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Stefan Kirkegaard Sløk-Madsen

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JUDGMENT AND
COMMERCIALIZATION

PhD School in Economics and Management

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CBS COPENHAGEN BUSINESS SCHOOL
HANDELSHØJSKOLEN

Entrepreneurial Judgment and Commercialization

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Til oldefar

Channel it all

Into a manuscript

Or divert it all

Into a clenched fist

- Swingin' Utters, Fistful of Hollow (Koski)

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For all I have forgotten, sorry and thank you too. To quote Adam Smith "Science is the great antidote to the poison of enthusiasm and superstition" (Wealth of Nations, p 797). I hope I have done a small part for the cure here.

For God and liberty
Stefan

Executive Summary

The fundamental research question posed in this thesis is: Can commercialization explain entrepreneurial choices in firm strategy, including beliefs and actions, in relation to increasing the likelihood of the entrepreneur-desired results? The thesis considers entrepreneurship as the exercise of judgment under uncertainty. This is investigated explicitly in the context of commercialization by firms. The thesis begins with an introductory chapter in which the theoretical implications of this view are presented.

Chapter 1 offers a theoretical analysis of the concept of commercialization as it is used in research and in the light of entrepreneurial judgment, entrepreneurial identity and perceived commercial opportunities. The mapping of the commercialization concept unfolds over 563 scientific articles spread over 30 years. Through these, the current ambiguous and fragmented understanding of the construct is illustrated. Based on this, a typology is proposed for a better collective understanding of the various contributions found within the literature. From this insight, areas of further interest for research on commercialization are suggested. This chapter is included in the thesis, as it emphasizes the need for developing a more precise conceptual grounding in the understanding of commercialization especially in connection with entrepreneurial decisions.

Chapter 2 is based on theory development and qualitative case methodology, which is used to investigate how entrepreneurs and their firms sell and commercialize in different markets. This chapter joins the emergent tradition of market-specific entrepreneurship research by asking why entrepreneurs are commercializing in specific markets, especially when market-specific issues should discourage new opportunity pursuits due to the presence

of significant uncertainty relative to other markets. It is theorizing that entrepreneurs must have a particular approach to their use of information when making decisions. This may appear irrational to others, but is fundamentally a rational approach to the world. This is important to comprehend if aiming for understanding or promoting entrepreneurship in firms or society.

Chapter 3 is a multi-method chapter with theory development and quantitative analysis methods. Here, the survival and ongoing element of firm commercialization is the focus. This chapter develops and applies a model for entrepreneurs' capture of value in maritime markets. The model explains the capture of value as a function of demand-side changes, which govern optimal choices on the supply side. The proposed models have been applied to statistical analysis of financial data and capability data from offshore oil service companies operating in the North Sea. The specific empirical context reflects general maritime conditions of derived demand, high capital intensity, and knowledge specificity. Therefore, it is argued that the models fit to the broader maritime area as well as other areas with similar properties. The chapter shows that judgment resulting in investments in alertness and capital heterogeneity management, deliver above expected capture of value when supported by capabilities within uncertainty management. The chapter is rounded off with a discussion of the delimitations, as well as recommendations for future research opportunities within maritime entrepreneurship.

Chapter 4 is a theory development chapter examining why companies might choose a nonmarket strategy to sell their products. A nonmarket strategy is a business strategy based on government intervention in market conditions. Particularly, the chapter contributes to the growing literature on firm nonmarket strategies by explaining why non-market commercialization can appear to be an attractive entrepreneurial choice for selling products. In this chapter, it is stated that as long as there is a possibility of selling by force, companies will be

tempted to commercialize in this way. The possibility of selling by force is shown to be an option in the collected illustrations. The rationale for strategy choice is based on decision-makers individualistic rationality and perceived greater certainty of desired commercial outcome through coercion rather than relying on voluntary consumer actions. However, such a choice has an impact on the capabilities of the firm. The chapter also states that politicians must maintain consumer sovereignty in order to avoid firms rationally choosing non-market strategies rather than market strategies.

The thesis finishes with implications for research, policy and business practice in Chapter 5.

Dansk resumé

Entreprenant dømmekraft og kommercialisering

I denne afhandling undersøger jeg, om kommercialisering kan forklare entreprenante valg, herunder valg og handlinger, i virksomheders strategi. Dette med henblik på at øge sandsynligheden for de iværksætter-ønskede resultater. Afhandlingen betragter iværksætteri som udøvelse af dømmekraft under usikkerhed. Dette bliver undersøgt specifikt i en firmakontekst. Afhandlingen indledes med et introduktionskapitel hvori de teoretiske implikationer af denne opfattelse præsenteres.

Kapitel 1 byder på en teoretisk udredning af begrebet kommercialisering, som det anvendes i forskningen og set i lyset af entreprenant dømmekraft, identitet og kommercielle muligheder. Kortlægning af kommercialiseringsbegrebet udfolder sig over 563 videnskabelige artikler fordelt over en 30-årig periode. Gennem disse illustreres den på nuværende tidspunkt mangelfulde og fragmenterede forståelse af begrebet. På baggrund heraf foreslås en typologi til bedre fælles forståelse af litteraturens mange bidrag. Yderligere foreslås nye veje for forskningen indenfor kommercialisering. Dette kapitel inddrages i afhandlingen, da det fremhæver behovet for udvikling af et klarere begrebsapparat i forståelsen af kommercialisering, særligt i forbindelse med entreprenante beslutninger.

Kapitel 2 bygger på teoriudvikling og en kvalitativ case-metodik der bruges til at undersøge, hvordan iværksættere og deres firmaer sælger og kommercialiserer på forskellige markeder. Dette kapitel indskrives sig i strømmen af markedsspecifik iværksætteriforskning ved at spørge, hvorfor iværksættere kommercialiserer på specifikke markeder, især når markedsspecifikke forhold burde afskrække nye aktører grundet

tilstedeværelsen af betydelig usikkerhed relativt til andre markeder. Det teoretiseres, at iværksættere har en særlig tilgang til deres anvendelse af information når de træffer beslutninger. Dette kan fremstå irrationelt for andre, men er fundamentalt en rationel tilgang til verden. Dette er vigtigt, hvis man ønsker at forstå eller fremme iværksætteri.

Kapitel 3 er et multimetode-kapitel med teoriudvikling og kvantitative analysemetoder. Her er overlevelses- og trivselselementet i firmaers kommercialisering i fokus. I dette kapitel udvikles og anvendes en model for iværksætteres indfangelse af værdi på maritime markeder. Modellen forklarer indfangelse af værdi som afhængig af ændringer på efterspørgselssiden, som styrerende for optimale valg på udbudssiden. De foreslåede modeller er testet via statistisk analyse af finansielle data samt egenskabsdata fra offshore olie servicevirksomheder opererende i Nordsøen. Den specifikke empiriske kontekst afspejler generelle maritime forhold omkring afledt efterspørgsel, høj kapitalintensitet og vidensspecificitet. Derfor argumenteres der for, at modellerne finder anvendelse inden for det bredere maritime område samt områder med lignende egenskaber. Kapitlet viser, at dømmekraft, der resulterer i investeringer i årvågenhed og kapital heterogenitetsstyring, leverer over forventet indfangelse af værdi, når disse understøttes af entreprenante egenskaber indenfor usikkerhedshåndtering. Kapitlet afrundes med en diskussion af afgrænsningerne, samt anbefalinger til fremtidige forskningsmuligheder indenfor maritimt iværksætteri.

Kapitel 4 er et teoriudviklingskapitel, hvori det undersøges, hvorfor virksomheder kan vælge en ikke-markedsstrategi til at sælge deres produkter. En ikke-markedsstrategi er en virksomhedsstrategi der bygger på statslig intervention i markedsforhold. Kapitlet bidrager især til den voksende litteratur om virksomhedernes ikke-markedsstrategier ved at forklare, hvorfor ikke-markeds kommercialisering ser ud til at være et attraktivt iværksættervalg til at

sælge produkter. I dette kapitel anføres det, at så længe der er mulighed for at sælge ved hjælp af tvang vil virksomheder blive fristet til at kommercialisere på denne måde. Muligheden for at sælge via tvang påvises at være en mulighed i de indsamlede eksempler. Rationalet for virksomheders valg bygger på deres beslutningstagers individualistiske rationalitet og opfattede større sikkerhed for resultatopnåelse via tvang, fremfor tiltro til forbrugernes frivillige handlinger. Et sådant valg har imidlertid indflydelse på virksomhedernes egenskaber og virksomhedens værdi. I kapitlet hævdes det endvidere, at politikere skal opretholde forbrugernes suverænitet for at undgå, at virksomheder rationelt vælger ikke-markedsstrategier fremfor markedsstrategier.

Afhandlingen afsluttes i kapitel 5 med betydningen af dennes resultater for forskning, samfundsudvikling og virksomhedsdrift.

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Introduction¹

Sales generate revenue, and revenue makes up 100% of a profitable “profit and loss” (P/L) statement in accounting. Other P/L items, that is other firm activities, are deducted from this 100%. Thinking strategically about a firm’s other activities or the overall purpose in relation to sales activities² is commercialization. Such thinking in an uncertain market requires judgment about the use of scarce resources. Both physical and mental resources are scarce, if by nothing else than by the opportunity cost associated with the particular use of particular resources. Agents that judge one use superior to another is therefore making an entrepreneurial judgment. This relation between scarcity and choice is among the purest of the microfoundations of economics and management research. Further, if we do not understand how the firm commercializes, we do not understand the firm. What is needed is a broader approach and understanding of the relationship between what the firm wants to do, and how the market will allow it to do it. This approach is the merger of entrepreneurial judgment and commercialization—understanding all of the firm activities without ignoring sales.

In brief, the importance of commercialization arises from its potential to improve demand-driven entrepreneurial judgment about uncertain outcomes. The fundamental research question posed in this thesis therefore is: Can

¹ This Ph.D. thesis is kindly sponsored by the Danish Maritime Fund. The funding body have had no direct involvement in the research, choice of method, or findings.

² This thesis highlights the difference between sales activities and marketing activities, as opposed to grouping them together. This distinction follows Cespedes (2012:125): “*Marketing managers operate at a national level and with specific product orientations. They are not as familiar with regional or account differences. Meanwhile, sales are driven by specific accounts, volume shipments, and trade deals. [Sales refers to] marketing managers as “headquarters theorists”, unaware of field realities.*” In other words, sales activities are centered on the transaction, marketing activities on the product or geography.

commercialization explain entrepreneurial choices in firm strategy, including beliefs and actions, in relation to increasing the likelihood of the entrepreneur-desired results?

A key tenet of pragmatic management research is the aim to serve both academic and practitioner communities (Tranfield, Denyer, and Smart, 2003), hence this introduction will equip the reader to better engage with the following chapters. The Introduction aims to do so by first providing a literature review of commercialization merged with a specific entrepreneurship school of thought; the judgment under uncertainty view. Based on this, the Introduction introduces an empirical setting, maritime offshore production, which is a particularly uncertain market, and therefore a good fit to investigate entrepreneurial commercialization judgment under conditions of uncertainty. From there the Introduction presents an overview of the chapters. The Introduction leaves concluding for the individual chapters and the summary Chapter 5. However the Introduction will provide a discussion centered on boundary conditions of the thesis.

I.1 Literature Review

Based on the above research question, this Introduction will start by performing two literature reviews, a narrow and what Albert (1985) would call dogmatic, search on entrepreneurship as judgment under uncertainty to ground the work, followed by a broad scientific review aimed at commercialization to get the widest possible and unbiased collection of views on this topic.

I.1.1 The Contribution of Commercialization to Emergent Entrepreneurship Research

In this section, I first present an emergent criticism of current entrepreneurship research, in particular, the use of the opportunity-construct.

I.1.1.1 An Alternative to Opportunity-school Entrepreneurship Research

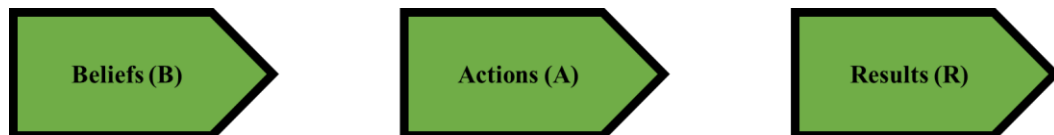
Foss and Klein (2012, 2018) have drawn attention to a dead-end in modern entrepreneurship research: the focus on entrepreneurship as opportunity discovery or opportunity creation. In the last decade, state-of-the-art entrepreneurship research has coalesced into a dominant opportunity-school, in which the research agenda has evolved into a technical discipline anchored on the opportunity construct, particularly on opportunity discovery, evaluation, and exploitation. While, at the outset, this was an “*ambitious and sweeping research program*” (Foss & Klein, 2018: 2), it has led to a narrow focus on start-ups (Foss & Lyngsie, 2014) and on ex-post (positive) results. The key issue is that opportunities are best observed after the fact and in relation to success, which removes the main features of entrepreneurship: judgments and decisions under ex-ante uncertainty, from the equation (Dimov, 2007; Klein, 2008; Klein and Bylund, 2014; Davidson 2015). Rather than focusing on opportunities as something observable ex-ante, Foss and Klein (2012, 2018) suggest a judgment-based view of entrepreneurship:

In this approach, entrepreneurship is conceptualized as judgmental decision-making which takes place in a market setting under uncertainty. Entrepreneurs combine heterogeneous assets, which differ in their attributes, and deploy these assets within a firm to the production of new offerings they hope will satisfy customer wants, generating profits. Rather than pursuing opportunities—which are only realized ex post, after profits and losses are realized—entrepreneurs pursue profits, and try to avoid losses, by anticipating future market conditions (Foss & Klein: 2018:6).

Despite the considerable emphasis on uncertainty, that is, unknown probabilities and outcomes, Foss and Klein’s view is not one of hopelessness. Their point is that uncertainty about the future instills hope in the entrepreneur that her belief

and the judgment she exercises can deliver profit despite the uncertainty of markets by utilizing an entrepreneur's unique heuristics (Gigerenzer, 2004). The operationalization of this approach to entrepreneurship is called the BAR framework (Figure 1), where "BAR" refers to *Beliefs, Actions, Results*. *Belief* concerns how the entrepreneur views the present, such as possible resource configurations and unmet customer demand, and the ability to change the future outcomes, such as by offering a new product for sale. *Actions* are the concrete investments of scarce resources in selected areas, including the resulting opportunity costs and implementation: setting up a firm, buying a machine, and the like. This stage represents the classic means-end model of praxeology (Mises, 1978) in which agents act to change subjectively perceived bad states for subjectively imagined better ones.³ *Results* are the observed outcomes. Did the entrepreneur achieve a perceived better state, and what exactly was that state? Keeping in mind that payoff may also be intrinsic, such as social capital or life learnings, not only materially extrinsic.

Figure 1: The BAR Framework



Source: Adapted from Foss and Klein (2018)

In this thesis, I argue that while the BAR framework matches well with observed reality and makes a theoretical well-grounded contribution. It is still a

³ Foss and Klein (2018) classify this as a Belief. It may be a fine point, but I argue that praxeology materializes as an Action: "As an *a priori* category the principle of action is on a par with the principle of causality. It is present in all knowledge of any conduct that goes beyond an unconscious reaction. 'In the beginning was the deed.' In our view the concept of man is, above all else, also the concept of the being who acts. Our consciousness is that of an ego which is capable of acting and does act. The fact that our deeds are intentional makes them actions. Our thinking about men and their conduct, and our conduct toward men and toward our surroundings in general, presuppose the category of action." (Mises, 1960:15)

new theory (all be it one building on classic insights) and is underdeveloped in certain areas. To advance the “judgment under uncertainty” entrepreneurship research agenda in this thesis, I place entrepreneurship in relation to commercialization and investigates this over a scale of analysis levels.

I.1.2 Commercialization - A Much Used but Ambiguous Construct

Tranfield et al. (2003) propose that a scientific literature review follows three stages; 1) Planning the review, 2) Conducting the review, and 3) Reporting and dissemination. Below I go through these for the topic of commercialization.

I.1.2.1 Stage 1: Planning the Review

To save a literature review from narrativity or randomness, it must be driven by a research question (Tranfield et al., 2003). Building on this thesis’ research question, a systematic review of management research usage of commercialization was conducted; *“Systematic reviews differ from traditional narrative reviews by adopting a replicable, scientific and transparent process, in other words a detailed technology, that aims to minimize bias through exhaustive literature searches of published and unpublished studies and by providing an audit trail of the reviewers decisions, procedures and conclusions”* (Tranfield et al., 2003:209). To get a systematic review of the usage of commercialization as a scientific construct in relation to a broad unlimited concepts of entrepreneurial choices, firm strategy, and desired outcomes as per my research question, I gathered a sample of peer-reviewed, innovation-themed research that was large enough to be representative but small enough to read in its entirety (Page & Schirr, 2008). My initial aim was a sample of at least 150 papers defining commercialization in some way. This cut off point was chosen as many specific management literature reviews have literature samples well below 50. As this sample was more general in nature, I, therefore, aimed at improving this number by at least a factor of three. I decided to focus exclusively on journals in the review, as they ideally represent the latest, most widely accepted research. This breaks slightly with the above definition of a

systematic review and is based on a simple trade-off; management research has grown tremendously and is often hard to compare and is, unlike more narrow fields of inquiry like specific medical or astrophysical questions, blessed with and fragmented into a mirage of different questions, analysis levels and methodologies (Ohlsson, 1994), and is hence more comprehensive to collect.⁴ As more STEM-oriented fields to a further extent share epistemological consensus and attempts to look at cause and effect in a more limited sense than management science that is more praxeological in tradition (Powell, Rahman, and Starbuck, 2010). I therefore decided to focus on (high quality) “research”, rather than completeness. I defined research for this purpose as peer-reviewed research in relevant high impact scientific journals. I started with the two highest ranked innovation journals Research Policy (RP) and the Journal of Product Innovation Management (JPIM) (Thongpapanl, 2012). To address the risk of inwardness typical of single-topic reviews (Denyer & Tranfield, 2009; Page & Schirr, 2008), I expanded the sample to also include broader management journals; the *Strategic Management Journal*, the *Journal of Operations Management*, the *Strategic Entrepreneurship Journal*, and *Marketing Science*. These journals’ current and five-year impact factors are similar to RP and JPIM, thereby ensuring broadness. I searched the included journals for the term “commercialization” via Wiley Online and Science Direct. Searches using deviations of the term, such as “commercializing,” did not reveal additional material of relevance. I conducted the review from 2017 going back 30 years.

I.1.2.2 Stage 2: Conducting the Review

I identified 1,759 potentially relevant scientific publications. I eliminated papers in which commercialization was only mentioned in passing (i.e., without a definition or discussion of the term). For example, Teotia and Raju (1986)

⁴ Which is also why I do not attempt a meta-analysis of the sample.

explicitly refer to commercialization when justifying the relevance of forecasting (the topic of their article), but their work makes no explicit contribution to the study of commercialization. The remaining 563 publications were registered in a database covering bibliometric details (e.g., authors, journal, publication year) and information on the research approach (e.g., industry focus, applied methodology, and research design). All of these 563 publications were reviewed in their entirety, and of these 270 offered a whole or partial definition of their applied commercialization construct. This number is a satisfactory grounding, as it surpassed my initial target and is larger than the typical literature review with a factor of over 5. In this is included formal and explicit definitions of commercialization, as in Athaide, Meyers, and Wilemon (1996), as well as implicit statements containing attributes of a (potentially) wider commercialization definition. Table 1 provides the sample distribution per journal.

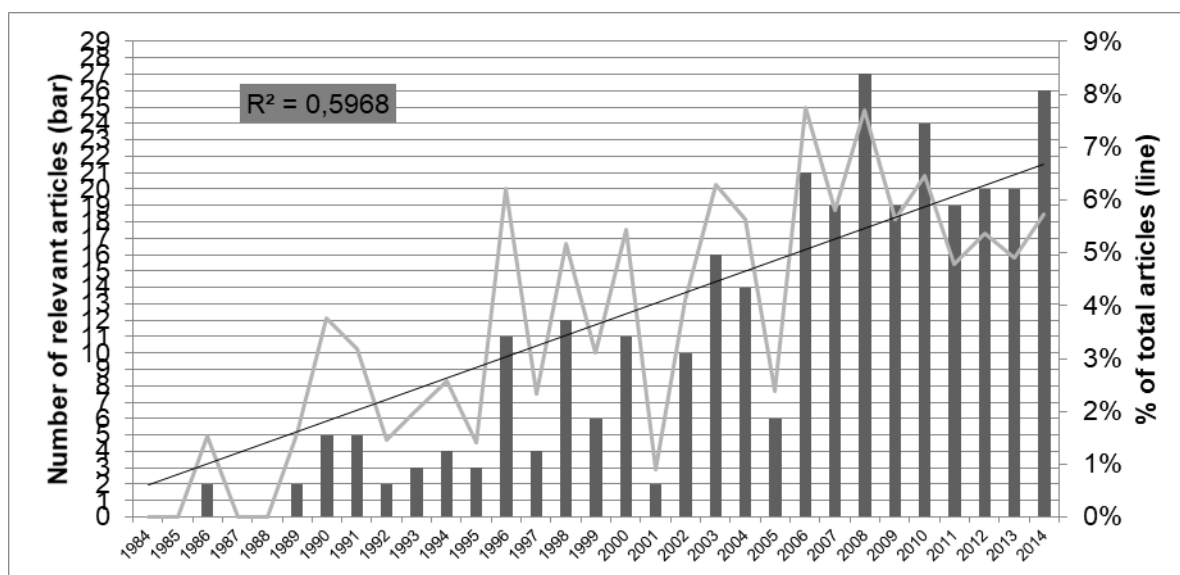
Table 1: Overview of literature sample

Journal	Area	Search on term	Sorted for relevance	Contain definition	SSCI 2017 Impact factor	Publication age
<i>Research Policy</i>	Innovation	999	248	125	4.661	47
<i>Journal of Operations Management</i>	Operation management	24	12	7	4.899	37
<i>Strategic Entrepreneurship Journal</i>	Entrepreneurship	69	41	17	3.488	10
<i>Marketing Science</i>	Sales and marketing	32	13	7	2.794	35
<i>Strategic Management Journal</i>	Strategy	248	109	56	5.482	37
<i>Journal of Product Innovation Management</i>	Innovation	387	140	58	4.305	34
TOTAL		1,759	563	270		

I.1.2.3 Stage 3 – Reporting and Dissemination

The sample shows a steady and growing engagement with commercialization in management research. The total number of publications has also risen; however as a moving average, +5% of management research is relating to commercialization (see Figure 2). In other words, commercialization is an established topic in innovation and management journals and is receiving substantial attention, which gives further merit to this thesis. Given the steady development of commercialization research, interest in commercialization does not appear to be a fad or fashion, and there is no cyclical movement and no imitation process (Abrahamson, 1991). The increased interest in this topic, the emergence of “chief commercial officer” positions, and the general tendency to use the term more often also indicate that this is not a management fashion (Benders & Van Veen, 2001; Kieser, 1997) but, more likely, a longer-term development. Which again warrant my attention to the commercialization research constructs.

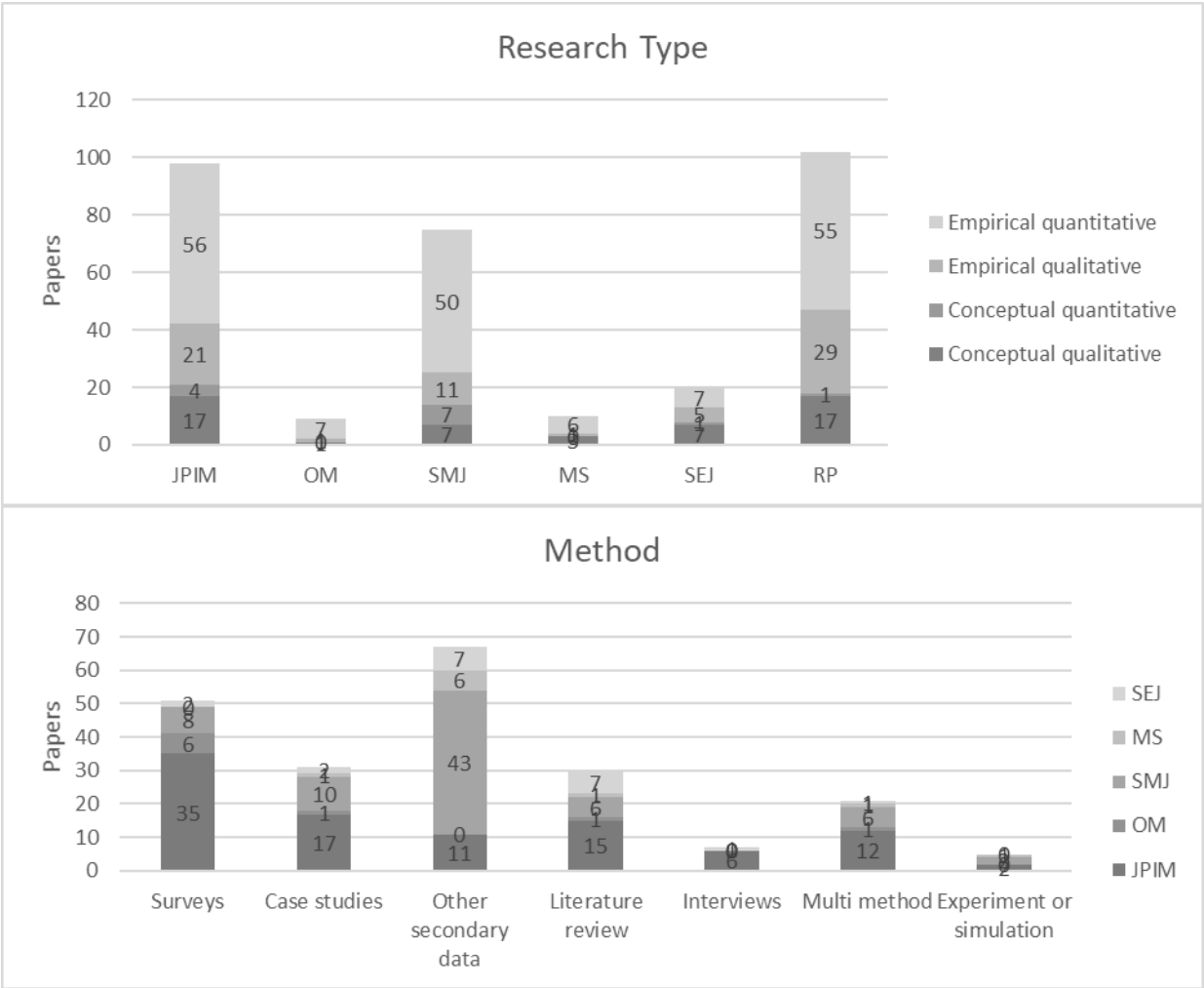
Figure 2: Year of Publication



The majority of publications were empirical studies of commercialization that used either surveys or secondary data, but commercialization has also been studied from a variety of other perspectives and methods, which offer insights into

different aspects of the phenomenon (see Figure 3), and the construct has been studied across 20 industrial settings. Further analysis showed, using first the microelements of the applied commercialization definitions in a Venn method (see Martin, Chadwick, Yi, Park, Lu, Ni, Gadkaree, Farhang, Becker, & Maudsley, 2012, for a method description) and later citations as the dependent variable in a regression analysis, that no dominant scientific definition of commercialization exists. This is likely due, as above mentioned, to the lack of epistemological consensus, and hence this thesis needs to further investigate the construct as such.

Figure 3: Research Type and Method



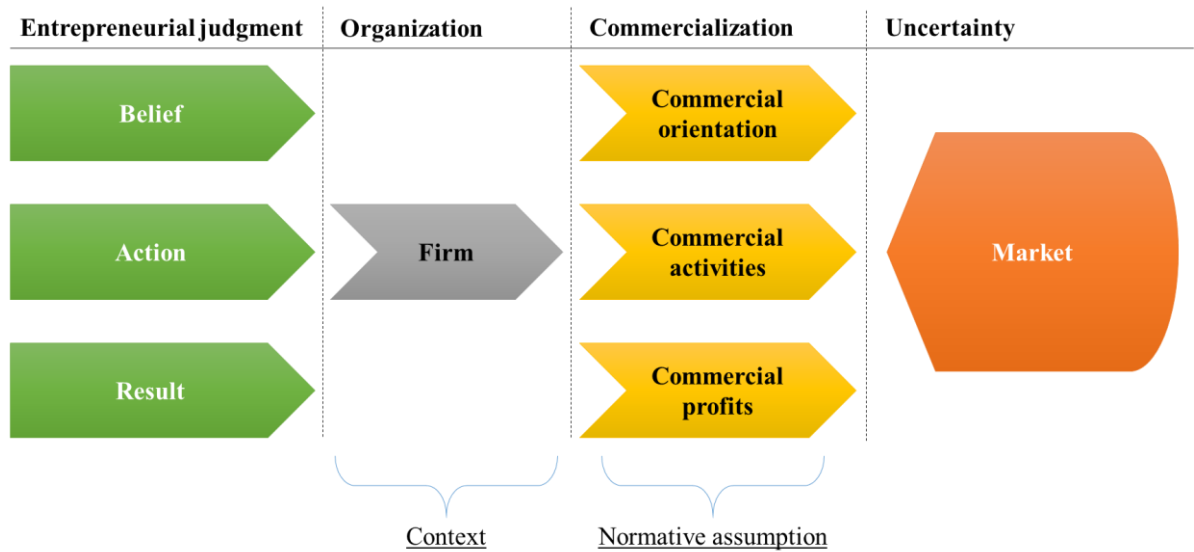
I.2 The Merger of Entrepreneurial Judgment and Commercialization

Scientific work benefits from clear constructs (Camerer, 1985, Whetten, 1989), and as amply demonstrated in the previous section, significant and multilevel ambiguity exists in the scientific meaning of commercialization. To move the analysis forward, I, therefore, define commercialization as thinking strategically about a firm's other activities or its purpose in relation to sales activities^{5,6}. This definition will be challenged in Chapter 1 but will serve the analysis at present. It serves the analysis, in that by that definition, commercialization occurs as the result of the actions of entrepreneurs making judgments about how to meet an assumed demand. Adding commercialization to the BAR framework provides the following understandings, which are graphically depicted in Figure 4: *Belief* in the commercial firm is commercial orientation; *Action* in the commercial firm is commercial activities; *Result* in the commercial firm is profits. While these redefinitions might sound pedantic or just semantic, they allow for further discussion and greater accuracy, as is demonstrated below.

⁵ In accordance with my methodology section, only individuals act. When I use the term “firm” as an entity that acts or chooses, this is shorthand for specific individuals within the firm, such as managers. I am not dismissing the organizational aspects, such as sense-making (Maitlis & Christenson, 2014).

⁶ This is close to the first recorded using of the word commercialization, from 1885: “*operation of making (something) a matter of profit above other considerations.*” Source: Online Etymology Dictionary. www.etymonline.com. Accessed Feb. 23, 2018. 11.37. It also fits with the first recorded using of *commercialize*, from 1839: “*subject to the principles and practices of commerce.*” The term commerce has even older roots as “*social intercourse*” (1503), or the “*large scale interchange of goods*” (1580). As such, the word is close to Hayek's suggested alternative word for economics, *catallaxy*, meaning “*admitting to community,*” or of “*enemy into friend,*” via mutually beneficial transactions motivated by divergent goals, as opposed to the ordering of resources according a common community goal, as is implied by the word *economics*. Source: Online Etymology Dictionary. www.etymonline.com Accessed Feb. 23, 2018. 11.43; and Hayek (1998).

Figure 4: Entrepreneurial judgment and commercialization



1.2.1 Beliefs and Commercial Orientation

As per Chapter 2, *Beliefs* are neither formulated or enacted in a vacuum, which means agents judgment are boundedly rational by both their cognitive limitations and by the structure of the environment (Simon, 1956, 1957). Choices are formulated to encounter an uncertain world of many other agents similarly judging and acting and competing for scarce resources under institutions of varying rigidity. These institutions under which judgment must be exercised can take many forms, from laws to norms, and serve to shape the incentive structure of the judgment. A market, in this understanding, is hence less about competition,⁷ and

⁷ In the neoclassical sense of *perfect competition markets*. The demand-market logic does contain the Hayekian concept of competition as a never-ending process of uncertain outcomes; “*Competition is a procedure of discovery, a procedure involved in all evolution, that led man unwittingly to respond to novel situations; and through further competition, not through agreement, we gradually increase our efficiency*” (Hayek, 1992:19). “*Competition is thus, like experimentation in science, first and foremost a discovery procedure. ... Competition as a discovery procedure must rely on the self-interest of the producers, that is it must allow them to use their knowledge for their purposes, because nobody else possesses the information on which they must base their decision*” Hayek (1998:68, 70).

principally about demand: no demand, no sales, no firm.⁸ It is also about the subjective well-being of entrepreneurs when they exercise judgment (Benjamin, Heffetz, Kimball, & Rees-Jones, 2012), such as their standard of living, and the opportunity to improve these standards and to act freely in the process of doing so (Sen, 1985, 1992), and their self identity (Ashforth, Rogers, & Corley, 2011; Fauchart, & Gruber, 2011; Navis & Glynn, 2011; Kodeih & Greenwood, 2014).

If the desired end of the entrepreneur is complex—meaning that the end requires many resources and choices dispersed over time—the uncertainty also grows. From this insight springs the competitive advantage of firms, as they allow for the planning of resource deployment over time, thereby potentially diminishing uncertainty and cost of dealing with uncertainty (Coase 1937; Hayek, 1945; Sautet, 2002). Firms are, in other words, vessels for entrepreneurial *beliefs* (and *actions*). Firms function by enabling efficient coordination up to a certain point where this coordination too become too complex (Coase, 1937). This coordination must be directed. The direction is the strategy of the firm. Strategy is relevant for firms because they seek to survive and thrive in the conditions of the market uncertainties they confront (Fligstein, 1993). The precise market uncertainties are, as stated, shaped by demand, institutions, and competitor configurations. Strategy is hence about both the how and the how to (Chandler, 1990) of surviving and thriving, and judgments about what to do and what not to do (Porter, 1996). Strategy is, in other words, “*the movement of an organization from its present position to a desirable, but inherently uncertain future position*”⁹ (Cespedes, 2014:60), and commercialization is thus linked to alternative firm choices and

⁸ Marketing literature contains a tradition about the creation of demand by the Marketing Departments and Marketing Activities, like advertisement. While demand can likely be awakened and opportunities created (Alvarez and Barney (2001, 2007), meaning the potential customer base grown, by firm activities, ultimately the demand comes from the subjective valuation and free choice of customers.

⁹ Readers interested in alternative to the position emphasis can consult Mintzberg (1987).

individual entrepreneurial judgment by means of the type of rationality that fundamentally guides strategy. As Simon (1978) states, “*there is no direct observation that individuals or firms do actually equate marginal cost and revenue,*” which would be the case if strategy was a purely a substantive optimization exercise (Simon, 1955). Rather, strategy is the result of processual rationality, a focus on the quality of the judgment process, including the well-being of the judging entrepreneur. Strategy is hence *satisfying behavior* towards *aspiration levels* (Simon, 1955, 1978, 2000; Selten, 2001). The link between commercializing and strategy hence instills a dynamic understanding of a firm’s choices, where the optimal tactic of the strategy has to be contingent on dynamic consumer demand and institutional arrangements. While commercialization remains the orientation, the most optimal strategic choices in order to reach that goal may change over time. Firms can directly or indirectly choose other focuses (doing nothing is a strategy too). Firms can, for example, be focused on production efficiency, on sustainability, or an unlimited number of other narrow or broad strategic focuses other than commercialization. Such an overall purpose of the firm’s coordination is called firm orientation. Firms and the entrepreneurs within them are, from a general welfare point of view—ideally—oriented towards a demand and, simultaneously, to optimize profits. Firms are hence—again ideally—seeking to serve customers, that is, to increase customer utility, but for a price—profit. This sets commercialization apart from other “other-directed” endeavors (Smith, 1759; Kant, 1785/2017), such as altruism or volunteer work. Table 2 presents three such alternative orientations and what they might entail in terms of the priorities and key strategic questions within firms. It is worth noting here the literature on organizational ambidexterity (see Raisch & Birkinshaw, 2008, for a review) as many organizations need to pursue several orientations in tandem—for example both production, development and commercialization.

Table 2: Examples of strategic orientations

Examples of strategic orientation	Dominant input to <i>Belief</i> in the BAR framework	Key strategy evaluation criteria for <i>Actions and Results</i>	Examples of key strategic questions
Production	Technology constraints	Lower fixed and variable costs	• Will this investment increase production volume? • Will this investment lower production costs? • Will this investment allow production of new products?
Organizational	Management constraints	Expand management choice sets	• Will this action decrease our cost of capital? • Will changing the organization free up resources? • Will new incentive systems make people cooperate more?
Commercialization	Demand constraints	Increase prices and sales volume	• Who will buy this and how? • How much can we sell? • What is the optimal price point?

Source: Own creation

The understanding of commercialization applied here is hence not just a function-specific emphasis, for example, on sales; rather, the emphasis on cross-departmental links within the firm. The sales department might do a good job convincing customers, but if production cannot produce on time, or accounting bills the customer the wrong amount or the purchasing department does not optimize the material procurement, full commercialization potential, the optimal relation of revenue to profit, is not reached. Therefore, sales leaders as an example cannot merely be operational in firms pursuing commercialization; they must think strategically too (Piercy & Lane, 2011). Hence, commercialization involves both sales and the ability to create products within the structure of a firm. It is top-line attention to revenue, with a bottom-line concern too. It is the link that aligns sales, strategy and entrepreneurial judgments. Hence, commercialization requires operationally clear links and coordination between not only sales and marketing,

as the customer-facing activities, but also between other areas of the business that directly or indirectly affect the purchase decision of the customers, for instance, billing regimes, delivery schedules, the actual product, and so on (Cespedes, 2012; 2014).

1.2.2 Actions and Commercial Activities

While some *Actions* are fundamental events, such as the creation of a firm, many are processual, repeated, and comprise the activities needed to bridge *Beliefs* and *Results*. Activities often require skills. A potential advantage—potential in that it is not guaranteed—of organizing in firms is to elevate individual skills to capabilities shared across the firm and not only embedded in particular employees.¹⁰ Capabilities are “*a high-level routine (or collection of routines)*” (Winter, 2003: 991) on the organizational level. Competencies and skills may become organizational capabilities when they are repeatable and linked to environmental opportunities and internal resources (Prahalad & Ramaswamy, 2004). This mirrors Garcia, Lessard and Singh’s (2014:23) assertions about strategic partnering in oil and gas from a capabilities perspective: “*Capabilities matter strategically in that they enable firms to take on particular challenges in ways that cannot be readily matched by others.*” As such, commercialization is supported (or hindered) by the specific capabilities of firms, which are in turn shaped by the past choices of management and the orientation of the firm. The object of capabilities, particularly those that are referred to as dynamic, is to mitigate changes in the market environment and to maintain a competitive advantage for the firm (Teece, Pisano, & Shuen, 1999). Capabilities are what more firm employees can do repeatedly (Shuen, Feiler, & Teece, 2014). The true role of salespeople, for instance, in commercialization is then to add value to both sides of the table, the selling firm and to the buying customer: “*The ‘visible hand’ of*

¹⁰ As is the focus of the distinctive stream of competences literature (Learned, Christensen, Andrews, & Guth, 1969; Hrebiniak & Snow, 1982; Hitt & Ireland, 1985).

management, to borrow a phrase from historian Alfred D. Chandler Jr. could not have succeeded in many industries without the ‘visible handshake’ of a team of salesmen out on the road” (Friedman 2004: 7). The sales department achieves this with capabilities in communicating and translating customer-desired values to the selling organization (Cravens, 2011), by means of processes, structure, and measurable performance criteria (Leigh, Cron, Baldauf, & Grossenbacher, 2011). For the commercial firm, commercialization is integrated around an organizationally shared responsibility for customer retention and management, relationship building, and problem-solving (Flaherty, 2011). In brief, the concept of capabilities fits into the BAR framework’s rationalist individualistic foundation by generalizing the individual activities of entrepreneurs and their employees to the firm level, especially as customers are also viewed as individual decision-makers, even when they too work in organizations.

I.2.3 Results and Commercial Profits

The *Results* stage in the BAR framework is the meeting of *Beliefs* and *Actions* with the outcome of the uncertain market process. While questions as to what drives customer satisfaction, retention, and implementation (Cron, Baldauf, Leigh, & Grossenbacher, 2014) are important inputs for commercial profit, they cannot remove the issue of uncertainty in commercial transactions, even for going firms. As such, it is valuable to comment on uncertainty to understand this further.

Uncertainty has sources, each with its own variation. Because *Results* are related to *Beliefs* and *Actions* in response to complexity, uncertainty must be understood in light of our boundedly rational ability to comprehend it.

I.3 Empirically Engaging Commercialization as Judgment Under Uncertainty

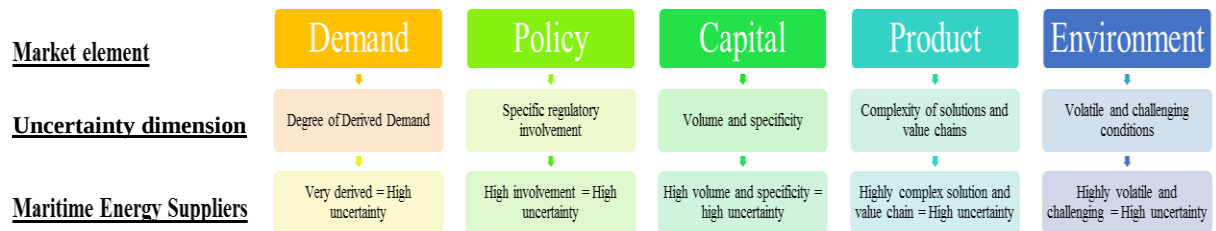
To truly highlight the judgment under uncertainty aspect of the BAR framework, two obvious research options appear. One could be experimental, in which only one uncertainty parameter is changed in a controlled manner; the other is researching a market with substantial uncertainty. For this study, I sought out a

market with substantial uncertainty resulting from a multitude of uncertainty sources. Examples of uncertainty sources include:

- Uncertainty can arise from demand. The fundamental *belief* that entrepreneurs must have is that customers will buy the product.
- Uncertainty can arise from changing institutional arrangements, making product and production methods possible or impossible.
- Uncertainty can arise from capital requirements; the need to put large amounts of capital into play is not only riskier but, due to the heterogeneity and specificity of capital deployment, increases uncertainty (Foss and Klein, 2012).
- Next, the complexity of the products and services delivered can increase uncertainty by their very nature, if they are technically complex and challenging.
- The size difference between suppliers and customers increases uncertainty too.
- Finally, the environment itself can potentially make entrepreneurial judgment uncertain, for instance, working on the open seas cannot be accomplished in all weather conditions, or working away from shore for a long time might require a feeding system, which may also increase uncertainty.

For this thesis, I identified a market setting rich in uncertainty based on these parameters: suppliers to offshore energy production. Figure 2 briefly summarizes the drivers of uncertainty for these suppliers. In the following section, I review this market in some detail.

Figure 2: Market uncertainty factors and variance



Source: Own creation

I.4 Danish Offshore Energy Supply

Denmark is a longstanding seafaring nation and remains the world sixth largest shipping nation. The sea has, since prehistoric times, provided Danes with fish to eat. For millennia, the sea has provided an efficient way to transport warriors for war or goods for trading. This is still the case today. However, the sea has in modern times provided yet another way to benefit the Danish people living on its coast: energy. Maritime energy production began with oil extraction. The first Danish oil rig was operational in 1972, and Denmark is currently self-sufficient in oil. Later sustainable energy also moved to the waves and the first Danish offshore wind park, Vindeby, was installed in 1991. Today upwards of 39% of the annual supply of electricity in Denmark is produced by wind power. Both oil and maritime wind are hence established maritime industries today, with a large population of supplier companies. The industries provide between 0.7% to 3% of the total Danish labor force and contribute significantly to the Danish GDP and the annual government budget.

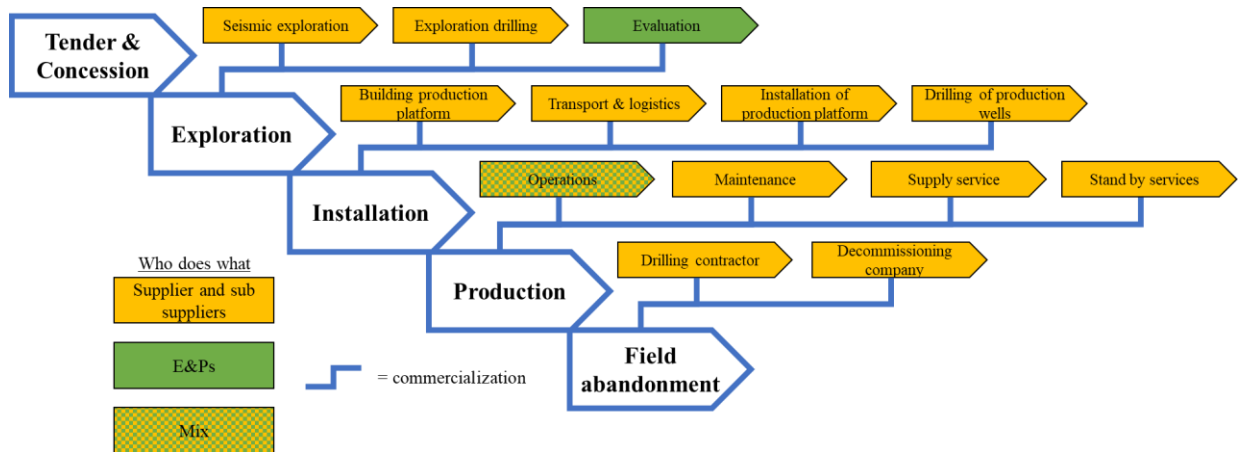
It is, however, far from easy to install anything on the open seas or the tricky Danish seabeds, and these industries would likely not exist,¹¹ and certainly not as

¹¹ This is a Coasian-based argument of marginal return of production within one firm (Coase, 1937).

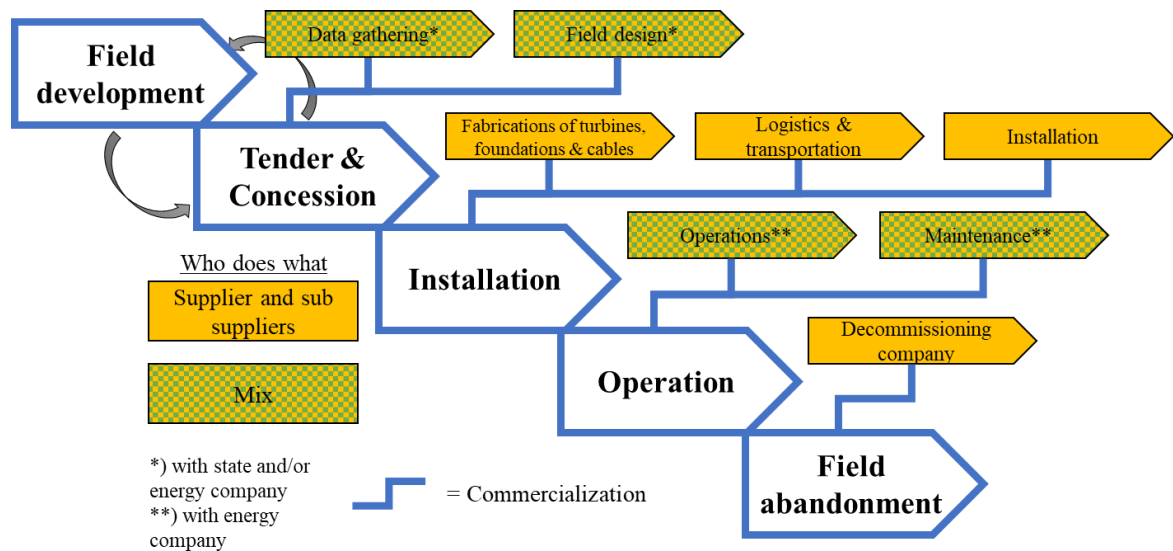
efficiently,¹² without specialized suppliers willing to offer products and solutions. These suppliers, alone and together in partnerships, constantly commercialize and innovate the possibilities in the numerous areas of products and process solutions needed to produce maritime energy (Halman & Braks, 1999; Barlow, 2000), some with wind-turbine foundation towers, some with supply cabling, some installment and service crews, some with underwater robots, and so on. While most suppliers primarily serve either oil or wind, there is much cross-fertilization with many firms having significant revenue shares in both oil and wind (Hansen & Steen, 2015). Figure 3 depicts the value chain of offshore maritime energy production. The figure indicates the extent to which the markets of both maritime oil extraction and offshore wind heavily rely on commercialization by suppliers. It is also clear that the specific suppliers needed for a project are plentiful. The desire of suppliers to meet customer demand drives innovation, and ultimately the technical boundaries of both offshore oil and wind (Lutz & Ellegaard, 2015). It results in the creation of firms of very varying size, significant uncertainties due to new possibilities, and the need to coordinate and communicate with many actors (Lang, 1990; Sabel, Herrigel, & Kristensen, 2017). Sales are, in other words, plentiful and both technical and organizationally complex in this market.

¹² This argument is based on core competences (Prahalad & Hamel, 2000). Due to the complex engineering challenges, efficiency comes from the decentralized structure of specialized firms. This is also what we observe in reality.

Figure 3: Offshore maritime energy production, oil



Offshore maritime energy production, wind



Source: Own adaptation, based on Olesen, 2015.

It is for the above reasons highly challenging to be a supplier to maritime energy production. There is a story in the Bible of the foolish man who builds his house on sand rather than on rocks (Matthew 7:24-27). Imagine the foolishness of placing a 17,000-ton oilrig in the open water with 3.5-meter wave heights, or erecting a 140-meter high wind park there? As I argue in Chapter 2 of this thesis, entering such a market requires a certain amount of foolishness; however, this can also propel interesting and novel solutions to commercialization without which the market would likely not be able to push the technology limit in the way that it

does. Chapter 3 goes further to investigate what it takes to survive in such a market. However, once challenges are solved and addressed, the path to internationalization is not far away if a stable home market is maintained (Normann & Hanson, 2017). Indeed, most Danish suppliers have, if not global then at least international, contracts for projects on a steady basis. Similarly, the employee base is often international, as is common in maritime and technical industries. However, internationalization is not given as local cluster structure, and local content requirements have the potential to limit international competition and create undue barriers to entry (Bower, Crabtree, & Keogh, 1997).¹³

The need to solve new, complex challenges is very present in the market, and the many different actors contribute to creating high levels of ambiguity and design uncertainty (Houman, Drejer, & Gjerding, 2017). A case in point, in Chapter 2, is where one case-study company provides hydraulic cleaning. As pipes get dirty, they lose carrying efficiency, which makes the whole installment less profitable. Changing such pipes is not only expensive but also poses risks to personnel, equipment, and the environment. Things can easily go wrong on the sea, which can have extreme consequences, so any technology that limits such risks has not only an economic value for the firms involved but a safety and preservation value for all humanity; however, as Chapter 2 documents, such solutions are not easy to invent or implement.

Due to the great number of possible externalities resulting from poor business choices or faulty technology, regulation plays a large role for these suppliers, probably more so than for most land-based industries. The regulation is mainly national in nature but is often ratified from international bodies, such as the EU or UNCLOS. Further, regulation can be both general, as in labor laws, or specific to the maritime or energy sectors, as with certain environmental regulations (for an

¹³ Commercialization and uncertainty relations to clusters and local content are underdeveloped both in this thesis and generally.

example of sector specific maritime regulation see Merkel & Sløk-Madsen, 2018). The desire for regulation is particularly clear as new technological limits and the harsh maritime environment provide both knowable risks and substantial uncertainties about new potential risks, with little opportunity to learn safely about cause and effects of potential disasters (Sabel et al. 2017). Therefore, regulation, and the policy that drives it, provides both opportunities and limits to commercialization (Verhees, Raven, Kern, & Smith, 2015); for instance, shared rules do to some extent limit competition for tenders, both regarding who can bid and the details of the offer. That said, current governance structures, both public and private (Block & Nelson, 2015; Stringham, 2015; Sløk-Madsen & Block, 2017) are not perfect and sometimes, as an example, expensive over-compliance in crew safety, might still lose out to cheaper crewing companies who are less compliant on bids for wind park maintenance. It is also not uncommon that the risk and requirements resulting from regulations are pushed down the value-chain from the customers, for instance, oil exploitation and production companies, to suppliers. As regulation plays a major role, firms are also faced with a commercialization choice here: they can, in brief, be reactionary with regard to rules, or be proactive in attempting to use regulation to create de facto monopolies or barriers to entry. An attempt to delve into this aspect of commercialization is found in Chapter 4.

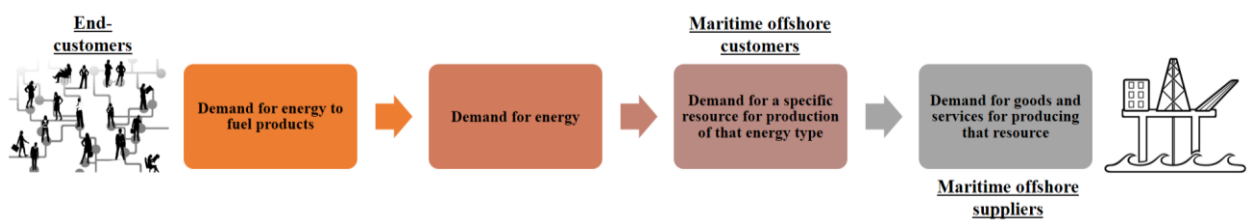
Further, as argued by Hennelly and Wong (2016), that while innovation complementarity is key for suppliers in maritime energy production, in their case UK offshore wind, such firms face both high market risk and political uncertainty, which requires them to invest based on trust. Suppliers must, therefore, hold very specific knowledge about both technical solutions and regulatory constraints. Even with capabilities to effect this, substantial capital investment is typically required for assets that are very specific (Williamson, 1996), and firms' capital and asset composition that supports commercialization are fundamentally heterogeneous.

Sovacool and Enevoldsen (2015) list the challenges as originating in the harsh conditions, and capital intensity and production bottlenecks. All these affect and are affected by capital choices. In fact, potentially reducing capital intensity is a commercialization supporting activity, particularly for offshore wind (Normann, 2015; Brink, 2017). Chapters 3 contain several examples and further detail on this aspect of the market. Suffice it here to say that suppliers are limited in what capital they can deploy, and the wrong choices will lead to bad performance with sunk investments.

While customers' projects typically have a lifetime of more than 20 years, with years-long projection and decommission time before and after this, development and prices are not locked, and the market in the 21st century has shown large volatilities, driven by the aforementioned factors and the fundamental demand for energy that forms the market's *raison d'être*. Supplying maritime offshore energy production is, therefore, an extreme function of derived demand. Derived demand as a construct originates with Marshall (1927, Book V, chapter VI), and is distinguished from natural demand. Natural demand is the direct demand consumers have for items such as food or shelter. Derived demand comes from the demand for something else. Owning a dirty car, for instance, could result in demand for a car wash, which would not have been in demand had it not been for the dirty car. Suppliers to maritime energy production are an example of extreme derived demand because of their distance from natural demand, as presented in Figure 4. These demand factors are guided by long-term macro-factors, such as geography and national policy, the path dependency of previous production and distribution investment, and the daily oil or electricity rate, which are investment instruments in their own right. Suppliers are in no position to alter these changes in demand in any significant way, in contrast to natural demand, which can often lessen uncertainty (think of a restaurant changing its menu from pizzas to burgers or vice versa, for instance), yet they have to bear the burden as their highly

specific nature allows them to do little else. It is after all difficult to convert an oilrig or wind tower foundations to other uses. Luckily, the advantage too falls with the suppliers, as in good times the specialized supply required to meet the derived demand drives up prices. The important aspect is that offshore maritime commercialization is a response to a derived demand, and that the capital structure of the market does significantly impact its elasticity exposure to demand changes.¹⁴

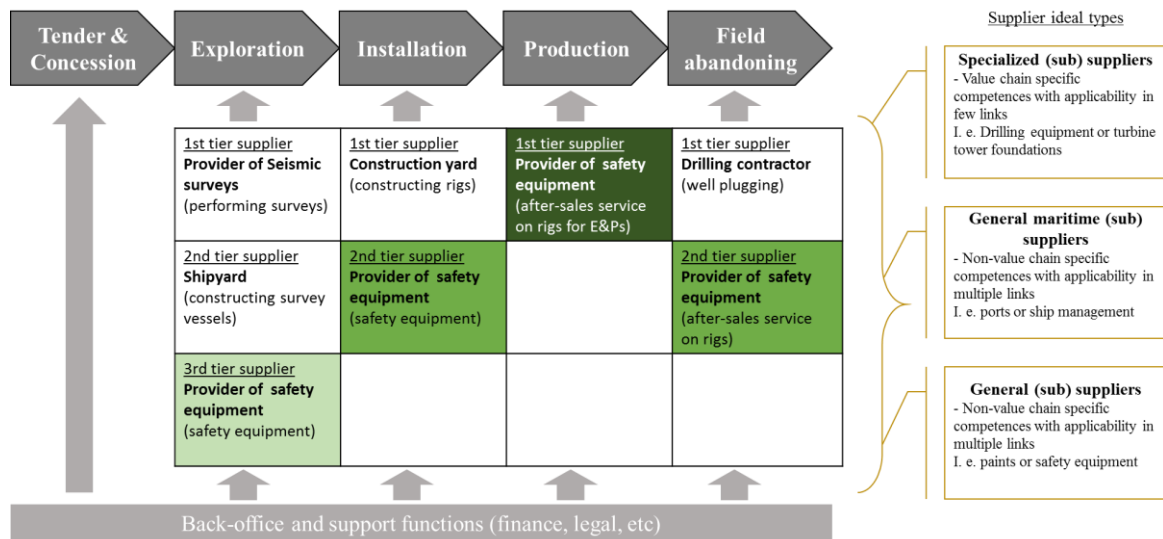
Figure 4: Derived demand and maritime energy production



Olesen (2015) distinguishes further between generalist and specialist firms in the supply chain, and further even, the place in the value chain attainable by means of the activities of the firm. Figure 5 shows how a specific type of supplier might position itself in the maritime offshore market. The individual firm can, hence, build on its specific capabilities pursue different supplier tier roles and ideal types in different parts of the value-chain. This thesis researches whether commercialization can help us understand the judgment behind the configuration of this choice. Thus, the phenomenon of a market with substantial uncertainty provides an empirical background for using commercialization to expand on the BAR framework.

¹⁴ See Baqaee and Fahri (2017) for a general discussion about such issues

Figure 5: Example of a safety equipment supplier commercialization

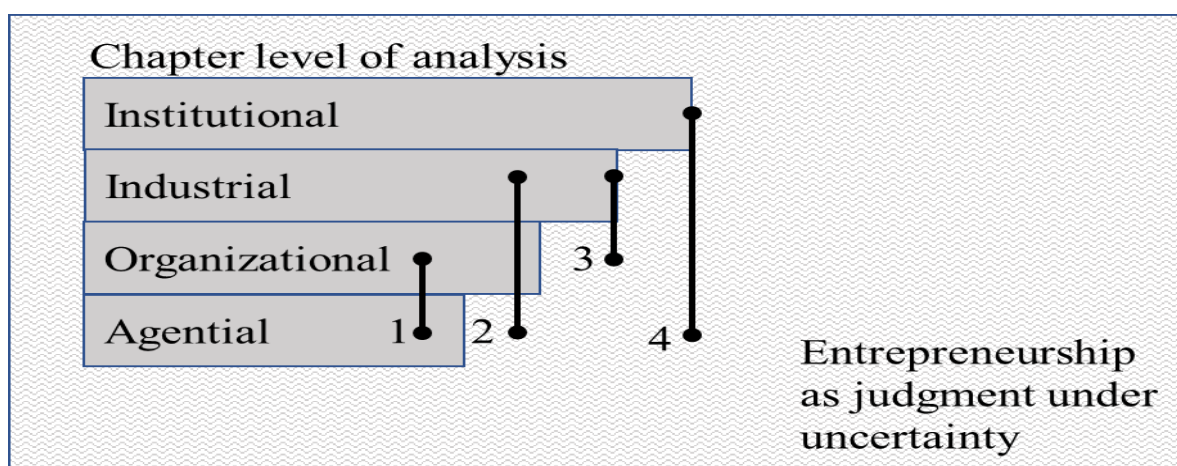


Source: Adapted from Olesen, 2015

I.5 Overview of Chapters and Level of Analysis

As stated, the fundamental research question of the thesis is: Can commercialization explain entrepreneurial choices in firm strategy, including beliefs and actions, in relation to increasing the likelihood for entrepreneur-desired results? In order to answer this, my individual contributions tackle different levels of analysis. This is illustrated in Figure 6. Each chapter further rests on a theoretical interest in entrepreneurial judgment, particularly the BAR-framework, typically engaged with supplementary theory, for instance heuristic decision making or maritime economics. All chapters are in paper format, and engages with different methods selected for relevance for their particular research aim. Below each paper-chapter will be shortly presented in this section.

Figure 6: Components of the thesis



Chapter 1 is a theory development paper on the interstice of the agentic and organizational level of analysis. The chapter explores the why, what, and how of commercialization as both a theoretical construct and a management practice. The why and what of commercialization is argued best explained using a theoretical foundation of entrepreneurship theory, particularly judgment under uncertainty, opportunity recognition and entrepreneurial identity. To understand the how of entrepreneurship, the chapter contains a typology of commercialization that allows for several restricted and particular understandings of commercialization rather than arguing for a singular one. The chapter also suggests research and practical implications for how, despite fundamental ambiguity in their understanding of commercialization, different research contributions can still be complementary, both scholarly and in practice.

Chapter 2 is a theory development and case-based paper on the interstice of the agentic, organizational, and industrial level of analysis. The chapter develops a heuristic model of entrepreneurial judgment. The paper aligns the judgment under uncertainty approach to entrepreneurship with market-specific opportunities and the organization of firms. The paper illustrates its claims by presenting qualitative data from small and medium enterprises. The paper finds

support for the model and argues that instances of entrepreneurial judgment, even when it appears irrational to observers, are fundamentally rational. Understanding the rational-choice foundation of entrepreneurship is argued to be fruitful for understanding and promoting market or firm-specific entrepreneurial activities.

Chapter 3 is a theory development and econometric paper on the interstice of the organizational and industrial level of analysis. The chapter provides a theoretical merger of entrepreneurial judgment and maritime economics by examining value capture as a result of entrepreneurial investment in capabilities within market alertness, capital structure management, and uncertainty handling. This argument is explored by three simple models and using statistical applications of price, financial, and capability data. The chapter explains value capture as dependent on demand-side changes, which guide optimal supply-side judgments and finds large support for uncertainty handling capabilities to have a multiplication effect on other judgment-related capabilities. The paper comments on boundary conditions of the field application and suggest future research particularly for the further merger of maritime and entrepreneurship research.

Chapter 4 is a theory development with illustrations paper covering all four level of analysis. This paper engages with the concept of nonmarket commercialization strategy and explains why, when, and how a firm opts for such a strategy rather than market-based commercialization. It also explains how the choice becomes self-enforcing in terms of the nature of entrepreneurial judgment, the arrangement of the given institutional settings, and the firms themselves. The paper is based on classic and institutional economics, public choice theory, corporate political action, and entrepreneurship theory. This enables the paper to advance a middle-range theory of the antecedents of nonmarket commercialization choice focusing

on the role of policymaker agency, a view which considers both the institutional context and firm-level agency. Specifically, the paper highlights the interplay between policymakers' individual agency and the broader concept of consumer sovereignty. The paper argues that infringing on consumer sovereignty makes nonmarket commercialization strategies possible via coerced selling and that the more efficient regulatory enforcement is in creating nonmarket profit opportunities, the less effective it is to diminish its effects. Additionally, the paper points out the role of firm-level resource constraints in choosing and promoting nonmarket strategies and capabilities within firms. The chapter suggests a new typology of firm behavior, given the degree of regulatory efficiency and consumer sovereignty.

Together, the four chapters take different approaches in understanding entrepreneurial judgment and commercialization. Table 2 provides a short overview of each chapter.

Table 3 – Chapter overview

Chapter	Title	Type	Research Question	Method	Empirical setting	Data	Findings	Scientific status
1*	Overcoming the Conceptual Ambiguity of Commercialization Research	Theory development	To what extent is commercialization a used and precise scientific construct?	Conceptual	A sample of management research	Literature sample	Commercialization is an increasingly used construct in general management research and in innovation research. It suffers from total ambiguity as a construct, but contributions can still cross-fertilize	Earlier versions presented at • <i>Druid Academy</i> 2015 (Rebild, DK) • <i>Academy of Management</i> 2017 (Atlanta, US). Earlier version submission • R&R in <i>Product of Innovation Management</i>. Current version submitted to • <i>Academy of Management Review</i>
2	Entrepreneurial Judgment in Context: A Heuristic Model of Commercialization and Opportunity Choice	Theory development and qualitative case method	Why do entrepreneurs choose to pursue opportunities against common sense?	Conceptual Qualitative Case-based	SME's in the offshore supply sector	Two companies over a period	Even when appearing irrational, entrepreneurial opportunity pursuit is fundamentally rational	Current version submitted to • <i>Entrepreneurship Theory & Practice</i>
3	Towards a Market-Specific Entrepreneurial Value-Capture Model—a Field Application of the Entrepreneurship as Judgement under Uncertainty View in a Maritime Market	Theory development and quantitative analysis	Will the right actions for capability investments provide results superior to market development? What is the precise capability relation driving this?	Conceptual Quantitative	Oil service firms in the North Sea Region.	Illustrations Financial data Oil price Company corporate values	The right actions can deliver above-expected results. The precise relation of the tested capabilities is the addition of alertness and capital management multiplied by uncertainty handling.	Earlier versions presented at • <i>Southern Economic Association</i> Annual Meeting 2016 (Washington DC, US) • Research seminar at Sauder School of Business 2016 • <i>International Association of Maritime Economists</i> Annual Meeting 2017. (Kyoto, JP). Earlier version submission • R&R in <i>Maritime Management and Policy</i> Current version submitted to • <i>Entrepreneurship Theory & Practice</i>
4	Policymaker Agency Impact on Entrepreneurial Judgment and Nonmarket Commercialization Strategy Choice	Theory development with illustrations	Why do firms use coercion-based selling?	Conceptual	A collection of illustrations	Illustrations Formal models	If the option to use coercion exists, firms will use it at the expense of market commercialization if doing so reduces uncertainty.	Earlier versions presented at • <i>Association of Private Enterprise Education</i> in Las Vegas, 2016. Current version submitted to • <i>Academy of Management Review</i>

*) Co-authored with Henrik Sornm-Friese (Department of Strategy & Innovation & CBS Maritime, supervisor)

I.6 General Reflections on Methodology

Social science theories and models are always dealing with an infinitely complex world by simplifying it. *“Models are, for the most part, caricatures of reality, but if they are good, then, like good caricatures, they portray, though perhaps in distorted manner, some of the features of the real world”* (Kac, 1969: 3). This is no less true for the BAR framework, and therefore it becomes imperative to be aware of the simplifications used, typically by means of an honest approach to the use of assumptions, constructs, or the acceptance of the constraints of the selected method. For this reason, Whetten (1989) suggests thinking of theory development as a matter of dealing with a certain subject or domain constituted by the *what* and *how* of a theory. *What* deals with the logical factors in the theory, such as a construct or a variable. The challenge is reaching comprehensive explanations without falling victim to parsimony. *How* is an attempt at causality, the links, and relations of the theory. Most importantly, however, is the third element, according to Whetten, the *why*: this deals with *“underlying psychological, economic, or social dynamics that justify the selection of factors and the proposed causal relationships”* (ibid: 491). While the *what* and the *how* is more directly dealt with in each chapter, the fundamental *why* does warrant special attention in the Introduction. The *why* is the *individual rationalist* approach (see Section 1 in Buchanan & Tullock, 1962; Mises, 1978) underlying the BAR framework, and by extension, this thesis. Such a view holds that individual agents make decisions under conditions of a scarcity of resources, both physical and mental, and seek to maximize their subjective utility given these constraints. To increase efficiency, and at the cost of liberty, agents aggregate and congregate in organizational forms, from traditional norms to modern multinational corporations; however, such collectives, be they abstractions or legal realities, never act without the involvement of some individual agent; a firm never acts, only their managers and employees do. From this core belief, a theory of

relations of the social element can be formulated, models built, and the what and how developed and related. Furthermore: “*Theories in the social sciences are not applicable irrespective of context. Context has been labelled an ‘amorphous concept capturing theory-relevant, surrounding phenomena or temporal conditions’ (Bamberger, 2008, p. 839) and defined as ‘situational opportunities and constraints’ (Johns, 2006, p. 386)*” (Busse, Kach, and Wagner, 2015: 6). This is the reason that the construct of commercialization here becomes a way of expanding the BAR framework to comment on specificities and empirical realities.

Hence, while all models are wrong, some are useful (Box, 1976). As such, we can think of social science as a flashlight beam highlighting a certain area of a dark room. As more research is added, the beam is extended or may be retracted, depending on whether the further research supports or challenges the existing light source. Staying with the flashlight metaphor, the flashlight is the chosen method or the strict adherence to one method, for example, econometrics or case studies. A possible choice for the thesis was to retain one flashlight, ensure that it shines as bright as possible. Another approach, the one used in this thesis, is to shine the flashlight in multiple directions, using different methods, which hopefully helps to find the missing key in the dark room, so to speak. This approach has been chosen for three reasons (Nissani, 1997): 1) commercialization is a widely under-engaged topic and might not fall easily into only one type of social science discipline or method; 2) the development in the industry doing the time of data gathering prohibited large-scale non-desk-based research; and 3) it allows for flexibility and creativity that has the potential to challenge current understandings and make important contributions. Hence, the chapters use both quantitative and qualitative methods. The thesis combines methods to arrive at more complex arguments. It uses abstract modeling where appropriate and empirical data where possible. The significant challenges with such an approach are twofold: 1) important subtleties

might be lost, and 2) the author might suffer from some confirmation bias that is difficult for the reader to disentangle. The possibility of both these issues occurring in the present work are hereby openly admitted; however, as this is a work in the vein of the individualist rationalist, dynamic, or quasi-Austrian school,¹⁵ I do not hold that theories about social phenomena need observations or data to be true. While observations and data can, given a very precise premise, disprove social theory, they principally serve to illuminate and give credence to theory; the ultimate proof is sought in the endless complexities of society (Hayek, 1968). The potential payout is for the agents and institutions upholding specific social scientific theories to truth to discover and realize. This is a unique feature of the economic social sciences (Boettke, 2017)—and I argue, by extension, management studies too—that requires us to work philosophically rigorously and openly, and be constantly aware that we are dealing with the most elusive subject matter, free choice, and with the dearest compound, human happiness and prosperity. As such, my eclectic approach to method selection attempts to follow Foss (1994), building on Popper and Hayek ideas that the goal of social science is to explain the unintentional effect of intentional behavior first and foremost, and methodological specificity second. Furthermore, despite the admitted potential dangers of interdisciplinary work, such work often holds the potential to make new headway in research, which is a promising aspiration when the thesis is dealing with an explicit challenge, the judgment under uncertainty view, to the dominant view, the opportunity school, within the entrepreneurship field.

¹⁵ This is no coincidence, as all the current major schools of management research—industry view, resource-based view, and evolutionary view—all have a clear connection to the ideas of Mises (Powell, Rahman, & Starbuck, 2010). Further, general management science has especially made use of Austrian economic theory to investigate entrepreneurship (Shane, 2000, for further examples, see: Jacobson, 1992; Foss & Ishikawa, 2007; Minitti & Levesque, 2008; Chiles, Tuggle, McMullen, Bierman, & Greening, 2009; Klein & Bylund, 2014); this thesis continues in this tradition.

I.7 Discussion and Boundary Conditions

This section foregrounds where my findings are a poor fit. An integral part of social scientific contributions, particularly those that are outspokenly contextual, is acknowledging clearly the possible range of the theory, the boundary conditions (Whetten, 1989; Busse et al., 2015), particularly as future research can fruitfully challenge these. The main limitation of my approach is the heavy emphasis on a unique market setting and demand-side logic. If that is relaxed, so too should the validity of the claims found herein, at least until further research can be undertaken, as fundamentally the thesis argues that the effectiveness of (specific) commercialization is context dependent in the BAR framework.

The use of maritime suppliers is a boundary condition too. To put it bluntly, by using a market that is as uncertain as possible in multiple dimensions, it is not possible for the thesis to separate particular uncertainties or their effect on one another. Future work should, therefore, assess links in the BAR framework in more singular-uncertainty markets. This might generate interesting insights in terms of commercialization prioritization for instance. Further to this fundamental boundary condition, when reviewed in detail, the market and context chosen here play a role for my claims in three specific areas. These are discussed below.

I.7.1 Sales-type and value chain complexity

Maritime offshore customers are few, and are mostly already known by suppliers. At the same time, the value chains and demand drivers are highly complex. This creates a special situation in which relational and challenging sales methodologies (which also go by other names) are likely to occur naturally. Since *how* and *how often* you sell is a large part of commercialization; markets with different sales dynamics, or more simple value chains or demand structures, might experience different utility from the commercialization construct and its relation to the BAR framework.

I.7.2 Regulations

If the author can be allowed one unsupported claim, it would be that in almost no western entrepreneurship classes are regulations mentioned. However, if one were to do an entrepreneurship class on maritime industries, it would be high on the curriculum; regulations have center stage in all maritime industries. Regulations touch on many issues for these firms, it contains to health and safety and the environment. But often also to contract and inter-firm relations to a far greater degree than many land-oriented industries. The thesis implicitly argues that the central role of regulations further brings commercialization, as defined in this chapter, to the forefront. Suppliers that accept liability for regulations as part of a deal with larger customers will benefit from a commercialization focus in evaluating the attractiveness of such a deal. This might not be relevant in less or differently regulated industries. A clear future research aim should be to investigate commercialization and the BAR framework in markets where government policy plays a smaller role or is close to unchanging.

I.7.3 Capital need

Capital is highlighted in the description of the market because the upfront requirement for capital is considerable, and often required long before it is utilized, for example, when ordering a specific type of ship, which needs to be constructed. Furthermore, the specific capital choices matters and is asset-specific and likely “sticky” (Bylund, 2015). The degree to which this impacts on commercialization is interesting and should merit further research.¹⁶ A stark contrast to this would be day trading, particularly short selling, which is close to instant and can be conducted with limited funds. If an agent holds the *Belief* is that the share price of Company A (a specific asset) will fall, and the agent takes *Action* to borrow funds to short shares in Company A, and if the *Result* supports the *Belief*, the agent will effectively have grown her capital almost

¹⁶ Foss and Klein (2012) makes a similar claim for general entrepreneurship theory.

instantaneously. The capital choice is now a simple one of whether to reinvest the gains.

There may also be conceptual boundary conditions in my utilization of commercialization. Below, I list some potentially promising, alternative ways of understanding the commercialization construct generally. These can be viewed as competing definitions of commercialization—or future work might show they are complementary to the understanding in this thesis.

1.7.4 Commercialization as a process

If commercialization is viewed as merely a process, presumably alongside many other processes within the firm, it opens up for questions other than the one engaged by this thesis. Among these are: what is the process, what does it consists of, who is involved, what is the start, is it one process or multiple ones?. Is, for instance, the attempt to commercialize a new type of underwater survey robot a process that starts with the first iteration of the previous model and continues until the first new regular model is ordered, or perhaps until the next generation takes over? The process view is a boundary condition in that it removes the imperative and evaluative elements of commercialization as defined in this thesis. This might make the term more acceptable, but it also makes it less meaningful.

1.7.5 Commercialization as an event

At the other end of conceptual understanding may be understanding commercialization as an event: a clear demarcation point in the activities of the firm. While such an understanding likely would only present a part of the broader understanding this thesis presumes, it is nonetheless tempting for the sake of analytical clarity. To use the above example, it may be that commercialization is the first sale of the new underwater robot. This is likely how commercialization is understood by many firms with production or management mindsets. While it can be good for measurement to have an event to focus on, this understanding omits the relational aspect of commercialization.

1.7.6 Commercialization as structure

One could also view commercialization as structural: the organizational structure required to commercialize, for example, a sales department, or even a new product development department. This is interesting, as it might more clearly place responsibility for commercialization with one department or person, such as a chief commercial officer. It is, however, debatable whether this is a true boundary condition. Chandler (1990) famously asserted that structure follows strategy as the required way to implement strategy. As such, commercialization as structure might be the result of commercialization as strategy.

It is certainly likely that these boundary conditions apply to this thesis, and perhaps more than mentioned above. On the other hand, commercialization, and especially sales, are (re)emergent research fields, and this thesis does give insights into commercialization understood as a strategy and explored under contextual constraints. Before commenting on the final boundary condition I would like to highlight two theoretical advantages to using the commercialization construct and definition proposed in this Introduction. First, as the normative objective of firms is profit attained by means of offerings, a better understanding of commercialization can help inform research and practice as to how both revenues and profit can grow together. This also means that since all going firms need to commercialize, even firms that do not have an expressed commercialization strategy or who are motivated by other purposes may still be analyzed as if they did, and their capabilities, skills, and choices, may be evaluated as such.¹⁷

Second, the definition of commercialization used in this thesis offers a coherent view of both the boundary and the productive aspects of the firm. Within sales research, salespeople and the sales function make up the boundary role of the firm

¹⁷ This is in part the argument of Alchian (1950) that the strategies of firms that survive look similar and as if they are motivated towards profit-maximizing, as this is the behavior that the market forces on them. This thesis does not, as will become apparent, accept all of Alchian's reasoning, as individual entrepreneurial judgement still have a bearing on outcomes.

(Singh, Marinova, & Brown, 2012).¹⁸ However, since salespeople can both oversell—sell more than what can be delivered—or undersell—do not sell to the full potential—I argue that the boundary role must also be understood in relation to the productive aspects of the firm. What can the firm do, and what does it actually *do*, for customers. This double-sidedness of the commercialization construct enables important research into the coordination mechanism, the cost of sales, and sales impact on the rest of the organization (Cespedes, 2012).

The final boundary condition is more theoretically profound: is the BAR framework a continuous model, as the thesis presumes, and can it be aggregated to the firm or group level, as the thesis assumes? This is underexplored in the BAR-framework. Particularly the role of property rights (and responsibilities) within the framework is not settled. To hammer the point home, imaging two academic entrepreneurs working on an intellectual opportunity. They have a *Belief* that the current state of affairs presents an unmet demand for an explanation of phenomena and they hence take *Action* by writing a paper. This paper is a co-written *Action* and it turns out that a pesky junior reader points out some minor mistakes in the references. Who is to blame in the BAR framework? The individual or both? Who remembers who might actually have been responsible for a particular reference? What if one of the authors, maybe without informing the other, gave the task to his assistant? Most importantly; Is the consequence of the mistakes that the *Actions* cannot lead to the desired *Result*? Clearly not; the paper can be convincing with minor mistakes, but the issue of group work and responsibility within each stage requires a lot more work, and this thesis' normative interpretation can be seriously challenged in the future as a result. Going back to the example, the paper—the *Action*—is clearly broken, though it might still lead to the desired *Result* if

¹⁸ There are several other competing understanding of firm boundaries. Transaction costs (Coase, 1937) is likely the most famous, where the boundary is the marginal return to organizing within the firm. Another is in the network literature where managers are often used as the boundary spanners (Barden & Mitchell, 2007)

customers demanding the alternative theory are willing to overlook minor and easily correctable flaws. If they are not, and potential correct *Beliefs* are dismissed as wrong because of faulty *Actions*, other questions beg to be answered.

Mentioning such boundary conditions and challenges upfront provides ample grounding for the reader to now proceed to critically examine each chapter. After Chapter 4, I will return with an overall conclusion on the thesis.

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Chapter 1 - Overcoming the Conceptual Ambiguity of Commercialization Research

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ABSTRACT

We investigate the much-used construct of commercialization. We argue that while the construct is much used, it also suffers from significant ambiguity as regards its meaning and usage throughout management literature. We, therefore, explore the why, what, and how of commercialization as both a theoretical construct and a management practice. The why and what of commercialization, we argue, is best explained using the theoretical foundation of entrepreneurship theory, particularly judgment under uncertainty, entrepreneurial identity, and opportunity recognition. To understand the how—or the flow of causality between motivations, activities, and outcomes—of commercialization, we develop a typology of commercialization that allows for several restricted and particular understandings thereof rather than arguing for a singular understanding. We argue that by using our typology, several meanings of commercialization can co-exist and can cross-fertilize research findings rather than competing for theoretical dominance or suffering from interdisciplinary ambiguity. We further suggest research and practical implications for how, despite fundamental ambiguities in their understanding of commercialization, different commercialization research contributions can still be complementary, both in scholarly work and in practice. The study is relevant across many subfields within management

science, particularly innovation, entrepreneurship, and strategy and contributes significantly to increasing our shared understanding of one of the most important aspects of commercial organizations—how they create revenue from resources.

Keywords: Commercialization, product development, innovation, management thinking, entrepreneurship.

1.1 Introduction

When an organization commits part of its inherently limited resources to innovative endeavors, it expects an appropriate return in the form of either a new revenue stream or an increase in profits from existing revenue streams—or both (Kim, Min, & Cha, 2015; Dunlap, McDonough, Mudambi, & Swift, 2016; Hottenrott, Lopes-Bento, & Veugelers, 2017). In addition to benefits arising from improvements in internal processes (Mueller, 2006), returns from investments in new product development (NPD) can be achieved by selling the new offering to customers (i.e., by convincing customers of its value-creation potential) or by licensing out the technology (e.g. Bianchi, Frattini, Lejarra, & Di Mini, 2014). This market-facing part of the innovation and development of product or service offerings is generally referred to as *commercialization* (Godin, 2006).

An extensive discourse stretching from Schumpeter (1942) via Teece (1986) to Crossan and Apaydin (2010) suggests that the innovation process is incomplete without commercialization (Adams, Bessant, & Phelps, 2006). Due to the general fuzziness of innovation management constructs (Fagerberg, 2004), and despite calls for academic contributions (De Jong, Verbeke, & Nijssen, 2014; Luchs, Swan, & Creusen, 2016) and practitioner interest in additional insights (Marx & Hsu 2015; Heidenreich & Kraemer, 2016), the construct of commercialization remains underdeveloped. Underdeveloped constructs are potentially unscientific, and impede the (appropriate) practical use of research findings (Tranfield, Denyer,

& Smart, 2003). For instance, commercialization plays a central role in many paradigmatic debates on innovation and management. For example, the theoretical debate over *first-mover advantage* versus *fast-second advantages* (Markides & Geroski, 2004) essentially focuses on the capabilities that turn innovators (i.e., market actors realizing technically new offerings) into profiteers (i.e., market actors realizing a profit). A general assumption underlying this discussion is that observable systematic differences among market actors' commercial capabilities can explain performance differences. Clearly defined commercialization constructs would aid the capturing of such differences, as well as assist with understanding what is not captured when commercialization is viewed in specific ways.

Shared definitions are desirable as they allow researchers to adhere to a deductive approach regarding, for example, questioning and subsequent scientific expansion (Camerer, 1985). A lack of a clear conceptualization hinders the development of theory, as theory requires, among other things, delimitations and definitions to satisfy the criteria for scientific discovery (Corley & Gioia, 2011). This significant shortcoming is problematic not only for our understanding of commercialization but also for related fields of study. For example, Ernst and Fischer (2014) point out that research on commercialization could improve understanding of patenting strategies. In short, one or more clearly defined commercialization constructs is important for improving explanations of innovation and management outcomes. Furthermore, construction clarity enables researchers to compare findings and work with boundary conditions as well as consider such boundary conditions' impact on research (Busse, Kach, & Wagner, 2017).

This paper provides three important contributions towards improving commercialization research. First, we show that the current scientific use of commercialization is diverse and ambiguous. From these observations, we lay out

the theoretical foundations from which commercialization can be understood as a scientific construct, building on the considerations of Whetten (1989). These foundations primarily concern entrepreneurial motivation, the *why* of commercialization, and opportunity recognition, the *what* of commercialization. The second contribution is a typology based on the theoretical foundations. Such a typology enables seemingly divergent commercialization constructs to interact and cross-fertilize one another. As such, this typology constitutes the *how* of commercialization. Third, and building on these contributions, we advance commercialization research topics that need further attention from scholars and comment on some of the implications of our paper.

1.2 The State of Commercialization Research

Reviewing a sample of management research published over the last 30 years in high-impact innovation-related management research journals, we found 270 papers that contain a wholly or partially defined commercialization construct. The current state of the art of commercialization-related research presents several fragmented and often divergent understandings of the construct, and no clear schools of thought or viewpoints with substantial scientific followings, besides a loose subsample of research relating commercialization to complementary assets. Table 1 presents an overview of the frequency of the defining elements. This section illuminates these defining elements, showing how some of them fit together well, while others resist being included in the same coherent scientific construct.

Table 1 – 364 elements of commercialization in definitions found in 270 research papers

Element	Frequency
Product development	41
Product launch preparation	35
Product launch and initial marketing	55
Newness	45
Exploitation	130
Complementary assets	48

A portion of the papers define commercialization as a component of product development. Such a perspective often uses commercialization as an umbrella term for a specific stage in the development of new offerings, although that stage-specificity is far from uniform across the sample. An example is: *“The commercialization phase starts after the design freeze. It involves the final product development modifications and the preparation and beginning of the production process and ends with the introduction to the marketplace”* (Brettel, Heinemann, Engelen, & Neubauer, 2011, p. 253). Similarly, *“successful commercialization of a new product in biotechnology involves a lengthy and expensive product discovery and development phase, culminating in the final FDA approval”* (De Carolis, Yang, Deeds, & Nelling, 2009, p. 151). A significant discussion in papers with a product-development view of commercialization is the role of the design stage of new offerings, and in the similar vein, if and when customer interaction is part of or separate from commercialization.

More specifically, some papers apply the concept of commercialization more narrowly, as the preparation of a product or service to be released to the market, though not including the actual product launch. An example can be found in Chiesa and Frattini (2011, p. 439): *“Strategic decisions are taken prior to the*

launch of the innovation, and even before starting its development. They essentially define the context in which the launch of the new product occurs.” In this view, commercialization typically involves the marketing department and is often related to longer-term strategic choices. This is in contrast to papers that apply a commercialization construct centered on the actual launch and initial marketing of offerings. In such interpretations, commercialization describes the process of releasing a product or service to the market. Borah and Tellis (2014, p. 123), for example, refer to commercialization in the following manner: “*We measure the number of commercializations by the number of new product launches per year.*” Research resting on this understanding is often associated with issues related to implementation and early feedback from potential or early customers. It is a popular definition among econometric papers as it is easy to measure.

Innovation is often associated with newness for the commercializing organization or the customers, and novelty is similarly found as an element in commercialization constructs in several papers, as in Coates and McDermott (2002, p. 442): “*Our analysis suggests that the development of the emerging technology and the subsequent commercialization of that technology created a number of new competencies at Analog Devices.*” The focus on handling new products and services in such definitions hence positions commercialization as a theoretical construct different from ongoing sales and marketing.

Commercialization is, however, most often understood as direct exploitation of innovation. Interestingly, such a perspective is almost the direct opposite of interpretations of commercialization as newness and instead encompasses the distinct skills, activities, and capabilities that ensure the ongoing delivery of a product or service. As such, commercialization is defined as all of the market-oriented processes that follow a new product’s development to ensure return on investment: “*Basic economic analysis suggests that any new investment in*

additional development or commercialization of a patented technology is justified only if the value of the discounted cash inflows from the investment is greater than the cost of the investment” (Levitas & Chi, 2010, p. 218). Similarly, Bohlmann, Spanjil, Qualls, and Rosa (2013, p. 237) note: *“The firm’s product strategy becomes manifest through product platform development and the commercialization of specific products.”* This view is aligned with the general interpretation of commercialization at Oxford Dictionaries:¹⁹ *“The process of managing or running something principally for financial gain.”* It is noteworthy that many of these papers deal particularly with university technology transfers and related topics, and are often vague about whether commercialization as exploitation is a process or an event.

The candidate closest to a shared “school” of commercialization thought is research related to complementary assets. Originally proposed by Teece (1986), this contingency interpretation sees commercialization as an overall process involving complementary assets. In particular, Teece (1986) emphasizes that firms need complementary assets, such as product development, production, and marketing, to ensure successful commercialization. Commercialization activities, indeed, require and enable a firm to build complementary assets (Teece, Rumelt, Dosi & Winter, 1994). A statement to this effect can be found in Chatterji and Fabrizio (2014, p. 1431): *“firms develop complementary assets to support commercialization.”*

As the above discussion illustrates, the construct of commercialization has been assigned substantially different meanings, spanning from single distinct events (e.g., a launch) to an entire process involving a multitude of more fluid events (e.g., NPD); it may further be viewed as including either only new offerings or the entirety of product lifecycle management. Given the diversity in

¹⁹ <https://en.oxforddictionaries.com/definition/commercialization>. Last accessed March 27, 2016, at 21:46 CET.

the use of the construct, use is at best inconsistent and likely ambiguous. The ambiguity is not unsolvable, however, and we therefore turn to Whetten's (1989) considerations for what contributes a theoretical contribution, which highlights that good theory rests on the three building blocks of *what*, *how*, and *why*. These three building blocks guide the analysis of theoretical foundations needed to deconstruct commercialization as a scientific construct and will be presented in the next section.

1.3 Theoretical foundations for understanding commercialization

According to Whetten (1989), a theoretical contribution must include three elements: the *what*, *how* and the *why*. The *what* of a theory concerns factors such as variables and constructs that should logically be part of a comprehensive and parsimony explanation of the phenomenon under investigation, in our case, commercialization. The *how* of a theory involves the connections or causalities that it claims to investigate. Together, *what* and *how* describe, though they can only explain if they are based on a *why*: the "*underlying psychological, economic, or social dynamics that justify the selection of factors and the proposed causal relationships? This rationale constitutes the theory's assumptions—the theoretical glue that welds the model together*" (p. 491). In order to deconstruct commercialization, we start with the underlying *why*, and progress to *what* and *how*.

1.3.1 The Why of Commercialization

Whether commercialization is the result of a prolonged and complex new development process performed by a multi-level stakeholder organization, or the first step of a simple barter between two persons, it requires agency (Munger, 2011). We go further and argue that it is the result of rational agency performed by individuals acting alone or in groups (Buchanan & Tullock, 1962). Rational agency is the desire to trade a situation that is perceived to be bad, S_1 , for a situation that is perceived to be better but uncertain, S_2 (Becker, 1993). In order to

decide between S_1 and S_2 , the individual must judge between them (Foss & Klein, 2012); however, judgment also requires time, which adds to the uncertainty in deciding over the use of the resources in S_1 to attain the goal of S_2 (Knight, 1921; Popper, 1959). Foss, Klein and Bjørnskov (2018) have suggested that this judgment under Knightian uncertainty aspect of rationality is essential in understanding market processes. Commercialization judgment is hence not given or abstract, but centered on agents hence acting entrepreneurially by their judgments and resulting commitments:

For it is impossible to eliminate the entrepreneur from the picture of a market economy. The various complementary factors of production cannot come together spontaneously. They need to be combined by the purposive efforts of men aiming at certain ends and motivated by the urge to improve their state of satisfaction. In eliminating the entrepreneur one eliminates the driving force of the whole market system. (Mises, 1949, p. 249)

It is possible to nuance the agential approach of the exchange of S_1 for S_2 in the pursuit of maximum utility that drives commercialization by more closely examining entrepreneurial motivation (Wry & York, 2017). Knight (1921), who in his original work mainly used utility maximization as the prime motivation in market relations, in prefaces to later editions of his 1921 work himself returns to the issue of motivation in much greater detail, mediating the distinction between what he refers to as economic motivation and the many other values that agents have and that motivate them, such as social, ethical, and esthetic values. In other words, what matters for judging uncertainty, and by extension commercialization, is what agents value: *“Finally, of greatest practical significance among nonrational elements in motivation is the factor of valuation”* (Knight, 1921: xiv). *“Recognition of other elements in motivation, social-symbolic, ethical, etc., will*

make the treatment more realistic and true in a human sense, less scientific in the sense of the objective sciences of nature” (Knight, 1921: xvii). Hence the *why* needed to understand commercial judgment must rest on a more varied appreciation of human valuation and subsequent motivation. This is particularly the case as judgment is not guaranteed to deliver the desired S_2 as the world might change over time. Furthermore, judgments are based on subjective valuations that are distorted by ignorance, tradition, and other behavioral constraints. While this is an area of inquiry on its own,²⁰ for the present analysis, we focus on the entrepreneurial motivation behind commercialization attempts as the main *why* of commercialization.

While classic economic theory argues that this is mainly irrelevant—“*At any rate, economics refers to every kind of action, no matter whether motivated by the urge of a man to eat or to make other people eat*” (Mises, 1949, p. 243)—modern management theory has established that a more nuanced view of entrepreneurial motivation can foster a better understanding of the commercialization activities of entrepreneurs and firms. For instance, Wry and York (2017) use identity theory to show how entrepreneurs can be motivated by either commercial or social identities and desires. Their work is a departure from the more regularly used entrepreneurial identities of “founder,” “inventor,” or “developer” as it opens up the possibility for more types of identities to matter for entrepreneurial motivation, particular those relating to social welfare. How entrepreneurial decision-makers who initiate and work on commercialization efforts become motivated by identity and how their approach to this shapes their firms helps answer questions related to potentially conflicting commercialization goals and opportunity recognition; for

²⁰ This is the area of behavioral strategy (see Powell, Lovallo, & Fox, 2011; Gavetti, 2012; Greve, 2013) or behavioral decision-making theory (see Camerer, 1999; Evans, 2011; De Martino, Kumaran, Seymour, & Dolan, 2006), and ecological decision theory (see Todd & Gigerenzer, 2007; Looock & Hinnen, 2015; Artinger, Petersen, Gigerenzer, & Weibler, 2015; Bingham, & Eisenhardt, 2011; Csaszar & Eggers, 2013).

instance, Aguilera, Judge and Terjesen (2018) use this insight to explain corporate governance divergence. The why of a given commercialization construct is therefore related to agentic motivated judgment on resource use.

1.3.2 The What of Commercialization

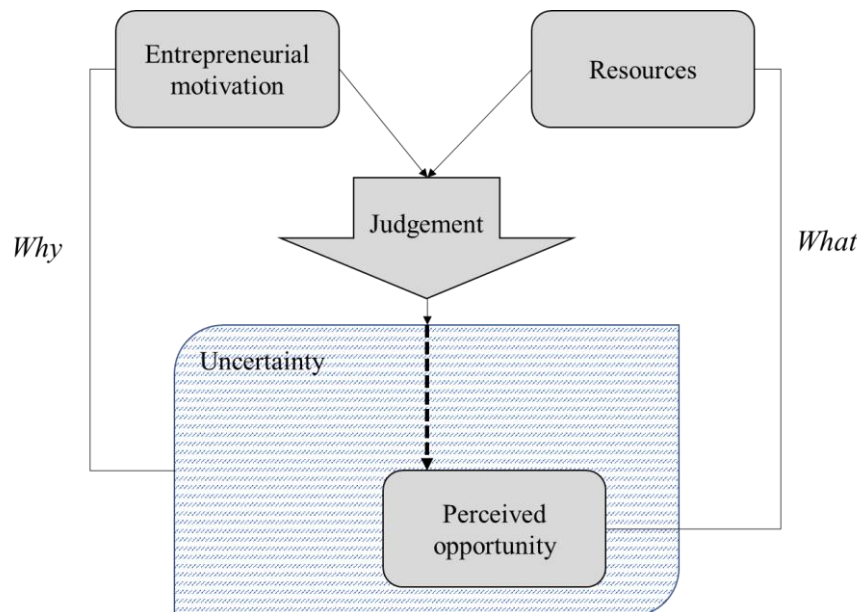
The *what* of commercialization is the opportunity to match demand with supply (Eisenhardt & Schoonhoven, 1990; Shane, 2000). While commercialization can be viewed as the successful matching of demand with supply, for instance, via the successful completion of certain internal processes (Borah and Tellis. 2014) or the attainment of revenue (Levitas & Chi, 2010), it is more inclusive and scientifically fruitful to not include the issue of success as a required tenet of commercialization constructs, as commercialization as a scientific term must equally be able to refer to unsuccessful commercialization attempts (Foss & Klein, 2012). This, however, presents a new avenue of theoretical ambiguity: how to delimit commercialization attempts, particularly unsuccessful ones, from other activities? Here, we argue that commercialization only concerns activities directly aimed at matching supply with demand, those that rest on an entrepreneurial judgment regarding resource configuration and market offering (Foss, Klein, & Bjørnskov, 2018).

Commercialization of opportunities can be seen as prompted by alertness to changes in demand curves (Kirzner, 1973). This is a fundamental customer-centric approach in which commercialization hinges on discovering what customers demand and when, rather than on what the firm can actually produce. Alvarez and Barney (2001, 2007) add to our understanding of commercial opportunities by suggesting that often customers might not know ex-ante what they demand, though the firm might hold the relevant supply resources. Hence, commercialization must involve opportunity recognition. However, left to itself, the narrow focus on the nature of opportunities is also insufficient to explain commercial judgment (Foss & Klein, 2012; 2018) as judgment is void without

resources and the organizing of their planned use over time (Sautet, 2002). This merger of agential motivation and commercial opportunities via judgment and contained by resources and often organized in organizations, but always aimed at matching supply with demand is important for understanding commercialization, as it speaks to why firms are good at different things, such as inventing or selling, while very few are good at both.

Figure 1 summarizes our theoretical foundations. The precise fulfillment and even the existence of the commercial opportunity is wrapped in a veil of uncertainty; yet the entrepreneurial agent who drives commercialization perceives a commercial opportunity and judges the optimal resource use for creating and selling products and services to fulfill the opportunity.

Figure 1 – The Why and What of Commercialization



Source: Own adaption based on Foss & Klein (2012) and Wry & York (2017)

1.4 A Typology of Commercialization: The How of Commercialization

To further operationalize the theoretical foundations, the authors suggest a typology of commercialization based on two dimensions. The first dimension is given due to the need for agential behavior to initiate commercialization: entrepreneurial motivation. As typologies must further extend theoretical

foundations, below we argue for a strategic approach stemming from entrepreneurial motivation as one dimension of the typology. The second dimension relates to the dotted line in Figure 1: namely how opportunities are perceived, as either discovered or created.

Strategy is linked to behavior (Powell, 2011; Greve, 2013; Cespedes, 2014), and social psychology has a long tradition of individual identity shaping the motivation that drives strategic behavior (for a review; see Stets & Burke, 2000), therefore, individual entrepreneurial identity directly impacts on commercial actions and outcomes (Fauchart & Gruber, 2011; Powell & Baker, 2014). As individuals identify with culturally defined roles, they adopt a preset group of categories for themselves and others, such as employees, customers, funding partners, and the like (Burke, 2004) or they personally identify with the goal of the firm (Fauchart & Gruber, 2011; Hiatt, Sine & Tolbert, 2009; Lounsbury & Glynn, 2001; Navis & Glynn, 2011). This impacts on the way they judge and evaluate options and strategies (Mead, 1934; Stryker, 1980; Stryker & Burke, 2000), and this translates into the commercial strategy. For the purposes of illustration, consider the “do-good doctor” entrepreneur who is motivated by a drugs’ ability to help a multitude of ill patients, and hence looks for employees who share this vision and show a preference for public “not-for-profit” funding over private for-profit investment. Alternatively, consider the “profiteer” entrepreneur who might be arbitraging existing products via licenses, who is motivated by cash alone, and uses aggressive remuneration packages to attract similar employees. These two identities are arguably at either end of an identity continuum but fit well with scholarly work that suggests that entrepreneurial identity and behavioral expectations can indeed include much other than monetary profit-seeking (Hoang & Gimeno, 2010; Murnieks, Mosakowski, & Cardon, 2014). The scale of the typology must therefore capture as wide a spectrum of entrepreneurial identity and motivation as possible, without omitting of any specific ones or combinations of

these. We therefore propose to use an inclusive proxy for entrepreneurial motivation and strategic orientation, namely the distinction within strategy research between exploration and exploitation (March, 1991; Choi, 2004; Kyriakopoulos & Moorman, 2004) as this is both broad enough and specific enough to encompass much commercialization research. An added benefit of the typology is that it allows for motivation to be dynamic in individuals and on aggregate firm level, as is often seen when entrepreneurs release products across stages for some ultimate goal.

The other dimension is, as stated, opportunity perception. Companys and McMullen (2007: 301) argue for there being three schools of opportunities:

The economic school argues that entrepreneurial opportunities exist as a result of the distribution of information about material resources in society. The cultural cognitive school argues that entrepreneurial opportunities exist as a result of environmental ambiguity and the cultural resources available to interpret and define these opportunities. Finally, the sociopolitical school stresses the role of network and political structures in defining entrepreneurial opportunities.

Our goal with this dimension in the typology is, as with the vertical dimension, to enable research using any of the three schools of opportunity constructs. This is of practical importance for research as, despite recent criticism, the opportunity construct is of immense importance for much management research, particularly within strategy and entrepreneurship studies (Eisenhardt & Schoonhoven, 1990; Mosakowski, 1998; Shane, 2000; Rindova & Kotha, 2001), and has the potential power to “coalesce” different research efforts (Companys and McMullen, 2007: 301). In short, as mentioned above, the existing literature centers on opportunity creation and discovery, as argued by Alvarez and Barney (2001, 2007); hence, we also use these as an operationalization in the typology.

The typology is presented in Figure 2, where commercialization is seen in relation to the entrepreneurial motivation that elicits strategic behavior somewhere on a continuum between exploration and exploitation, while the opportunity is perceived to exist on a continuum between being discovered and created. The typology in Figure 2 allows for different interpretations of commercialization within the same organization to be motivated and aimed in different directions without contradiction. This is in line with the literature on organizational ambidexterity (Andriopoulos & Lewis, 2009; Raisch, Birkinshaw, Probst & Tushman, 2009), as many organizations might move across different commercialization attempts on such a continua (Prange & Verdier, 2011).

Figure 2 – The How Typology of Commercialization

		Opportunity perception continuum	
		Discovery	Creation
Entrepreneurial motivation continuum	Explore	a. Commercialization as New Product Development	b. Commercialization as Invention
	Exploit	c. Commercialization as a Daily Cctivity	d. Commercialization as Fielding

Source: Own adaptation from March (1991), Alvarez and Barney (2001, 2007), and Wry and York (2017).

In each quadrant, we have added a description of the type of commercialization insights we expect to find there, and we now briefly discuss each in turn. It is important to note that we do not argue that a hierarchy exists between them in terms of either operational efficiency or theoretical prominence.

a. Commercialization as New Product Development

Commercialization in the orientation of opportunity discovery motivated by exploration typically deals with the development of new product or service offerings. It focuses on the identification of customer demand and the adaption of firm resources and capabilities to match the opportunity discovered. A practical example is the development of new pharmaceuticals.

b. Commercialization as Invention

Commercialization in the orientation of opportunity creation motivated by exploration is typically focused on invention. It focuses on the creation of new possibilities for customers and involves experimentation with firm resource combinations. A practical example is a start-up funded on an original vision which pivots the strategy several times before getting it right. The focus on handling new products and services here positions commercialization as a theoretical construct different from ongoing sales and marketing.

c. Commercialization as a Daily Activity

Commercialization in the orientation of opportunity discovery motivated by exploitation is typically oriented towards market launches and subsequent roll outs. It focuses on meeting existing customer demands as efficiently and quickly as possible. Resources are aligned to serve the daily commercial activities, with typically little or, only initial, room for deviating from the plan. A practical example is a new collection of clothing from a fashion brand.

d. Commercialization as Fielding

Commercialization in the orientation of opportunity creation motivated by exploitation aims to create large-scale access to new possibilities for customers. It focuses on the spread of new possibilities for customers to buy new products or services and on controlling the use of firm resources

to maximally increase the spread. A practical example is the eventual global roll-out of an online streaming service. This might encompass the distinct skills, activities, and capabilities that ensure the ongoing delivery of a product or service in the large scale and for a limited time.

With this typology it is now possible to better grasp areas of commercialization that warrant further research attention. This is discussed in following section.

1.5 Discussion and Future Research Suggestions

Based on the sampled literature, theoretical foundations, and the typology presented, we go on to discuss five selected avenues for further research on commercialization. Our suggestions focus on 1) the when of commercial uncertainty, 2) organization, 3) market interactions, 4) measurements, and 5) performance outcomes.

1.5.1 The When of Commercialization Uncertainty

Whetten (1989) famously states that theoretical contributions must answer the *why*, *how*, and *what* of a theoretical suggestion. We have followed that core idea in this paper, but insist that a fourth issue is needed for the specific area of commercialization, that of *when* commercialization occurs, particularly as success is argued not to be a defining criterion of the construct. Reviewing the research on commercialization, contributions exist that view commercialization as a specific event in time or space, as do contributions that view commercialization as a process. We argue that the reason for this further ambiguity is to be found in the research phenomena itself (Flyvbjerg, 2006): commercializing organizations are, needless to say, complex to compare. They range from the flat to the very hierarchical. They range from poor startups to cash-intensive incumbent multinational corporations. Therefore, organizing towards commercialization can be seen, both by the organizations and in the research, as event-oriented or process-oriented, depending on the context. Event-orientation involves viewing commercialization as one or more specific measurable events, for instance, a

patent grant or a market launch. An example here might be a university that sees commercialization as strictly a matter of obtaining patents. This belief entails one type of organization of resources, or actions, in the terminology of Foss and Klein (2018), as opposed to a more dynamic, fluid, process-orientation involving ongoing sales and running incremental improvements, for example, a crowdfunded startup.

The issue of *when* is furthermore important when considering the role uncertainty should play in understanding commercialization, as, on the one hand, a process is more uncertain the longer it continues, and, on the other, if the event of commercialization is so far off from the current S_1 , it is also very uncertain. Uncertainty does feature as a noteworthy part of the commercialization literature we sampled. The majority of the papers argue that uncertainties, risks, and costs increase as a commercialization project moves closer to market launch. For example, Chiesa and Frattini (2011) argue that commercialization is a critical stage in the technological innovation process, mainly because of the high risks and costs it entails. They show that commercialization is particularly challenging in volatile, fast-moving, and uncertain high-tech markets where the window of opportunity is extremely narrow. Others argue that although costs increase, uncertainty is reduced as a new product moves closer to the commercialization stage (Knott, 2003). While these disagreements open up important avenues of research in their own right, we believe that uncertainties, risks, and costs are not specific, defining aspects of commercialization, a perspective that fits well with the judgment under uncertainty approach of this paper. We view judgment under uncertainty as an attribute of any organizational and managerial process, not just commercialization. However, future studies may analyze the extent to which commercialization entails greater risks, uncertainties, and costs than other organizational actions and under what circumstances this may occur. Such

research might also analyze how firms can overcome the higher risks and costs associated with commercialization.

1.5.2 The Commercializing Organization

The result of entrepreneurial judgment from a set of linked and interdependent processes and actions should at some point create lasting commercial capability. This process needs more attention and can, with likely benefit, be engaged with from existing theoretical views. Future research may disentangle a firm's commercialization capability to uncover how its processes are embedded in its internal organization, on the one hand, and how it relates to decision-makers' judgment, on the other. We suggest separating commercialization into an organizational, execution-oriented process and a managerial process, where the latter focuses on decision-makers and their relationships that define the process for commercial execution. Along these lines, Garvin (1998) suggests an integrated framework for understanding organizational and managerial processes that can serve as a useful basis for developing a process-capability view of commercialization.

While much of the research that contributes to our evaluation of the commercialization construct is theoretical, additional work is required to ensure clarity and to examine the relatedness of the construct to general management and economic theories. For instance, there are several key complementarities between capability-based theories (of commercialization) and transaction-cost economics, as discussed by Alchian and Demsetz (1972) and Langlois and Foss (1997). Capability and governance issues are closely interrelated, for instance. For example, access to complementary assets significantly affects governance challenges as firms may choose to build capabilities on their own, or by cooperating with other companies, or licensing a relevant technology (Teece, 1986). As such, transaction-cost economics have been explicitly applied in the study of commercialization (e.g., Stumpa, Atahide & Joshi, 2002). When the

boundary of a firm is given by the marginal return of one more transaction within the firm exceeding the cost of a market transaction (Coase, 1937; Williamson, 1975, 1979), the role of commercialization is affected by transaction-cost considerations. For instance, Song and Thieme (2009) apply transaction-cost economics to argue that a product's transition from the pre-design stage to commercialization lowers uncertainty, meaning that the boundaries of the firm become clearer.

1.5.3 Market Interaction

Commercialization is likely to involve some type of action by agents other than the commercializing entity. For example, customers may decide to buy the focal product or unions may need to accept a new production method. As such, the conceptualization of commercialization also opens up the space for reflection regarding voluntarism and judgment among other market actors, variations in markets, and the definition of customers. It can easily be argued that voluntarism among market actors is key to understanding commercialization (Munger, 2011). Adaption of innovation, for instance, is often costly and perceived as risky by consumers (Slater, Mohr, & Sengupta, 2014). If we view customer choices as involving whether to accept a given offering as part of commercialization, this could affect entrepreneurial motivation itself. In doing so, it affects the extent to which market-actor acceptance is viewed as an important, predictable component of commercialization. This aspect warrants further attention, especially as regards the measurement of success and the prediction of outcomes—and these considerations' impact on strategy formation and choice. As commercialization is linked to research and development (R&D), it can be (partially) understood as (new) customer development in parallel with NPD. Given this conceptual relation, it is somewhat surprising that minimal transfer of concepts has occurred between the two domains. Additional research may conceptualize and test the extent to

which NPD insights apply to (new) customer development (e.g., in relation to stage-gate models, portfolio planning, and risk management).

Market interaction also raises issues regarding the usefulness of the commercialization construct in monopoly situations. For example, to what extent do monopolists need commercialization capabilities when acceptance can be enforced rather than earned? How is commercialization success impacted in such situations? This also opens up opportunities for important work on commercialization choices in relation to non-market strategies, such as lobbying (see Funk & Hirschman, 2017). In addition, variations in markets may be related to the content of the previous section of our discussion, in the sense of creating variations in commercialization capability development. For instance, markets with only one customer, such as a government, or markets in which products and services are highly regulated may require a different variety of commercialization. According to Lehrer and Asakawa (2008) and Pinkse, Bohnsack and Kolk (2014), external incentives, such as governmental schemes, can shape or even create a market, which in turn influences commercialization efforts and methods. Likewise, commercialization in highly competitive markets or markets with more certain rates of change may operate differently. The pharmaceutical industry, for example, is characterized by the assumption that commercialization will occur once the authorities approve a product, as long as the company can produce and distribute that product in sufficient volumes (Blau, Pekny, Varma, & Bunch, 2004).

Another important aspect of commercialization is the value proposition itself. Is the value proposition a product or a service that has been developed by the firm? Alternatively, is it the technological resources resulting from the development of a new product or service (e.g., patents and know-how)? Given the ongoing diffusion of innovation in the open-innovation paradigm (Chesbrough, 2003), commercialization may co-occur with development rather than following it.

Moreover, it may increasingly lead to the commercialization of new technologies that are disembodied from physical artifacts or service processes (Bianchi, Frattini, Lejarraga, & Di Minin, 2014). The appropriation of value from these predominantly tacit, highly complex knowledge assets through licensing transactions may require different commercialization approaches and capabilities than those needed for selling physical goods and services. This shift in focus may also increase the firm's risk profile, as the diffusion of knowledge assets may benefit competitors and undermine its competitive advantage (Teece, 1986; Arora, Fosfuri & Gambardella, 2001).

1.5.4 Measurement

We claim that commercial success is not required as part of the definition of the commercialization construct, so other instruments for measuring commercialization need to be developed for both quantitative and qualitative studies. Notably, processes provide a convenient level of analysis, as they have beginnings, ends, and boundaries that can be defined with some precision and minimum overlap (Garvin, 1998). For quantitative settings, we need scales and measures that capture the degree of a firm's commercialization capability. While R&D, productivity, and profitability are among the standard items in official databases, commercialization indices are not. Recently, Mishra and Modi (2016) estimated marketing capability as the inefficiency score of a production function, which is a somewhat unusual but innovative way to potentially capture commercialization. As such, we need to develop tools suitable for capturing data useful for studying commercialization. In addition to census data, empirical studies should analyze various self-reporting scales in order to develop suitable instruments. For qualitative settings, we require an understanding of how to identify and describe a firm's commercialization capability, especially as regards which questions to ask, which artifacts to look for, and which behaviors to notice.

1.5.5 Performance Outcomes

Once suitable measures have been developed, the impact of commercialization on firm performance can be investigated. There is a general notion that “good commercialization capability leads to good performance.” However, the extent of this impact and the conditions leading to greater or lesser impacts (moderating factors) remains unknown. This includes the potential negative externalities of commercialization, such as less basic corporate research, as shown by Tijssen (2004). Such issues constitute interesting fields for future research.

Some work has already been carried out in relation to commercialization’s impact on performance. For instance, Udell, Bottin and Glass (1993) frame commercialization as a choice between new venture creation and licensing. This view becomes more nuanced in Boyd and Spekman (2010, p. 602), who state that

... licensors that emphasize value creation may wish to follow a less restrictive commercialization of their products so as to generate funds faster for future R&D activity. Alternatively, a firm emphasizing value appropriation may wish to follow a more restrictive distribution strategy to enter the market itself at a later date.

Bianchi et al. (2014) add that because fewer salespeople are needed to support licensing opportunities than to handle direct sales, commercialization via licensing is more cost-effective for innovators. Whether licensing also offers better returns remains unclear thus far. As a significant number of the publications in our study address licenses, we suggest a study, focused on this subsample, that investigates the implications of licensing for commercialization strategies. Such research could help answer fundamental questions about how the creation of

capability sets in firms can improve financial performance in correlation with licensing decisions.

1.6 Research and Management Implications of Findings

Any field of research that has not developed a shared set of accepted concepts and a common understanding is in danger of conceptual ambiguity. Such conceptual ambiguity hinders scientific investigation, theory development, and testing in a Popperian sense (Popper, 1963) and risks confounding policy and strategy recommendations with clusters of errors or misunderstandings. In this respect, this paper aims to “salvage” commercialization research from not only ambiguity but also dangerous practical misunderstandings. It is hence our aim that this paper furthers dialogue and interdisciplinarity.

Constructs are important not only for research but also for practice. Practitioners are highly interested in various aspects of commercialization, including sales and marketing, and look to research to gain new insights into how to manage their business. We argue that an understanding of commercialization can advance our understanding of why some organizations repeatedly succeed in deriving rents from innovations while others do not. We do not argue that some or all existing commercialization research be discarded. What we have proposed is a model that aids understanding of the theoretical antecedents and inherited assumptions behind particular examples of commercialization research. If done correctly, such a model will show that while important foundations vary significantly, different aspects of commercialization can complement one another if they are understood correctly and read through a shared prism.

In this paper, we have hence proposed understanding commercialization as a managerial and organizational phenomenon that rests on entrepreneurial motivation and opportunity perception. In other words, how commercialization is understood relates to what management understands and promotes in its

organizational choices. An example is the commercialization of university outputs, such as research and student employment, and subsequent university organization and strategy (for recent examples, see Barham, Foltz, & Prager, 2014; Guerzoni, Aldridge, Audretsch, & Desai 2014; Libaers, 2014; Olmos-Peñuela, Castro-Martínez, & D'Este, 2014; Rasmussen, Mosey, & Wright, 2014). If, for instance, commercialization is viewed as an event, then the responsibility of the university ends with creating a company or obtaining a patent. If, on the other hand, commercialization is a process, then the task of universities might include sales methods as part of their incubator or entrepreneurship activities. Adopting a full process view, universities may even be expected to run companies.

We do not propose that our typology be used as a definitive grading of commercialization research across the board. Such a notion has several obvious drawbacks, not least that papers dealing with commercialization might do so in relation to other topics, which is often commendable. What we do suggest the typology is useful for is to ensure that commercialization research is fundamentally comparable, even when fundamentally diverging as regards antecedents, definitions, and assumptions. This will make even methodologically different research contributions complementary and will improve our scientific discourse and understanding. Hence, we do suggest that researchers market their contributions using one of the quadrants in the typology in order to enhance understanding of the view applied in a particular study. While the issue of event versus process understanding of commercialization is often implicitly deducible from research, it is an issue that should be also be considered further and explicitly, both for producers or consumers of research findings. Over time, this will lead to a more structured body of literature with results that are more compatible within and between each quadrant of the typology.

Another advantage of our typology is practicality, in that it can be question-driven. As an example, imagine designing a curriculum for a course in

commercialization. The designer of the course might start by selecting one paper that suits the course particularly well. This paper can now be placed in the typology. Now, for the next paper, the designer can decide whether the course plan would benefit from more papers in the same mold, or whether it might benefit more from other approaches.

A possible critique of the typology is the lack of dynamism. While this is likely a minor concern for many research designs that use a commercialization construct—as the data they use is also static—it might pose a problem for more longitudinal research designs in that the nature of the opportunity and the entrepreneurial motivation might change over time. For example, Pfizer’s development of Viagra was initially aimed at it being a heart medicine and a study of this early period might place commercialization in quadrant “a” of the typology. However, once the real benefit of Viagra became known, the firm likely changed to a quadrant “d” perspective. Another example is the trading card game, “Magic the Gathering,” which was initially invented as a niche product to be played by gaming hobbyists between “regular” game sessions at conventions; yet, it became an enormous hit, spreading leagues beyond both its initial customer group, and can be found in retailers from specialty stores to regular bookshops, in even small towns. Rather than dismissing the utility of the typology for this shortcoming, we draw attention to it as a strength—that commercialization research design can engage and highlight not only initial commercialization aspirations but also work with how and why these change over time.

1.7 Conclusion

“Commercialization” is a commonly used construct in management research, and its definition is widely assumed to be known and singular. However, even though the construct is used widely and profoundly enough for it to be called scientific, it suffers from significant conceptual ambiguity. Not only are the

current conceptual and causal ambiguities unsatisfactory but they also hinder the development of commercialization research and practical knowledge. To overcome this challenge, we have advanced a typology for commercialization research comparison and complementarity. This model is based on viewing commercialization as a motivated entrepreneurial judgment under uncertainty. Our paper has noted clear avenues for further inquiry and has opened up additional ways to further develop our understanding of commercialization. Much unexplored territory remains for this very important concept in management.

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Chapter 2 - Entrepreneurial Judgment in Context: A Heuristic Model of Commercialization and Opportunity Choice

Abstract

This article develops a heuristic model that underlies entrepreneurial judgment regarding market uncertainty. Such a model aligns the judgment under uncertainty approach to entrepreneurship with market-specific opportunities and the organization of firms. The paper illustrates the model by presenting qualitative data from small and medium enterprises (SMEs) in a rarely studied and highly complex market setting, that of suppliers to offshore energy production. The paper finds support for the model and argues that instances of entrepreneurial judgment, even when it appears irrational to observers, are fundamentally rational. Understanding the rational-choice foundation of entrepreneurship is argued to be fruitful for understanding and promoting market or firm-specific entrepreneurial activities.

Ultimately, it is the quality of the entrepreneur's judgment that determines his success. (Foss, Klein, & Bjørnskov, 2018)

2.1 Introduction

In recent years, entrepreneurs and entrepreneurship have received considerable attention in management research, prompting both specific journals and general outlets to publish research relating to entrepreneurial behavior and orientation. This rediscovery of the entrepreneur is positive as entrepreneurial behavior is linked to positive growth and change. From the outset of the rediscovery, many of the research questions examined in this literature have concerned perceptions of uncertainty-bearing (Busenitz & Barney; 1997; Bhidé, 2003; Rigotti, Ryan, & Vaithianathan, 2011) and entrepreneurship strategies (Dess, Lumpkin, & Covin, 1997; Lechner & Gudmundsson, 2014). While important insights have been gained, the field of entrepreneurship studies has recently been criticized as superficial (Foss & Klein, 2012, 2018, Foss, Klein & Bjørnskov, 2018). In particular, the general field of entrepreneurship's applied focus on the opportunity construct, principally on questions of opportunity recognition and discovery, rather than on the fundamental uncertainty-bearing function of entrepreneurship, has been a key criticism (Foss & Klein, 2018).

The issue of too great a focus on opportunity constructs as also lead to a dominant tendency in research on a specific firm-type, the start-up, and in a few specific industries, primarily software and pharmaceuticals, and to draw general conclusions from these. To address this criticism, market- or context-specific entrepreneurship research has been suggested (De Massis, Kotlar, Wright, & Kellermanns, 2017). This is highly relevant as the advantage of opportunities as a subject for research can be argued to philosophically be their embedded nature: they exist and are experienced only within a context. This paper links the uncertainty-bearing aspect of entrepreneurship to opportunities by highlighting not the opportunities themselves, but rather the context in which they may exist and

how this is perceived by entrepreneurs, hence contributing to a fundamental research question of entrepreneurship context and industry choice. The paper's principal emphasis is on the fact that uncertainty, as a variable that is experienced, is market dependent. As judgment is based on a combination of subjective emotions, information accessibility, and past experience, the paper is able to advance a heuristic explanation for how potential commercial opportunities are judged by entrepreneurs. This is of interest not only in relation to the specific research questions concerning why entrepreneurs attempt to commercialize some opportunities and not others, but also because it addresses the long-term dynamics of decision making, thereby moving us closer to an answer to the riddle of why commercial firms are formed and in what way, and how this is related to how the firm is subsequently run and what it is used for. Further, this paper is far from the first to link heuristics to commercial strategy (Greve, 2013; Artinger, Peterson, Gigerenzer, & Weibler, 2015; Looock & Hinnen, 2015), however the link of heuristics to entrepreneurship as done via smaller size firms are largely unexplored outside of this paper.

In order to provide evidence for the proposed contextual theoretical model, in the paper a study of a highly contextual and complex commercial setting, that of SME suppliers to the offshore energy production industry, is conducted. This is of interest as such suppliers can simultaneously be viewed as belonging to the same context (offshore supply technology) and two distinct contexts (suppliers for oil extraction or wind turbine installment). The paper begins by laying down the theoretical foundations and suggesting a theoretical model from these; thereafter, the method used for collecting the data against which the model is assessed is described; and it ends with a discussion and conclusion.

2.2 Theoretical Foundations

In this section, the emergent judgement-based approach to entrepreneurship, as distinct from the currently dominant “opportunity approach,” is described. Thereafter, the nature of uncertainty is considered in greater detail, and, finally, the heuristic decision-making that links the two is introduced and discussed. Together these elements form the basis of the model and subsequent empirical inquiry.

2.2.1 *The Judgment-based Approach to Entrepreneurship*

In this paper, entrepreneurship is understood narrowly as firms’ attempts to commercialize products or services. As the success of commercialization is inherently uncertain, entrepreneurship fundamentally concerns judgment under conditions of Knightian uncertainty (1921), as opposed to the risky but predictable activity of recognizing and exploiting objective opportunities. Hence, a subjective uncertainty-bearing, rather than opportunities, becomes the fundamental subject of entrepreneurship research. This line of reasoning is proposed by Foss and Klein (2012, 2018a, 2018b), who highlight the need to operationalize an alternative to the opportunity-focus research paradigm in order to understand what entrepreneurs do about uncertainty. They suggest the BAR framework as an operationalization of such entrepreneurial judgment about uncertain outcomes. “BAR” refers to *Beliefs*, *Actions*, and *Results*. The entrepreneur has a *Belief* about what resources are available and what combination of these will lead to what the entrepreneur considers a better future. The entrepreneur takes *Actions* based on these *Beliefs*. These *Actions* encounter the uncertainty and dynamism of the market, and *Results* are created, along with selection and treatment effects which impact on future choice sets. However, these *Results* may or may not be desirable or predictable in either the short or long term. To illustrate this, imagine a firm owner wanting to

grow the firm's revenue. The owner acts entrepreneurially by imagining certain *Beliefs*, in this case, that hiring a new salesperson will increase revenue by selling to new customers. The entrepreneur-owner now takes *Action*, interviews five candidates, and selects one to offer a job to. The first *Result* occurs when the person selected, who might have competing offers, accepts; a later *Result* is revenue either growing or not. Alternatively, it may be the case that the new employee does not grow new revenue but is skilled at customer retention. Such a different *Result* would likely impact on *Beliefs* and *Actions*—for instance, should the entrepreneur fire the salesman after learning of the latter's aptitude? This question again forms the starting point for a new entrepreneurial judgement process.

Interest in how agents judge is as old as modern economic inquiry itself. Adam Smith (1759), for instance, distinguished between *passions* and the *impartial spectator*: *passions* refer to emotionally guided choices, while the *impartial spectator* refers to choices derived from cognitive analysis. Contemporary attention to these matters generally occurs in the field of behavioral economics. It is noticeable that Smith does not use the word *behavior* to describe human judgment, preferring *conduct* for this purpose. While behavior is instinctual or descriptive, the result of passions, and is therefore shared with non-sentient entities, such as animals or plants, or even rolling rocks, and is observable ex-post, conduct is distinctly human in that it requires an ex-ante choice to behave in a certain manner, and is therefore open to evaluation and learning, be it moral or for reasons of efficiency, by oneself and others (ibid.). What modern behavioral economics and Smith agree on is that, as humans, we are constituted by an emotional system on which a cognitive system is superimposed (Loewenstein & O'Donoghue, 2004, 2007), that one is affective and the other deliberate, and that

both can be engaged in the problems agents experience.²¹ The interplay between emotion and cognition is particularly relevant for judgment when agents lack data or the capacity to process the data available (Damasio & Sutherland, 1994; Winter, Méndez-Naya & García-Jurado, 2014; Dhimi, 2016), which makes the Bayesian neoclassical agent an inadequate construct for understanding judgment about uncertainty. Rather, the suggestion is that, when faced with uncertainty or complexity, agents employ judgment heuristics that are *fast* to compute and *frugal* in their use of information (Gigerenzer, 2004). In this paper it is argued that the *Belief* stage in entrepreneurial judgment is a result of decision heuristics, and while the direction of belief can change independently of the heuristics of the individual, beliefs are always captured and structured by agent heuristics.

2.2.2 The Nature of Uncertainty and Heuristics for Entrepreneurial Judgment

Despite the considerable emphasis on the uncertainty of unknown probabilities and outcomes of entrepreneurial actions, Foss and Klein's approach is not one of hopelessness. Their point is that uncertainty about the future instills hope in the entrepreneur that, by means of the entrepreneurs use of entrepreneurial judgment - and by extension, unique heuristics, positive change and profit can materialize despite and to a degree because of the uncertainty of markets (Gigerenzer, 2004). Hence, it becomes important to highlight how entrepreneurs acquire and process knowledge about uncertainty (Busenitz & Lau, 1996).

The BAR framework is methodologically rationalist individualist (see Buchanan & Tullock, 1962; Mises, 1978). This means that entrepreneurs are ultimately humans who attempt to subjectively judge means and ends validity for attaining the results they desire ex-ante. It also entails that these humans are boundedly rational in doing so, due to their cognitive constraints and the complexities of the

²¹ These are often referred to as System 1 and System 2 (Kahneman, 2011).

world they inhabit (Langlois, 1990; Foss & Weber, 2016). This results in processual capacity constraints, cognitive economizing, and cognitive biases impacting on decision-making. In order to enable any action, choices are based on a biased view of the world at the individual level. A bias is a deviation from standard rationality that is either sufficiently structural or sufficiently common that it allows for observation across a set of choices and, often, choosing agents (Dhami, 2016). Examples of types of biases, of which there are many, include confirmation bias, sunk-cost bias, selection bias, and others. While deviations from standard Bayesian rationality is often portrayed as undesirable in modern behavioral economics (Rizzo, 2016), the central tenants of Knightian uncertainty are that “*a) agents must assess uncertainty in order to act, and b) over time be more right than wrong*” (1921: 270) in areas in which their past assessments provided them with the possibility to judge again, and they must do so efficiently, or in other words, quickly. This implies the use by entrepreneurial agents of heuristic rules to inform their *beliefs*, particularly as Knight repeatedly talks about interfaces between objective fact, subjective valuation, and mental models when uncertainty is experienced at the agential level: “*Heuristics are rational in the sense that they appeal to intuition and avoid deliberation cost, but boundedly rational in the sense that they often lead to biased choices*” (Conlisk, 1996: 676). For instance, *over-commitment bias* and *confirmation bias* appear to be theoretically significant threats to the success of commercialization in firms (Camerer, 1999; Thaler, 2000), leading them to overdo poorly thought out attempts at commercialization. On the other hand, other biases, such as *overconfidence bias*, might be especially important and result in strategic advantages for smaller but agile firms and may be the primary reason they even attempt commercialization in the face of competition from presumably more established and cash-intensive firms. Biases are further based on preconceived

notions, and often compounds by further biases confirming the original biases, for instance confirmation bias. In terms of the BAR framework, this can would be an entrepreneurial belief about the attractiveness of certain opportunities over others for instance. Heuristics on the other hand are fluid in nature and rest squarely in conceived experience, hence such preconceive beliefs are updated relatively quickly. Heuristics in other words are more efficient and superior for entrepreneurial decision making than biases. We can therefore assume that rational successful entrepreneurs – those that survive in business - use heuristic decision making.

Heuristics provides entrepreneurs with a private recipe regarding what information to address and how to evaluate this information to inform their entrepreneurial *Beliefs*. As heuristics are environmentally embedded, agents' judgments also become bounded by their *cognitive limitations* and by the *structure of the environment* (Simon, 1956, 1957). Choices are formulated to counter an uncertain world in which many other agents are similarly judging, acting, and competing for scarce resources in institutions of varying rigidity. These institutions in which judgment must be exercised may take many forms, from laws to norms, and serve to shape the incentive structure of the judgment (Smith, 2003). An industry or market with potential entrepreneurial opportunities, in this understanding, is hence

less about competition,²² and principally about demand: no demand, no sales, no firm.²³ It also concerns the subjective well-being of entrepreneurs, such as their standard of living, when they exercise judgment (Benjamin, Heffetz, Kimball, & Rees-Jones, 2012), and the opportunity to improve these standards and to act freely in the process of doing so (Sen, 1985, 1992).

2.3 The Heuristics of Entrepreneurial Judgment

Heuristics and biases have been linked to entrepreneurship by many authors (see Zhang and Cueto, 2017); often, however, the concepts of biases and heuristics used are either muddled or are not effectively delimited. This is particularly the case as heuristics is as much about ignoring as acknowledging the information that can impact on entrepreneurial commercial success: what information to ignore and what to attempt to influence. Furthermore, as the world is endlessly complex, even the potentially perfect heuristic ordering of cognitive ability cannot avoid the impact of unknowns. To model this, a hypothetical commercialization possibility frontier is proposed: a success that is the 100% attainable with exactly the right

²² In the neoclassical sense of *perfect competition markets*. The demand-market logic does include the Hayekian concept of competition as a never-ending process of uncertain and ex-ante unknowable outcomes; “*Competition is a procedure of discovery, a procedure involved in all evolution, that led man unwittingly to respond to novel situations; and through further competition, not through agreement, we gradually increase our efficiency*” (Hayek, 1992: 19). “*Competition is thus, like experimentation in science, first and foremost a discovery procedure. ... Competition as a discovery procedure must rely on the self-interest of the producers, that is it must allow them to use their knowledge for their purposes, because nobody else possesses the information on which they must base their decision*” (Hayek, 1998: 68, 70).

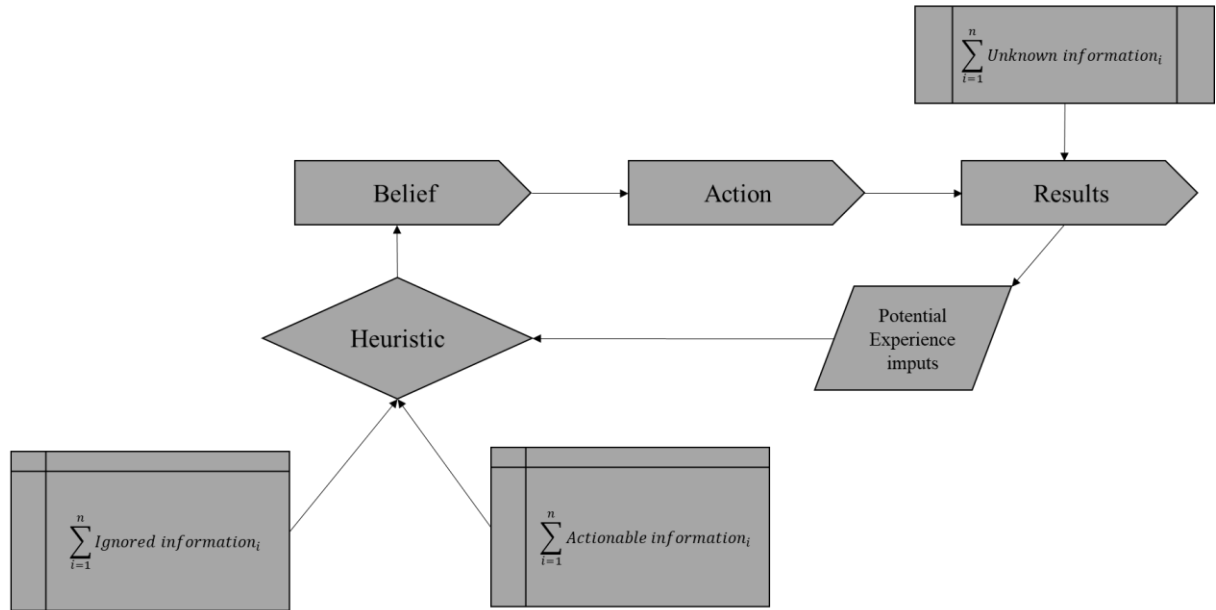
²³ Marketing literature includes a tradition concerning the creation of demand, such as by means of advertising, by marketing departments and through marketing activities. While demand can likely be awakened, meaning that the customer base grows, by firm activities, ultimately, in terms of the reading of the judgement-based approach to entrepreneurship used in this paper, demand arises from the subjective valuation and free choice of customers (Foss & Klein, 2012). A similar formal argument for this can be found in Stigler & Becker (1977).

combination of resources, the right choices at the right time, and not negatively impacted by the sum of all other market participants choice sets. In such a case, the agent heuristically acted on the right information that should have been acted on, ignored the right information that should have been ignored, and no unknown information impacted on the commercialization. The last part of this aligns with Knight (1921), Alchian (1950), and Smith (2003) as learning over time improves a firm's output if the unknown or ignored factors or their impact do not change fundamentally.

As uncertainty arises from a lack of perfect foresight into the actions of other market participants and the compounded nature of the interaction of these, *“the producer, then, must estimate (1) the future demand which he is striving to satisfy and (2) the future results of his operations in attempting to satisfy that demand”* (Knight 1921: 237). The heuristic issue is that while uncertainty about current and future information is philosophically objective, it can only be experienced subjectively. This process is mapped in Figure 1. In this paper, it is argued that information points can be further modeled into three types: unknowns $\sum_{i=1}^n \text{Unknown information}_i$, actionable $\sum_{i=1}^n \text{Actionable information}_i$, and ignored $\sum_{i=1}^n \text{Ignored information}_i$. Each quantum of information involves a likelihood and an impact magnitude on the commercialization-possibility frontier. For instance; the outbreak of a local war in most countries is likely low; however, its potential impact is considerable. It is important to note that, for the validity of the model, it does not matter whether the contexts are ignored deliberately or a result of biases—the result is the same: the entrepreneurial agent mentally discounts their impact or likelihood to zero. The same is true of unknowns, which pertain to much of the world (Hayek, 1945, 2002). The actionable group is however information that the entrepreneur believes it would be valuable and possible to attempt to

impact or change. The composition of these types represents the heuristic of the entrepreneurial judgment informing entrepreneurial belief.

Figure 1—Heuristic model of entrepreneurial judgment



The paper hence proposes viewing each group of information as a sum, which combine to represent the objective world now and in the future (as the future is unknowable, the farther ahead in time the entrepreneur is guessing, the larger $\sum_{i=1}^n \text{Unknown information}_i$ becomes). It is furthermore important that while the members of the actionable grouping are selected by means of the heuristic, this is not in any way a guarantee that the action can be performed or that the result will be desirable or planned, as is the case in the illustration above with the hiring of a salesperson. The model is moreover rational, in the sense that it requires the ignoring of certain information because of the cost of obtaining it (Stigler, 1961). The heuristic, it is argued, informs the *Belief* and, as time progresses, is potentially

updated (the “Potential Experience Input” box in Figure 1) as a sorting method for information points, which is similar to the BAR framework’s more loosely defined treatment and selection effects (Foss & Klein, 2018). This makes the model one of ecological rationality based on trial and error (Smith, 2003). It also aligns the model with cognitive approaches’ ideas of temporality impacting on entrepreneurship and agents changing the way they think and perceive as time passes (Churchill & Bygrave, 1989; Moore, 1986; Hindle, 2004). The model also mirrors Alchian (1950), who suggests that while the profit motive is the generally accepted motivation for firms, and it may look as though firms are maximizing profit over time, this is merely the result of market choices and evolution observed ex-post; hence the model can explain a multitude of entrepreneurial motivations (Wry & York, 2017). In summary, the model proposes an explanation of the mental process involved in pursuing opportunities for rational entrepreneurial beliefs, even when they seem irrational to outsiders, such as entering highly complex and uncertain industries.

2.4 Method

Using case study research to investigate aspects of commercialization is a well-established method (Woodside & Baxter, 2012), and while qualitative data sources cannot generally be used to test constructs, they have the advantage that they add to theory development (Eisenhardt & Graebner, 2007). Full-scale qualitative work typically involves multiple cases sourced by means of probabilistic sampling (Stake, 1995; Yin, 2002) or purposively selected cases sourced based on perceived maximum variance (Eisenhardt, 1989; George & Bennett, 2005). This study does not aim to be a full-scale qualitative study; it merely entails a smaller sampling aiming at typical cases, that is, cases that include a streamlined and identifiably consistent conception of the phenomenon under scrutiny—here, entrepreneurial

judgment and commercialization in a specific and seemingly unattractive market. The measure of typicality is that, for industry practitioners and experts, the cases would appear recognizable and similar to the mean of their conception of similar type firms in the same industry. This entails that potential tendencies observed in the cases are generalizable in the shared context.²⁴ In other words, the aim in case selection for this paper was for the cases to share validity as regards phenomena such as size, customertype, legal frameworks and more (Flyvbjerg 2006).

To illustrate the potential validity and application of the heuristic model to entrepreneurial judgment, the paper investigates two case companies over a period of time in order to separate the decision-making elements from the influences on these. The case companies were selected based on their sharing the key attributes of belonging to the same industry, offshore supply, and serving two distinct industries: offshore oil extraction and offshore wind power. This is an important selection criterion, as it demonstrates the contextual embeddedness and subjective understanding of commercial opportunities as viewed from a firm perspective, as opposed to the objective appearance often portrayed ex-post in research. Another selection criterion was size—both firms are SMEs—as such companies typically lack the resources of larger organizations (Hill, 2001) and the key selling skills and capabilities²⁵ of their staff are typically underdeveloped (Douglas & Brodie, 2010). Thus, it is a fair assumption that, based on their nature as small enterprises,

²⁴ This is similar to what Lorenzen and Foss (2009) refer to as prototypical cases. As this paper uses two cases and highlights both their similarities and differences, the word typical is more suited to this method.

²⁵ Regarding the use of the term “capability” in this paper: it is not the aim to contribute to the literature on capability; the reader is requested to understand the use of this term in the broadest possible sense. For readers interested in capability studies in energy supply see, for instance, Garcia, Lessard, and Singh (2014), and Shuen, Feiler, and Teece (2014).

SMEs are permeated with personal viewpoints and constructed realities (Drucker, 1974; Powell, Lovallo, & Fox; 2011). Hence founders' and managers' individual biases and heuristics will have a significant impact on performance, as minimal bureaucracy exists to limit them (Foss, Klein, & Lien, 2016). It was hence also a selection criterion that the founders still be involved in daily operations.

To find typical cases, firms for the case study were selected based on external input provided by industry experts and sources. For the cases selected, interview responses were triangulated with other internal data (strategy reports, financial reports, etc.) and external data (media coverage, industry reports, academic papers, etc.). The interviews were open-ended, with anchored questions on how commercialization was approached and done. From this point, the interviewer picked up on emergent themes, while also drawing on issues of firm formation and changes in strategy over time. The findings were clustered around the themes that emerged and that had received the most "airtime" in the interviews. Such themes are likely those that suffer from the availability heuristic (Tversky & Kahneman, 1974; Dhimi, 2016), and are hence also likely to be the themes that were most likely to be recalled in everyday decisions. In addition to the verbal answers, the first round of interviews included a series of small risk games that tested risk perception, centered on loss aversion, and a repeated version of the dollar auction (Shubik, 1971) developed by the author. Two rounds of interviews were conducted over 12 months. The interviews were conducted by the author and recorded, with a colleague reviewing the recordings and comparing these to the paper statements. The paper employs state-of-the-art case methodology, as suggested by Gibbert, Ruigrok, and Wicks (2008), who recommend evaluating case-based research based on the samples' internal validity, construct validity,

external validity, and reliability. Table 1 lists how this was conducted for the sample. Figure 3 illustrates the data sources and their relations.

While more comprehensive qualitative case research would have included interviews with other stakeholders, such as customers and employees, these were deliberately omitted to focus on the personal biases of the founders. Precisely because the aim of the method is not to access objective truth—rather, a subconscious viewpoint of the truth—this choice is appropriate for this paper (Woodside & Baxter, 2012).

Figure 2—Overview of data

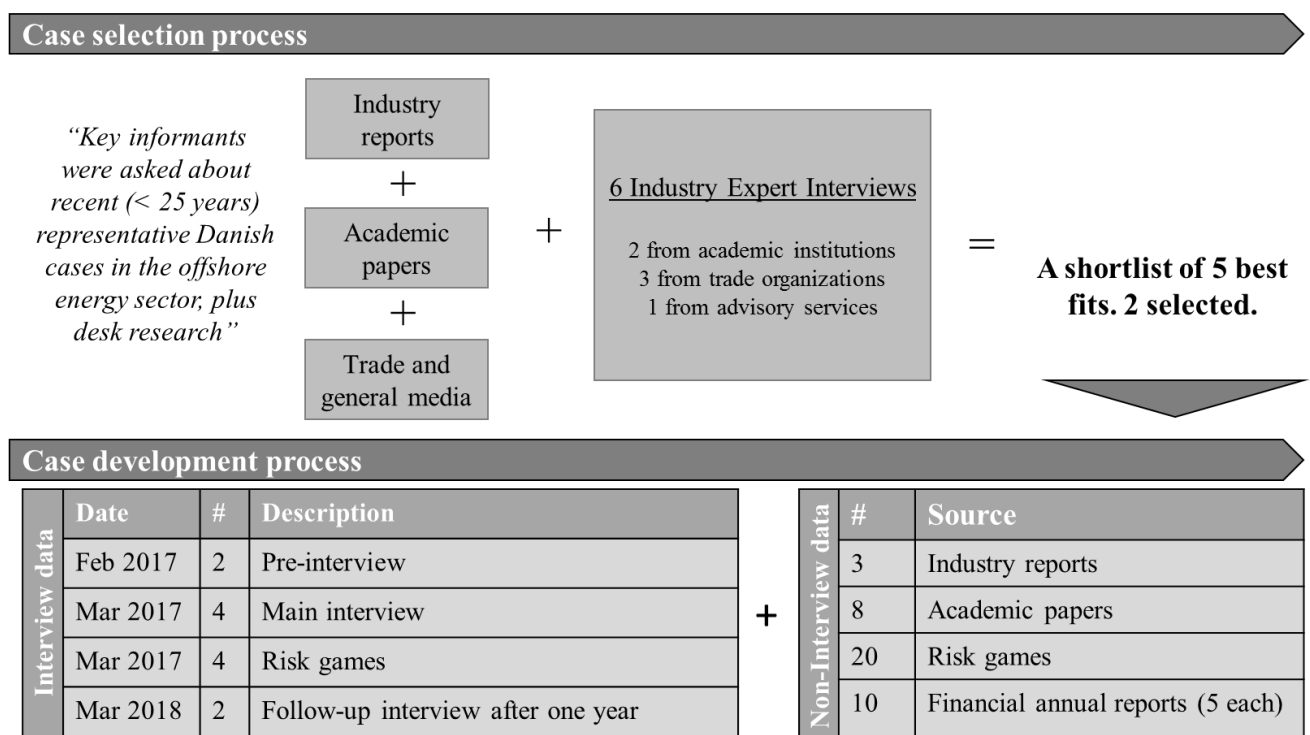


Table 1—Overview of case methodology

Methodological elements	The sample
<i>Internal validity</i> (the causal relationships between variables and results)	+ Literature gap in mainstream entrepreneurship theory related to biases, infused with behavioral economic theory foundations.
<i>Construct validity</i> (the extent to which a study investigates what it claims to investigate)	+ Original interviews conducted face-to-face with single interviewees. + Risk games conducted face-to-face. + Interview content reviewed by one person not present at the interview, and by the informant in question. + No framing or priming; interviewees were not told the precise goal of the research other than that the topic is commercialization in SMEs.
<i>External validity</i> (the extent to which the phenomenon investigated is also present in other cases)	+ Double-cross and nested approach in which the interviewer asked about one innovative project in early, launch, and running stages, which providing six commercialization projects distributed across two companies in the same industry, plus general insight into the funding and operations of the case companies themselves. + The case selection itself: both case companies are Danish but work internationally. They are highly innovative and operate as suppliers. Both companies have fewer than 100 full-time employees. + Triangulation with other sources. + Pre-case selection process. - No customers or regular employees interviewed, which may have added further validity.
<i>Reliability</i> (the extent to which the study is transparent and replicable)	+ Actual names of case companies are used. + Semi-structured interviews, which were recorded and written in a protocol. + Additional interviews were requested to further elaborate when required in order to secure information. + Some answers were tested using small behavioral risk games.

Source: Based on Gibbert et al. (2008)

2.5 Contextual Background and the Selected Cases

The case companies are North Sea-based suppliers to the maritime energy production industry, which is often viewed as one distinct industry, yet can also be

described as two distinct industries; oil extraction and offshore wind installation. Both companies serve both the offshore wind installation and offshore oil extraction customers. Both maritime oil extraction and offshore wind customers rely heavily on suppliers such as the case firms (Olesen, 2015). Both oil rigs and offshore wind turbines are installed and operated in stormy waters and on challenging seabeds. As mistakes can result in environmental damage and loss of profit, assets, and even lives, these factors place substantial demands on the technical ability and risk of suppliers. Suppliers must maintain high levels of innovation in order to solve these serious engineering challenges. Both case firms are from the Danish Esbjerg region, a known powerhouse for maritime offshore production. They were both established by founders frustrated by their employment in larger companies. As is typical for these type of suppliers, both were founded on technical innovation, though have become more commercial over time. There are differences too: the establishment of one was mainly the work of one founder, the other, of a team. One is more than twenty years old; the other, less than ten. While both were founded on technical insight, the educational background of the founders is very different. Both firms describe themselves as being agile and alert: “*Small is beautiful,*” as the chief executive officer (CEO) of Ocean Team Group (case 1) says, while the CEO of World Marine Offshore (case 2) states, “*It has to be fun.*” Such statements align well with the paper’s theoretical foundations and add further validity to the case selection and findings.

The choice of cases is argued to be sufficiently representative of companies of this size, in this market, and in this region, while also teaching us about why they specifically commercialize in the manner that they do. Commercialization is the main goal of both firms, and they focus substantially on return on investment, both for themselves and for their customers. The cases provide new, in-depth insights

into typical commercialization processes, as they are well matched with the general reality of SME commercialization (Oyson, 2011), which is dynamic (Lowe, Henson, & Gibson, 2006; Sternad, Jaeger, & Staubmann, 2013).

SME suppliers to the maritime energy production industry often find themselves pressured because both their customers and their suppliers tend to be larger and more powerful than they are. It is hence not uncommon for these customers and suppliers to transfer business risks and cash-flow exposure to firms such as the case firms in this paper; for instance, larger customers often impose a de facto extra cost on their suppliers by placing the responsibility of meeting health and safety and environmental regulations on the suppliers. Further business uncertainty is represented by the derived nature of energy production itself (Marshall, 1920; Stopford, 2013). A typical feature of derived demand is that capital investments are “sticky” (Bylund, 2015) and asset-specific (Williamson, 1996), which means that changing the focus of the business is difficult and costly. In terms of the BAR framework, the cost of wrong *Belief* is high. When derived demand drivers reduce the size of the market, companies such as those in this case study are stuck with their capital choices while revenue dries up as their customers operational expenditures and capital expenditures follows the development of derived demand for oil. For their wind-related customers, the focus is on constantly decreasing the price of offshore wind installations to make them a broadly and non-subsidized competitive energy source in a world of low electricity prices. Added to this is the desire of most customers to operate non-stop, which involves technical and commercial challenges in both good and bad times. In summary, maritime offshore energy supply is a market with substantial uncertainty that requires continually updated technical knowledge and both a short-term operational focus and a long-term strategic focus. These tough conditions

make it an interesting market for investigating entrepreneurial judgment and commercialization using a mental processing approach.

2.5.1 The case firms

The backgrounds of the case companies are briefly described in what follows.

2.5.1.1 Case firm 1: Ocean Team Group A/S (Incorporated)

Ocean Team Group (OG) was founded in 1995. It is a specialized service company that undertakes the cleaning of technical fluid-carrying systems using customized purification methods, especially in hydraulic, lubrication oil, and process systems in the energy sector, heavy industries, and maritime industries. Despite its small size, it is among the world leaders in purity-system solutions. Its products are highly important to its customers as 80% of the damage sustained in hydraulic and lubrication oil-based systems originates in unclean systems. Such damage may involve significant financial costs. The firm was hence founded on providing innovative solutions to existing problems. When pipes become dirty, they lose their carrying capacity, which ultimately leads to an operational shutdown. Most cleaning technology requires operations to cease; however, OG can clean without requiring an operational shutdown. Furthermore, the equipment can be permanently placed with the customer and requires only two people to operate, as opposed to the industry standard of six. Such features have enabled OG to move their value proposition from maintenance to pre-maintenance—as the CEO asserts: “*We do not clean, we keep clean.*” Over time, it has become apparent that hydraulic technology can also prolong the life of offshore installations.

2.5.1.2 Case firm 2: World Marine Offshore A/S (Incorporated)

World Marine Offshore (WO) was founded in 2011. The company's founders come from an industry background and worked for the same company, with investors having backgrounds in ocean fishing and the maritime oil industry. The founders primarily built their company around a new and patented ship-type, the Windserver, but have expanded into areas such as diving services and fiber-optic cable installation. Despite the young age of WO, it is a well-established and successful supplier in the industry. Its products provide tangible cost-saving benefits to its customers. The firm has gained a reputation as an innovative problem solver, for instance, solving the task of packing ships for offshore wind installation more efficient: If equipment is missing or lost on the voyage, ships must return to the dock, resulting in a loss of production hours and, potentially, a loss of wind park output. If, on the other hand, ships are overpacked, they are more expensive to fuel, which has a negative environmental impact and cost effects. In addition, the crane system on wind turbines has a limited lifting capacity. Based on an internal idea and subsequent conversations with a large wind turbine producer, WO won the concession to design a new ship logistics system that solves these problems. The solution is now being used by WO on its vessels, as well as on vessels owned and operated by other firms.

2.6 Findings

With the fit of the cases to the theoretical foundations having been established, in this section the information that impacts on the heuristics of the case firms' decision-makers is discussed. The elements are mapped in Table 2. They are listed in alphabetical order and shared information points are highlighted in blue. In order to give the reader a proper grounding to the cases, the paper provides two examples, one for each firm, of how they work with commercializing

opportunities. Thereafter, the discussion turns to actionable information points, ignored information points, and the impact of experience in order to illustrate how *Beliefs* were affected by the original heuristics, and how these heuristic recipes and their impact changed over time with input from experience.

2.6.1 Ocean Team Group commercialization example

A customer requested the cleaning of many long, small-diameter pipes. OG told the customer that the process was not possible; however, the ensuing dialogue started an innovation process that resulted in the firm developing a cleaning technology that uses supercritical carbon dioxide (sCO₂) rather than water or other chemical compounds. Carbon dioxide behaves like a gas but has the density of a liquid, is relatively easy to work with, is close to non-toxic, and has a small environmental footprint. It furthermore has a low temperature and high stability, which allows extraction of material with little effect on the object being cleaned. Unfortunately, that customer never returned to purchase the solution. The firm sought another customer for the technology and after a long process convinced a very skeptical potential customer to commence external tests. The tests confirmed both the need for the technology and its potential. Unfortunately, the onslaught of falling oil prices forced that customer contact out of his job, and OG was back at square one. Next, they attempted to align with a partner; unfortunately, it became apparent that the sCO₂ technology would take business away from the partner firm. In 2018, OG commenced tests with a newly confirmed trial customer—seven years after the project commenced. In the process, OG has had dozens of meetings with potential customers that have confirmed the business relevance of the proposition, though, either as a result of conservatism or bureaucracy, turning confirmed value potential into a trial order have been exceedingly cumbersome.

2.6.2 World Marine Offshore commercialization example

One of the largest South European energy companies was inexperienced in installing and running offshore wind parks but had signed a letter of intent (LOI) with a supplier of turbines. The LOI focused particularly on park production uptime. Based on the requirement for uptime, WO started talks with the end-customer in 2012, mainly providing advice on how Crew Transport Vessels (CTVs) could support or hinder park production uptime. These talks persisted until the start of 2014, without any indication of the initiation of a tender process. The contract was placed in a tender in September 2015, and WO won it in December of that year. It was hence able to order two specially built CTVs above market price, with a guaranteed long-term contract for future delivery in 2017. WO underscores that by understanding how its own technical capabilities could support the customer's ultimate concern (uptime), it was able to de facto dictate what the future solution should be and know that it matched its technology, thereby increasing the likelihood and speed of its selection over competitors.

Table 2 — Overview of Findings

	$\sum_{i=1}^n \text{Unknown information}_i$	$\sum_{i=1}^n \text{Actionable information}_i$	$\sum_{i=1}^n \text{Ignored information}_i$	Experience impacts
World Marine Offshore	?	• Cost structure • Culture • Customer Access • Financial position • Innovation frontier • Management composition • M&A possibility • Opportunity type • Pricing	• Competition • External financing • Long term (>3 years) • Macro development • National placement	• Culture • Knowledge management • Salience
Ocean Team Group	?	• Culture • Customer Access • Financial position • Innovation frontier • National placement • Opportunity type	• Competition • External financing • Macro development • Pricing	• Culture • Customer Access • Financial Position • Knowledge management • Salience • Self image

2.6.3 Actionable information

For the sake of clarity, the four information points that are only held by WO are discussed first in this paper. WO uses its commercial team for new or major customer accounts and places the responsibility for additional sales on the local operations. It views both sales and pricing as processes to be analyzed and managed. This entails a portfolio mindset in terms of which all activity must be priced correctly and be driven by customer needs rather than by internal costs. Cost remains a factor in this though; a component of the commercial capabilities of WO is to work commercially with their fixed and variable cost mix, including on long-term contracts. Such capabilities provide a strategic advantage over competitors whose organizations are too unwieldy or too cash-strapped to accomplish this well. WO further believes that local management must have its hand on the cooker and prefers to distribute risk and ownership as much as possible to achieve this. The point of such reasoning is to incentivize smooth and lean daily operations and to continually improve margins. The main task of top management in WO, on the other hand, is in the words of the CEO is *“to always push the envelope and go outside the established comfort zone”*. This dual approach to management and cost is believed to provide capabilities for agility and speed that larger competitors lack. As an illustration of this, the company was contacted by a Greek partner that asked WO to operate a vessel under the Danish flag. The top management turned it down as it was too simple and would merely disrupt the focus of local management; instead, they decided to undertake a joint venture with the Greek company to co-own the vessel. This took place at the height of the summer vacation, which is traditionally a very inactive time in Danish business life, and was completed in less than a month, with external administration taking up the bulk of the time used. Such projects push the company further, teach the organization new things, and create shared

incentives—this is typical of how WO works. This is also the reason that WO perceives that the main barrier to growth is access to the right people and to finances, rather than commercial opportunities. It is interesting that the younger and team-founded company has more information points in the actionable category than OG does, though this might simply be explained by the broader range of decision-makers in WO.

As both firms serve international customers and have non-Danish employees, the above examples illustrate another difference too. WO does not view itself as a Danish company, whereas OG does. OG has defined its strategic aim as one of being a market leader in terms of technology and quality rather than in terms of size or price. OG explains this trade-off choice with reference to the nature of the Danish economy: high levels of income tax make it impossible for firms to compete on the basis of price. In addition, OG is aware that the trade-off entails a growth constraint as it does not build the capability to manage volumes well. With reference to the global context, OG believes it is helped by being Danish; however, it believes in local knowledge too, and utilizes a wide network of local partners, rather than direct ownership, to achieve this.

Moving to actionable information points that are shared by the firms, starting with how they view opportunities. Both firms highlight the need to know what capabilities they have, though never to turn down an opportunity upfront simply because it seems difficult, but rather to consider due reservations and then never go beyond a preset limit of exposure. For instance, as long as OG is not taking on debt, the CEO will push on if he believes there is a possibility of profit and knows that OG has the capabilities to complete the project. This is interesting as we observe the voluntary invocation of an absorbing barrier (Taleb, 2018), but not the opportunity itself, as guiding point for heuristic decision-making. WO, for

instance, is very focused on always obtaining suitable commercial terms, such as payment terms, health and safety, delivery guarantees, and the like, upfront, or it refuses the deal outright. Both firms invest upfront in assets specific to deals with larger customers and therefore should constantly face hold-up risks (Williamson, 1971); however, the focus on commercial terms seems to have (rightly) diminished this concern for their entrepreneurial judgment. As opportunities mature, both firms move from emotional responses closer to data-driven analysis, though it is only once actual offers are presented that estimates are cross-checked between departments, and even this is a relatively new policy in the firms. As the CEO of WO states: “*If we handled risk like large firms, we would not exist.*” In this study, this attitude was controlled in both firms by subjecting the interviewees to risk games. In these games, they showed both similar behavior for which they presented similar reasons, focusing on controllable risk.

To convert opportunities into revenue, particularly as the firms are often smaller than their competitors, both are greatly focused on innovation. In OG, *radical innovations* come from the CEO, whereas *incremental innovations* originate in the organization as a whole as problems are being dealt with (see Ettlie, Bridges, & O’Keefe, 1984). WO maintains and adds to an idea bank for both types of innovations, primarily through biannual workshops with operations managers and ship officers. For its innovations, WO is exceptionally focused on acquisitions of other firms, especially of distressed firms, whose balance sheets it can improve with cost synergies from within the WO group.

Furthermore, as opportunities come from customers and customer leads both firms are highly focused on maintaining close customer relations. For illustrative purposes, consider the first international customer of OG, Maersk, which remains an active contract. If OG had refused Maersk’s wish to use OG’s services in new

markets, the existing business would likely have suffered too. By OG maintaining access to Maersk as a customer, the latter drove the internationalization of OG. Therefore, the firms see growth through existing customers as an important process in their innovation and continued competitiveness, as it pushes them out of their comfort zones; this in turn aligns well with the dynamic capability literature (Teece, 1997). To support this, the firms use sales approaches reminiscent of the “Challenger sales” methodology where suppliers challenge the preconceived needs and solution scope of the customers and aim to be knowledge brokers in this regard (Rapp, 2014). The firms particularly emphasize listening and translating their customers’ needs to their own technical capabilities as the focal point of sales, rather than comparison with competitors, substitutable solutions, or even the general market.

As the offerings of both firms are technically complex, they state that personal relations, trust, and customer insights are paramount to sales success. WO even states that it will never get a customer it does not already know. However, building the relevant network of customer leads is a long and costly affair. OG, for instance, is very engaged in teaching relevant education programs and invites students to write assignments for it. This is seen as a way of building hydraulic knowledge among its future customers. WO has an aim of obtaining both long- and short-term contracts as this aids in achieving the ideal customer mix. When the company was founded, for instance, all its ships were ordered without there being contracts for them to undertake, while the latest two were ordered with long contracts secured. A strategy involving both long- and short-term

contracts requires companies in this sector to deliver local content,²⁶ which is why the firm has subsidiaries rather than local partners.

The focus on customer access also guides the approach to innovation, as both firms aim at innovations that are viewed from a value-chain perspective and which bring them closer to the customers and to increasingly being viewed as integrated partners (Weitz & Bradford, 1999). An example is found in WO's solution for ship logistics as discussed in the background above.

Finally, the firms are highly focused on organizational culture as they believe that this can attract talent from larger firms. Internally, OG promotes a democratic company culture in which people “*work with the company, not for it,*” while involving the CEO in key external meetings. The flat hierarchy makes the company more agile than others, which in turn attracts talent. Furthermore, Danish suppliers have a reputation for being highly competent and non-threatening. Danish people are seen as creatives who run companies based on technical pride, which often results in solutions that are superior to what the customer expects. This noteworthiness, in turn, provides additional sales down the line, supporting the customer access focus. Another illustration is how WO ships provide iPad entertainment systems and are able to remain at wind parks for up to five days—these are features that primarily support work on distant offshore installations in the future rather than current customer needs.

The formulation of the heuristic in terms of what information to take action on has thus far proven successful for the firms, and both are financially successful and have high brand value. Despite his non-academic educational background, the

²⁶ *Local content* is a term used to describe community investments that are required from companies, primarily by governments and customers (Mærsk Drilling website definition: <https://www.maerskdrilling.com/en>)

CEO of OG is known as Dr. Oil. He explains his core beliefs as being a focus on the product and an understanding of where the market is not serving customers optimally. Both companies ultimately deliver a similar general value proposition: they increase their customers' operational uptime by providing outstanding technical solutions. For instance, WO's innovative ship types can work in wave heights of 3 meters, as opposed to the industry standard of 2 meters. This translates into 300 work days at sea, a hundred more than the standard. However, as mentioned above, heuristics are as much about what information to acknowledge as about what to ignore, which is what the paper turns to next.

2.6.4 Ignored information

An interesting observed departure from regular business logic, which is, however, supported in the theoretical foundations of this paper, was the attitude of the firms to competitors. The OG CEO altogether refuses to study competitors or the world in general when developing potential innovations, and WO has a similar attitude. Both firms' founders believe that too much premarket analysis would deter them, in that the ex-ante theoretical and empirical evidence against succeeding would, in most cases, be overwhelming. Thus, while the motivation to innovate or invent is always born out of dialogue with a customer, thereafter, the commercial and technical state of the market is ignored. Neither company performs ex-ante market analysis nor investigates the extent to which competitors already have offerings that approximate their novel idea. Rather, they develop a solution based on their own capabilities, which is hence substantially inward-looking. While this attitude might sound risky, it seems not to have been the case in such an uncertain market as offshore energy production; for instance, the latest six patent applications filed by OG all show international novelty, without there having been prior checks on this.

Hence, while specific customer demand is an initial motivator, the quantity of total theoretical market demand is not. The firms highlight that such an overconfidence bias is simply required for them to pursue any innovation. If they attempted a more neutral analytical approach ex-ante, they would be deterred from any new project involving invention by the nature of their limited and heterogenic capital structure. Both firms hence simultaneously display risk aversion and a risk-neutral attitude. They are risk neutral in that they risk high sunk and opportunity costs when they do not perform pre-analysis of the total market size before attempting inventions or commercialization. At the same time, when a risk test was conducted during the interview, management and the founders persistently showed risk-averse choices. They explain this as a matter of never taking chances on bets they cannot control, even when the expected utility would be higher as a result of taking the risk. With this manner of managing risk and uncertainty, they always attempt to internally control and contain a potential loss when they undertake entrepreneurial judgment.

In two areas the firms differ in terms of what information points they ignore. The first concerns firm nationality and long-term placement. Here, WO strictly focuses on being an international firm, and has as a goal that no more than 5% of its revenue should come from Danish projects. It also does not strategize beyond a three-year horizon. WO as such also holds larger macro-uncertainties, such as regulation, constant. As this is an ignored aspect, it is not clear whether fundamental institutional changes or challenges would prompt a move of headquarter on the part of the firm.

Finally, the firms differ in their relation to pricing strategy. OG does not strategically engage in pricing optimization with either new or existing contracts. When a new contract has been initiated, a decision is made about how important the business is to obtain, and pricing is based on this threshold, with a margin

included for leeway in negotiations. Existing contracts are typically renegotiated every four years. The large size of the customers provides them with capabilities as regards cost structure and bargaining power, and, as a result, OG typically has to accept the verdict. Heuristics, like firms, do not exist in a vacuum, and over time both are likely to change as a result of the experiences of firm decision makers. These are investigated in the next section.

2.6.5 Experience input

As expected, based on the paper's theoretical foundations, over time experiences have impacted on the heuristics of the firms' decision-makers. In addition, as expected, this has occurred to a greater extent for the older of the firms, as this firm have accumulated more experience. That experience will change the composition of the heuristic permanently or temporary; however is not a given. In this section, the areas in which such experience input might challenge and change lasting heuristics is reviewed.

First, *Beliefs* about culture are challenged by experience, particularly the perceived advantage of being Danish. A few cultures deviate from the positive view of Denmark, and that makes sales harder in those markets. Norway, which was historically under Danish rule, is the primary example of this. In order to address this matter, both firms have attempted to counter it by hiring Norwegians in sales functions. Other cultures have more binary approaches to hierarchy, and Great Britain especially can be a difficult market from which to recruit talent as a result of this. WO has worked around this issue by using the founding team's global network to recruit from, which has helped speed up commercialization of several areas; however, it is facing challenges as its growth empties that talent pool. One way to resolve this is to place even greater emphasis on being truly local and to create local subsidiaries that are allowed to develop a local company

culture. As WO particularly has experienced, training non-Danish people to work in the Danish manner is costly.

Another major challenge related to culture in both firms is the hiring of sales representatives—this has proven to be a bottleneck for growth. Hiring new sales talent is a weighty decision that always involves the top management. It is costly to make a wrong decision: training a sales representative takes up to two years as salespeople must be both commercially minded and technically knowledgeable, which creates a need for considerable investment in education, on-the-job training, and travel. Typically, both firms attempt to reduce risk by hiring internally from among older technical employees and by developing a key performance indicator (KPI)-based action plan for each sale hire, especially as concerns listening, product knowledge, and research and development skills. It is the belief in both firms that such high upfront expenses reduce long-term costs. WO is more aggressive, also directly hiring university graduates for sales roles, which can likely be explained by the background of the management: staff at OG are more trade-educated, while those at WO are primarily more university-educated. In addition to this, both firms believe they have the right people for the job for the present; however, they want more big-data and analytically educated staff in the future to aid their commercialization efforts by providing scientifically valid input for performance comparisons for their customers, as such input and data are increasingly requested.

Furthermore, the important customer access focus has been challenged. A regular issue in OG's sales work is that it is more expensive when a product-to-product comparison is made; however, due to its efficiency (for instance, running two cleanups at the same time) and a lack of operational downtime, it is cheaper on a full project comparison base. Unfortunately, this is a difficult argument to

make to a customer's purchase department that focuses on short-term budgets, and OG must often attempt several sales pitches at several entry points before it closes a deal based on its efficiencies, as their customers' organizations have changed and now involve decisions by more removed purchase committees.

Both firms' inclusion of finance opportunities in their judgments has also changed. The firms have found banks very tedious to work with and hence finance innovations with a combination of equity, shareholder loans, and management earn-outs. After several attempts at obtaining finance from government schemes (of which there are many in Denmark), OG has given up on that possibility too. To illustrate: the CEO of OG has long had the desire to use ultrasound to clean pipes, and the company has participated in EU-funded research projects. Unfortunately, these projects have not been fruitful, and OG has failed to see results materialize beyond what it had already developed internally. Attempts to have industrial doctorates funded have not been fruitful either. The company attributes this to government grant-givers favoring large companies over small ones in both the granting of funds and in bureaucratic practice associated with grants.

Knowledge management has grown in importance and, for both firms, is soon likely to be a permanent feature of the heuristic recipe when attempting commercialization. The reason for this is that the firms face the problem that knowledge is too embedded in individuals, which creates a considerable operational risk to shareholder value. For instance, OG's sales are structured around references and, as projects are archived for reference, it is always the CEO's job to tag projects to ensure data validity in the course of searching for references when scaling new projects. For WO, it became more than a theoretical concern when their CEO was run over by a car, prompting the company to invest heavily in knowledge management methods and systems. On the daily

management side, OG has established a three-generation leadership model (involving persons not blood-related) as a social responsibility in order to ensure the company's survival independently of any one person, as the loss of key knowledge would be detrimental to the firm's survival. Both firms are now also managed by means of preset KPIs that are all reviewed in weekly management meetings. The point is not to meet the KPI per se, but to have cause to investigate deviations and make common plans to get back on course. As such, management in both firms believes it is important to communicate deviations from KPIs to the whole company, so that all feel a responsibility to help, and all can understand why certain actions are taken.

While founded on technical solutions, both firms have had to work on what they independently describe as “salience.” In relation to commercialization, salience comes from providing interesting technology that is understood by customers. Both firms further describe salience as a capability. It has taken time for the firms to realize that they needed to shift from being feature-based technology firms to being benefit-oriented commercial firms—this journey required investment in consultants and new hirings and, fundamentally, a change in *Beliefs*. OG, for instance, works on several initiatives, such as getting field technicians to supply narratives and images to help all employees focus on customer benefits rather than technical proficiency (which should speak on its own merits). For both firms, the salience capability is built on understanding customers' current and future needs—preferably better than the customer does. Capabilities in this area are seen as a clear differentiator from larger companies, which are more focused on product sales. An issue here is that customers desire a proven technology, with few wanting to be guinea pigs; hence, reference customers are pivotal in supporting firm salience. Both firms also aim to be first-movers so that they can set the

dominant design to support their salience (Suarez & Utterback, 1995). They do, unfortunately, see that fast second competitors (Marides & Geroski, 2004) are copying the products faster than they can keep up. OG believes that the threat of copying is different across market segments, prompting the company to patent products to a greater extent in the wind-related business than the oil business.

Related to salience is self-image, which has been an interesting area of both mental and commercial innovation for OG. When the oil price fell in 2014, OG lost 40% of its revenue and was forced to cut back on many nice-to-have expenses and to reevaluate its self-image. However, the market was still attractive and, in 2015, a new strategy called “Be it” was developed for implementation in 2016. The strategy comprised three elements: 1) a focus on working smarter, 2) transformation from being a service company to being a modern technology rights company, and 3) preparing the organization for that transition. Becoming a technology rights company, as opposed to a project or service company, is a tremendous change that affects the entire business. Rather than selling machines and service crews, the company now rents out machines to customers and trains the customers own people. The strategy has a cost-saving benefit for customers, as well as ensuring that customers are always getting a state-of-the-art solution in terms of technology and regulative requirements. The strategy has even more benefits for OG. First of all, it makes the appropriability regime tighter (Teece, 1986) and avoids turning customers into competitors for future business. It furthermore leads to more dialogue with customers and makes OG more like a partner than a supplier. The strategy change is of interest from a theoretical point of view in that it builds on the firm’s capabilities but innovates the constitutional (Buchanan, 1975) and contractual (Williamson 1985, 1996) framework by separating the goods traded from the rights traded. In the next section, the

implications of the proposed model and its relevance for entrepreneurship research generally are discussed.

2.7 Discussion of Implications

It is impossible to know the future, and it is likely as impossible to know the inside of the mind of another. Yet entrepreneurs are agents who are willing to make guesses about the future and to commit resources to these guesses. Therefore, all who are interested in entrepreneurs, be they researchers, investors, would-be entrepreneurs, or even policymakers, will benefit from greater knowledge of how the entrepreneurial mind works when forming judgment under uncertainty. In this paper, a theory of how some of these mental processes work has been advanced, and has been further illuminated and supported by illustrative cases. As is argued in this paper, entrepreneurs might appear crazy at times, but they are not irrational. Particularly not when they successfully apply the same heuristic sorting recipe repeatedly. For instance, the case firms' simultaneous disregard for competitors and their mental use of absorbent barriers demonstrates this: they know they must play, but they do not gamble their lives. It is indeed exceptionally rational, when forming a judgement about uncertainty, to heuristically decide what to think about, what to act on, and what to ignore. If this is indeed how entrepreneurs think when judging opportunities, and they are hence rational, it opens up for new ways to work with entrepreneurial policy and strategy.

As entrepreneurship is, as described here, an act of rational choice, the trick to influencing the level of entrepreneurship in society or organizations is to work with the perceived cost and perceived benefits, and, importantly, their perceived likelihood of entrepreneurship (Boettke, 2012, based on the work of McKenzie & Tullock, 1978). Should a policy aim at promoting entrepreneurship in specific industries or markets, appealing to heuristics and rational choice is a path that is

likely to prove successful, and vice versa. The inherent rational-choice foundation of the paper is also the main boundary condition. If entrepreneurs were not rational, we would not be able to understand the mental process of their judgment by rational means. If, however, that were it the case, it would not remove the importance of asking research questions relating to entrepreneurial mental processes and judgment.

Another boundary condition of the paper is the understanding of expertise. As described above both firms and their founders are viewed as experts in their field. Kahneman & Klein (2009) have stated that outside high validity environments, experts tend to overfit and therefore solve problems more poorly compared to intuitive reactions of nonexperts. The argument put forward in this paper, is that the nature of heuristics themselves can help avoid this by making bonafide technical experts embrace a non-expert mindset in the commercial aspect of their entrepreneurial aspiration, as we see with the discovered importance of business salience over technical ability, while at the same time act as experts in technical delivery and keeping a focus on internal capabilities.

In many ways, the paper mirrors Behavioral Strategy and confirm the findings from this literature (Bingham & Eisenhardt, 2011), such as that successful application of individual mental models of firm leadership develops into organizational capabilities. But the present work also adds to the literature by showing that the use of heuristics and the learning and honing of logics are happening in even smaller firms than those typically investigated. The author does, however, argue that this is due to the global composition of the case firms customer base. Particularly as the decision-makers of both firms display an impressive ability to understand cognitive distant opportunities in their

commercialization attempts (Gavetti, 2012) likely gained from exposure to a wider array of uncertainty impacting factors than more local SMEs.

The paper is also of relevance to sales research. Uncertainty, for instance, is a key element in much practical sales methodology, for instance the “Straight Line System” as made famous by Jordan Belfort of *Wolf of Wallstreet* fame (Belfort, 2017). The author also observes that the actions of both firms align with the five key attributes of sales success for SMEs that Douglas (2013) highlights: 1) personal owner involvement in the sales process, 2) consistency that drives performance to the degree that this is possible for a small company, 3) that they are not developed users of the latest sales-supporting technology, such as Customer Relationships Systems, 4) that there is an imbalance in favor of the buyer in commercial transactions due to the sheer relative size of the buyer, and 5) that the geographical location of SMEs impacts on their performance. As regards the last point, this paper is hence also of interest as it sheds further light on the ongoing debate on centralized versus decentralized sales departments and practices (see: Lewitt, 1960; Swoboda, Schulter, Olejnik, and Morschett, 2012; Ahearne, Hauman, Kraus, & Wieseke, 2013). However, as such, despite the specifics of the markets served by the case firms, the case firms are typical beyond their own “industry,” and the findings of this paper are likely generally applicable to SMEs and the ongoing contextual exercise of entrepreneurial judgment.

2.8 Conclusion

This paper set out to show that entrepreneurs judge commercial opportunities only in the context in which both the entrepreneurs and the opportunities exist. In the paper it has been argued, and support was found for the proposition, that entrepreneurs judge based on a mental recipe, a heuristic, regarding which information to act on and which to ignore. It has been argued and illustrated how

such a recipe can be understood as an ecological rational-choice heuristic that, if not too far off target, continually improves when new opportunities for commercialization are assessed. Ample support was found for this approach to understanding entrepreneurship in at least small firms in complex settings. One may conclude that engaging the rational choice of agents is the path to understanding and promoting entrepreneurial activity in given particular contexts.

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Chapter 3 - Towards a Market-Specific Entrepreneurial Value-Capture Model—a Field Application of the Entrepreneurship as Judgement under Uncertainty View in a Maritime Market

Abstract

Recently the field of entrepreneurship research has been critiqued for too much attention on the opportunity construct, and too little attention on the specific industry and market context of entrepreneurial pursuits. This paper engages these criticisms by applying the judgment under uncertainty view of entrepreneurship to a specific theoretical and practical context, that of maritime economics and markets, particularly oil service firms operating in the North Sea. The paper provides this theoretical merger by examining value capture as a result of entrepreneurial investment in capabilities within market alertness, capital structure management, and uncertainty handling. This argument is explored by three simple models and using statistical tests of price, financial, and capability data. The model explains value capture as dependent on demand-side changes, which guide optimal supply-side judgments and finds large support for uncertainty handling capabilities to have a multiplication effect on other judgment-related capabilities. The paper comments on boundary conditions of the field application and suggests future research particularly for the further merger of maritime economics and entrepreneurship research.

A good theory of entrepreneurship should explain the conditions under which entrepreneurship takes place, the manner in which entrepreneurship is manifested, and the interaction between entrepreneurial activity and firm, industry, and environmental characteristics (Foss and Klein, 2012:2)

Keywords: Entrepreneurship, Offshore Production, Oil, Maritime Economics, Capital Structure, Uncertainty, Value Capture.

3.1 Introduction

An entrepreneur, and by extension firms, has to make choices that impact value capture in the short-term and long-term (Kirzner, 1973). These choices are made under conditions of uncertainty, and therefore constitute a challenge as to how to judge and select the perceived best options for a firm to capture value. Value capture is retaining some percentage of the value generated in firm transactions. The results of sound judgment, that is, judgment leading to value capture, needs a clear and applicable understanding of entrepreneurial judgment (Foss & Klein, 2012; 2018). Such an understanding must serve two purposes: to explain the choices the firm can make to ameliorate uncertainty, and to relate these to an overall benchmark of uncertainty for the specific market setting (Foss, Klein, & Bjørnskov, 2018).

To illustrate this, imagine a firm in the offshore oil service industry. This firm is in a situation, s_1 , in which oil prices are high, and the derived demand for its services is also accordingly high. In s_2 , the firm decides to actively seek more customers to make the best of the good times and initiates a sales dialogue with a new potential customer. The customer wishes to rent three jack-up oil rigs with crews and is willing to bid these rigs and crews away from their current contracts. As it happens, the firm must choose between serving this new customer by

investing in more equipment as well as canceling a current contract to a small but longstanding customer, or lose this new revenue stream. In s_3 , the firm decides to proceed with the new customer, sacrificing an existing contract as well as taking on debt to buy new equipment. The firm's overall revenue is increased, while the former customer is left dissatisfied. In s_4 , oil prices begin to decline. The change in oil price forces the new customer to leave the market. The disappointed former customer stays in the market but refuses to do business with the firm due to the entrepreneurial choice in s_3 . The result is a short-term gain in revenue, but a longer-term loss in value capture as a result of the loss of more durable customers and the expansion of assets and liabilities. Incidents such as this occur in business every day, yet both general entrepreneurship theory and the many subfields of management and economics are ill-suited to explain how these entrepreneurial choices work and which actions guide long-term or lasting value capture for a firm.²⁷

This paper contributes to existing knowledge on these matters in three ways: 1) it argues for the need for a market-specific entrepreneurship theory that acknowledges market specificities and value drivers, in this case in maritime economics; 2) it merges maritime economics with the “judgment under uncertainty” view of entrepreneurship; operationalized in the *Beliefs, Actions, Results* (BAR) framework of Foss and Klein (2018); 3) the paper uses the framework by applying it to a ten year quantitative study of value capture by North Sea offshore oil service firms.

The paper is structured in the following way: First, the paper builds a conceptual background merging maritime economics and entrepreneurship as

²⁷ Although some methods exist to help envision futures, such as Net Present Value, these rely still on judgement about input to such calculations, which is entrepreneurial judgment.

judgement under uncertainty view. Here, the paper argues for the presence of a lacuna for the theoretical foundations of the entrepreneurial judgment and maritime economics. As a consequence, three hypotheses are suggested. These are subsequently applied to a sample of firms in the North Sea oil service market, and the findings are then presented. The paper subsequently comments on the implications for management, boundary conditions, and future research, before concluding.

3.2 Conceptual Background

3.2.1 Entrepreneurship is the Missing Link of Value Capture for Maritime Economics

General entrepreneurship research has recently been confronted by two principal challenges: 1) a call for the incorporation of more market- or industry-specific insights and subtleties (De Massis, Kotlar, Wright, & Kellermanns, 2017; Foss, Klein, & Bjørnskov, 2018); and 2) the problematic tendency of the opportunity construct employed in much entrepreneurship literature to focus excessively on a specific firm type—start-ups—and unique industries, such as software and life-science (Foss & Lyngsie, 2014; Foss & Klein, 2012; 2018). To engage both challenges, the author sought out a market that has seen very limited engagement by entrepreneurship research. The market of maritime production, and by extension the research field of maritime economics, was selected precisely because it is a field of economics and management that is almost completely void of theoretical entrepreneurship studies, while the industry that is its subject matter involves much entrepreneurship in practice. This section first outlines maritime economics and its potential benefit for entrepreneurship research and theory and then outlines the requirements of such a maritime entrepreneurship theory of value capture.

Maritime economics understood as the modern subfield of economics and management dealing with activities related to seaborne transport and resource extraction has been well established since the early 1970s (Goss, 2002; Heaver, 2012). While maritime economics has embraced multidisciplinary in certain areas (Heaver, 1993; Talley, 2013; Woo, Bang, Martin, & Li, 2013), other important avenues of analysis, such as institutionalism (Button, 2005), are less developed, and the field, in general, is predominantly focused on neoclassical, or “as if”, as Nobel Laureate Milton Friedman famously describes it, economic methodology (McConville, 1999; Cullinane, 2011; Talley, 2011; 2013), with some key sources even claiming that the industry is perfectly suited to match this methodology (Stopford, 2013). For their many merits, such methods alone are ill-suited to explain entrepreneurship as a dynamic process of exercising judgment under conditions of uncertainty over time, particularly as the choices and actions resulting from the exercise of such judgment often have lasting and compounding effects, as illustrated in the example in the introduction.

Maritime economics never experienced the same rebirth of the entrepreneur that has been observed in much economics and management science, particularly since Shane and Venkataraman, (2000), and hence lacks theoretical founded entrepreneurship research traditions, and are therefore without an understanding of the exercise of judgment as it concerns the securing of the capture of value. It is further difficult to model dynamic market processes given many of the underlying assumptions that maritime economics has inherited from neoclassical economics, particularly if they are taken too literally. Hence, value capture is often explicitly or implicitly assumed either to be occurring automatically (in the case of full information or perfect competition) or simply to have occurred (in the case of objectively given prices). In other words, all value is assumed to be automatically captured and depleted, and there is no room for new entrants, whether they be

firms or methods (Kaldor, 1972). Even if such models are viewed as an instant snapshot of a potentially more dynamic market—as may be the case in maritime economics (e.g., Stopford, 2013, particularly pages 161-167)²⁸—assuming perfect competition remains a method poorly suited to explaining value capture, as there is no residual value and hence no opportunity for entrepreneurial action (Mises, 1949) or strategy differentiation (Schumpeter, 1911; Knight, 1921; Mises, 1949; Bianchi and Henrekson, 2005). From such foundational challenges springs the relevance of introducing entrepreneurship as a field of research, one that traditionally involves the creation, definition, discovery, and exploitation of opportunities (Klein, 2008)²⁹, into maritime economics. Entrepreneurship theory consequently offers insights into how both current and future firms change the technological possibilities and market conditions by means of the choices they exercise (Shane & Venkataraman, 2000; Sautet, 2002; Zahra, Sapienza, & Davidsson, 2006; Foss and Klein, 2012). This process has been demonstrated to be relevant for maritime research too as the economic development of maritime industries is self-evident, but far from self-executing, and entrepreneurship is thus about both new firm formation and equally about the survival of existing firms in maritime markets (Ekberg, Lange, & Nybø, 2015).

²⁸ There are three reasons why the “repeat” static equilibrium method cannot be claimed, as Stopford does, to model dynamism. 1) Human behavior cannot be assumed to involve the same degree of certainty as natural sciences, as humans are motivated by the ideas they hold. 2) The actual passing of time (even in passing from one state to another) adds to uncertainty. Imagine an agent at t_1 wanting to predict his response to a certain problem at t_3 : even with full knowledge of the relevant cognitive theory and complete information, the agent still requires time, t_2 , to process and decide on the problem, and that time may affect him and the world. 3) While some such models attempt to model learning, they likely miss an important understanding of how subjective learning and communication operate (Knight, 1921; Hayek, 1945; Popper, 1959; 1963; O’Driscoll and Rizzo, 1996; Zahra et al., 2006).

²⁹ Ranging widely in particular research interests from macroeconomic growth to firm strategy the individual lifetime earnings and optimal career choices of economic agents.

Despite a long-established call for independent maritime entrepreneurship research (Svendsen, 1981), maritime economists may be tempted merely to incorporate general entrepreneurship theory and empirical findings directly into the maritime field, as indeed some few have done (Evangelista and Morvillo, 1998; Borch and Batalden, 2015). However, such an approach is not without drawbacks. Contemporary work on entrepreneurship often treats the entrepreneurial function in ‘*a highly stylized and abstract fashion*’ (Foss & Klein, 2012: 26). Furthermore, most empirical work and subsequent theory interaction have been conducted in the software or life-science industries, both of which differ fundamentally from maritime industries in the way their capital and payment outlays work, how they are regulated, and the nature of their customer base.³⁰ Maritime economics should start developing an entrepreneurship research agenda that progresses beyond the fine work of business history biographies (see, for instance, Hornby, 1988; LaRocco, 2012; Jones, 2013; Jephson & Morgen, 2014) to the conceptual and modeling stages. This paper is a step in that direction: it utilizes insights from entrepreneurship theory to build and apply a theory of value capture in maritime markets. This endeavor is also fruitful for general entrepreneurship theory, as specific market and industry insights can challenge and improve the research validity of general entrepreneurship studies, which is indeed a growing research interest within entrepreneurship proper (see De Massis et al. 2017).

³⁰ Software companies, for example, typically have marginal costs approaching zero and very low upfront capital expenditure (capex). Maritime entrepreneurship is completely different, operations are very costly and while there have been enormous improvements, they are likely to remain so. The investment and payout structures are also different: building ships takes time, is exorbitantly expensive and, as a result, many ship owners and operators earn a large part of their profit not on operations but from the buying and selling of maritime assets.

This paper models value capture in maritime markets and are consequently both a specific market theory of entrepreneurship and a step towards a general maritime economic theory of entrepreneurship. In doing this, the aim is to adhere to the following:

A good theory of entrepreneurship should explain the conditions under which entrepreneurship takes place, the manner in which entrepreneurship is manifested, and the interaction between entrepreneurial activity and firm, industry, and environmental characteristics’ (Foss & Klein, 2012: 2).

A theory of maritime value capture as an applied entrepreneurship theory must consequently also conform to a certain set of expectations. First, it must assist in conceptualizing how value capture can occur, *generally* and in the *individual* firm; so it should focus on actions for opportunity discovery and exploitation (Klein, 2008). As a step towards this end, it must explain what happens to value that is not captured by individual firms. It should ideally, but not necessarily, go beyond theorizing to empirical illustration and even testing (Hayek, 1968). Finally, and most importantly, it should take account of the specific demand structure of maritime markets. These conditions require two models to be worked out in this paper: one dealing specifically with relative value capture, and another that explains the result of the first model by focusing on the judgment exercised by firms. This paper does not claim to be a complete empirical testing of causal inference, yet it is an application of theory-driven data analysis to a specific sector for the purpose of initial analysis and illustration.

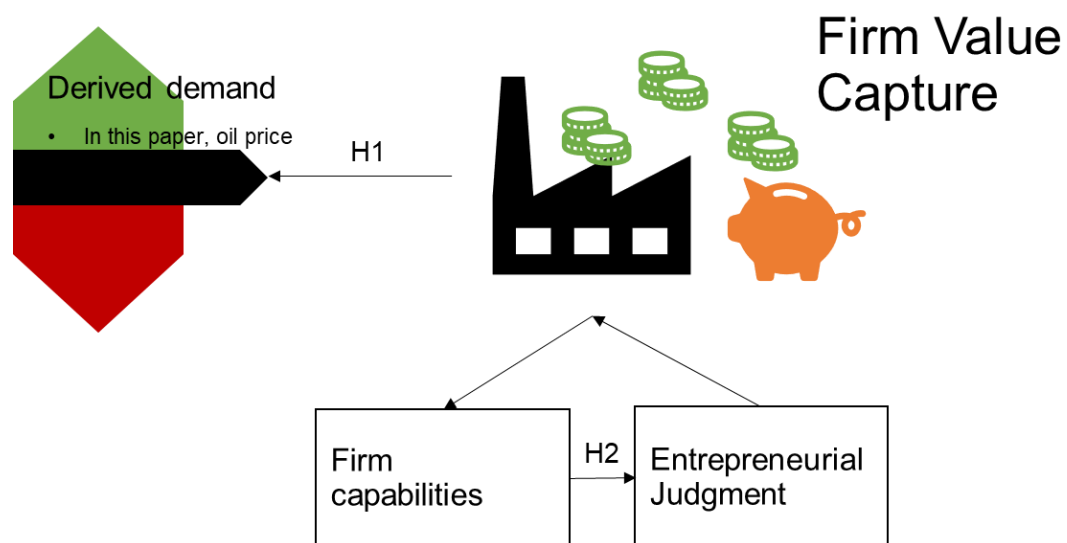
3.3 A Model of Sector-Relative Value Capture

To introduce entrepreneurship into the inherited neoclassical assumptions of maritime economics, this paper adopts a Kirznerian trick (Kirzner, 1972). The trick consists of introducing the “layman” concept of competition to the neoclassical model of perfect competition. This changes the model from a static state to a dynamic one, in which actual competition among firms bidding prices and quantities up and down takes place. Competition thereby no longer describes an end-state in which a competitive process has already occurred as in the perfect competition model, but an ongoing process with uncertain outcomes (Hayek, 1945, 1946, 1968). Uncertainty then means that value capture by a firm cannot be guaranteed; the value captured is dependent on the state of the market and the activities of competitors, customers, and others, and on the judgment of the firm itself. With a layman concept of competition, the market model changes to one of dynamic demand and supply curves. Dynamic shifts occur for reasons most often beyond the control or the limits of knowledge of individual firms (Hayek, 1945). This is substantially important for maritime economics because of the derived demand nature of most maritime activity (Marshall, 1927; Stopford, 2013).³¹ The concept of derived demand is important because of the historical fact of the specialization of commercial activities since the early nineteenth century. This led to a separation between shippers of goods, on the one hand, and ship owners and operators, on the other (Fayle, 1933; De Ville, 1993; Stopford, 2013). Consequently, while commercial maritime activity is possibly more than 5,000 years old, from the nineteenth century, we begin to see specialized maritime business models separated from other commercial activities. From specialized ship

³¹ As is the case with most business to business markets (B2B) markets. It is, however, a dominant feature of how maritime markets are presented and thought of both academically and practically.

owners to today's oil rig providers, the important aspect is that maritime commercialization is a response to a derived demand; people do not ship goods because there are ships, or drill for offshore oil because there are rigs; entrepreneurs provide ships because there are goods to ship, and rigs because others wish to use oil. A dynamic model of competition is useful for capturing such modern, derived demand maritime entrepreneurship as, fundamentally, it views entrepreneurship as judgment under conditions of uncertainty about the shape of future demand. In terms of the model, this means we can model a firm's value capture performance being, on the one hand, relative to the performance of the derived demand (the price) for a specific item, such items could be freight rates, oil, or whatever other goods constitute the next step in the derived demand value chain from the step under scrutiny, and on the other the entrepreneurial judgment and the firm capabilities on which this judgment rests. This is modeled in Figure 1. The model further includes two main hypotheses that will be presented below.

Figure 1 – Derived demand and entrepreneurial judgment impact on firm value capture



The argument is that if firms can, in fact, perform above or on a par with the development of the derived demand, this is a testament to the exercise of sound entrepreneurial judgment; If value capture is on par with the derived demand price development, the firm will have captured its expected share of value. If the firm's value capture is less than the demand side, the firm has captured less than its expected share of value, due to judging wrongly. If the firm side is above the demand side, the firm has captured above its expected value.

Hypothesis 1: A specific firm's value capture development can be different from what the overall total derived demand development would dictate.

Turning our attention to the working of entrepreneurial judgment, it is relevant to first dissect the components of this on a firm level, as we are dealing with multiple decision makers in each firm. Foss and Klein (2018) propose a framework for operationalizing entrepreneurship as judgment under conditions of uncertainty. The framework is referred to as BAR, which stands for *Beliefs*, *Actions*, and *Results*. *Beliefs* are the entrepreneur's conceptions of current resources and how to utilize these to increase the likelihood of the desired outcome. *Actions* are what the entrepreneur does to seek the outcome, and *Results* are the actual outcome, including, potentially, knowledge of how to alter *Beliefs* and *Actions*. To take the BAR framework from the individual and particular level to the organizational and general, a further step is needed; the use of capabilities as an aggregate of *Actions* in the BAR framework moves the theory from the individual entrepreneur to the organizational level. The argument is that capabilities are the *Actions* a firm is capable of repeatedly doing, disregarding the unique skillset of specific employees. Such capabilities can be related to sales force composition and tactics, but also for other areas such as supply chain

composition (e.g., delivery ability), financial agility (e.g., billing regimes), corporate governance (e.g., reimbursement limits), and human resources (e.g., incentive schemes). The particular desired composition of these capabilities is a result of ongoing entrepreneurial *Beliefs* manifesting in the architecture of the business model of the firm (Zott, Amit, & Massa, 2011; Ritter & Lettl, 2018). The success rate, the extent of the *Results* desired in the BAR framework, is contingent on the ability to capture value (Maloni, Gligor, & Lagoudis, 2016; Yuen and Thai, 2017). Further validation of this model design choice is the already established use of capabilities in maritime economics (Jenssen, 2003; Maloni et al., 2016). All capabilities are not born equal in the BAR framework, and Foss and Klein (2012) particularly highlights three areas of capabilities on which sound entrepreneurial judgment rests and reinforces; Alertness, Capital structure management, and Uncertainty handling. To understand the theory and develop testable hypotheses each element will be commented on below, particularly in relation to maritime value capture.

3.3.1 Alertness Capabilities and Entrepreneurial Value Capture

As the reasons for the changes in maritime demand curves are derived and far removed from the specific maritime business, a firm should have the capability to notice such changes and this is referred to as alertness. The concept of alertness, that is, of being alert to changes that may result in new opportunities for profit and loss, and what these will do to and for the firm, is sourced from Kirzner (1972), who states that the challenge is understanding why yesterday's plans are exchanged for today's new plans. Operationalized alertness is hence the capability to notice shifts in the supply and demand curve. Alertness is a capability, as opposed to being a property of an individual genius, and can be hired in and supported (or hindered) by resources and organization. The ability to hire such entrepreneurial skills aligns well with Schultz (1979) in that entrepreneurial ability

and capabilities, are supplied, demanded, and subsequently priced on the market for production and management input, which seem anecdotal evident in maritime markets.

As the model investigates aggregated firm strategies consisting of specific dispersed individual actions over time, alertness can also help explain the heuristic nature of learning by firms in particular industries; how the translation of market information gained in a specific situation translates to general perceptions, which explains why agents enter, stay, or exit market transactions, and the (changing) means they use to do so (O'Driscoll and Rizzo, 1996). Alertness capabilities hence relate to changes and effects in the short, medium, or long term, or all of these (Keynes, 1936; Kirzner, 1972). It is particular skills and capability sets that enables a firm to notice short- or long-term changes.³² As an example one can think of day-to-day (short-term) individual sales versus a firm-wide, long-term cash retention strategy; a salesperson might see his or her bonus affected by day rates on steel and be incentivized by this when deciding when to process a new order despite it having adverse effects on his employer's long-term strategy.

3.3.2 Capital Structure Management Capabilities and Entrepreneurial Value Capture

Maritime industries are typically industries where large capital outlays are required far in advance of potential cash flows; the outlays are also highly specialized, as for instance ship types (Veenstra & Ludema, 2006). Furthermore, ships are not instantly transferable to more profitable ports or retrofitted to new usages (Ruan, Feng, & Pang 2017). Not only does it take time, but the time required is dependent on other factors, such as ports, shipping routes, and crews (Pirrong, 1993). In other words, maritime capital structure is not just asset specific, but highly and fundamentally heterogeneous. Accordingly, even firms

³² This is anecdotally evident too in the sample used later in this paper.

that have alertness capabilities are constrained by their capital structure (Foss & Klein, 2012). Firms face important choices as to how their specific capital is deployed and, subsequently, how the firm can redeploy it if more profitable opportunities present themselves, as in the illustration in the introduction to this paper. Hence, the second capability set concerns the management of capital structure heterogeneity (Menger, 1871; Mises, 1912; Hayek, 1931, 1941); the fact that maritime assets are not direct and instant substitutes for one another (Lewin & Cachanosky, 2016). Often, in theory, capital structure is either assumed to be homogeneous or, as is generally the case in knowledge- and capability-based theories of the firm, not given much attention. However, capital structure is not trivial in maritime markets, where capital heterogeneity and resulting multi-asset specificity (Lachmann 1956; Penrose 1959) easily lead to maladaptation costs (Williamson, 1991) and malinvestment (Hayek, 1931). Capital structure theory is hence required to move (maritime) entrepreneurship theories from opportunity acknowledgment to opportunity exploitation (Foss & Klein, 2012). A workable understanding of capital structure for maritime entrepreneurship must, therefore, describe both monetary investment and the asset this investment acquires (Williamson, 1985), and how these are organized (Richardson, 1972) and ultimately used. In entrepreneurial attempts at capturing value, capital is structured according to its specific deployment over time; capital goods are, in other words, what entrepreneurs judge them to be at a given point in time (Sauce, 2016). If the pursuits in which it is tied up prove unprofitable, the firm faces a loss or at least redeployment costs as actual capital reshuffling is “sticky” and costly (Bylund, 2015).

An empirical illustration of the importance of capital management for maritime entrepreneurship may be found in the case of the Norwegian offshore supply vessel operator, Viking Supply Ships, which after unsound entrepreneurial capital

choices faced a harsh restructuring process that resulted in all its anchor handling tug supply vessels and all but one of its platform supply vessels (PSV) going from being contracted to being on the spot market. Of their large deficit, about 60% was the direct result of write-offs of the PSV assets. The company further faced a large punitive, one-off refinancing cost and significant changes in human capital, such as staff layoffs and the CEO stepping down to handle other internal projects (Hartkopf-Mikkelsen, 2016c, 2016d).

A firm might also miss an opportunity owing simply to the time required to shape capital into assets needed for going to market (Salgado, 1999), and it is often not immediately obvious ex-ante which capital assets should be combined (Foss & Klein, 2012). The Denmark-based shipowner, Celcius Shipping, for example, twice missed a perfectly timed market entry due to the bankruptcy of Chinese shipyards from which it had ordered its ships, and has changed its capital structure several times, including investments in gas, oil product tankers, ship financing, and chemical ships (Hartkopf-Mikkelsen, 2016a, 2016b). In addition, entrepreneurial decisions about the future are not made in a vacuum or unrelated to other decisions, such as those about current capital structure; Hayek (1937) shows that changes in capital structure too are interrelated, as future financing options depend on the past capital structure of the firm and other firms.

3.3.3 Uncertainty Handling Capabilities and Entrepreneurial Value Capture

As the capital structure is subjectively experienced by agents it is must purposeful deployment is further complex and uncertain. Dealing with a dynamic market requires both entrepreneurial judgments about the shape of future supply-demand curve and suitable actions. This is not about mathematical skills of probabilities. Knight (1921) famously drew attention to the distinction required between risk, which can be modeled, and uncertainty, where all possible outcomes are unknown or unknowable. Foss and Klein (2012: 85) have further drawn

attention to a more nuanced understanding of Knight's argument, as it is 'primarily **about the ability to articulate and communicate, or transfer, estimates about the future**, rather than the ability of individuals to make these estimates themselves' (emphasis in original). While firms need to acknowledge that outcomes are uncertain, uncertainty is not an excuse for inaction or a lack of analytical problem engagement—quite the opposite. As both probability and outcomes are uncertain, economic agents must act entrepreneurially, which means 1) envision possible outcomes, 2) assign a likely probability to them, and 3) be able to communicate the vision and envisioned outcomes to themselves, to the resources required for the execution, and to customers. This is an important component of the Knightian contribution and one often overlooked.³³ An example of the importance is the introduction of new technology, such as a ship-type, that requires customers to change standard operating procedures. If the selling firm is unable to convince the customers to change, value capture will not occur.

While uncertainty judgments about the shape of demand curves and their relation to the firm's capital base, as described by Knight (Klepper, 2002; Gartner, 2007), are key, and there is ample evidence of relevance of this in maritime industries (Maloni et al. 2016), the explanation is insufficient without further insights into the links between the three aspects. Alertness is required to become aware of changes, and capital structure management capabilities are required to know of possible resource (re)configurations, but uncertainty judgment and handling capabilities are required to act with impact on the insight of the other two (Day, 1994; Kohli & Jaworski, 1990). It is however not obvious if sound entrepreneurial value capture judgment is best viewed as stand alone capabilities,

³³ Kirzner mentions "selling costs" as having the ability to shift demand curves; this may be a related argument.

a sum of these capabilities, or as uncertainty handling serving as a multiplier on the combined effect of alertness and capital structure, hence all are tested.

Hypothesis 2a: Neither alertness, capital structure or uncertainty handling capabilities on their own can explain value capture.

Hypothesis 2b: Derived demand value capture is positively correlated with entrepreneurial judgment as a sum of alternates, capital structure management, and uncertainty handling capabilities.

Hypothesis 2c: Derived demand value capture is positively correlated with entrepreneurial judgment as a sum of alternates and capital structure management capabilities, and multiplied by uncertainty handling capabilities.

3.4 Study Context and Data

3.4.1 North Sea Oil Service

As argued, maritime industries are different from other industries more commonly studied in entrepreneurship research. Maritime markets tend to be multi-level regulated, derived demand industries with unique customer characteristics, in which capital and payment outlays are substantial and highly dispersed over time. As an example of maritime markets, the North Sea offshore oil service industry has been selected, as it matches well with these shared maritime market characteristics. The industry comprises oil rig production, services, and manning. While this covers an array of operations and business models, the industry in the North Sea shares a fair number of similarities, as starting or running operations in this sector require both specialized know-how and, typically, large investments in equipment and research and development. The industry is further highly regulated by means of government mandates and

industry-internal requirements, especially as regards health, safety, and the environment. Most importantly, as is further illustrated below, the demand for maritime oil services is derived from the oil price.

With 173 active drilling rigs, the 750,000 square kilometer North Sea is the world's most active offshore drilling region and boasts a sophisticated supply chain of specialized suppliers for engineering, procurement, construction and installation (EPCI). The North Sea industry is supplied by firms from different nations, though the sample is limited to the three main ones: Denmark, Norway, and the UK, which together account for over 90% of production in the region. These countries operate under diverse but similar legal schemes,³⁴ thereby differentiating the sample selection to the limit of being international yet still comparable. Furthermore, the North Sea is feared for its harsh environmental conditions, with storms and a challenging seabed providing pressing logistical challenges, a constant need to innovate, and posing a very grave risk of loss of material and personnel.

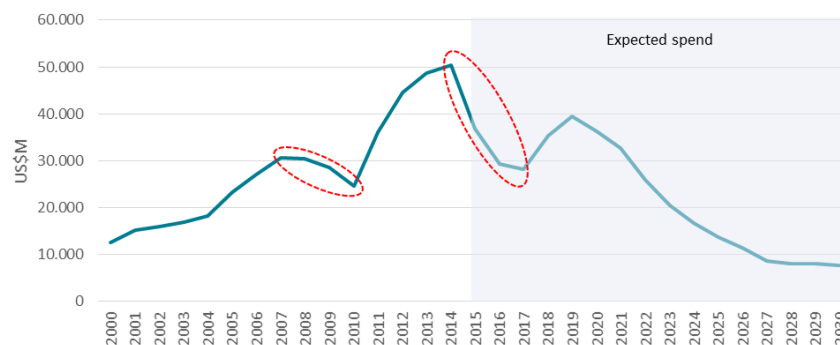
3.4.2 The Derived Demand for North Sea Oil Service Firms

Activity in the oil service industry depends on the exploitation and production (E&P) firms' investments, which lead to most EPCI contracts for the oil service firms. Despite an extended time period from exploration to first production, these contracts are highly influenced by the day or short-term price of oil. Development in E&P firms' capex for Denmark, Norway, and the UK increased from 2000 to 2007. Following the beginning of the financial crisis in 2008, capex declined until 2010, when an increase again occurred. This trend was halted by a big decrease

³⁴ Denmark and Norway have Scandinavian civil law systems. While the UK primarily has a common law system, Scotland (where many of the sample firms are located) is more a civil law than common law system, making the countries' legal frameworks fairly comparable. Furthermore, a large part of the relevant laws originate at the intergovernmental - particularly EU - level.

commencing in 2014 when the oil price plummeted. It is likely that we will see a long-term declining trend in capex as fields mature and oil consumption declines in the nearby oil markets; however, the effect of this on the sample firms varies as some utilize technologies to prolong the life of a field.

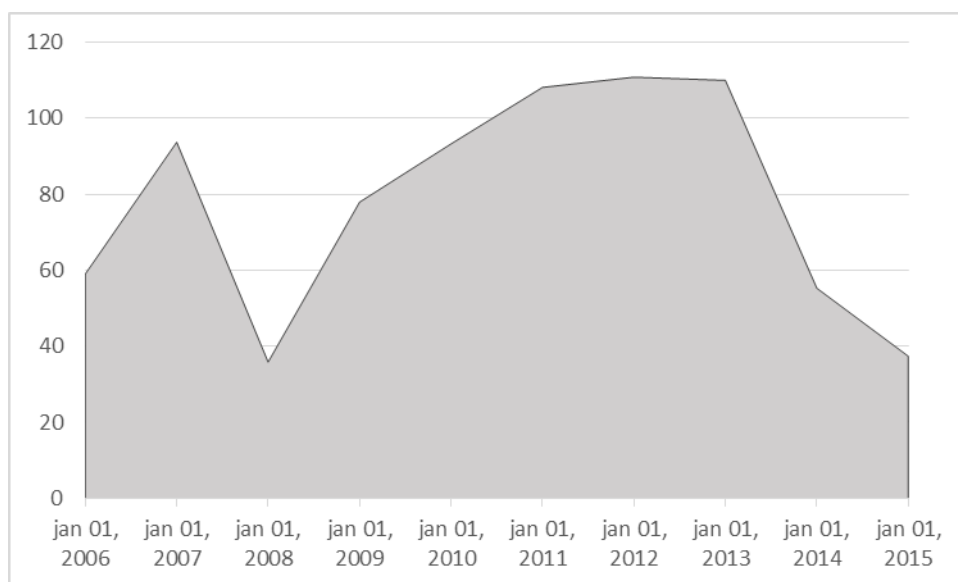
Figure 2 – E&P capex spend for the North Sea



Source: Wood Mackenzie. The capex figures are the combined total for each country, that is, UK capex includes non-North Sea activities like the Irish Sea.

The oil price used in this paper is that of Brent Blend, which refers to four different fields in the North Sea. While averaging well below \$20/bbl before the new millennium, in the period from January 2000 to June 2015, the Brent Blend crude oil price rose to \$143.95/bbl in July 2008. This 188% price increase was followed by a historical fall from July 2008 until the price point of \$36/bbl was reached in January 2009. Subsequently, the price of Brent Blend increased rapidly over the next years and topped \$128/bbl in March 2012. The period from July 2014 until January 2015 saw the second major drop in Brent Blend crude oil prices, more than 60%, from \$115/bbl to \$45/bbl.

Figure 3 – Europe Brent spot price FOB (Dollars per Barrel)



Source: IMF

3.4.3 Data sample, Variables, and Equations

For derived demand, the paper uses the end of year day rate of Europe Brent Spot Price FOB (free on board). Firm data was collected with the aim of separating capabilities from their effects (Zahra et al., 2006). Firm profit and loss (P/L) data were extracted from the Bureau van Dijk databases for a 10-year period starting in 2006. This is used as performance data. Some of the firms in the basic population sample are also globally active; however, in this paper, their proximity to the North Sea is assumed to be a shared factor that influences the capability set of all firms in the sample (similar to competition for the same talent pool, for instance). Only firms with a full 10-year record of reported figures were included in the final sample. Firms not active from the beginning of the period were excluded. There is no survival bias, as no firm in the original sample went bankrupt during the period. Furthermore, clear outliers with 3x or more standard deviations as regards numerical values were removed as these are likely reporting errors (Laurent, 2013). The end sample consists of a total of 430 underlying data

points distributed among 13 Danish firms, 13 Norwegian firms, and 17 British firms.³⁵ Also noted was their size-type: 0 one-person firms, two small and medium-sized firms (SMEs, < 100 employees), 25 local divisions of larger firms, nine large firms (100-5,000 employees), and seven multinational corporations (MNCs, > 5,000 employees). As a proxy for capabilities, the paper uses corporate values as these are ideally an indicator of company culture over time (Geertz, 1973; Enz, 1988; Hofstede 1990; Meglino & Ravlin, 1998) and clearly impact on performance (Gordon & DiTomaso, 1992; Rosenthal & Masarech, 2003; Edwards & Cable, 2009; Jonsen, Galunic, Weeks, & Braga, 2015). It is, therefore, a valid assumption that the corporate values expressed are based on lived experiences (as opposed to marketing ploys) and that the values are thus closely correlated with capabilities over time. The value sets were collected from public sources—such as firm web pages and annual accounts, or by contacting the firms—and were coded on a five-point Likert scale in relation to the three capabilities under investigation, while values potentially relating to other capabilities were ignored. A short sample overview is presented in Table 1.

Table 1: Data overview

Data source	Period (years)	Data points	Firms	Nationality			Firm Size			
				<i>DK</i>	<i>NO</i>	<i>UK</i>	<i>SME</i>	<i>Lrg</i>	<i>Div</i>	<i>MNC</i>
Performance	10	430	43	13	13	17	20	9	25	7
Capability		129								
Demand		10	—	—	—	—	—	—	—	—

³⁵ While some oil service companies are also found in Germany and the Netherlands, they are not of the same magnitude and are typically more focused on gas-related activities.

Equation 1. Relative value capture (H1)

$$Avg\left(\sum_{i=1,2,\dots,10} \frac{F^{t_i}}{F^{t_1}}\right) <=> Avg\left(\sum_{i=1,2,\dots,10} \frac{D^{t_i}}{D^{t_1}}\right)$$

Here F is financial performance, D is derived demand, and t represents periods (financial years) over a 10-year period. In order to compare firms of various size, the model employs indexed numbers for performance. Averages are used to ensure the inclusion of the time and dynamic elements of derived demand —this prevents specific instances of management failure, change of accounting methods, and the like from skewing the model.

Equation 2.1. Value capturing ability OLS formula (H2a)

$$AvgF = \beta_1 Size + \beta_2 Nationality + \beta_3 A_c + \beta_4 C_c + \beta_5 U_c + \varepsilon$$

Equation 2.2. Value capturing ability OLS formula (H2b and H2c)

$$AvgF = \beta_1 Size + \beta_2 Nationality + \beta_3 (A_c + C_c + U_c) + \beta_4 U_c (A_c + C_c) + \varepsilon$$

$AvgF$ is *Results* in terms of the BAR framework, the composition of capabilities is *Belief* and *Actions*. Here A_c refers to alertness capabilities, C_c is capital structure management capabilities, and U_c represents uncertainty handling capabilities. Firm size and nationality are dummy categories included for robustness.

3.5 Results

3.5.1 The Relation Between Derived Demand and Value Capture

Equation 1 confirms H1 by demonstrating that while over time the majority of firms in the sample perform worse on average than the derived demand

development, 37% of the firms performs better, beating the derived demand development. This gives support for looking further at howcome, the second element of Figure 1, as it does seem likely for firms in a derived demand market, that their chosen capability set and entrepreneurial actions are of consequence. The sub-sample variance, if one especially successful firm is omitted as an outlier, further indicates that entrepreneurial impact on performance holds approximately the same magnitude for high and low performers, which could be evidence for the generalizability of the BAR framework. The results of the analysis are shown in Table 2.

Table 2 — Results of Equation 1

	Avg. indexed performance over 10 years	Number of firms in group	Sub-sample variance	Sub-sample variance one outlier omitted
Below expected value capture	-290	27	7738.75	—
Expected value capture level*	132	—	—	—
Above expected value capture	792	16	27379.03	5109.20

Source: Own analysis based on reported P/L data.

*) Oil price value

3.5.2 The Composition of Capabilities for Entrepreneurial Judgment

Solving Equation 2.1 provides the results listed in Table 3. The F-test is satisfactory, as is the R-Squared explaining 48% of firm value capture. As expected neither of the two control variables: firm size and nationality, are

significant. Looking at alertness capabilities (alertscore), capital structure management capabilities (capscore), and uncertainty handling capabilities (uncertaintyscore) each are significant, with alertscore and capscore score being >95% significant, and uncertaintyscore >90%. Alertscore and uncertaintyscore both have positive effects on value capture, while capscore have a large negative effect. As each capability set significantly impacts value capture, H2a is rejected. However looking further at the figures does point towards H2b and H2c for the following reasons; 1) while being negative, the large effect of capscore warrants interest in the effect of combination with other capability sets; the numbers might indicate that a sole focus on capscore is detrimental to opportunity pursuit and therefore value capture, 2) the lower significance level of uncertaintyscore fits well with theory, in that uncertainty handling only holds practical relevance if combined with purpose (alertness) and ability (capital).

Table 3 — Results of Equation 2.1

Source	SS	df	MS	Number of obs	=	43
				F(5, 37)	=	6.83
Model	50158284.1	5	10031656.8	Prob > F	=	0.0001
Residual	54370381.7	37	1469469.77	R-squared	=	0.4799
				Adj R-squared	=	0.4096
Total	104528666	42	2488777.76	Root MSE	=	1212.2

Performance	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
nSize	245.4282	220.4779	1.11	0.273	-201.3026	692.1589
nNationality	-252.2572	225.3986	-1.12	0.270	-708.9582	204.4438
Alertscore	987.6034	388.3245	2.54	0.015	200.7832	1774.424
Capscore	-1020.541	389.3386	-2.62	0.013	-1809.416	-231.6657
Uncertaintyscore	573.9915	332.1764	1.73	0.092	-99.06172	1247.045
_cons	-209.7045	679.9821	-0.31	0.760	-1587.479	1168.07

Solving Equation 2.2 provides the results listed in Table 4. The F-test is satisfactory beyond the level of Equation 2.1, as is the R-Squared level, explaining 51% of firm value capture. Again, as expected neither of the two control variables is significant. Moving to the testing for H2b and H2c, Alladded is the sum score of

all three capabilities, while *UncertaintyAlertScoreCap* is $U_c(A_c + C_c)$. Each are significant, with *UncertaintyAlertScoreCap* being most highly significant. H2b is rejected in that *Alladded* has a negative impact on value capture. This can however be taken as further support to the postulate in the previous paragraph; too much attention on capital structure management might hold back the firm from opportunity pursuit. H2c is accepted, as the multiplying effect of uncertainty handling capability to the added capabilities of alertness and capital structure management is very positively correlated to value capture.

Table 4 — Results of Equation 2.2

Source	SS	df	MS	Number of obs	=	43
				F(4, 38)	=	9.78
Model	53031276.1	4	13257819	Prob > F	=	0.0000
Residual	51497389.7	38	1355194.47	R-squared	=	0.5073
				Adj R-squared	=	0.4555
Total	104528666	42	2488777.76	Root MSE	=	1164.1

Performance	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
nSize	229.3755	207.3303	1.11	0.276	-190.3428	649.0938
nNationality	-17.50758	225.1715	-0.08	0.938	-473.3435	438.3283
Alladded	-567.7465	256.275	-2.22	0.033	-1086.548	-48.94491
UncertaintyAlertScoreCap	1049.403	242.4712	4.33	0.000	558.5454	1540.26
_cons	-396.4305	643.9681	-0.62	0.542	-1700.076	907.2148

3.6 Implications for Management

Entrepreneurial judgment under conditions of uncertainty is a key aspect of running and growing a business. Improving capabilities by having the right *Belief* about derived demand market development, coupled with the capability to perform the right *Actions*, are valuable for obtaining desired *Results*, and this paper demonstrates that investment in firm capabilities can be fruitfully guided by this understanding. This is especially the case when *Results* are viewed relative to industry peers and competitors. The implications for management are to invest in

such capabilities collectively, and to trust the effect of these investments over the medium term (here, 10 years).

3.7 Boundary Conditions and Suggestions for Future Research

This paper set out to model market-specific entrepreneurial value capture for maritime economics and narrowed the focus to a specific submarket, one that shares prototypical tendencies across firms (see Foss and Lorenzen, 2009). The dataset used in this paper is therefore limited and should be viewed primarily as an empirical illustration of the underlying theory and causal inference, as opposed to definitive proof thereof. Further empirical applications are welcomed to further develop the validity of the results. Some theoretical aspects could be explored further too, such as how organizational learning affects maritime entrepreneurship. Foss and Klein (2018) describe two learning effects from the *Results* stage: *selective effects* and *treatment effects*. The latter removes bad business practices (such as those occurring through bankruptcy or the removal of not-demanded products from a firm's portfolio), and the former improves potentially good business practice by learning from less-than-desired *Results* to change *Beliefs* and optimize *Actions*. This paper's market-specific application of the BAR framework raises some interesting questions in this regard. First, if the drivers of demand are far removed from the firm and their customers, as is the case with oil service firms, how is the *treatment effect* to be understood? How can the entrepreneur distinguish the right *Beliefs* and *Actions* from other uncertainties affecting the result? Are maritime industries, as a result of this, more or less prone to suffer from confirmation biases resulting from their derived conditions, causing them to create clusters of entrepreneurial errors repeatedly? These are interesting questions both for general entrepreneurship research and for maritime economics.

Also of further interest is the precise set of relevant capabilities. This paper is deductive in that its arguments are based on theory, especially that of Foss and Klein (2012), for selecting the capability setup; however, more explorative approaches have considerable scientific merits too, as seen with Maloni et al. (2016) and Yuen and Thai (2017). Linking such explorative work to the BAR framework would further advance our understanding of maritime industries and the changes that occur therein. By means of the underlying conceptual background, and by utilizing the notion of capabilities, the argument put forth in this paper has implicitly been that entrepreneurial actions take place at many levels in a firm. This seems true for maritime industries; however, the impact of the degree of entrepreneurship in maritime firms and operations is an interesting future area of research too, linking, for instance, mainstream management work on entrepreneurial orientation to maritime markets. More work is also required to identify the individual maritime entrepreneurs; is it the CEO, or the innovator (in a paraphrasing of Schumpeter), or as Klein (1999) points out, the investor? For instance (and relatively simplistically), are the ship owners, ship operators, or ship crews the most important entrepreneurial agents in maritime markets?³⁶ These are interesting questions in their own right, as well as in conversation with the BAR framework: where do entrepreneurial capabilities most manifest themselves and where are they most needed; and how, precisely, do maritime entrepreneurs create these in organizations? Is the story of maritime entrepreneurial change at heart one of the unique talent reshaping the world to his or her vision, or is it driven to a greater degree by institutional arrangements, or is it a whole different type of fish?

³⁶ There is likely an interesting historical argument in this too, as this may change with further specialization and technological advances.

Finding answers to these and likely many other questions will be a rewarding endeavor, as originally envisioned by Svendsen (1981).

With these issues stated, this paper is a step towards a theory of maritime entrepreneurship as a specific market entrepreneurship value capture theory and understanding. Maritime entrepreneurship research can be a necessary stand-alone effort within the field of maritime economics, though it has the potential to cross-fertilize to general entrepreneurship research too. Maritime economics can be a scary field for outsiders as it requires intensive investment in industry knowledge before any research can be undertaken. That said, maritime industries offer substantial and interesting cases and data for the mainstream entrepreneurship researcher to access; hopefully, this will attract many more entrepreneurship researchers to study this field in the future. For instance, cases such as containerization by individual shipping lines (see, e.g., Pedersen and Sornn-Friese, 2015) can add to the discussion of opportunity creation and discovery. It may be the case that, as a maritime entrepreneurship research stream emerges, it will further aid in bridging maritime interests with those of a wider group of researchers.

3.8 Conclusion

The author aimed to introduce the foundations of entrepreneurship as a judgment under uncertainty theory to a maritime context, where change from derived demand is especially manifest. Building on this, the paper developed a model of entrepreneurial value capture that is relevant for maritime economics. In doing so the paper has hopefully highlighted the value—pun intended—of paying special attention to entrepreneurship in maritime economics, and of entrepreneurship theory paying special attention to specific subfields. The theory presented in the paper is not a mere restatement of an already existing and

accepted entrepreneurship theory if such can be said to exist. Rather, it is a theoretical adoption modeled to explain entrepreneurial commercial action in a modern maritime context. That the paper found a positive result in applying the models provides ample ground for further work.

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Chapter 4 - Policymaker Agency Impact on Entrepreneurial Judgment and Nonmarket Commercialization Strategy Choice

Mr. Burns (businessman) talking about a critical media exposé: *“Look at that rabble-rouser. He’s threatening our ill-gotten gains.”*

Richard “Rich” Texan (businessman and former U.S. Senator): *“Goldarn it! I worked hard to ill-get those gains.”*

- *The Simpsons*, Season 18, Episode 21, “You Kent Always Say What You Want”

Abstract

This paper engages with the concept of nonmarket commercialization strategy and explains why, when, and how a firm opts for such a strategy rather than market-based commercialization. It also explains how the choice becomes self-enforcing in terms of the nature of entrepreneurial judgment, the arrangement of the given institutional settings, and the firms themselves. The paper is based on classic and institutional economics, public choice theory, corporate political action, and entrepreneurship theory. This enables the paper to advance a middle-range theory of the antecedents of nonmarket commercialization choice focusing on the role of policymaker agency, and which considers both the institutional context and firm-level agency. Specifically, the paper highlights the interplay between policymakers’ individual agency and the broader concept of consumer sovereignty. The paper argues that infringing on consumer sovereignty makes nonmarket

commercialization strategies possible via coerced selling and that the more efficient regulatory enforcement is in creating nonmarket profit opportunities, the less effective it is to diminish its effects. Additionally, the paper points out the role of firm-level resource constraints in choosing and promoting nonmarket strategies and capabilities within firms. The paper suggest a new typology of firm behavior, given the degree of regulatory efficiency and consumer sovereignty. By focusing on the agency of both policymakers and firms, the study goes beyond particular institutional settings to global relevance in explaining the choice and long-term interdependence of welfare outcomes of policy and management choices in firm-based societies.

4.1 Introduction

This paper investigates commercialization strategy, which is defined as how firms plan to pursue revenue from their invested capital. In particular, the paper focuses on why consumers opt to buy what firms attempt to commercialize, and how firms can use institutional arrangements to increase the likelihood success of their commercialization strategies. Management research, as with economics, from which many fundamental tenets of management research arguably stem, has previously paid little attention to why, as opposed to how, firms sell, and consumers buy particular offerings. The focus has been on what people choose, or choice utility, not on why they choose or what they might like to choose, or true utility (Gul & Pesendorfer, 2008). Pigou (1932)—“*the fountainhead of modern economic analysis*,” according to Coase (1960: 28)—specifies a reason for the mainstream neglect of commercialization: “*Of bargaining proper there is little that need be said. It is obvious that intelligence and resources devoted to this purpose, whether on one side or on the other, and whether successful or unsuccessful, yield no net*

product to the community as a whole” (Chapter III, §16). However Pigou also goes on to argue in the same paragraph that, indeed, bargaining seems to be the main concern of business people. This paper argues that fruitful insights can be gathered if we cease disregarding the relevance of the *why of sales* for social science. Modern researchers in economics and management should, therefore, devote more attention to “*bargaining proper*”—sales and commercialization strategies—simply because commercialization choices, processes, and outcomes are decisive for both private and public consumer welfare. Hence, commercialization deserves far more research attention. As Munger (2011) has noted, especially the aspect of voluntary actions among selling and buying agents is in need of investigation in order to avoid the assumption that all sales are “*well and truly*” voluntary, or *euvoluntary*, as he has termed such transactions (2011:192). Management research should, therefore, pay more attention to why firms can sell and how that impacts on their organization. This is particularly the case as this impact is embedded in both the institutional arrangements of the greater market and entrepreneurial judgment that guides firm strategy (Foss, Klein, & Bjørnskov, 2018). To engage with the issue of *euvoluntary sales*, this paper builds on the methodology of Aguilera, Judge, and Terjesen (2018); however, rather than asking, as they do, how we can explain variance in choices relating to corporate governance, given institutional arrangements, this paper asks why nonmarket strategies for selling products using coercion rather than persuasion exist given institutional arrangements.

Following Aguilera et al. (2018), the paper builds the analysis on the boundary condition of the agentic behavior of decisions makes, both in firms and among policymaker – the latter being an extension of the original model. This is done to address the *why, when, and how* of nonmarket commercialization strategy (NCS) choice. This enables the paper to

push forward the discussion on the classic debate in institutional theory regarding the tension between the dominant institutional pressure and agentic behavior (Zucker, 1991), and encourage its empirical testing and falsification. (Aguilera et al., 2018: 3).

This paper hence continues to heed the call among institutional scholars to focus more on the impact of the organizational agency level on institutional arrangements (DiMaggio & Powell 1991; Greenwood, Hinnings, & Whetten, 2014). However, while the agency of commercial organizations, such as firms, and their employees, managers, and owners most definitely cocreates institutional arrangements, particularly at the micro level, this paper also draws on the public choice school in highlighting the agency of politicians, civil servants, and other regulatory officials who are ultimately responsible for the macro-level institutional outcome; in this paper, these individuals are referred to as policymakers. This paper hence argues for institutional framing and regulative capacity as shaping the strategic possibility of NCS, which allows the paper to engage the antecedents of strategy choices within the context of a specific national governance logic. This requires integrating national-level forces and firm-level socio-cognitive agentic behavior in explaining strategic choice outcomes; hence, the paper depends on the socio-cognitive stages of agency (Thornton, Ocasio, & Lounsbury, 2012), coupled with the concept of entrepreneurial judgment for firms (Foss, & Klein, 2018; Foss, Klein, & Bjørnskov, 2018), and the assumption, from public choice theory, of self-interested and boundedly rational policymakers (Munger, 2015) forming the fundamental dynamics of our process model. The paper conceptualizes how policymakers create an institutional possibility that allows for both proactive and reactive nonmarket commercializing among entrepreneurial firms, as well as what happens to the firms and the market if these nonmarket opportunities are pursued. The paper's

fundamental insight is that a nonmarket strategy triggers essential and long-term changes at both the organizational micro- and at the macro-policy level.

Placing agency at the center of the analysis of institutional arrangement cocreation is, by extension, also a placing of choice and intentionality at the center of understanding why firms choose NCS, what allows the choice, and how the outcome manifests. The paper's method inherits the three stages of the socio-cognitive process in evaluating choice alternatives (Thornton et al., 2012). The first stage is the awareness of the possibility of NCS. The second stage relates to practical accessibility: does the firm have access to the resources and the organization necessary to pursue the NCS? The third stage is activation, in which the choice is actualized and effects materialize. Socio-cognitive modeling fits well with the Belief, Action, Results or BAR model of entrepreneurial judgment (Foss & Klein, 2018), which the paper also uses. This is a further tip of the hat to our emphasis on agency, in that, ultimately, a strategy choice must be chosen by an entrepreneurial agent. The BAR model is also three staged, which again fits well to supplement the method of Aguilera et al. (2018). The first stage is *Belief* in the existence of an entrepreneurial opportunity that it is possible to pursue. The second stage involves the *Actions* chosen to pursue this belief; and the final stage is the *Results* arising from the combination of entrepreneur's belief and actions, and the interplay of these with market conditions and the institutional arrangement. In the model used in this paper, the firm becomes aware of the possibility of NCS, and entrepreneurially selects it for reasons the paper investigates later. If it is deemed to be practically accessible, the actions required to pursue a nonmarket over market strategy are taken and the required investments are made. Undertaking these actions creates an entrepreneurial result that teaches the entrepreneur and the organization about the merits of NCS for the goals of the firm.

For NCS to be efficient, coerced, as opposed to *eu*voluntary, sales must be a legal possibility. This requires that policymakers must opt to disregard consumer sovereignty (Hutt, 1936). In short, in completely free transactions, only consumer choices would determine sales and the long-term commercial success of firms, making consumers, as a group, sovereign in the market process. The extent to which this sovereignty is infringed, either by direct financial aid to firms or indirectly by firm-centric institutional arrangements, provides the degree of attractiveness of NCS. Building on public choice theory, the paper claims that consumer sovereignty can be disregarded by policymakers for three non-exclusive reasons: ideology, personal self-interest, or simply as a result of boundedly rational mental processing capabilities (Foss & Weber, 2016). However, two more elements are required. First, the resource constraints of firms, and second, the regulatory enforcement available to policymakers. In practice, the main challenge to entrepreneurial judgment arises from firms' resource constraints. Even financially rich firms are limited with regard to how much they can organize (Coase, 1937), and entrepreneurs must assess strategy in terms of likely resource use (Foss & Klein, 2018; Foss, Klein, & Bjørnskov, 2018). Regulatory enforcement capacity by policymakers is important in that granting nonmarket strategy opportunities to firms is void if the underlying premise of the opportunity is not enforced.

Based on these central claims, the paper forms a multi-level study that contributes significantly to aligning diverse research streams relating to institutional arrangements, sales, and the commercialization choices of commercial firms. In this manner, the paper contributes to the growing literature on nonmarket strategy and, in particular, adds further knowledge on the link between corporate political actions (CPA) and policy outcomes and market performance, as proposed by Figueiredo

(2015), by suggesting a necessary joint middle range agency theory of institutional arrangement that enables or promotes NCS choices.

Building on the central statements on agency and institutional causality, the paper forms a multi-level study of nonmarket strategy choice and thereby contributes to management theory in the ways described below. First, the paper brings the issue of euvoluntary sales to the forefront of the understanding of and research on commercialization strategies. Second, the paper supplement and extend both strategy and institutional research by highlighting the cocreational elements of institutional arrangement and firm-level strategy choice (Elert & Henrekson, 2017). Third, by utilizing a holistic, yet nuanced categorization of the dominant national logics present in a wide variety of national economies, the paper extends the limits of comparative commercialization research. The paper also contributes to the call for more contextually embedded examinations of entrepreneurship (Bowen & De Clercq, 2008; Foss, Klein, & Bjørnskov, 2018). Finally, the paper is apt as we advance an ideology-free, new typology of nonmarket strategies that can guide future research and practice in the otherwise highly politically contested area of company–government relations.

4.2 Theoretical Foundations

In this section, the paper describes the building blocks of the conceptual model. The first step is to show how NCS is made possible within a prevailing national institutional logic. To this the paper add insights from the public choice school, to the effect that, disregarding the specific institutional logic prevailing, all public decisions are still subject to policymaker biases (Munger, 2015). This insight helps formulate the primary boundary condition inherent in the paper's middle-range theory of NCS choice: that policymakers formulate regulations without full information being available and for other than public interest, potentially

disregarding even the prevailing national logic. Next, we introduce and discuss the relevance of consumer sovereignty as a benchmark against which to measure the agentic behavior of both policymakers and commercializing firms. Lastly, we combine and extend the discussion of the institutional logics perspective (Thornton et al., 2012), given the stages of the socio-cognitive process from Aguilera et al. (2018), by adding to this the concept of entrepreneurial judgment and the likely long-term results of NCS for both firms and society.

4.2.1 National Institutional Logic from a Public Choice Perspective

The proposed model is globally relevant in that it is germane to different institutional logics operating in different countries. The paper hence fundamentally analyses institutional logic as the socially constructed assumptions, values, beliefs, formal and informal rules, and practices that, according to Aguilera et al. (2018: 6, based on Berger & Luckmann, 1966; Friedland & Alford, 1991; Thornton et al., 2012),

equip organizations with a toolkit to interpret their experiences, direct their attention towards specific choices, define future goals, and limit their potential organizational choices.

The actual manifestation of institutional logics touches on the pillars of state, market, and society; however, their interplay is historically different across nations, producing country-level institutionalized logics that are unique (O’Riain, 2000). Institutional logic is the combination of the pillars of society, state, and market to generate one of four types of national economies or logic: a liberal type promoting market dominance, a social rights type that sets social limits to market strategies, a developmental type in which market strategies are coordinated by the state and society, and a socialist type in which the state seeks to retain power and to subsume market and society (Smelser & Swedberg, 2010). A clear boundary

condition, which also provides for the falsifiability of a middle-range theory such as the one used in this paper, is that each national legal system is primarily one of the four types, which is also in line with the judgement-based approach to entrepreneurship that the paper uses (Foss, Klein, & Bjørnskov, 2018). This means that while more types of institutional logic can be in place or compete for dominance, in the national market, each firm or subsidiary must adhere to one primarily (Besharov & Smith, 2014; Greenwood et al., 2011; Jones, Maoret, Massa, & Svejnova, 2012; Pache & Santos, 2010). This paper argues for a further testable claim: that public choice assumptions regarding policymaker behavior can be found in all four forms of logic.

Aguilera et al. (2018), who also further detail the above argument, hold the national logics constant, providing a “zone of comfort” for firm-level deviance if firms are to have legitimacy in the view of broader society. This paper posits that even though national logics are of a prevalent type, their precise intonement is in the hands of policymakers who, for divergent reasons, may all allow NCS, this allowance is shown by the red arrow in Figure 1. This is relevant as the question of a NCS is, this paper argues, less about legitimacy and more about the recognition of commercial opportunities.

The main contribution of this paper to the middle-range institutional cocreation model of Aguilera et al. (2018) is to include and emphasize the role of the policymakers in governing the state pillar of institutional logics. The contribution includes the public choice tradition of economics. In this body of work, the economical method and behavioral assumptions are applied to nonmarket organizations such as governments. It is primarily the notion that policymakers as agents are boundedly rational and self-interested which manifests itself in opportunistic behavior and a lack of the cognitive capacity to include all the

information needed to make decisions that are truly for the common good (Buchanan & Tullock, 1962; Munger, 2015; Foss & Weber, 2016). As a level of analysis, public choice typically has institutions both formal and informal that serve to aggregate information or impact on preferences that shape cooperation for collective or private benefit. In practice, this can lead to exchange-based government by self-interested individuals (Buchanan and Tullock, 1962; Buchanan, 1975). According to public choice theory, policymakers can be convinced to pursue certain policies within the prevailing institutional logic for their own benefit or simply because their bounded rationality provides them with limited avenues to question the result of their actions, and will likely lead them to trust the information provided to them by, for instance, commercializing firms engaged in CPA, due to the costly, limited, and asymmetric nature of aggregate information. Public choice theory, as with the method of Aguilera et al. (2018), is not a normative prescription of the desired nature of the agentic behavior behind institutional change. It is rather a fitting and empirically valid theory of explanation, which is a further reason for merging the two. Public choice theory does not claim explanatory dominance—it is also open to other explanations for policymaker behavior (Buchanan, 1982). For the sake of simplicity, in this paper, we refer to those reasons as *ideology* (Munger, 2015). In the following section, the paper proposes a benchmark to measure the effect of policymakers' agency on the institutional attractiveness of NCS. The paper further argues why this is relevant in all of the four suggested national logic types.

4.2.2 Consumer Sovereignty as a Policy Benchmark

Policymakers' involvement in shaping institutional arrangements and competitive forces allows for ambiguity in the distinction between private interests and public mandates at the transactional level (Hendricks & Gaoreth, 2006; Schiller, 2010). This paper argues that the theoretical fix to this ambiguity is to use

consumer sovereignty as a policy benchmark. The theoretical foundations of consumer sovereignty (Hutt, 1936; Mises 1949) begin at the core premise of a market, that of a relation between a demand-side and a supply-side. This relation serves to coordinate exchange; however, according to the theory, focusing only on coordination is too narrow. As with any relations, there is a power relation to consider too. While free markets are positive-sum games, buyer-seller relationships are still power relationships that necessitate a decision about whether a deal will happen and on what terms. While this is likely to involve negotiation in euvoluntary transactions, if the buyer ultimately does not buy, then no deal materializes. The sovereignty of the consumer refers to this emphasis on the buyer, who has less at stake in the particular deal than the producer, as the producer had to invest in the production of the supply (Hutt, 1936; Mises, 1949, Foss, Klein, & Bjørnskov, 2018). Hence, it is ultimately the consumer who has the real power, as, over time, if consumer sovereignty is supreme, consumers decide who get to be producers. This reasoning applies to both end-consumers and firm-supplier relations. The consumer has the sovereignty in a free market; however, as the selling firm succeeds in CPAs, this sovereignty diminishes.

To explain this crucial statement, one must examine the concept of sovereignty (for an in-depth public choice analysis of the construct, see Salter, 2015). In reality, in all national logics, this paper argues, are found examples of government policy often shaping commerce to the extent that certain transactions have only the outward appearance of trade, while in fact the producer has usurped the sovereignty of the consumer via CPAs. This area is complex, and many advocates of market-shaping legal regimes claim that they serve long-term consumer welfare. This paper does not address such a claim further but simply notes that true consumer sovereignty must be based on the euvoluntary actions of buyers.

The reason for this statement is that sovereignty makes conceptual sense only if it is grounded in a sovereign relation and is not bestowed. It is not policymakers who make consumers sovereign; rather, they can make them serfs.

To illustrate this point, imagine having access to a bundle of dollars and having a cold to cure. Assume that the bundle is limitless and that the cold is ongoing. A sovereign consumer could finance the cure for the cold with no restrictions. To relax the assumptions slightly and limit the bundle of cash, while assuming that colds are commonplace, one can buy an already existing cure with no restrictions as aggregate demand would have promoted its existence if this were scientifically possible. However, imagine that a new regulation dictates that all cold medicine must receive government approval, or only government-trained doctors can order the necessary ingredients, or any similar scenario. Now, even in the first example of endless cash, the consumer is no longer sovereign. Euvoluntary actions—not cash propensity—are the basis of sovereignty.

Consumer sovereignty is further important as it directly engages with the need to sell products to consumers holding buying power and asymmetric information about ways to increase their utility by divesting of this buying power. Consider the statement, “the world’s oldest profession,” which refers to prostitution.³⁷ It proposes that the oldest profession, and hence the oldest market, is the offer of sex for trade due to some agent’s willingness to produce a surplus supply of sex or the production of satisfaction. However, the statement is misleading; in order for it to make sense, there must be a distinct skillset, or capability, that is removed from the supply of satisfaction that addresses consumer utility, namely the skillset of selling or commercializing, which addresses the asymmetric information of

³⁷ On a side note, Buchanan and Tullock (1962) also use prostitution to illustrate theory.

potential consumers. If the world's oldest profession is selling sex, then selling precedes supply, or the production of sex, as an even older profession (or, in strategy terms, capability). In other words, a market requires a demand, a supply, and commercialization of the said supply: the meeting of supply, demand, and information. While prostitution as a supply is often outlawed, we find many examples of the opposite too: the mandatory purchase of either specific products or products from specific vendors—in all such cases consumers are less than sovereign. This is relevant because while the sovereignty of consumers is dispersed, the resources of corporate interest are centralized. Hence, when policymakers open up the removal of the sovereignty of consumers in market transactions, they open up for CPA.

4.2.3 Commercialization and Entrepreneurial Judgment

Commercialization of perceived opportunities is driven by entrepreneurship. Foss and Klein (2012) have defined entrepreneurship as “judgment under uncertainty,” particularly the willingness to commit heterogenic capital arrangements to uncertain, in a Knightian sense, bets (Foss, Klein, & Bjørnskov, 2018). To operationalize this understanding, Foss and Klein (2018) have suggested the beliefs, actions, results (BAR) framework. *Beliefs* are an entrepreneur's perceptions of means, such as ideas and resources, and their relation to a desired end, such as profit. *Actions* refer to the activities of entrepreneurs, such as creating a firm or offering a product for sale. Finally, *Results* are the actualized outcomes of the actions once they encounter the uncertainty of entry into market relations. Entrepreneurship is typically viewed as a journey through which, simplistically, an entrepreneur invents a new resource, “markets” it, and accumulates wealth. In the BAR framework, such a journey is one of input (*belief* in the opportunity), throughput (the *action(s)* of pursuing the opportunity), and output (the *result* of positive or negative profits from the way

the opportunity manifests itself and the cost associated therewith). However, as Foss and Klein (2012; 2018) build on Knightian (1921) uncertainty, uncertainty can prevent *results* from reflecting an entrepreneur's initial desires, or even deliver a completely different and ex ante unimaginable outcome. Whatever the results are, learning will occur and will inform future judgment for the entrepreneur, the organization, and the market. This prompts the following question: what if an entrepreneur could use CPAs to secure ex ante the desired *result* as opposed to an uncertain ex post market *result*? In effect, limit the exposure to uncertainty by removing it early in the process of pursuing an opportunity.

This paper considers NCS to be such an option. A desire for monetary profit or some other utility motivates entrepreneurs and owners of firms to risk capital in these firms. There is no aspect in the entrepreneurial establishment of firms that makes them particularly disposed to market transactions. Coase's 1937 paper on the nature of the firm was conceived precisely to explain how firms offer a way to supersede the market and its voluntary price mechanism (Bylund, 2014). When an entrepreneur determines the best approach to obtaining the desired utility from the established firm, the choice is rationally a utility function and is therefore influenced by perceived risk. If commercialization via government mandate seems less risky or uncertain than exposure to the uncertain judgment of the consumers, then the former option will rationally prevail.

4.2.4 Entrepreneurial Judgment and Corporate Political Action

If the institutional logics and the policy attitude toward consumer sovereignty allows, and regulatory enforcement is strong enough, it can be a profitable use of resources for a firm and the entrepreneurs working within it to use political

contacts to secure rents by opting for NCS (Brown & Huang, 2017).³⁸ However, as the quote on the title page illustrates, there is an interesting and often overlooked feature of even the most successful NCS: the strategy did not become successful without expending effort and costs. As Tullock (1998: 405) has explained in discussing subsidies, which can be a rent of NCS, the “*argument is quite simply that God does not come down and give people gifts, they have to work for them.*” Nonmarket strategies also constitute a growing topic within management research (Hillman & Hitt, 1999; Lord, 2000; Boddewyn, 2003; Henisz & Zelner, 2003; Doh, Lawton, & Rajwani, 2012; Funk & Hirschman, 2017). Moreover, CPA’s are also a stable topic in public choice theory (see Candel-Sánchez & Perote-Peña, 2013; Dahm, Dur, & Galzer, 2014; Gennaioli & Tavoni, 2016). Nonmarket commercialization strategies consist of CPAs which are operational actions that firms undertake to actively influence and transform political and regulatory bodies (Getz, 1997; Hillman and Schuler, 2004; Doh et al., 2012; Funk and Hirschman, 2017). Through such activities, a firm seeks to gain *influence rents*, extra profits that result from influencing the institutional arrangements under which the firm serves (Ahuja and Yayavaram, 2011). This paper builds on Figueiredo (2015) and mainly focuses on indirect nonmarket strategy. This is defined as the investment of firms in CPA that is aimed at deliberately using government (or similar) mandates to create and sustain new entrepreneurial business opportunities or to avoid hindrances or interventions from government interference in existing opportunities. An indirect nonmarket strategy is a step beyond direct nonmarket strategies, which involve the use of CPAs to secure direct subsidies for a particular firm or whole industry. In this paper, CPAs are *Actions* in the BAR framework,

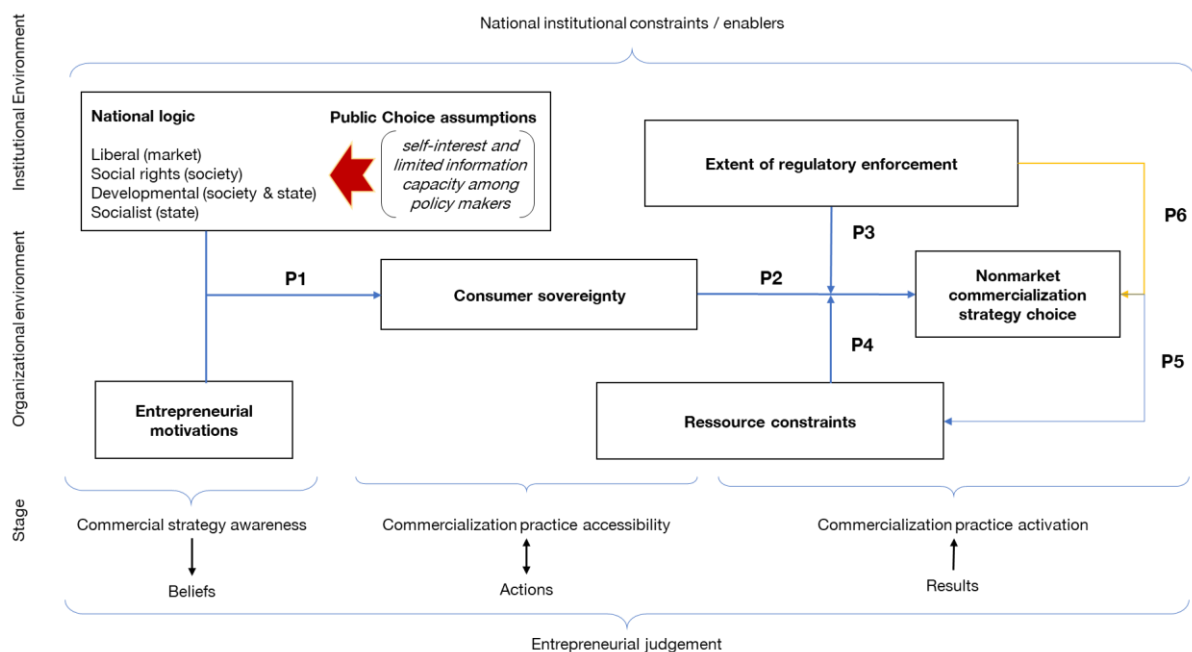
³⁸ There are competing interpretations of firm–policymaker contact, such as firms providing access to goods that are needed for policymaking (Bouwen, 2002), and that firms often are not clear on the purpose of general political contact (Woll, 2008).

which can appear more or less relatively attractive in the *Belief* stage while providing more certain than market strategies, *Results*.

4.3 The Sociocognitive Perspective on Nonmarket Commercialization

Based on the theoretical foundations presented so far, the paper is now in a suitable position to formulate propositions in a theoretical model that explains why firms opt for NCS. Figure 1 provides an overview of the combined institutional and organizational levels and their relation to policymakers and entrepreneurial agency factors that are fundamental to the model.

Figure 1 - Middle-range model of nonmarket commercialization choice



4.3.1 Meaning Formation as Competition

As the original method lays out (Aguilera et al., 2018), middle-range theory starts by accepting that competing forces impact on entrepreneurial sensemaking in an awareness stage. This stage comprises (1) the top-down institutional logic that forms the social legitimacy of firm operations, and (2) the bottom-up

entrepreneurial motivations surrounding profit, procedures, and purpose that interpret the scope of social legitimacy in relation to entrepreneurial motivation when forming judgment under uncertainty. When entrepreneurs form beliefs about market possibilities, the competition between entrepreneurial motives and social legitimacy is pivotal (Ashforth, Rogers, & Corley, 2011). If an NCS is acceptable and fits with the entrepreneurial motivation, it becomes a possible entrepreneurial coherent strategy choice (Kodeih & Greenwood, 2014), particularly if it can be envisioned in a manner that silences potential conflicts between the original motivation and values as the institutional possibilities present themselves (Seo & Creed, 2002).

As *Beliefs* concern judgment under uncertainty, the model views the interplay between national logics and entrepreneurial motivations as creating or removing opportunities in the judgment of possible choices surrounding uncertainty. Here, it is worth mentioning that motivation is not removed from individual agency, which would violate the fundamental assumptions of public choice theory and make the model contradictory. Entrepreneurs who are forming firms, or work in existing firms, hold personal convictions and emotions that impact on their judgment regarding perceptions of opportunities, social legitimacy, and entrepreneurial actions (Navis & Glynn, 2011; Fauchart & Gruber, 2011). For instance, an entrepreneur motivated more by the product than by profit might decide to deviate from a profit maximizing logic in order to continue to market the product. This aspect of entrepreneurial motivation impacts on entrepreneurial *beliefs* and is important to appreciate, as it explains why firms, as they become aware of NCS possibilities, might choose to engage in them, and might even plan to create them proactively.

As shown in Figure 1, the effect of pursuing NCS or using CPA is not automatic. If doing so results in less social legitimacy, the firm would invite a new dimension of uncertainty into their *beliefs*, which is irrational to do. Taken together, the figure shows that the impact of public choice assumptions on national logics competes with entrepreneurial motivations in informing the *beliefs* about the accessibility of later entrepreneurial *actions*.

4.3.2 Nonmarket Commercialization Possibility Range

In accordance with the method of Aguilera et al. (2018), the next part of the model is the *modus operandi*, the coupling of possibility and effect. This is based on Hambrick and Finkelstein's (1987) construct of managerial discretion, conceptualized as the theoretical bridge linking the human agency of decisionmakers with the internal and external constraints of the firm. This enables the paper to propose that while the prevailing national logic prescribes certain commercialization practices as legitimate and others as not, the consideration of alternative practices comes from the agency of the firm. However, to enable this possibility, policymakers must be willing, for ideological, selfish, or from mental-constraint reasons, to disregard consumer sovereignty at the specific commercial transactional level. The degree to which the firm observes or believes this willingness among policymakers, the paper argues, interacts with entrepreneurial motivation and national logic to inform the entrepreneurial judgment of the firm. At this stage, the firm acts in what entrepreneurs consider to be the zone of conformity to the prevailing national logic and its policymakers' wishes. It is likely also here that the firm decides whether to proactively use CPA or just accept given possibilities.

An example of this is the possibility of impacting on the regulation of other industries to utilize this to create demand for the firm's own products in those

industries. One illustration is environmental regulations. Often, politicians might desire to “green” a specific industry, but unless they are willing to close down the industry, technological partners are frequently necessary to supply the technology for a green transformation. The new business division of the Danish industry conglomerate, Grundfos, devised a filter to reduce carbon dioxide (CO₂) emissions from large pig farms. Since CO₂ emissions affect public goods, selling this technology in euvoluntary markets is likely to be highly uncertain, and Grundfos indeed chose a NCS from the onset by lobbying the government to legislate CO₂-threshold laws. Pig farmers are not forced to buy the Grundfos product, but if they consider that economies of scale are sufficiently important or have made past investments in farms of a certain size, then, de facto, they are.³⁹ The entrepreneurial judgment that is undertaken in this case, as explained by the BAR framework, indicates that the degree of uncertainty of *results* in a euvoluntary market relation is troubling and it subsequently uses *beliefs* about the institutional arrangement to guide *actions* for securing coerced revenue.

In sum, nonmarket commercialization choices are derived from the agency of policymakers’ impacting on national institutional logics, the entrepreneurial motivation of firms, and the level of consumer sovereignty. These three factors influence the belief of the entrepreneur’s judgment regarding the uncertainty of results and the actions to limit this uncertainty, which in turn can impact back on the three factors. In other words, awareness precedes entrepreneurial *beliefs*, which precede *actions*. In light of these arguments, the paper proposes:

39 The Danish Agriculture and Food Council, which represents pig farmers’ interests, has been periodically successful in using the direct nonmarket strategy of receiving federal subsidies for these investments, and, indeed, the efficacy of the indirect Grundfos nonmarket strategy has been somewhat dependent on this as a nonmarket strategy symbiosis.

Proposition 1: The greater the combined degree of self-interest, boundedly rational mental capacity constraints, and ideological willingness to disregard sales-level consumer sovereignty among policymakers, the more likely it is that entrepreneurs will consider NCS.

4.3.3 From Market to Nonmarket Commercialization

While the previous part of the model provides the awareness of nonmarket commercialization options, accessibility makes it possible. As entrepreneurs must make a judgment under uncertainty, hoping to access an opportunity and create a competitive advantage that protects them from others accessing that opportunity, they will attempt to be only as different from a free market as legitimacy (Deephouse, 1999) and transaction costs will allow (Coase, 1937). In this paper, the argument is that as the agency of policymakers opens by degrees to noneuvoluntary sales, firm managers can have discretion to use CPA and pursue NCS even against the prevailing national logic. The activation of NCS is likely because firm decisionmakers can form an entrepreneurial belief that challenges the prevailing national logic (Thornton et al., 2012). For this to be activated, the firm must believe that the total value of customers accessed via coerced sales is at least that of those accessed euvoluntarily.

To examine this point, let us assume a scenario. The scenario assumes a well-functioning market that is national in the sense that a national government can impact it by means of legislation. The market is composed of two competing firms, but there is no special institutional arrangement or technology that benefits either firm. Now, a new law passes that makes the two firm's offering accessible to a new customer group. The new customer group would not buy the offering if they were free to choose. For the sake of simplicity, one can add the new demand to the total demand. So, the original market demand is still present, but now an

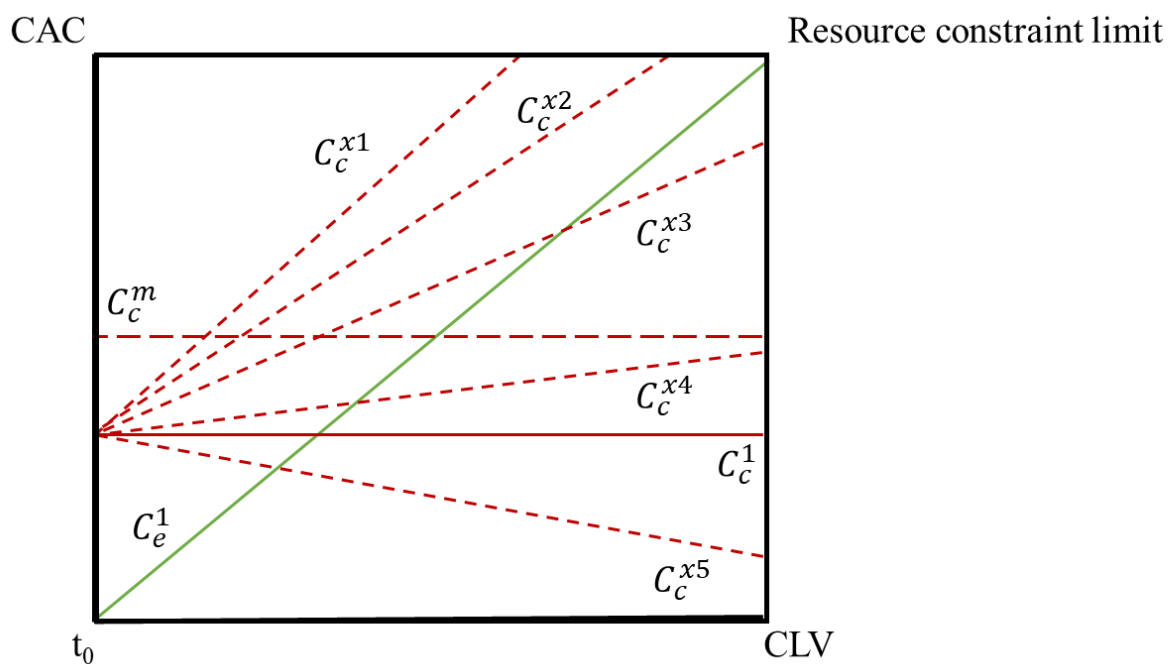
institution, such as a government bureau, has added to the total market size by requiring purchase by new consumers. The firms now face a choice: they can commercialize by focusing on the new “nonvoluntary,” or coerced, segment or they can ignore this segment, as they know it will buy regardless, and instead concentrate on the original competitive market segment. The strategy chosen is to focus on the coerced segment. The next paragraphs explain this surprising statement.

First, as a vessel of profit maximization, a firm should only focus on NCS if such a strategy has the potential to either decrease uncertainty or deliver higher profits compared to market strategies.⁴⁰ This can be illustrated as follows: assume there is a cost to acquiring customers among euvoluntary customers (CAC_e) and another for coerced customers (CAC_c). Assume further that each customer type generates a certain average value for the firm as long as they are customers. This value is a customer lifetime value. It has one value for voluntary customers (CLV_e) and one for coerced ones (CLV_c). In order for firms to choose to invest in a coercive customer segment with CPAs, it must hold that $CLV_e - CAC_e < CLV_c - CAC_c$, at least in the *beliefs* of the entrepreneurs. These values are uncertain and not always knowable ex ante, particularly as uncertainty relates to both reward and associated cost (Knight, 1921). Hence, if a firm believes that it is more certain to

⁴⁰ While uncertainty cannot be mathematically modeled, as outcomes are unknowable (Knight, 1921), it is experienced by boundedly rational agents (Foss & Weber, 2016), and they must mentally perform a version of expected utility in how they perceive uncertainty and their subjective valuation of utility (Mises, 1949). Agents must feel at ease that their action exchanges a perceived better situation 1 for a perceived better situation 2. Damasio & Sutherland (1994) have demonstrated that individuals who have suffered damage to their emotional centers respond less to fear and make extremely risky decisions. In the absence of mathematical precision, emotions make agents capable of rational entrepreneurial judgment by enacting feelings in place of unobtainable facts.

profit from C_c because, for example, it seems more controllable, the firm will select that option. A further constraint derives from the capacity to serve customers. In other words, a trade-off in strategy choice is necessary because the firm cannot serve customers indefinitely. If it could do so (costlessly), it could potentially make a copy of itself and pursue more commercialization strategies via two separate business units. Readers who are familiar with transaction-cost economics will recognize this argument as similar to the Coase (1937) argument. Similar support for this argument is found in Austrian theories of capital heterogeneity (Foss & Ishikawa, 2007). The point is also elaborated later.

Figure 2 - CLV and CAC of nonmarket and market commercialization



With the assumption that both CLV and CAC are accumulative values, Figure 2 plots some strategies. The firm commits to a strategy at point t_0 . For simplicity's sake, assume a simple linear relation for strategies, C_e^1 . In basic terms, attracting

more customers entails higher costs but also delivers additional value to the firm. C_c^1 plots scenarios in which capturing the coerced customer segment requires some expensive CPA upfront, such as lobbying for a law, though CAC is subsequently flat. Figure 2 presents several versions of the strategy. Another version of coerced customer choice is found in C_c^{xn} . In these cases, there is still CAC following the initial investment; in cases where $\alpha_c > \alpha_f$, no firm will pursue coerced customers for profit reasons alone. Based on this, the paper suggests:

Proposition 2: As coerced sales are costly to achieve, they will be pursued only if the customer acquisition cost and customer lifetime values of coerced sales surpass those of euvoluntary sales in the judgment of the entrepreneur.

The next part of the model deals with moderating effects on the results of the nonmarket strategy. Namely, the extent to which regulatory enforcement can uphold pressure on consumer sovereignty and the resource constraint inherent in firms, both at the level of actual assets, and the in mental workings of the decisionmakers.

4.3.4 Regulatory Efficiency and Uncertainty Judgment

North (1990a, 1990b) points to regulatory enforcement as a focal point of influence on economic exchange. He also importantly points out that this can vary across geographies, while the de jure content of national laws inclines towards homogeneity (Malik, 2014). Buchanan (1975) also shows that policymakers can increase uncertainty by changing rules, but the degree of enforcement limits this impact on uncertainty of economic exchange. The level of regulatory enforcement is formed by political (Roe, 2003) and cultural (Licht, 2017) institutions, and differs across the four distinct governance logics. This paper's basis in Aguilera et al. (2018) follows Banerjee (2011: 161) in “*defining the extent of regulatory enforcement as the degree to which government monitoring is consistent, and the*

severity of punishment for violating rules and laws is predictable.” Regulatory authorities, with their legal power, are hence a significant contextual contingency that do or do not yield power to coerce customers or firms to act in the way specified by policy or governmental practice, and thus impact the firm’s conception of socially desirable practices (Pache and Santos, 2010).

As firms are legal entities that exist within a body of national law, the regulatory environment naturally plays a significant role in the institutional pressures of policymakers on firm accountability and commercial strategies (Edelman & Stryker, 2005). If firms view the regulatory environment as welcoming or even promoting NCS and CPA, entrepreneurial *Actions* would follow suit as a result them being judged as creating more certain *Results* according to the BAR framework. From a public choice perspective, regulatory efficiency is also very important for another reason. Classic public choice theory (Buchanan & Tullock, 1962) generally makes the assumption that agents do not know their place in the constitutional arrangement before agreeing on the fairness of those terms. Similarly, while policymakers can signal policy desires, without regulatory efficiency, the policy holds little relevance. An illustration is found in the greening of public tenders. If a desire to have more environmentally sustainable suppliers for the public sector is not supported by mandates to prioritize this policy concern over other policy concerns (like cost reduction), firms that follow the signal and invest in greening their production risk unrecoverable CAPEX rather than the signaled competitive advantage, disregarding whether they agree with the ideological aspirations of the policymakers or not.

As argued, the attractiveness of NCS is directly linked to the assessed uncertainty of pursuing an opportunity by this means. This also includes whether

the approach is reactionary or is proactively engaging in CPA, and what kinds of direct or indirect outcomes the firm seeks from policymakers. In hard law's strict regulatory enforcement, a direct mandate is likely be placed on certain customer groups, for instance. Under institutional arrangements, utilizing soft law's flexible regulatory enforcement, they can place a constant pressure on regulatory bodies. In regimes of limited law with common regulatory voids, obtuse standards, and lax regulatory enforcement, incumbents might attempt to hold to existing nonmarket opportunities, though new entrants will likely forego the possibility as they judged it unenforceable or not lasting. In sum, the more difficult the enforcement is, the less certain NCS seem within entrepreneurial judgment—and this will guide CPAs and NCSs themselves. Hence, the paper proposes:

Proposition 3: The degree of regulatory efficiency has a direct effect on nonmarket entrepreneurial attention, as regulatory efficiency determines the relative-to-market strategies certainty of NCS.

4.3.5 The Prioritization of Resources for Strategy

A large contribution of the BAR model of entrepreneurship is its acknowledgment of resource constraints. Entrepreneurs do not have unlimited resources, and they must choose to deploy those they have in specific pursuits; once deployed, the resources are not easily transferable (De Massis, Audretsch, Uhlaner, & Kammerlander, 2018). Hence, while all entrepreneurial activity requires that opportunities be recognized (Alvarez & Barney, 2005), larger firms can pursue more opportunities or the same opportunities in different ways, such as market and nonmarket options (Zahra, 1996). For smaller firms, such as startups, access to the CPA capabilities potentially required for pursuing or creating nonmarket opportunities might not exist or come at the expense of market capabilities (Brush, Greene, & Hart, 2001; Baker & Nelson, 2005). In relation to

the model, the entrepreneurship literature teaches that entrepreneurial behavior depends not merely on sociocognitive awareness and recognition of an opportunity; it also requires a satisfactory portfolio of resources for pursuing that opportunity in that manner (Smith, Judge, Pezeshkan, & Nair, 2016), which together form the judgment about uncertainty. As shown in Figure 1, the model predicts that resource constraints moderate the likelihood of NCS and CPA efforts by enabling or constraining the firm in its sociocognitive activation process related to discovering and pursuing the imagined nonmarket opportunity. It also holds that, given the transactional limit of the firm, more resource-rich, typically larger and incumbent firms, obtain an advantage when NCS become a possibility. It is also fundamentally an argument that institutional arrangements can in fact transform uncertainty into something resembling risk (Knight, 1947).

Proposition 4: As firms are constrained in their access to resources and their ability to govern transactions in a cost-effective manner, entrepreneurs will opt for more certain strategies over less certain ones in order to maximize the utility of their resources and their configuration.

The model does not end with the adaptation of NCS but goes on to suggest two longer-terms effects of allowing and pursuing these types of strategies. These will be elaborated in what follows. The first deals with the effect on the nonmarket commercializing firm, and the other on the regulatory environment.

4.3.6 Organizational Learning is Derived from Successful Results

An important element in the BAR framework underlying this model is that *results* inform new *beliefs* and *actions*. As stated, commercialization in a market setting is a judgment about which *beliefs* and *actions* will lead to desired *results* in view of the market uncertainty, as the BAR framework explains. If there were also the option that desired *results*, such as sales, could be guaranteed ex ante, then this

guarantee would prompt a specific predetermined set of *actions* and subsequently determine *beliefs* that supersede potential alternatives. Fittingly, Henisz and Zelner (2003) and Doh et al. (2012) have argued that CPA must be considered in terms of the traditional rationales found in strategic management. Strategic management, much like the underlying economics that influenced it (Powell, Rahman, & Starbuck, 2010), attempts to optimize limited resources. It not only involves such resources as plants, buildings, patents, and so forth, that are limited, but also the strategy choices themselves, as choosing one, such as being a discount provider, excludes another, for example being a premium brand. The strategy is hence less of a choice about which actions to take than it is about which actions to avoid (Porter, 1989).

When first entrepreneurs decide and act upon a NCS by initiating CPAs, the firm accumulates not only tangible assets but also specific capabilities (Fainsod, 1940; Dahan, 2005; Doh et al., 2012). As time progresses, these capabilities mature to form an enhanced and integral part of the firm's general capability set, which is the source of the potential competitive advantage of that individual firm.⁴¹ However, just as with the overall strategy, a focus on certain capabilities means less or no focus on others. Bluntly stated, a focus on lobbying capabilities distracts from marketing capabilities. A market-oriented firm does not invest in lobbying without making a strategic choice to do so, and customer-focus capabilities differ from bureaucratic-efficiency capabilities.⁴² Since nonmarket capabilities have been judged to be beneficial for commercialization, they force

⁴¹ While capability studies are primarily within the management research stream, this basic idea is as old as Adam Smith: firms enable greater divisions of labor and specialization, though potentially, beyond a sensible point, creating complacency traps (Cespedes, 2014).

⁴² Some firms might do both, but the business-unit or product-line level should theoretically indicate a large dispersion of capabilities.

out investment in others due to the profit motive itself. Firms are not interested in underutilized resources or capabilities, as idle resources and capabilities lower financial performance. Hence, if nonmarket strategies are successful, they become exclusionary of alternative strategies, especially for smaller firms. The BAR framework calls this a “treatment effect,” whereby subsequent runs of entrepreneurial judgment with wanted *results* reinforce the *belief* about certain resources and configurations and promote *actions* that are suited to the reinforced *belief*.

Proposition 5: Affirmation of successful results from CPA drives entrepreneurial learning and capability choices, making nonmarket commercialization capabilities take precedence over market capabilities.

4.3.7 Increasing Regulation Cannot Forestall Specialization in NCS

A general worrying aspect of NCS is that it suspends market judgment of optimal resource allocation, from which firms as entities obtain both their effectiveness and their moral claim to profits (Mises, 1949; Foss, Klein, & Bjørnskov, 2018). Policymakers might wish to limit these negative effects of allowing nonmarket advantages to individual firms, particularly if the motivation for disregarding consumer sovereignty is not a desire to help that particular firm, with, for instance, local job creation, but a desire to promote desired policy outcomes such as environmental sustainability. Several problems exist in this regard according to public choice theory; in short, these relate to incentives for promise-keeping and information availability (Munger, 2015).

While politicians might promise one thing when granting commercial rights, they rarely have strong incentives to make good on that promise in the long run, or they might be replaced with others who do not hold that promise at all. For example, in 1988, the Danish Parliament commissioned the company

Storebæltsforbindelsen A/S to begin work on the Great Belt Bridge, the world's third-largest suspension bridge, which connects the islands of Funen and Zealand. In the original concept, the bridge's revenue would be used to compensate for its costs, and the price of the crossing would eventually be reduced or removed. However, in 2000, the firm opened the Øresund Bridge, which connects Copenhagen, Denmark, with Malmo, Sweden. Ultimately, the Great Belt Bridge was more in demand than projected, while the Øresund Bridge was less frequently utilized. Given this, the parliament decided to use the revenue from the first bridge to subsidize the second, instead of honoring the promise to lower the price of the former. Currently, there are plans for a bridge to connect Zealand to Germany, but it is unclear whether revenue from the first bridge could also cover the costs of this bridge if it too proves to be less popular. A price reduction for the Great Belt Bridge seems distant, and because of the quasi-voluntary sales situation, there are no market forces to correct the bridge-building politicians and the entrepreneurs they employ. This is an interesting process to understand using the BAR framework. In the first case, *beliefs* and *actions* delivered beyond the desired *results*. This outcome then influenced *beliefs*, at least those concerning the possibility of expanding resources in relation to the second case of bridge building, where the *results* were not desirable. Viewed in the long term, there is a limit to how many times this can occur, that is, how many market mistakes the original *result* can support—however, the involvement of an institutional arrangement seems to prolong the process of dismissing bad ventures.⁴³

Turning to the matter of information, policymakers' choices communicate information to entrepreneurs, while still having limited actual information about

⁴³ To clarify, Foss and Klein (2018) denote the removal of failed entrepreneurship attempts or poor judgment exercised as *selection effects*.

consumer choices (Hayek, 1945); while this is a substantial avenue of research, for the present, the effects are examined using two scenarios. Returning to situation C_c^m in Figure 2 and looking more closely, it seems equally attractive to choose either a market or nonmarket strategy, given that firms sell out to their resource constraint limit. However, recall, first, that CPA resources are needed to secure C_c and, second, that they must be taken from market resources that serve C_e . Moreover, if no firm invests in CPA, the coerced demand dissipates (no law is passed), or C_c must attempt to buy on normal terms. Finally, C_e will make fewer purchases if not targeted by marketing. Even in this situation, C_c^m will be selected over C_e^1 . Figure 3 presents a simple prisoner dilemma that shows why this is the case. While it may benefit both firms to choose to market to voluntary customers—thereby capturing both their existing voluntary segment and, by default, the non-voluntary, in some split—they instead both lobby out of fear of the other, which disadvantages them both.

Figure 3 - Prisoners' Dilemma of commercialization choice

		Company B	
		Nonmarket	Market
Company A	Market	3 1	3 3
	Nonmarket	2 2	1 3

At this point, a fair objection might be that firms naturally like to compete, so they will logically do so by specializing in different market segments. This objection may be valid. It ultimately poses an empirical question; however, if

firms are comprised of risk-averse rational individuals who fear change, then these will prefer perceived certainty rather than risk losing out on the government market and evidence also suggests that NCS can be efficient (Shaffer, Quasney, and Grimm, 2000).

Figure 4 - Market return distribution with free competition and shared competition

Year	C_a	C_b	C_c	M_s
1	30	30	30	90
2	60	60	60	180
3	10	10	10	30
Total	+10	+10	+10	30

Year	C_a	C_b	C_c	M_s
1	90	0	0	90
2	0	180	0	180
3	0	0	30	30
Total	0	90	-60	30

Note: M_s denotes market size

Regarding the second part of the issue, that governments do not know the dispersion of consumer choices, they might opt for a “fairer” distribution among firms or worry that C_e will suffer from the introduction of C_c to the market and suggest distributing C_c among firms in a “fair” manner. This approach is appealing to firms, as it would free up resources to compete for C_e and facilitate planning, which would make profit more predictable. It is, however, still a suspension of the market force’s judgment of entrepreneurial ability, and it is therefore dangerous. Consider, first, a market with no suspension. In this market, three firms compete for C_c . Each firm invests 30 in production, and each captures one-third of the market. Now, as shown in Figure 4, randomly assign market size over the next three years. Note that only earnings above 30 signify profit. Over the three-year period, each firm has earned 10. Now, assume that customers can choose when in the three-year period to make a purchase. This seems realistic, as some customers

might postpone or shift investments between budget years. Firms then lobby the government for a “fairer” distribution of market size, and the government decides That each firm will receive one year of C_c . The result is that firms have to invest in that year only, but it will have to be an investment of 90 to meet potential demand. Note that the outcome is the same regardless of whether the firms vote among themselves or according to a next-in-line principle. One firm benefits considerably, while the others lose out (zero profit is opportunity cost, after all). Hence:

Proposition 6: The negative impact on consumer welfare and choice and firm capabilities of policy-induced nonmarket strategy opportunities cannot be undone with increased policy attention.

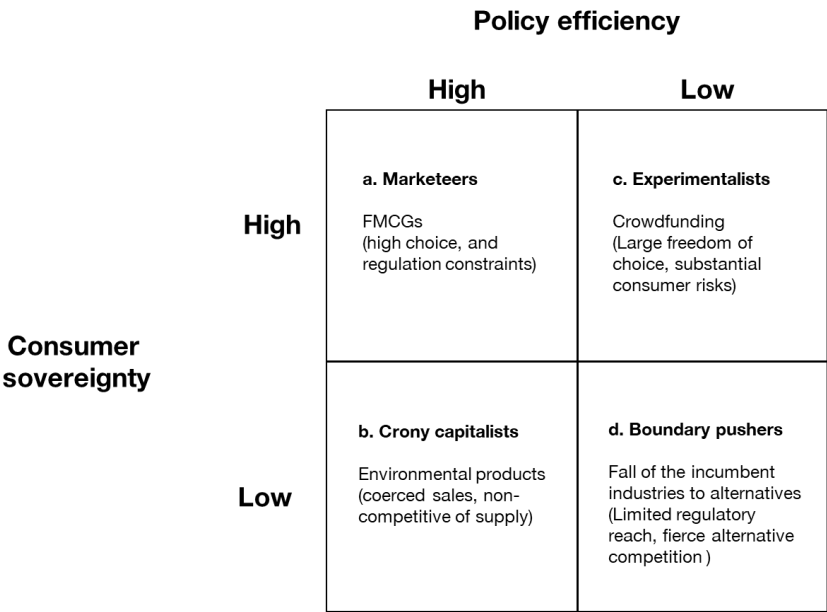
To summarize, if possible and if it is relatively more certain, firms will attempt NCS for rent capture if coerced sales are a legal possibility. However, this is not optimal for either firms or consumers, as it is not certain that the best firm will win since market disciplinary forces are suspended.

4.4 A New Typology of Commercialization Strategy Choice

NCS depends on the willingness of policymakers to disregard consumer sovereignty, thereby creating a zone of conformity within which it is acceptable for a commercial firm to seek commercial rents via political means. The willingness hinges on policymakers behaving as do other market actors, in that they are self-interested or only boundedly capable of understanding the implications of their specific policies on general institutional outcomes, even despite the prevailing national logic, or if they just plainly ideologically welcome CPAs. This agency of policymakers interacts with the firm’s entrepreneurial motivation and judgment. In this section, the paper focuses on entrepreneurial

agency with the backdrop of regulatory efficiency (Buchanan, 1975) and political adherence to consumer sovereignty (Hutt, 1936; Mises, 1949). These two dimensions form the conceptual dimensions presented in Figure 5.

Figure 5 - Typology of Commercialization Choice



Related to the first dimension, firms can be in a market that is highly dependent on consumer discretion or, conversely, one where consumer choice and sovereignty are limited by policymaker discretion. Taken as a continuum, we here find, realistically, that the choice to buy a product in a modern economy can be coerced to various degrees for many types of goods and services.

Likewise, on the second axis, regulatory efficiency dictates the degree to which uncertainty relating to consumer choices is contained by political priorities, and subsequently the degree to which a rational entrepreneur might judge it profitable to pursue CPAs.

Hence, and according to the methodological power of Aguilera et al. (2018), this paper continues to focus on the institutional context within which agency is

embedded by developing a new typology based on consumer sovereignty and regulatory efficiency; however, unlike that paper which models deviance, this one models opportunity pursuit. The argument is that while commercialization is specifically a diverse and many-faceted endeavor, there is, within the competitive, institutional, and political arrangement, a likely best-practice for commercialization for a specific commercial undertaking. This enables the paper to suggest four types of commercialization approaches, subsequently labeled: (a) marketeers, (b) crony capitalists, (c) experimentalists, and (d) boundary pushers. As these are fundamentally abstractions, the paper elaborates on each using anecdotal illustrations. As the typology occurs at the firm-level, the illustrations are industry-specific, rather than, for instance, driven by the macro-level of national logic.

a. Marketeers

In many well-functioning economies, we see both substantial regulatory efficiency with a hard law approach, and large consumer choices present within the market for fast moving consumer goods (FMCG). While regulation undoubtedly precludes certain entrants, the large and dispersed demand keeps competition fierce and, so far, not controllable by policymakers to a significant degree, although examples, such as subsidies to farm production, for instance, do exist. Firms serving these markets must adhere to regulations; however, they should not invest greatly in CPA but rather in marketing. A case in point is the energy drink Red Bull which was initially illegal to sell in several European countries. Rather than attempting to directly influence lawmakers, Red Bull promoted the rebel message of its illegal status to the point that consumer demand grew so as to make policymakers themselves find a way to get Red Bull on the

selves everywhere, either from a desire to please voters or due to a loss of tax revenue from private or illegal import.

b. Crony capitalists

Paying taxes is 100% coerced, but it is often presented as a purchase in the modern state. After all, no taxman on horseback rides around collecting penance at gunpoint. Today, the situation in many countries has shifted to the following scenario: if an agent or the agent's employer, depending on the case, does not pay the agent's government subscription, then that agent will be seriously hindered in performing any other actions in the market and ultimately risk custodial sentencing. It can be analytically beneficial to view taxation as the forced buying of certain services. From such a perspective, it becomes manifest that some products or services might also exist only in relation to tax revenue: a private company uses the tax mandate to further rent-seek from transactions among third parties. The illustration selected for this type of coerced buying is Postnord A/S. When a Danish citizen orders a good from the US, the citizen is required to pay import duty and value-added tax. Since there is no straightforward way to pay this upfront, criminal intent to avoid taxes when ordering goods from the US cannot be assumed. In Denmark, most private packages are delivered via Postnord A/S, a private company co-owned by the Danish and Swedish governments. When deciding how to handle private imports from the US, Postnord A/S encounters a commercialization choice: find a way for customers to pay the required charges upfront or use the opportunity to extract a further fee for checking if dues have been paid. The latter option also creates delays (a decrease in customer value), as packages are not delivered until the fee is paid. Since there are dues to pay for any package that is documented or believed to be worth more than 80 DKK in purchase price, including used goods, it is almost guaranteed that opening a

package from the US will grant the chance to add a fee. This fee is 160 DKK and it often exceeds the actual duty and tax, which must also be paid. Postnord A/S have chosen this approach even though it creates a worse and, in a free market, less competitive solution due to the delay in package delivery.

Another illustration is found in shipping. Since the late 1980s, the International Maritime Organization has been debating environmental problems that result from ballast water releases from ocean-going ships. These issues can be fixed in various ways in new builds and in existing ships. One solution is a process that the Danish company, Desmi Ocean Guard, offers. A particularly interesting aspect of this case is its provision of a different approach to price setting. Determining the right price is a substantial challenge for entrepreneurs and the factor that has the largest impact on profit (Hinterhuber, 2004). However, when demand for the entrepreneurial offering is due only to legislation, the uncertainty relating to pricing decreases substantially. If the cost⁴⁴ of noncompliance for the customer is too small, there is no market, as the potential customer will rationally opt for noncompliance. If the cost of the retrofitting solution is too high, customers will likely buy new ships instead. Desmi's job hence becomes one of lobbying at a fine level, where they can price profitably at a certain percentage below the payoff threshold.⁴⁵ In such cases, governmental and extra-governmental bodies not only provide firms with a market that would likely not exist without regulations, but also circuitously decide the price points and cost structure of the

⁴⁴ Fines, reputational effects, being barred from market access, a spillover effect in related markets, perception of the unknown effects of being caught for noncompliance, and the like.

⁴⁵ Interestingly, the present study has not found evidence of CPAs, apart from attending general information-sharing sessions by Desmi. This might prove to be an entrepreneurial error on the company's behalf: not understanding the reverse causality in the BAR framework resulting from regulation.

commercialization. In the BAR framework, optimal commercialization involves *actions* relating to lobbying that make *results* desirable and the dictation of *beliefs* to suit these actions; such as “we are saving the Earth. Therefore, coercion is okay.”

c. Experimentalists

Particularly with the advent of global consumer-level trade enabled by the growth of the internet (Klein, 2006), we have started to see what Stringham (2007) calls a market-chosen law. An example is found with the global auction site, eBay. Stringham makes the case that the rating system of such platforms enables trust among market participants far superior to that provided by any one national legal system. If consumers are not served, they will push out sellers. The competitive advantage of sites such as eBay becomes a superior legal system to that which national states’ legal systems can provide. A similar effect can be said to exist in crowdfunding sites, where products live and die based on their consumer reputation, disregarding any policymakers. A case in point is the large number of electric vehicles promoted on these sites, despite their dubious legal and insurance status in the home countries of the backers. Hence, markets with high consumer sovereignty but low regulatory enforcement enable experimentation and trade where uncertainty is high but shared more equally among trading partners.

d. Boundary pushers

The last quadrant deals with situations of low consumer sovereignty and low regulatory enforcement. It is hard to imagine such a situation within one specific national logic. However, as national logics also coexist with other national logics, such a situation can occur. An illustration is found by revisiting the Postnord A/S illustration above. The possibility of Postnord A/S altering its process is evident from Amazon.com, which offers Danish customers a way to pay their import duty

upfront. Postnord A/S has chosen to commercialize via a forced mandate rather than according to consumer desire, and customers must pay the extra fee to obtain their goods (a classic hold-up problem; see Williamson, 1971; Klein, Crawford & Alchian, 1978) despite the availability of the Amazon model, which could potentially stimulate more package deliveries and thereby bolster the core business of Postnord A/S. In relation to the BAR framework, Postnord A/S was able to guarantee a *result* and after that, designed *actions* and *beliefs* accordingly. Amazon.com saw the obstacle and rather than attempting to impact on Danish law, it *believed* it had the market capability to serve customers better and took *action* accordingly, making them boundary pushers in the typology.

The typology developed shows that the macro-level political choices and coercive powers of policymakers determine the optimal commercialization strategy at a firm-level. This informs the *beliefs* and *actions* of entrepreneurs in pursuing opportunities and can help explain why some fail, and why some are successful in judging the typology correctly, and subsequently use their resources optimally for that institutional setting. In this manner, the paper stimulates promising new research opportunities by aligning CPA, entrepreneurial judgment, and institutional arrangements.

4.5 Discussion

Capitalism is a complex marvel that is hard to comprehend. How coordinated efforts can be both the result of human action and can be upset by an attempt at human design (Hayek, 1945) leaves many scholars, business people, policymakers, and laypersons unable to understand the subtleties and time dimensions of commercial organization and the institutional arrangements around them. Furthermore, pure national logics cannot be said to exist in the world today.

Even societies dedicated to markets have pockets of state control and, likewise, even professed socialist economies have formal and informal markets.

In recent years, the term “neoliberalism” has gained popular momentum (Boas & Gans-Morse, 2009; Flew, 2014; Venugopal, 2015; Springer, Birch, & MacLeavy, 2016). The term remains vague and hard to pin down in any meaningful economic scientific way and often contains contradictory elements, such as emphasizing the dominance of markets, while at the same time viewing government failure as a market failure. While terms such as “neoliberal” allegedly point to broader social trends, proponents often excuse specifics that they agree with (such as promoting certain industries). Intellectually, they argue similarly to philosophical romantics based on aesthetics, as opposed to the materialist ethical foundations underpinning modern scientific discourse (Schmitt, 2017). The intense interest in the construct outside economics and the management sciences provides us as management scientists with a rallying call, however, to better explain why some firms opt for and have success with NCS, while also being honest about the institutional effects of this. This paper is, in the spirit of middle-range theory, an attempt to move beyond both universal and indigenous excuses for NCS, and instead highlights the context dependence of firm choices. This enables us to better probe the entrepreneurial judgment guiding commercialization choice, given the boundary conditions of the institutional arrangement, and to engage these questions empirically (Merton, 1968).

4.5.1 Future Research

As Hayek points out, the value of a theory is not that it can be immediately subjected to available data, but that, once data becomes available, it is indeed able to undergo testing (Hayek, 2002). The next stage in understanding entrepreneurial judgment regarding NCS is to extensively test the central premise of

policymakers' agency as determining the mental possibility of nonmarket commercialization in entrepreneurial judgment as the main driver for these choices. The ambiguity of motivation among policymakers and this interaction is an especially interesting empirical avenue to pursue. In this vein, adding further evidence to the long-term effect on institutional arrangements and firm-level capabilities are also highly relevant (Greenwood et al., 2011). Also relevant are the highlighted boundary conditions of resource constraints of nonmarket commercializing organizations. This is a very relevant and (in this context) underexplored avenue of inquiry. For instance, but not limited to, at what point and how do firms manage both strategies, as indeed some do?

By shifting the debate from the dominant national logic to consumer sovereignty, the further hope is to revisit in greater detail the finer points of nonmarket behavior and CPA. Are some *corporate social responsibility* policies, for instance, an excuse to infringe on customer property rights by diminishing the voluntary nature of their purchases? If politics is based on moral concerns, be they utilitarian or natural-rights oriented, how does a firm's NCS support that basis if the strategy involves coercion of customer choices? Is it the role of policymakers, in setting the institutional arrangement in terms of which firms function, to solve externalities and public good issues by providing profit opportunities via coercion to private firms, or is it to rearrange the institutional arrangement to avoid the externalities all together? What does the answer to this question imply for the type of NCS and the effectiveness of CPA chosen by firms? After all, as previously stated, policymakers make the rules, and the rules dictate the potential relevance of NCS for firms and entrepreneurs within the BAR framework.

4.5.2 Implications for Practice

Good research is often more about the questions asked than the answers provided (O'Driscoll and Rizzo, 2002). As alluded to in the beginning of this section, asking questions related to the coordinated efforts of commercial interest and coercive power is a recurring theme within social inquiry; hence, more fundamental answers must be given to the effect of consumer sovereignty, so that a bulwark can be established against the excuses of special interests, whoever or whatever they might be, an ambition very much in the spirit of public choice (Olson, 1962). If this paper is correct, all should be wary of policymaker agency in relation to the commercial aspirations of entrepreneurs, particularly when policymakers have the regulatory mandate to turn policy into some kind of reality (often not the one envisioned). The solution is not to resort to utopian ideals concerning changing the humanity of policymakers or entrepreneurs, which again would likely create other externalities, if even it were possible. It is not to resort to kneejerk outlawing of CPA, as this can violate individual and group rights, and obstruct an important source of practical information for politicians. Instead, and in the spirit of public choice, the solution is to put clear controls on the degree to which policy can touch "the business of everyday life," as Marshall (1890/2009) would call it. As policymakers influence their agency in relation to entrepreneurial judgment with regulations, that seems an appropriate place to start. One way is to enforce regulatory resource constraints on policymakers, limiting the amount but not strength of regulations they can in total assert. British Columbia implemented such a rule, whereby implementing a new regulation requires you to remove an existing regulation 1:1. While the system is not perfect, it builds on the acceptance of agency constraints among policymakers and incentivizes deeper engagement with specific regulations that form the institutional constraints, while at the same

time decreasing the chance of successful CPA—resulting in making it appear more costly and less attractive in the entrepreneurial judgement process.

If policymakers want firms removed from government policy, which is not a certainty, they must protect the sovereignty of consumers in market interactions and use this aim as a policy measure. It is the responsibility of policymakers to decide whether CPA is an attractive investment—or, in other words, whether CPA can remove or reduce the perceived uncertainty relating to *results* in the BAR framework. One way to do this is to make the use of CPA more apparent to commentators; this can have positive spillover effects for public debate by inflicting reputational costs on firms that pursue CPAs. Refocusing the discussion of the nonmarket strategies of firms on to consumer sovereignty could also help shift the present understanding of these issues beyond a binary discussion of state versus private ownership, with potentially equally self-serving agents employed in both government agencies and private companies. Euvoluntary action on behalf of decision-making consumers, not ownership, is the relevant point of distinction between consumer welfare and its alternatives in national logic. This means viewing transactions on a scale that ranges from 100% euvoluntary transactions to 0% euvoluntary transactions, or coerced buying, or from consumer to producer sovereignty. True apologists for crony capitalism, whether they be willing or unwilling, often obscure this point.

4.6 Conclusions

The purpose of this paper has been two-fold. First, it advanced an understanding of why entrepreneurs opt for nonmarket strategies. To answer this, the paper placed entrepreneurial judgment about uncertainty into the relation of the institutional arrangement as formed from policymaker agency, disregarding the specific dominant national logic. Simply put, if policymakers forego consumer

sovereignty, NCS becomes more likely. This is related to the second purpose: the attempt to replicate a middle-range context-specific institutional model, previously used on corporate governance, to explain other firm behavior. While the original method highlighted departure from the zone of conformity, this paper has highlighted the possibility of divergent conformity. The application of the theoretical framework to another complex issue on the border of the commercial and political shows the significant explanatory power of the original model.

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Chapter 5 - Thesis Conclusion and Implications

To increase human knowledge in commercialization is not irrelevant. Since the advent of free enterprise, the world has tangibly improved more than in any other period of human history. We live longer, fewer people are living in poverty, and many, maybe most, people have access to technology the richest person could not even buy, or comprehend, 50 years ago—just take out your smartphone and open Netflix. Free enterprise is something to be thankful for, and interested in.

Free enterprise comprises firms that sell. *“Selling is not a sideshow, a pesky obligation apart from the real business of finance, law, or accounting. It is business in glorious technicolor”* (Broughton, 2012:3). This thesis has attempted to increase our understanding of how to get firms to sell correctly so that we individually and collectively get as much out of free enterprise as we can. The fundamental research question of this thesis is: Can commercialization explain entrepreneurial choices in a firm’s strategy, including beliefs and actions, in relation to increasing the likelihood for entrepreneur-desired results? I believe the answer, given the boundary conditions, is positive: the resource allocations that result from commercialization are both shaped by and shape the markets where we all live. By researching commercialization on the supply-side from a demand-side perspective, it is possible to understand required entrepreneurial beliefs, contextually optimal entrepreneurial actions, and indeed to see that they lead to desirable supply-side results, and, by the logic of non-coercive markets at least, increased demand-side welfare too.

The thesis main theoretical foundation is based on a relatively recent and

heterodox entrepreneurship theory; the BAR framework. The status of recent and heterodox provides both challenges and opportunities for the thesis. It is a great chance to expand and further develop the “mother” theory, while at the same time facing the challenge of not violating its key premises and contributions when these might be unclear. Table 1 provides a short overview of the claims, contributions, and challenges that chapter 1-4 in the these thus provide in relation to the BAR framework.

Table 1 - Main Claim, Contributions, and Challenges

Chapter	Claim	Contribution	Challenges
1	While commercialization is a much-used construct in management science, it suffers from ambiguity.	By engaging the construct through the view of entrepreneurial motivation and opportunity perception, it is possible to have ambiguous and even conflicting commercialization research efforts cross-fertilize.	The avenues of commercialization research still in need of development are vast and many faceted.
2	While entrepreneurial choices might appear irrational, they must at heart be rational for the entrepreneur.	Using heuristic decision theory to further engage entrepreneurial judgment it is possible to explain entrepreneurial choices as rational despite them appearing otherwise to outsiders. This is further investigated in a case study taking the BAR framework a small step towards empirical testing.	Even if taken at face value, it is hard to go to large scale testing of heuristic entrepreneurial choices.
3	Even in extremely derived demand industries, entrepreneurial choice still matter for firm outcomes (here value capture).	The merger of maritime economics and the BAR theory is very promising. The application of the capabilities supporting BAR-judgement seems supportive of the theory.	While support was found for the tested capabilities mix, more explorative work on other capabilities and their relation to the BAR-framework is much called for.
4	If policymakers disregard consumer sovereignty, they open up for nonmarket commercialization that appears attractive due to its more certain nature	Entrepreneurial judgment is always done in context. If this context alters the relative uncertainty of commercialization, entrepreneurs will adjust their beliefs and actions accordingly, therefore when studying the context, the lessons of public choice should not be ignored.	This is but a small step in expanding the BAR-framework towards including the policy that shape the institutional arrangements that shape the context of entrepreneurial judgments.

A major contribution of this thesis has been exposing the BAR-framework to other theories, like identity theory and public choice, as well as to empirical realities. The BAR framework has in light of this work, proven to be a good foundation, and seems a good alternative to the “opportunity school of entrepreneurship” in the pursuit of better understanding what entrepreneurship is, and what entrepreneurs do. As the foundations have held water – maritime pun intended - this also allows the thesis to take some practical implications and lessons from the thesis, namely;

- When attempting to do or understand commercialization, the entrepreneurial motivation and perception of opportunities should not be ignored.
- Promoting entrepreneurship in society or within firms must be based on the fundamental understanding that entrepreneurial pursuit must appear rational to the entrepreneur.
- Understanding and working with heuristics can make better repeated judgments, particularly in resource scarce, but information rich, environments.
- The overall behavior or structure of the market is not the key main explanation of relative firm value capture, the entrepreneurial decision are.
- Investment in the right set and relation of capabilities ensure value capture, particularly alertness capabilities, capital structure capabilities and uncertainty handling capabilities.
- As industries take steps down the road to serfdom by aligning with policy makers, the answer to stop it cannot be “better people” among

policy makers or entrepreneurs, but must be incentives and structures to ensure that consumer sovereignty is maintained.

- If entrepreneurs decide to go down the road to serfdom and invest in CPAs, that choice will have a lasting effect on the capabilities of their firms.

My hope is that an increased focus on commercialization make entrepreneurs, customers and policy makers better at unleashing the amazing super power and energy source that free enterprise is. It is also my hope that we do this based on the idea of human beings and their free choices. Powell (2014) argues that we need humans to return to strategy research⁴⁶ and take more of the center stage from abstractions like dynamic capabilities. He argues that strategy (and by my extension, commercialization) is 75% personal and 25% impersonal: a very human activity, conducted by humans for humans. However, it is often dealt with vicariously in research, almost as if the personal-impersonal ratio were backwards. This creates a potential problem as there is a dangerous tendency of impersonality to beget more impersonality, which can also create ethical problems, such as disregarding customer welfare. Powell challenges research to aim for more humans in strategic research and better methods in strategy research. This thesis was an attempt to heed this challenge.

⁴⁶ And, by his extension, teaching.

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