mentor), they involve new young employees and engineers (6) to participate in this process.

4th year at OceanAccel (2019): they continued their involvement but there was not much involvement with OceanAccel's 2019 start-ups with the exception of SENSE (scale-up) with a proof-of-concept, which is being negotiated. In fact, there were 2 other scale-ups engaged in 2019.

All in all, the R&D Unit is looking for ways to connect more people within SATELLITE to what is happening at OceanAccel. There is a challenge for more connection and learning.

Probably there more interesting development in 2019, was the launch of SATELLITE Jump 2019, the internal accelerator of SATELLITE: “This would not have happened without our OceanAccel involvement.” (Innovation Coordinator)

7.1.7 OceanAccel start-ups as ‘validation tools’ for internal exploration initiatives

In 2016, SATELLITE did a trial with *AquaSense* (the inspection drone) and they offered *ScanMarine* an experimentation facility, but they did not use it at the end. In 2017 there were many more interesting start-ups with a potential SATELLITE fit, which in part is due to the fact that SATELLITE participated on the scouting and selection, as mentioned above. Examples include:

- *Auto Vessel*
- FEO-AR (mentored by R&D Engineer)
- MedAssist Online (mentored by R&D’s General Manager)
- *Maritime Monitor* and Magnetik (mentored by Innovation Coordinator)

After the selection days, SATELLITE already knew which are the start-ups that they want to work with. There is a reason why they are the Lead Mentors of FEO-AR and MedAssist Online.

SATELLITE used FEO-AR (Augmented Reality start-up) to validate an internal exploratory project at an early stage. Start-up engagement emerges as an organizational learning and validation tool to advance an early-stage internal innovation exploration project (Horizon 2) at a cheaper cost. This validation of internal exploratory projects operates through mentoring engagement between the start-up and the corporate. There is also another related mechanism of shaping the start-up to enable product-market fit: “The role of the mentor is to coach the start-up to identify the needs within the market and we are part of the market, so we also provide our own needs that might be either coincident or deviant with the overall market”.

Therefore, through engaged mentoring and meetings, SATELLITE shaped FEO-AR’s solution to meet their needs, and in doing so, validated an internal exploratory project. This “shaping” worked as an experimentation and appropriation procedure in that SATELLITE used the lessons learned in this POC to subsequently develop the solution internally, giving rise to the internalization tension, which I analyze in Chapter 5.

7.1.8 R&D and lack of entrepreneurial skills: new internal acceleration program

This is a potential trajectory going forward given the lack of entrepreneurial skills at SATELLITE' R&D Unit. Maybe at some point SATELLITE can have its employees' startups to get a chance to develop and accelerate their ideas outside the company at OceanAccel: *"OceanAccel can be very interesting but we are not that far yet. It is on the back of our head."* So far, there is neither an inside-out venturing initiative nor a case coming from the current entrepreneurial innovation programs—SATELLITE challenge or SATELLITE *Jump*—that have spinout into the external environment.

However, in 2019, an important milestone in the SATELLITE's entrepreneurial trajectory took place: SATELLITE' R&D Department launched a reloaded company-wide internal acceleration program, SATELLITE *Jump*: "This would not have happened without our OceanAccel involvement", that is, "if we have not been on the OceanAccel program these past years. The 2019 company-wide SATELLITE *Jump*—in two previous occasions it was only for the dredging division—had 108 ideas submitted by teams mainly from Rotterdam and Papendrecht after massive publicity and communication. 20 final ideas were selected, and 7 winners were announced on their own Shakedown.

SATELLITE' R&D adapted the lean start-up process for the internal acceleration program: "get and look inside the building" for business unit validation. The program was developed in collaboration with B.B. who started a very prominent European High-Tech Accelerator, which was the original model for OceanAccel. It was a lean start-up program with modules of finance, IP, pitching, networking, business model canvas, etc., etc. But it was adapted for a corporate context: it is very different to start up inside vs outside a company! B.B. was recommended by OceanAccel's Director. This also means that there is no competition between OceanAccel and SATELLITE *Jump*: "they complement each other", The outside-view is still needed to reframe and challenge *"what we do and how we look at our problems."*

7.1.9 TMT's involvement in SATELLITE's entrepreneurial innovation

SATELLITE' R&D staff claims that the company is a horizontal company with one vertical axis. There is one C-level executive who does support the new entrepreneurial innovation initiatives, either internally or externally. Yet, the CEO is not that involved. They were not present at SATELLITE's Jump Shakedown.

The SATELLITE' Innovation Manager is happy to share the process but not the 7 internal ideas/projects due to IP and confidentiality issues. She shared some of the lessons learned: "it is possible to do it. It was the first time with a lot of unknowns." SATELLITE' R&D staff will process what has been done: they will follow-up and sustain some of the winners, which actually (3 of them) will do testing during the summer of 2019.

Table 7.1 Summary for SATELLITE

DIMENSIONS	SATELLITE
<i>C-Level involvement in OceanAccel</i>	No
<i>Employee Mentoring for OceanAccel</i>	Medium
<i>Type of Innovation pursued</i>	Incremental, Architectural & Radical
<i>R&D and Entrepreneurial Innovation Processes & Structures</i>	Traditional R&D and developing Entrepreneurial Innovation Process (Innovation Challenge & Jump)
<i># of Ocean Accel Ventures engaged (2016-2019)</i>	10
<i>Time for Proof-of-concept (POC)</i>	6-9 months
<i>Organizational Adaptation to external disruption or opportunity</i>	Medium
<i>New Ventures of inside-out Corp Entrepreneurial Innovation (so far)</i>	0

7.2 TANKTECH

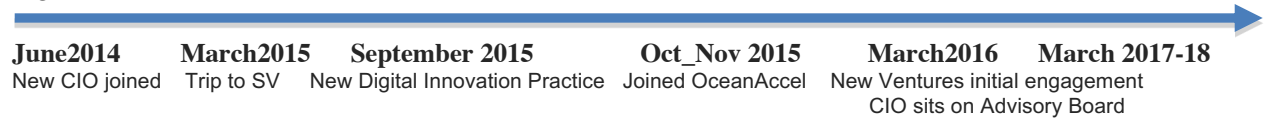
TANKTECH is one of the world's leading independent tank storage companies. TANKTECH operates a global network of terminals located at strategic locations along major trade routes. With a history of over 400 years, TANKTECH ensure safe, clean and efficient storage and handling of bulk liquid products and gases for a variety of customers, ranging from chemicals, oil, gases and LNG to biofuels and vegoils. TANKTECH is listed on the Euronext Amsterdam stock exchange and is headquartered in this major European port complex. Including the joint ventures and associates, TANKTECH employs an international workforce of over 5,700 people. Even though TANKTECH has demonstrated adaptation capability over its 400-year history, it is only until very recently that they started an 'official' innovation unit and joined OceanAccel to address the challenges regarding digitalization, transparency of operations, real-time information and energy transition. As one Innovation manager put it: *"If we want to survive the next 400 years, we should really start moving away from traditional thinking, and really look for new solutions and new innovations to run our business."* (Innovation Engagement Leader, 2017)

7.2.1 Organizing R&D and Entrepreneurial Innovation in a 400 years-old company

In 2014 a new CIO was hired to develop new innovation capabilities to cope with both digitalization and energy transition demands. In early 2015, this CIO took the C-level suite and the Board to Silicon Valley to convince them of the real need to be innovative in today's business environment: *"we didn't go to Singularity University but to actual large companies to see how they were innovating to cope with disruption"* (CIO, 2018). Later that year (2015), a new small innovation function was formed with a few employees with ample experience in the business units and terminals, and actually relatively low experience in entrepreneurial innovation. Around the same time, this newly Unit joined OceanAccel as a strategic partner for three years. The negotiations to make this happen were between TANKTECH's new innovation key personnel (The CIO and two Innovation Managers, who later will act as OceanAccel's start-ups mentors) and the two OceanAccel Directors. The timing could not have been better: *"we were both starting our initiatives, so we saw the OceanAccel as a good opportunity to learn"* (CIO, 2018). In March 2016, TANKTECH was starting its participation as a full corporate partner in the OceanAccel

program with key Lead start-up Mentors, providing “use cases”, hosting a start-up roadshow at TANKTECH’s headquarters and the CIO sitting on the accelerator’s Advisory Board. See below the TANKTECH’s innovation function timeline.

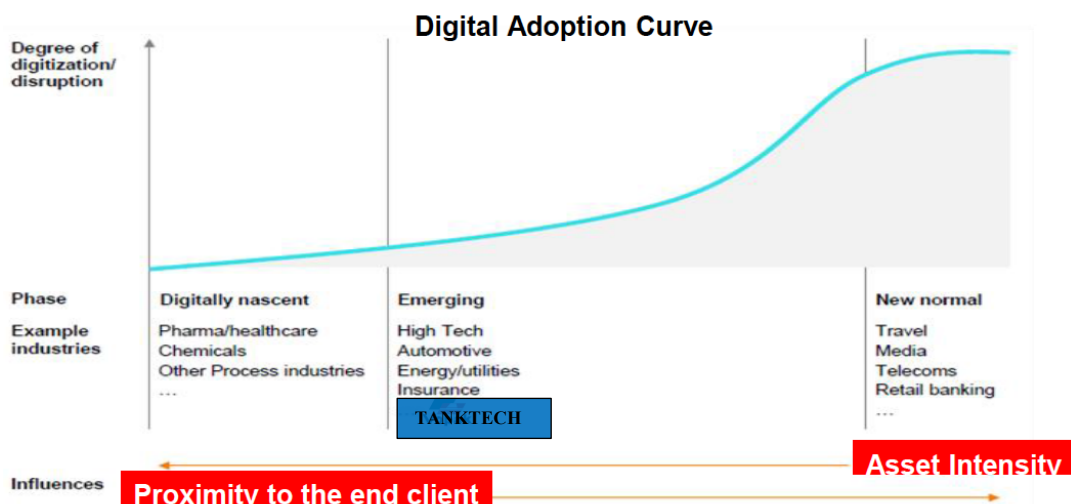
Figure 7.2 TANKTECH’s recent Innovation Timeline with main events



7.2.2 Digital Adoption at TANKTECH

Given that TANKTECH is a company with old legacy IT systems, there are important challenges for TANKTECH to adopt and adapt to the 4th Industrial Revolution, i.e., to the Internet of Things (IoT) era. Considering the industry where it operates and its internal change over the last 4 years, TANKTECH is an *emerging* player in terms of the digital adoption curve, along with the Oil and Gas sectors. TANKTECH is an asset-driven company operating a B2B model, therefore not that close to the end client as other industries such as travel, media, banking and telecoms that have had to adapt even faster to the digital era and its disruptions.

Figure 7.3 TANKTECH in the Digital Adoption Curve

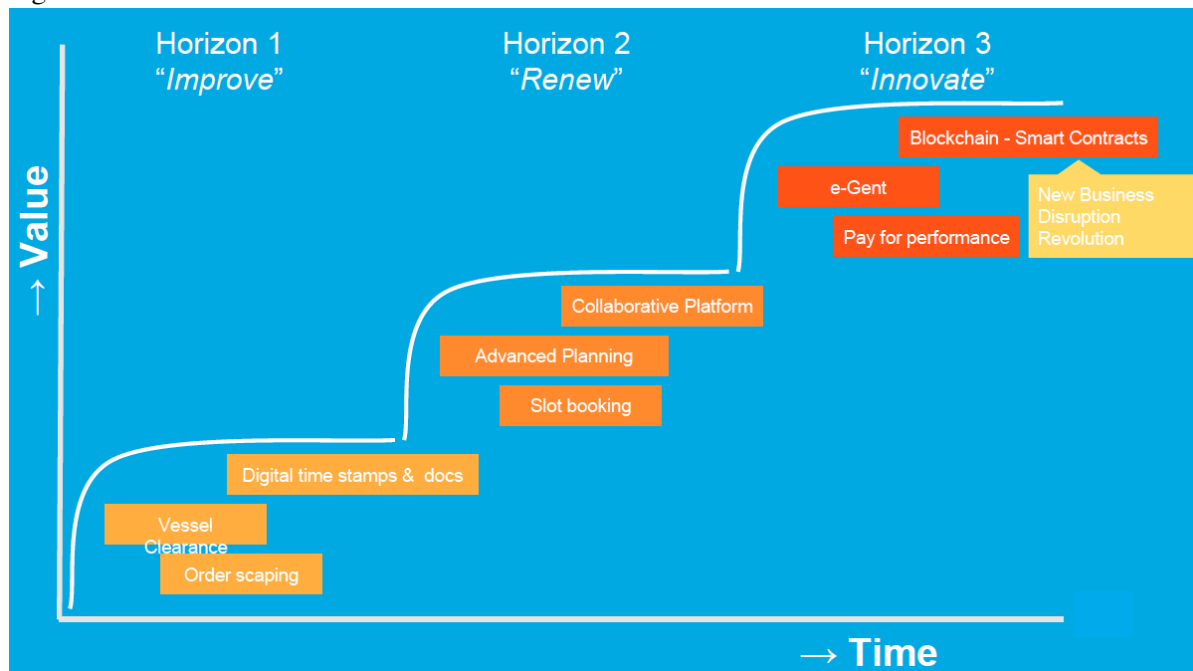


Source: TANKTECH, 2019

7.2.3 Innovation Horizons and Processes at TANKTECH

This new Innovation Unit has defined its work in terms of McKinsey’s three horizons based on two axes, i.e., value creation and time: Improve in the Horizon 1, Renew in the Horizon 2 and Innovate in the Horizon 3, as shown in the Figure below.

Figure 7.4 TANKTECH in the Three Horizons Framework



Source: TANKTECH, 2019

Examples of work on the Horizon 1 (70% of work for today) include Vessel clearance, order scraping and digitalization of time stamps and documents. Work currently performed on Horizon 2 (20% of work for “tomorrow”) includes developing a collaborative platform, further advanced planning of key operations and slot booking. Finally, TANKTECH is currently exploring Blockchain-based solutions for smart contracts and Pay for performance metrics, for Horizon 3 (10% of the work is “for the day after tomorrow”) where new business model disruption is and will be happening. They said they need to be prepared for what is coming. Therefore, TANKTECH has set up the Digital Innovation Unit to be prepared across these three Horizons: because “thinking about the day after tomorrow & new business models is very difficult in this company” (Innovation Engagement Leader, 2017).

7.2.4 Innovation Process at TANKTECH: How does it work actually?

TANKTECH's Innovation Unit comprised 10 Full Time Employees (FTE) with a 100% of their time focused on innovation: 5 innovation managers, 2 Innovation Engagement Leaders, an innovation implementation manager, who deals with the change, one dedicated business process analyst, an innovation coordinator and a management trainee.

TANKTECH has defined an innovation process to address the digitalization challenges and opportunities. This process starts with uses cases, i.e., business challenges collected from the businesses' units at the terminals. The terminal management provides the Innovation Unit with insights on what is happening in the terminal, what is their day-to-day operation problems, challenges, etc. Then this Innovation Unit tries to find a match in the study process where they can find a matching technology that can potentially be a solution for these challenges and issues. Once the Innovation Unit find a match, they will develop a Proof-of-Concept (POC) and try to do those POCs between 6 to 8 weeks through a "sprint way of working" (Agile Development approach). So far this Innovation Unit has collected over a hundred (100) of use cases where the bulk is about Horizon 1 work, that is, basically fixing local current problems. According to one of the innovation informants, "there is nothing major, fancy or R&D like...". Some of these uses cases are applicable for the majority of the networks, some of them are only confined to a handful of terminals.

TANKTECH does all the POC with external parties because of available resources and time commitment: "If you would do the proof of concepts all in the house, you immediately run against resource issues, everybody is busy. And then the proof of concept will take forever." At some point of time, TANKTECH had about 60 proof of concepts running at the same time, which can only be done if with external parties. POCs are usually complete within 6 to 8 weeks, most of the time at a terminal, in parallel to all the processes and systems but trying to not interfere too much the daily operation. At the end of the POC done between 6 to 8 weeks, there is a minimum viable product (MVP) to show the basic working operating principles, that is, a demo of how this can work. But the "plugs" can be pull-off and everything is back to normal again. Therefore, the impact on the terminal organizations is minimal. The resources needed from the terminal are minimal too, as the budget needed is zero from the terminal for the POC phase. That is, whatever the costs are in this phase, which is usually not that much (20K-50K), it is funded by TANKTECH's Innovation Unit.

The end product for the POC is an info-graphic, which is basically one page describing what was the business challenge, what was the solution tried out, what is the overall concept of the project, what was trying to be proven. And a few pages behind that talking about high level business cases. When more than one proofs-of-concepts (up to 10) are tested within one domain, that is called a *lighthouse*. In addition, this TANKTECH Innovation Unit keeps track through internet smart sheets of all the projects that are running, so everybody that is interested can follow what and where these proofs of concepts are. And they deliver a short movie clip of about 1 and a half minutes, where the business units people talk about what was the challenge, and the innovation manager mentions what was tried out and what was the output. The POC phase ends with a demo day where all the above items are shown.

This open innovation type-of-approach has several benefits, including time and resources saving, non-interference with daily operations as well as clearly defined roles and responsibilities.

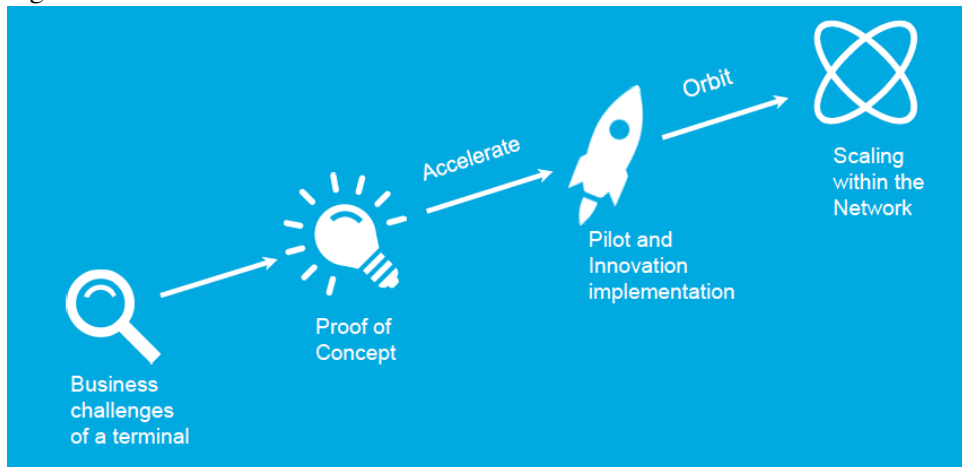
7.2.5 From Proof-of-Concept (POC) to Pilot: trying to cross this chiasm

After the POC phase, it is up to the TANKTECH's business, to that specific terminal which came up with the "use case" to decide to move to a pilot: "If they want to do a pilot, they need to allocate budget, they need to allocate resources for a project they will run and start implementing it at the terminal." Basically, here in the Pilot phase—if any—is the hand over from innovation to the business itself, where this Innovation unit will now participate more in a facilitating role.

In the pilot phase, the external parties (start-ups in many cases) that have worked in the POC phase have an edge over alternatives because they know the situation, and there might be a good fit for the business. However, for the pilot, TANKTECH will always make a selection who is the best provider for the business challenge, considering the POC results. Once a vendor/provider is selected for a Pilot, then it becomes a normal execution project with related milestones and metrics, and once again, TANKTECH's Innovation Unit is in a facilitating mode. The Innovation Unit will be part of the project team, to ensure that there is still plenty of innovation there, making sure the data is well captured and processed accordingly. The Innovation Unit tries to make sure that in the pilot phase, the project is optimally implemented and that the change management, business process, analytics, is done in the right way.

The Innovation Unit writes the business case together with the business, making sure that they capture the business case, not only by the euros (the money's side), but also the benefits that are less tangible and understandable by everyone. If for example, TANKTECH can save one hour of manpower daily in a shift, they cannot get rid of one guy, but they can optimize his work. Though it is very difficult to measure it, they start proving that they can speed up the operation or that it increases the efficiency. This Unit puts all benefits in the business case and then they will start implementing that full scale on the terminal where the innovation project manager helps guide the project and get it live in the terminal.

Figure 7.5 TANKTECH's Innovation Process



Source: TANKTECH, 2018

7.2.6 Innovation Metrics and Governance

TANKTECH has established metrics to measure the POCs impact in 5 areas: i) safety and security, ii) productivity, iii) energy, iv) efficiency in supply chain, and v) customer intimacy. This metrics help to assess the POC and Pilots both before and afterwards: what is the investment needed and what is the potential savings or potential additional revenue. For TANKTECH it is important to assess the “the general feeling of the potential of the projects, within the TANKTECH network. So, if there is a high value, and there is ease of implementation, is it going to be relatively easy. If, in turn, it is going to be “medium easy”, then it is going to be quite hard to implement. If the value is high and the ease of implementation is low, then it will be a high-profile project.

When there is a high-profile project, TANKTECH's Innovation Unit can, together with the businesses, have a governance for it called ITIC, IT Investment Committee. Then, this ITIC can establish that the pilot in that area be funded up to 40% by this committee, so to ensure the threshold of the terminals to enter into a pilot is lowered considerably. Therefore, there is an incentive to run the pilot. The high-level business case is used to establish how much Capex and how much Opex is possible. Once the pilots are completed, TANKTECH's Innovation Unit will measure against the high-level business, and assess whether it is more or less matching or whether it is lagging behind. Or actually whether it is a better case than expected. And finally, they will determine how fast and how wide they will scale this solution.

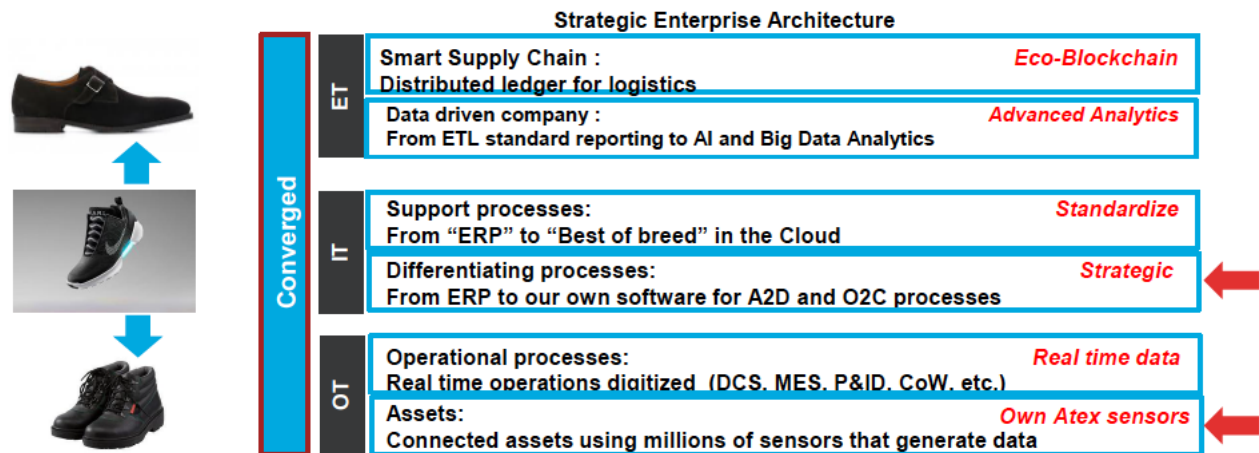
By early 2017 they were starting to implement four major pilots projects, and running a number of bigger business intelligence-driven proof of concepts as well, including capturing big data and running analytics and predictions on data captured from the commercial side as well as data captured from the performance of TANKTECH's assets which are now sensing via the Internet of Things (IoT).

7.2.7 Innovation Challenge: “The real challenge is cultural, not technology”

TANKTECH's recent innovation journey to address the key technological disruptions is in progress not without internal challenges. The Board is convinced to move ahead as they have seen the 'innovation light'. The Global Directors are moving to become convinced. At the middle management level, which is reluctance of control points and afraid of the threat of new technologies that will replace some jobs, TANKTECH's Innovation Unit is in the process of finding 'ambassadors'. Finally, operators are keen to use new technology as it makes their work “easy, fun and safe”. (Innovation Manager, 2018).

Ultimately, TANKTECH's key innovation challenge is to develop an integrated strategic enterprise architecture where all technology layers converge: i) Operational Technology (OT), including on the ground real-time operations and connected assets through sensors, ii) core Information Technology (IT) moving Enterprise Resource Planning (ERP) to “best of breed” in the cloud, including TANKTECH's own software, and finally, iii) Enterprise Technology for smart supply chain and advanced analytics. As TANKTECH's informants put it, is about connecting the entre/intrapreneurs' sneakers with the safety shoes (operators on the ground) and the formal shoes (mid-level managers resisting change).

Figure 7.6 TANKTECH’s Digital Architecture Roadmap



Source: TANKTECH, 2019

7.2.8 Partnering with OceanAccel to source and learn entrepreneurial innovation

As mentioned, during the time that TANKTECH’s new Innovation was formed and they opened up to the outside world, TANKTECH engaged with OceanAccel as a founding corporate partner. Both were new to this arena: TANKTECH was starting its innovation area and OceanAccel was about to become the first Accelerator in the Port maritime sector. At the beginning there were some issues regarding exclusivity for TANKTECH that can be illustrated by the following questions: “who is going to join?, Do our competitors also participate in the same platform? Or there is exclusivity?” TANKTECH actually negotiated exclusivity because they did not want competitors in the first phase of the platform being part of it and benefiting. They see that even though they are a market leader, they can lose value capture opportunities by having competitors that can access OceanAccel’s start-ups new technologies. TANKTECH’s Innovation managers believed it was very important to have an interaction with the OceanAccel program: not only by absorbing, but also by giving, by mentoring and by spending time with the start-ups. And also by sharing, that is, by being very open to the OceanAccel’s members, by inviting them to TANKTECH’s premises, to check their innovation lab and related processes. For TANKTECH to do all of the above with competitors in the room, it could prove difficult: “we would not feel very comfortable” (CIO, 2018).

TANKTECH's Innovation Unit made the case internally to join OceanAccel. It was the CIO with the Innovation Lead who went to the Board and said that they would like to join OceanAccel because it fit TANKTECH's initial phase of POC exploration. They made the case that they would like to do these proofs of concepts by working with start-ups "*very focused on a certain area*". TANKTECH's innovation area has found that start-ups are craving for *use cases* and company challenges. According to TANKTECH's informants, start-ups are eager and enthusiastic to work with TANKTECH because these use cases give them the direction they need to develop their value proposition. Those use cases give an opportunity for the start-ups to validate and eventually to do business with this tank storage company.

7.2.9 Organizational learning and start-up engagement pathways

TANKTECH works and engages with start-ups both from OceanAccel and the larger port maritime space. If they are in the business domain, or they are doing something with IoT, if they are doing something with mobility, or they have a proposition in the industrial environment, they are good fit to start a conversation: "*They will know how to find us. So, I've met maybe over 300 companies, out of which maybe 50% were not known to me. I didn't know of their existence, completely new names, etc. And not only from the Netherlands, but also from the UK, from the US, from Germany, from Asia... we really see many many companies*" (Innovation Lead, 2017). The new ventures' maturity vary: some of them are really in the start-up phase, some of them are 3, 4, 5 years ahead on their development, some of them are growing very fast. TANKTECH learns about new technologies by entering in contact with new ventures of all different stages.

In 2016, they did proof of concepts with four OceanAccel start-ups. Though they didn't expect a lot in the first year, the outcome was above expectations. As mentioned, the POC phase is coordinated by the Innovation Unit and then the transition from the POC phase into the Pilot phase is determined by how TANKTECH's executive board really look at this as they need to sign off on this to move further. For example, *AquaSense*, a 2016 OceanAccel start-up, had a very vague and broad proposition. AquaSense wanted to make a vessel that was going to do everything. The problem was that "a lot of everything is a lot of nothing" (Digital Innovation Lead, 2017). TANKTECH's Digital Innovation Unit presented to AquaSense the use case for inspecting the Jetties and put them in touch with another company, with whom where we had already done a few

proof concepts with a drone. TANKTECH helped them to be more specific and focused to key problems.

However, TANKTECH matched a certain problem (use case) with *AquaSense*'s solution and it was seen as too expensive at that point of time. TANKTECH needs to find a way on how the matching can be better. In the case of *PortGateway*—2016 OceanAccel start-up with a scheduling solution—TANKTECH was still one year later in 2017 “considering how to move forward” as there was still a possibility that *PortGateway* will have a role in the Pilot phase with the platform that TANKTECH has built, where information between different supply chains' stakeholders are shared: “But the question is if we should do that with *PortGateway* or with other start up, or should we do this ourselves? This is still not 100% clear.” (Digital Innovation Lead, 2017). The difficulty was not so much on the technology or the platform, but it was more about how they set up connections, what is the use and convenience of the interface. The POC between TANKTECH and *PortGateway* was not that unique, according to TANKTECH's Innovation Manager. At the end, there was no Pilot with *PortGateway*, which by late 2017 shut down operations in the Rotterdam area and focused in other markets. TANKTECH developed its own scheduling solution.

As with scale-up Magnetik, they had an invention including a patent using magnets in scaffolding solutions. Magnetik has been around for three years, and their proposition was to sell these magnets to the scaffolding company. But the scaffolding company knows that the use of those magnets, that they only need to use for 1/5 of the total scaffolding volume, so they were not so interested because it is directly and negatively impacting their business. So for the last two years, TANKTECH tried to bring the three parties together, i.e., Magnetik, the scaffolding company and TANKTECH to work as three parties. The key element was to ensure that the margin for the scaffolding company, remain more or less the same, in terms of scaffolding time and material, so they can do more with less. And the margin is secured, therefore the three parties shared the savings. TANKTECH is also looking at scaffolding around jetties to improve their maintenance. This is a major scaffolding job, because there is a need to go underneath and around. If this work can be done with magnets, there can be considerable savings in time and materials. There are all kinds of solutions that TANKTECH has been working out with them based on TANKTECH's uses cases, which answered Magnetik's proposition. In fact, TANKTECH put the

magnets solution in the tenders that had to do with their terminals and jetties’ maintenance work. Magnetik received an investment from the Port Fund in 2018.

Another successful case was where TANKTECH engaged with a start-up with Semiotic Labs, a new sensor manufacturer. They developed a cheap safe sensor to be put in TANKTECH’s pumps to predict its working operation, anticipate required maintenance and prevent any malfunctioning. TANKTECH did a POC, then a Pilot and subsequently scaled it through their terminals’ network.

One of the key challenges is moving “from POC to Pilot” where the real problem is. To move to the Pilot phase, TANKTECH’s business units need to take ownership and free up resources to work with the start-up or scale-up. Another challenge for start-ups to work with TANKTECH’s terminals network is that they are not familiarized with the protocols and safety requirements in this industry given the risks of the liquids and gases that are managed, stored and distributed.

Table 7.2. Summary for TANKTECH

DIMENSIONS	TANKTECH
<i>C-Level involvement in OceanAccel</i>	Yes
<i>Employee Mentoring for OceanAccel</i>	High
<i>Type of Innovation pursued</i>	Incremental and Arch
<i>R&D and Entrepreneurial Innovation Processes & Structures</i>	New Digital Innovation Department New Corporate Venture Capital Unit
<i># of Ocean Accel Ventures engaged (2016-2019)</i>	46
<i>Time for Proof-of-concept (POC)</i>	3-6 months
<i>Organizational Adaptation to external disruption or opportunity</i>	Low to medium
<i>New Ventures of inside-out Corp Entrepreneurial Innovation (so far)</i>	1

7.3 VOX

As a family-owned company, VOX is global dredging and marine infrastructure company headquartered in a leading European Port working on dredging, off-shore wind and off-shore oil and gas. VOX was founded in 1868 by the VOX family, who currently controls 78.5% of the company. It employs 4,816 people worldwide and it has also recently started a Corporate Innovation, Research and Development (CIRD) Unit. VOX has supported OceanAccel since its very beginning through a mandate that came from its Chairman, after an invitation made by a former Prime Minister and Emeritus Partner of Global Professional Firm, who in that capacity was instrumental in convincing VOX and other Partners to join OceanAccel. VOX's COO sits on the Advisory Board of OceanAccel together with the former Prime Minister.

7.3.1 From R&D to CIRD: new entrepreneurial organizational designs

Similar to the previous two corporate cases, VOX has also recently started a new Innovation Unit, i.e., the Corporate Innovation, Research & Development (CIRD). In the past, there was a Research and Development department as part of the Estimating and Engineering department, that was separate from the other Departments. One department was Ship management, which is responsible for the vessels and other was the Engineering department, which was responsible for tendering and making sure that VOX earn money with the vessels. According to the informants, the former R&D was a part of the Estimating and Engineering but then it was purely based on theoretical thinking and the ship management department was much more practical. The upgrade to the R&D department started when Dr. Mark Palensky (Estimating & Engineering Dept), and also a Professor at a leading Technical University, wrote an Innovation Memo for the Board of Directors about the need of organizing the innovation projects. The main reason is illustrated in the following quote: *“We are innovators within the projects, but when the project finishes, innovation is finished!... We no dot reuse innovation knowledge. We need to organize ourselves differently”* (PG, 2017). So, the choice was to make a new R&D department with 2 people from the Ship management department and 2 people from the Estimating and Engineering department. It is rather new because VOX believed that they have to invest more in innovation because it wouldn't happen automatically. As a dredging company, VOX is a contractor and they said are very innovative to solve problems within projects but when the project is ended,

the innovation stops, and it is not re-utilized. Therefore, the mandate for this new R&D department is to organize that innovation over and across projects so that VOX can use and re-use innovation for the next projects to avoid re-inventing the wheel again. VOX was not able, in the past, to reuse innovation as they invented very time new solutions for the same problems.

Therefore, VOX is in a transition process to organize innovation which is normally typically scattered inside projects (execution and tenders). When there is a tender or project, then there is innovation potential, but VOX is trying to look for ways to organize it a bit more at the corporate level, so that sometimes they will have a slightly longer time to develop something. That way, VOX can also anticipate important changes in a better way. In 2016, this request came from the board to come up with better ways to organize the work in this area. Then, people from different parts of the company were asked to join this innovation effort: people from the Ship Management department, from the Dredging Engineering department as well as from the offshore oil and gas and offshore wind. This new department is comprised by people who are almost fully dedicated to innovation at a corporate level. The aim is to listen both within and outside the company to figure out which are the larger trends impacting the industry and to identify a number of actionable roadmaps for VOX.

7.3.2 EXCELERATE: Strategy and Corporate Innovation Roadmaps

The ultimate aim is for the whole company to be innovative, not just a small group of people. That's the philosophy. The members of the CIRD are innovation facilitators. VOX's aim is to basically cover both ends of the organizational spectrum when it comes to innovation potential: on the one hand, they can choose to concentrate innovation in the small team and "if you do that you go very quickly but you pay in the sense that it will be harder to get acceptance of the new things developed." On the other hand, "at the other end of the spectrum you can try to completely involve the potential end user. But then you might go very slow.". VOX's ambition is to be somewhere in the middle, so that they can speed up innovations where and when it is needed: "We can always organize a proper embedding in the company" (PG, 2017).

One of the key challenges is to connect the CIRD staff with the other parts of the company in order to have a sort of "distributed system" where you do not only see your silo but all of them connected. To address this challenge, VOX has set "roadmaps" as bundles of ideas that together can achieve a shared objective. Within the roadmap, there can be several maps. These roadmaps

can be filled with either *outside-in* ideas from external innovators and start-ups or *inside-out*, where internal employees invent new things and push it into the company. This new Roadmaps Process is called EXCELERATE, i.e. a combination and complementation of two words: to excel and accelerate.

Though there are a lot of ideas within VOX, there is a need to organize it that so that the whole spectrum is well served. The VOX's approach works from ideas to POCs and to the final "embedding phase" in the sense that the same ideas that VOX stakeholders have accepted, are also accepted by our clients: *"That's where it becomes more difficult."* (MP, 2018)

VOX has basically two *outside-in* roadmaps that are related to their main markets, that is, dredging and marine construction and off- and on-shore wind. This is where VOX look for customer values and for what clients want. Then cutting through that is the networks' roadmap where VOX staff is basically trying to have relations with as many people as they can to learn about new customer values that they otherwise didn't hear about yet.

This is the way that VOX's CIRD started to work by trying to collect ideas from all over the company and then figure out if they fit in one of these roadmaps. If not clear, CIRD's role is to try to help them to connect to a roadmap and to start up by going through the funnel. VOX wants to be much better in outside-in thinking. They have realized now that there are many things that have been developed outside, for example, on data management or sustainability issues: *"there's a whole world busy with that and we were always quite traditional, so that we said OK, we want to investigate that ourselves"* (MP, 2018). Because, it used to be the case that *"only if we develop it ourselves, we will trust that"* (PG, 2018).

OceanAccel plays a key role in this outside-in thinking. In this process of adopting and learning from the outside, VOX needs to make sure that the company is ready to test those ideas.

In this process of learning and engagement with start-ups, the key challenge for VOX is: *"How can you solve one of our key problems if we cannot openly tell our problems?"* (MP, 2018) Because VOX does not know the start-ups' solutions, so they need to interact to find the match. They have had good experiences with start-ups in terms of matching so far. Based on that, VOX tries to proceed to contract to them or make some form of agreement to test the technology to see if it works for that kind of problem. That's the way VOX pulls it from their idea into the company into a shared solution. This engagement can be illustrated by the example that follows. One start-up is looking at ways to clean exhaust gasses and VOX has made an agreement to do a pilot test.

It is critical to have control over the exhaust gasses (diesel engine or heavy fuel oil) because there are new regulations coming out from the IMO. This is going to be a challenge. Therefore, there is a business case to do something about it. They've got a technology. VOX will help them to run a pilot and that's just a way for this dredging company to quickly test if what the start-up offers is suitable: "If we would have to develop it ourselves from scratch that would have taken us forever." (MP, 2018) This is a good example of how VOX gets involved with these start-ups. For every cycle of OceanAccel, there is between 3 and 5 ideas that VOX tries out.

7.3.3 Bringing Entrepreneurial thinking & doing: from OceanAccel to VOX's core

One of the latest developments to report in my research was the appointment of the former OceanAccel's founding Managing Director as Director of Digital Transformation at VOX. One of his main objectives is to promote bottom-up entrepreneurial activity and a digital organizational culture by empowering the different internal "crowds" to be more agile and proactive. One of his first actions was to rapidly set an external WIX website without asking SATELLITE's IT and upload some inspirational videos regarding organizational cultures and digital transformation, including a video that shows how just 1 guy in a park start dancing alone and trigger that dozens of people join them, creating a "swarm". The hiring of the former OceanAccel's founding MD is both a symbolic and strategic move to accelerate internal adoption of new lean entrepreneurial mind-sets and practices.

7.3.4 Governance of the Demand-driven Innovation Process

At VOX, innovation starts with the ideation, then concept development and then to prove the idea based on what is the business need. In every phase there is a need of new sponsors for the next phase. For example, when they go to prove that they have to apply something from here they talk with the asset owner, so he/she knows the usage of the innovation and he/she understands what this business proposition.

VOX's CIRI uses gates and a committee to decide which projects got funded and continue through the pipeline. In the first stages there is participation of the middle management and the MCI management committee decides about the projects which will continue. It's getting more and more involved in the governance. The CIRI innovation team will always be responsible for the support throughout the funnel. But the sponsor will change: *"if it is just an idea we'll be focused*

on an asset manager, then will be more senior management who has to fund it in the later stages. So, it changes but there's always one person of the CIRD involved during the funnel.” (PG, 2018)

Table 7.3 Summary for VOX

DIMENSIONS	VOX
<i>C-Level involvement in OceanAccel</i>	Yes
<i>Employee Mentoring for OceanAccel</i>	Medium to high
<i>Type of Innovation pursued</i>	Incremental
<i>R&D and Entrepreneurial Innovation Processes & Structures</i>	Early stage of a small Corp Innovation R&D (CIRD) and new OI program with Start-ups
<i># of Ocean Accel Ventures engaged (2016-2019)</i>	15
<i>Time for Proof-of-concept (POC)</i>	More than 9 months
<i>Organizational Adaptation to external disruption or opportunity</i>	Low
<i>New Ventures of inside-out Corp Entrepreneurial Innovation (so far)</i>	0

7.4 ROYAL PORT

The objective of the ROYAL PORT Authority is to enhance the port's competitive position as a logistics hub and world-class industrial complex. Not only in terms of size, but also with regard to quality. The core tasks of the ROYAL PORT are to develop, manage and exploit the port in a sustainable way and to render speedy and safe services for shipping. The ROYAL PORT is responsible for handling shipping traffic, and developing public infrastructure, existing port areas and new port sites.

This port and industrial area are managed and operated by ROYAL PORT. It is a non-listed public limited company, with shares held by the Municipality (75%) and the State (25%). In 2009, the ROYAL PORT invested €34m, while the turnover was around €500m. The company has about 1,200 employees. The Port complex occupies 10,500 ha with industrial sites covering an area of 5,300 ha, and infrastructure and water surface covering the remaining area. The length of the port is 40 km, while its quay length is 89 km. The port also includes 1,500 km of pipelines.

The ROYAL PORT has evolved in terms of its institutional logics, including its role in entrepreneurial innovation:

1. The landlord: as the public entity regulating safe and efficient shipping by developing public infrastructure, the original core role was to be “the shopping mall for the *Zaras and H&Ms*” of the port maritime related industries.
2. The governmental corporation: From being a traditional governmental institution that regulates, a new SATELLITE of “corporatization” started to take place in 2004, where business-oriented practices and management models were introduced in the ROYAL PORT.²⁷
3. The ecosystem enabler: starting in 2011 and driven both by the vision of the Port2030 strategic roadmap and by the leadership of the former CFO who stepped down in April 2019, the ROYAL PORT became the enabler of new entrepreneurial innovation ecosystem. This ecosystem has meant several initiatives aimed to promote both corporate innovation

²⁷ When you enter the ROYAL PORT headquarters, you do not feel that you are in a Governmental institution but rather a big multinational corporation with all its related symbols.

and start-up entrepreneurialism, including programs intersecting both, such as OceanAccel. Among these initiatives and programs, there are Intelligent Port (an R&D Tank), RDM (a large MakerSpace), the RDM Logistics Lab, Port Innovation Lab (venture competition for early stage ventures coming out of Universities), RAMLAB (hardware and additive manufacturing), the CEO Forum (a C-Level gathering to discuss and share best practices in innovation across the Port complex), and OceanAccel. All these initiatives are designed and established under a *structural separation* logic, i.e., though they are primarily funded by the ROYAL PORT and may have ROYAL PORT's executives in their Boards, they are independent initiatives that happen outside the Port entity, which operates as a key enabler.

- 3.1 The only relevant internal corporate entrepreneurial innovation initiative was (is) the Game Changers Program, which aims to develop entrepreneurial skills among the employees and to promote the creation of *inside-out* ventures. This Program has comprised three main phases, since its inception in 2014: i) internal capability development, ii) intrapreneurship, iii) internal acceleration, i.e., corporate venturing to enable the spin-out of promising intrapreneurial projects. Details and examples are discussed below, specially the current re-structuration, which is relevant to the research question of Chapter 4.
4. The Entrepreneurial Regulator: given the advancement of the enabling logics along with the further development of the internal corporate entrepreneurial logics, and particularly, the integration of a former structurally separated unit—the RDM Logistics Lab—into their core business, we observe a conflict among different competing institutional logics. The regulatory logics (set the neutral playing field) and enabler logics (trigger entrepreneurial innovation initiatives in the ecosystem/complex to accelerate adaptation to technological discontinuities) are in conflict with the business-oriented logics that intends to develop and sell new products and services in both the local and global market.

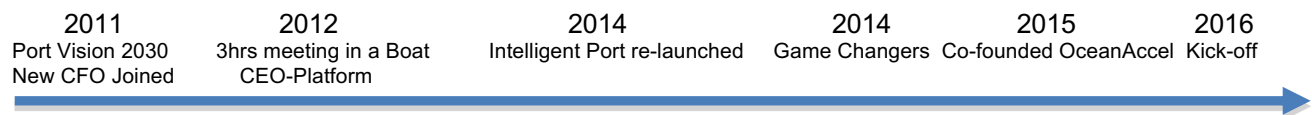
7.4.1 The Enabler Logic of a Governmental Corporate

To fulfil this overall strategic objective, the ROYAL PORT has been, since 2011, a key agent in promoting R&D and Entrepreneurial Innovation internally and for its clients in this maritime industrial complex. Precisely in 2011 there were two pivotal events: the completion of the strategic roadmap called Port Vision 2030 and the appointment of a new CFO who has led several of these efforts, including the re-launch of the Intelligent Port R&D Center, the internal

Game Changers internal innovation program, the CEO Platform as well as the launch and sustained steering of OceanAccel, the World Port Accelerator: *“We are an enabler of the economy but we also have to take some risks. You cannot be a successful Port without taking risks by small investments”* (H.D., 2017)

See below the timeline and ROYAL PORT’s journey depicting these main events and new initiatives regarding internal corporate innovation, R&D and ecosystem acceleration.

Figure 7.7 Timeline of enabler of entrepreneurial innovation in a Port maritime ecosystem



The ROYAL PORT has been a key driver and enabler of several initiatives of in R&D and entrepreneurial innovation, including OceanAccel the accelerator, RDM, the largest makerspace in the world, and the R&D Center in collaboration with leading Universities, the Municipality and the premiere business association. Put simply, without the leadership and financial support of the ROYAL PORT, OceanAccel would not exist. OceanAccel’s Managing Director and Finance Director are still on the ROYAL PORT’s payroll. Being a state- and city-owned organization biased towards operational efficiency and safety in a traditional industry, the internal bureaucracy is high, according to our interviewees. For that reason, as mentioned, many initiatives have been ‘structurally separated’ from the ROYAL PORT’s core activities, that is, established outside the boundary of the organization and managed independently, even if some the people running these initiatives are still on the payroll of the ROYAL PORT, such as the case of OceanAccel and RDM.

7.4.2 Organizing innovation and adopting entrepreneurial methods

The ROYAL PORT does not have an internal R&D function or an innovation department. This is a deliberate choice, because they do not want innovation to happen in just one department. They aimed at innovation to happen company-wide, so that's why they have a small innovation team, which is growing up, given the increasing relevance of the area. They went from a 4-people team in June 2017 to an 8 people team in 2019.

The main internal innovation program has been the Game Changers program. Designed after a Big Oil and Gas's internal innovation program, the Game Changers program was launched in 2014 as a capability training to enable a new way of thinking and doing innovation work. The program has been facilitated together with innovation and leadership consulting firm, which also provides part of the OceanAccel's entrepreneurial training. The Port employees are trained on the validation/acceleration process customized for a corporate. As for the 3rd version of the Program in 2017, there were nine teams working on strategically important projects. The program lasts nine months and it is aimed to enable another way of working, another way of thinking: *"to approach things differently, to spot opportunities, to break out the bubble of doing the same thing we've been doing for years, and so it's done in multidisciplinary teams"* (Innovation Manager, ROYAL PORT, 2017).

At the end of it, the teams will be presenting their concepts to potential stakeholders—including externals—to get them on board at an event called Lift Off. This is actually the end of the official training program, and the beginning of the follow-up (or end) for some of them depending on the feedback and assessment at Lift Off. For a few months, employees participating in this program are freed up, 40% of their time (2 days a week), for seven months, to actually start up those projects. They are given Euro 10k to prototype. After that at Lift Off, the Innovation Board evaluates which projects will continue, which projects will stop, which need acceleration. And then the Port employees that want to follow-up need to be freed up again. So, they actually have a lot of time to work on, in addition to training and facilitation.

The ROYAL PORT's Innovation Area has trained around 150 people, including business units ambassadors. For a 1,100 people organization, though this number still is not a critical mass, they have been able to train both game changers and ambassadors, and as such, have a base of innovation-minded people across the organization, supported by a strong top-down leadership on the matter. And, of course, there is variance in how these innovation-minded people adopt and apply these methods in their everyday work, once the training has finished: *"We have to be realistic here, the fact that we've trained them doesn't mean that they apply it every day"* (Innovation Manager, ROYAL PORT, 2018)

The idea behind the Game Changers Program is to educate these interested employees, so that they will come back into the organization to spread the word, spread the (new) way of thinking, and apply the methods. However, to have the game changers input back the new methods and mindsets

is not easy: “We've learned from the first two programs that people actually experience difficulties, when trying to hold onto their new approaches and to spread the word, when they get back into the organization, because the rest of the organization has not received the training.” (Innovation Manager, ROYAL PORT, 2017).

The Port is an organization that build waterways and quays, so it cannot afford any failures there. Therefore, it is difficult to embed a culture and (innovation) process of proof-of-concepts, i.e., experimentation. And, especially, if the project is unsuccessful and does not receive the 10K, it is difficult—not impossible—for this “game changer” to spread the word, and the practice and further apply the lean experimentation method beyond the innovation project.

7.4.3 Learning and Scaling Experimentation

To foster an experimentation practice, and, ultimately, cultural change and new dynamic capabilities, the Innovation Department has allocated a small budget of 10K to actually do the proof-of-concept (POC). The aim of this budget is to stimulate the innovation from the start to validate that this idea could be something interesting, where there are additional stakeholders that would “buy-in”. Once the project has its initial validation, the next step, would be a pilot at the business unit level, where further stakeholders are needed to support it.

The innovation manager believes that the area “need to do more than just give the budget”. Some people will do the proof-of-concept (POC) but others probably need some more help, to provide suggestions and to stick to a fixed timeline, which is part of the efficiency-driven organization. Only with further support along the entire process, they will be able *“to spread the methodology in the way we work. But we are not there yet. We are just now contemplating on that, because we see that it's not enough to do the Game Changers and then expect people to start applying it. It won't spread. At least not fast enough. But we have an agenda, a transition agenda.”* (Innovation Manager, ROYAL PORT, 2017).

Adopting and embedding new lean entrepreneurial methods and mind-sets into the core company have not been not easy: *“let's be realistic we've trained less than 10 percent of the company, including our 20 ambassadors for innovation in different departments, so, the game changer and the ambassadors makes 10 to 15 percent of the company...”* (Idem, 2018)

The Innovation Department has been talking to TANKTECH's Innovation Unit for inspiration as the tank storage company is further advanced in this regard, compared to the ROYAL PORT. OceanAccel facilitates *learning spillovers* among corporates.

7.4.4 Innovation Governance: TMT and “Innovation Rings”

At the ROYAL PORT, there is TMT level commitment in the form of an innovation Board, comprising board members, where the CEO, CFO and COO sits and decide the way forward. The CFO is in charge of innovation. Then, there is a board right below that, comprising the main departments and business units. The Innovation Board will decide if the teams get the 10K or not. Then, below, in every department, there are innovation ambassadors who help make the connections between the Innovation Department and the Game Changers program: the ambassadors are the “innovation rings”.

By June 2017, the Innovation Department was in the middle of discussions regarding how to start supporting POCs earlier in the process as well as how to support the pilots with a bigger team.

7.4.5 Game Changers Example: The case of inside-out venture D&W

D&W was a solution for parking spaces for the dump vessels that came out of the Game Changers Program. The intrapreneur managed to leave his normal job for 2 days a week (*“it was quite a challenge”*) to pursue this opportunity, which was further validated (he was not the original owner of the idea but was attracted to lead it during the Game Changers program) and very well assessed at the Lift-Off event.

The Innovation Board offered the Team the opportunity to be further validated and accelerated externally at OceanAccel as a full-time job with the same salary and in case of failure, he or she can return back to his normal current job. This shows the commitment of the Board to foster intrapreneurial capabilities and to seriously explore corporate venturing opportunities.

And the end, the intrapreneur decided not to pursue this project externally as a “real entrepreneur” at OceanAccel because of personal and work-related reasons: *“First, I love my current job, second, I have 3 little kids, and I realize that starting a business is over 80 hours a week. And I do not want that. Though I am entrepreneurish in my projects, I am not an entrepreneur by heart”* (MT, 2018)

At the time of interviewing this intrapreneur, he and the CFO were deciding which company would become the joint venture partner to further develop and commercialize this project. There were 3

options: TREKKER, a SME with 10 FTE, which has been in the fleet management market for 25-30 years with navigation maps for rivers and seas though they are very conservative and not very innovative; TOWAX, an innovative company with about 40 FTE, working on IoT solutions; and finally, the 3rd candidate was DOCKTECH, a 2018 OceanAccel scale-up. The ROYAL PORT finally chose TOWAX, a company where TANKTECH Ventures—its corporate venture capital unit—invested in.

The Game Changers program has been re-structured in 2019 based on the OceanAccel program. The original program of 9 months and 2 days a week for 30 participants, was deemed as “quite heavy”. Though the results are satisfactory, and the program has reached almost a 15% of the company, they felt the resources (financial and human) can be spent differently. The Innovation Team has also learned along the way. They pivoted the approach to maximize impact and have just launched a new light and lean program, which is more focus on the opportunity itself rather than in teaching tools, methodologies, etc. The new Program is a fast track Opportunity Acceleration Program of 10 weeks with 3 module days and coaching in between. The Innovation team scout ideas that are already active, not new ideas. They did 2 rounds in 2019 and they are in the process of further assessment. The consulting and leadership consulting firm was involved in these 2 initial fast-track programs. Since the Port’s Innovation Team has now developed internal capabilities to facilitate it, they will do the 3rd version on their own.

7.4.6 The Entrepreneurial Regulator: managing conflicting institutional logics

Along with adopting the lean entrepreneurial method internally through the Game Changers Program and promoting it externally through OceanAccel in its *enabling* logic, there has been yet another relevant development at the corporate innovation level of the ROYAL PORT.

Given the strategic relevance of digitalization, the Port leadership decided in 2018 to integrate back the RDM Logistics Lab, which was previously operating independently. It was integrated into the new Digital Business Unit (DBU), which has become a client-facing unit that develops and sells relevant products and services for clients and ports elsewhere.²⁸ Among these

²⁸ In June of 2017, the Innovation Manager told me: “So, we are just in the process of actually discovering that there are also different business models for us, digital business models, digital services...” (MB). DBS operates in the same content area as the Innovation Team and sits in the same floor, which enables knowledge sharing and collaboration.

products, there are: *Prontex*, a port call optimization tool, *Shipmap*, a real time ship arrival system, *BoxInside*, a supply chain optimization tool to track container at any given time, *TimeBunker*, a notification system, *Queen*, a system to book buoys and dolphins, among others. DBU has been recently established and it has a big challenge: “*They are trying to find a way in the organization and they need cash flow.*” This newly entrepreneurial drive manifested in this new Digital Unit has recently created conflicts. First, with external incoming start-ups and scale-ups at OceanAccel, which have been trying to validate similar products in this port maritime complex: “*they are enabling and killing the ecosystem at the same time*” (former OceanAccel’s MD). Second, it has also created latent (potential) conflict with other value chain incumbents that see this new “business logic” as a potential threat to their own offering: “*The Port should focus on the development of this maritime cluster as both as a regulator and enabler, not an another competitive entity trying to cope emerging spaces with new products*” (COO, TANKTECH). Ultimately, this business tension between the entrepreneurial regulator and the regulated incumbent actively trying to adapt to the unfolding digitalization scenarios refers to this deeper tension: Who becomes the data platform? This is an emerging tension among incumbents—not only between incumbents and certain new ventures—in this port maritime value chain, mutating into an ecosystem due to digitalization.

There is an interesting puzzle here: how do a regulator adopts and apply the lean entrepreneurial method without disrupting its very regulatory function?

The Port is in the process of accommodating the conflicting regulatory, enabling and business institutional logics. From an ecosystem perspective—that I will take in Chapter 5—it seems desirable to limit the entrepreneurial logic and related drive of the enabling regulator.

Table 7.4 Summary for ROYAL PORT

DIMENSIONS	ROYAL PORT
<i>C-Level involvement in OceanAccel</i>	Yes
<i>Employee Mentoring for OceanAccel</i>	Yes (4-6) per program
<i>Type of Innovation pursued</i>	Incremental and Arch
<i>R&D and Entrepreneurial Innovation Processes & Structures</i>	Game Changers 2.0 and new Digital Business Solutions Department (DBS)
<i># of Ocean Accel Ventures engaged (2016-2019)</i>	25

<i>Time for Proof-of-concept (POC)</i>	6-9 months
<i>Organizational Adaptation to external disruption or opportunity</i>	Low (structural separation)
<i>New Ventures of inside-out Corp Entrepreneurial Innovation</i>	3

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