

Article

## Entrepreneurial Judgment and Value Capture, the Case of the Nascent Offshore Renewable Industry

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**Abstract:** Entrepreneurship may be regarded as the mechanism of change towards sustainability. Any entrepreneur that seeks to start a new venture in an emerging industry will face resource and time constraints. The question we raise here is how the entrepreneur should prioritize use of time and resources to increase likelihood of success. To address this question we depart from a theoretical perspective of entrepreneurship seen as judgment, and bridges it over to entrepreneurship seen as co-creation. In other words, we combine the subjective with the intersubjective, and explore the effects of the actions successful green technology entrepreneurs in the emerging offshore renewable energy industry make in building their new ventures in nascent markets. Inspired by earlier studies on market entry, combined with new ways to understand new venture emergence, we find that independent entrepreneurs benefit from leapfrogging typical stages in the technology development process and rather devote time and efforts on resource acquisition. We also find that the most important value-capturing, decision-making heuristics are those related to “hybrid governance”. We discuss implications for theory, practice, and policy.

**Keywords:** heuristics; uncertainty; unpredictable strategy; marine renewable energy; international entrepreneurship; sustainability; greentech

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## 1. Introduction

One of the defining features of entrepreneurial ventures is that they are resource constrained [1]. The resource constraints become especially apparent in new technology ventures that seek international markets from inception [2]. Like most other entrepreneurs, their leaders need to cope with resource limitations as they build their new venture, but they also need to manage an extensive technology and product development process, acquire a considerable amount of venture funding, and build efficient sales and marketing capabilities.

Evidently, ambitious technology entrepreneurs need to make some tough choices on how to spend their time and resources. If they solely prioritize technological development and neglect business development, they will soon run out of cash and have no organization ready to commercialize the technology when the products are ripe. On the other hand, if they focus solely on business, they may have little practical customer value to offer the market. Technology entrepreneurs therefore need to balance their priorities.

Arguably, prioritizing time and resources becomes increasingly difficult in emerging industries where the future is unknowable—unpredictable, or near to unpredictable. This situation is what the theory calls Knightian uncertainty—decision-making without likelihood judgment.

As such, this study seeks to unpack the relative importance of various types of value capturing heuristics used by entrepreneurs in an emerging industry with Knightian uncertainty—the emerging offshore renewable energy industry. We have chosen this industry because it is dominated by entrepreneurial actors with limited resources, it is technologically demanding to develop competitive market offers in the emerging industry, and the international nature of the industry requires “born global organizations” that are able to execute boundary-spanning business activities right after inception.

Most importantly, it is a new, emerging industry, and as such, an unpredictable one. In many ways, the chosen industry reflects what we may label a non-existent, or not-yet-existent-market [3]. It is a market and technology situation that falls into what we may label “real unpredictable” conditions. Within such a context, the entrepreneurs have to make challenging and tough priorities in terms of time and resources for, on the one hand, developing their business capabilities, and on the other, for developing their technology. The major challenge is to make these decisions—and act—when available information is unreliable, time is limited, and the future unknowable—a state of Simonean and Knightian uncertainty. In many ways, this is Simon’s [4] concept of bounded rationality extended with Knight’s [5] notion of unknown and unknowable uncertainty (that is, decision making without likelihood judgment), as opposed to (parametric or) predictable uncertainty. In this study, we contrast two main views of entrepreneurship, namely Foss and Klein’s [6] *subjective* theory of the entrepreneurial firm with Sarasvathy and Dew’s [7] *intersubjective* theory of the entrepreneurial firm, and we bring them together through the concept of judgment about co-creation.

## 2. Conceptual Background—The Nascent Industry

The offshore renewable energy industry is an emerging industry that seeks to transform wave, tidal, and deep water wind power into electricity. The industry has several characteristics which make it particularly interesting for entrepreneurship research. First of all, it is emerging. At the time we collected

our data (during 2007) there were no operational commercial solutions. Secondly, with seas and oceans covering around 70% of the surface of the Earth—the “blue planet”—it has vast potential. According to the International Energy Agency the theoretical potential of wave and tidal energy amounts to more than 80,000 TWh/year globally [8], the European Wind Energy Association suggest energy produced from turbines in deep waters in the North Sea alone could meet EU’s electricity consumption four times over—a potential multibillion dollar industry. What makes it even more interesting are the strong incentives for rapid commercialization of new technological solutions. Technological entrepreneurs are currently fighting maybe the biggest technological battle of our time in the competition to supply the prevailing design for the renewable energy solutions that will ultimately replace fossil fuels, as such, it facilitates sustainability. Finally, it is a “Born Global” industry [9]. Since ever-scarcer fossil fuel resources and climate change are global problems, the energy challenge (and, hence, the business opportunity) is inherently global. Many governments all over the world are currently investing heavily in R&D in the renewable energy sector in order to find new energy solutions that reduce greenhouse gas emissions (see, for instance, the marine renewable energy article by Elliott [10]). These factors represent strong incentives for international mobility of the new entrants in the industry that seek to benefit from governmental support and they create strong first-mover advantages for regional actors that want to participate in the large-scale development of the industry.

A large number of studies have focused on factors that spur rapid market entry. For example, three major reviews have recently been published on international new ventures [11–13] and all emphasize the ability of new technology-based firms to rapidly enter multiple markets by delivering superior quality and service based on advanced technology. However, earlier studies have also shown that entrepreneurs in technology industries have the tendency to develop technological myopia, and hence under-prioritize work related to strategy and business development [14,15].

This takes us to our research agenda: How do technology entrepreneurs make decisions when time is limited, information is unreliable, and the future unknowable? This research question intertwines Simon’s [4] concept of bounded rationality with Knight’s [5] concept of unknowable uncertainty (as opposed to predictable uncertainty). Specifically, for the present paper, our research question is: *Should independent offshore renewable energy entrepreneurs prioritize developing their technology, or should they develop their business capabilities, or should they do both?* For the practitioner, it is actually a question of what decision-making heuristics to employ—once the new venture is launched.

Like Bingham and Eisenhardt [16], we concur that heuristics “constitute ‘rational’ strategy in unpredictable markets (p. 1438)”. Such heuristics are thus not just simple ‘rules of thumb’, but in fact form the basis for value-creating strategies that are more effective than their analytical alternatives [17]. Evidently, under such conditions, more information and analysis is not necessarily a better solution, since it is impossible to know what type of information should be further analysed. Hence, judgment under unknown and unknowable uncertainty needs to be exercised.

### 3. Literature Review and Theory Development

In an attempt to generate testable hypotheses on decision-making heuristics employed by technology entrepreneurs, we start with insights from Penrose [18], combined with a new approach to the firm recently conceptualized by Foss and Klein [6]. This new approach builds on, and further develops,

Knight's [5] work on judgment. Building on these insights, we seek to understand more profoundly how successful technology entrepreneurs make their value capture judgments. Do they *experiment* with capital heterogeneity combinations, or do they just *deploy* a "superior combination of capital assets"? In other words, do they take the capital attributes as "given", or do they seek to "discover new valued attributes"? [19]. This debate goes to the heart of why firms exist, and reflects a *subjectivist* epistemology of entrepreneurship.

Following Penrose [18], Kor and Mahoney [20,21] argue that firm growth can be seen as a dynamic process of management interacting with their heterogeneous resources, and it is the management's imagined productive opportunities that govern the deployment of these heterogeneous resources. In other words, the management's envisioned, and thus *subjective*, productive opportunities are a function of their perceptions of available tangible and intangible resources, and their possible deployment combinations. The productive services that these resources yield, is a result of choices made between *imagined* opportunities and constraints from both the "inside" and the "outside" environment.

Apparently, it is next to impossible to measure these *subjective* judgments *ex ante*, but the choices successful technology entrepreneurs make under uncertainty can be traced *ex post*—through their factual choice of actions. What complicates the above perspective is that these deployments are made under conditions of Knightean uncertainty. Inspired by Lachmann [22], and in the words of Gloria-Palermo [23], the forward looking perspective is toward an "unknown but not unimaginable future" (pp. 120) where the imagined productive opportunity set is guided by forward looking imagination.

There is a vast body of literature on uncertainty conceived as risk (with *a priori* probability, or statistical probability); however, there are basically no studies under conditions of *unknowable uncertainty*. We therefore concur with Foss and Klein [6] that judgment in entrepreneurship is under-theorized—given its role in economic organization. In this study, we therefore seek to unlock, at least partially, the black box of entrepreneurial decision making. In particular, we interpret entrepreneurial judgment to *represent a set of value capturing decision-making heuristics*. Since we also view judgment under Knightean uncertainty as the realization of a particular skill, specifically "that of dealing successfully with resource allocation decision under uncertainty (pp.70)" [6], and since entrepreneurs "deploy various decision heuristics to deal with uncertainty (pp. 97)" [6], we seek to assess *the relative importance* of such decision-making heuristics. In other words, we conceive of judgment in the same way as Langlois [24] who conceptualizes it as "the (largely tacit) ability to make, under condition of structural uncertainty, decisions that turn out to be reasonable or successful *ex post*" (pp. 1112).

Note that Langlois unpacks Knight's *risk* and *uncertainty* as parametric and structural uncertainty. Moreover, as pinpointed by Langlois (*ibid.*), Schumpeter [25] also maintained that "entrepreneurship depends on intuition, the capacity of seeing things in a way which afterwards proves to be true, even though it cannot be established at the moment (pp. 85)". Thus, in an attempt to address the first string of our research question, and based on the judgment discussion above, we conjecture that any effective value capturing judgment relating to *technology advancement* will manifest itself in the firm's ability to capture value from its technology development efforts. Since such judgments are largely a tacit and often implicit phenomenon, we need to look behind the scenes, and interpret the effects of them *ex post*. Since we are studying technology based firms, it is useful to focus on the stage of technology development. Are the technologies just sketches of a model, a prototype, or a fully developed production unit? For instance, in the computer software industry, a fully developed pilot may hamper the acquisition of the

pilot customer since it has not been developed according to customer demands [26]. That is, too much technology development, or too little technology development, may actually hamper the market development of the firm. Henceforth, our first hypothesis seeks to establish the link between technology development and the new firm's ability to capture value:

*Hypothesis 1: In nascent green industries, entrepreneurial actions emphasizing technology development efforts will increase the probability for value capture. In particular, the likelihood for value capture is higher the more developed the technology is.*

### 3.1. Relating Entrepreneurship as Judgment to Entrepreneurship as Co-Creation

In contrast to Foss and Klein's [6] *subjective* theory of the firm, the view advanced by Sarasvathy and Dew [7] introduced an empirically-based entrepreneurial theory of the firm. Their conceptualizations reflect an *intersubjective* epistemology of entrepreneurship. Wiltbank, Dew, Read, and Sarasvathy [27] extended these ideas to the strategy domain, and write convincingly about the nature of non-predictive strategy, wherein they pose the question: "How can a firm know what to do next?" (p. 981) This is rather straightforward when the situation is predictable (*i.e.*, "try harder to forecast better"). However, decision making *without* likelihood judgment, or, put differently, decision making under conditions of Knightian uncertainty represents a serious challenge to most entrepreneurs and managers of new firms, especially in nascent industries. Based on the work of Brews and Hunt [28], Wiltbank, Dew, Read, and Sarasvathy [27] delineate two fundamental ways to address this question: entrepreneurs and managers should either "try harder to predict better" (the planning school of strategy), or they should "move faster to adapt better" (the learning school of strategy). However, these prescriptions merely seek to position the organization in a *given* environment. Wiltbank, Dew, Read, and Sarasvathy's [27] suggestion is that entrepreneurs and managers of new ventures (in unpredictable markets) should instead seek to co-create the future (that is, to amend or re-construct the environment), and the means of doing this is *not* through prediction, but through involving self-selected stakeholders into viable partnerships, and by doing this, they take control over, and co-create, the immediate future. Causation is conjectured to be the opposite of effectuation [29]. Effectuation inspired entrepreneurs constantly make decisions and take actions. Causation entrepreneurs base their expertise on their ability to plan and predict which basically captures what we label "predictive uncertainty". Effectuation reflects such a co-creation method where stakeholders self-select and commit themselves to the construction process. Put differently, *hybrid governance* may play significant roles in developing new firms in new markets. That is, alliances can be viewed as the access mechanisms to partner-owned resources [30], and one fruitful angle for resource-constrained new technology firms is to ally themselves with more resourceful actors [31]. For instance, extant industrial partners typically seek to match up with viable new ventures with a new or emerging technology [32]. For new ventures, alliance partners may have the requisite or complementary knowledge, the knowledge to fast scale up new initiatives, or the production, sales, or distribution channels required. As the business opportunity in the renewable energy sector is inherently international, our conjecture is that the access to such resource providers significantly contributes to the development process. Thus, in an attempt to assess the second string of our research question, we conjecture that entrepreneurial judgment which advances stakeholder involvement will contribute to the

likelihood of value capture. Henceforth, our second hypothesis addresses the link between strategic partnerships and the likelihood for value capture:

*Hypothesis 2: In nascent green industries, entrepreneurial actions emphasizing business development activities will increase the probability for value capture. In particular, the likelihood for value capture will be higher with the presence of external stakeholders such as 2a) early-stage financing, and 2b) an international alliance partner.*

### 3.2. Prioritizing among the Value-Capturing, Decision-Making Heuristics

We have conjectured that both the development essentials above are likely to influence the firm's potential for value capture. It is just as likely that technology entrepreneurs are *unable* to simultaneously prioritize all the activities associated with both these two main types of tasks; and this is also the underlying research question of this study, namely how resource-constrained, independent technology entrepreneurs make priorities between the *technology development* activities affiliated with Hypothesis 1, and the *business development* activities affiliated with Hypothesis 2. The third hypothesis addresses those judgments. According to Davis, Eisenhardt, and Bingham [33], three or four value capturing heuristics are the optimal structure in unpredictable environments. Their main findings are that too many heuristics impede development, whereas too few heuristics facilitate chaos. In other words, balancing technology development with business development activities may correctly reflect what has been labelled managing at the operational "edge of chaos".

Davis, Eisenhardt, and Bingham (Ibid. 439) claim that the relationship between structure (heuristics) and performance in unpredictable environments is an inverted V (not an inverted U as we would initially presume) "with tipping points on both sides of the optimal structure, consistent with an edge of chaos". According to Wiltbank *et al.*'s [27] theorizing about stakeholders' involvement, entrepreneurs and managers of new ventures ought to co-create the future and to re-construct the environment through partnerships, and by doing this, they take control over the immediate future. Henceforth, new firms in nascent industries will be better off by prioritizing co-creation with external stakeholders:

*Hypothesis 3: Technologically advanced early stage firms in nascent green industries are, under ceteris paribus conditions, relatively better off by prioritizing business development rather than directing relatively more efforts into further developing their technology base.*

## 4. Research Method and Data Collection

In order to uncover viable decision-making heuristics, we had to look behind the scenes. As elaborated on above, it is close to impossible to measure *subjective* judgments *ex ante*, but the choices entrepreneurs make under uncertainty can indeed be traced *ex post*—through their factual choice of actions. Basically, we capture what they actually do which implicitly discloses their decision making heuristics regarding these types of developments.

Our data set was collected by global survey. By investigating just one industry we also reduce the risk of confounding results [34]. The International Energy Agency [8] stated that there were 53 known wave energy companies and 25 known tidal energy companies in the world. This list was assessed through Internet search and extensive use of networking within the industry. One of the co-authors even

seconded to the Wave Energy Centre in Portugal while gathering the data. In this sense, the survey addresses the whole population of wave and tidal companies, not a selected sample. Only companies with clear intention to commercialize the technology were included. Embryonic projects and pure university research projects were excluded, and some newcomers that were identified throughout the process were added. Thus, the survey was administered to 90 companies in the world, each of which had a technical concept for harnessing large scale wave or tidal energy that they aimed at commercializing through a dedicated organization. We decided to not include deep water wind in the survey, as the global population at the time of the survey counted less than five. Respondents in the survey remained anonymous—this was decided after feedback from managers—in order to raise the response rate. To ensure commitment and avoid answers from persons outside the target group, telephone contact was taken at managerial level before sending the web survey to personal e-mail addresses. By default, the survey was sent to the CEO in the company. If the CEO for some reason was not available, it was filled out by the person responsible for business development. As a result, we have fifty complete answers from companies, which yield a response rate of 56 percent of the estimated total wave-and-tidal corporate population worldwide. Of all the respondents, 57 percent developed wave energy technology, 27 percent tidal energy technology and 16 percent developed both types. Geographical distribution: 49 percent Europe, 35 percent N-America, 12 percent Oceania, 4 percent Asia. The average age of the responding firms is 6.1 years. The survey shows that the industry is primarily dominated by start-up companies (96 percent are independent start-ups). We also see evidence that these independent firms are truly international new ventures with a very high mobility—they view the whole world as their potential marketplace, and many establish activities in the markets that have the best governmental support structure.

## 5. Research Variables

The first sale to a pilot customer is regarded as a critical performance measure of new ventures, as it signals the first phase of initial market acceptance. At least, it manifests what we may label the most critical dimension of “value capture”—the very first sale. In this study, we therefore dummy-coded the year of the first pilot customer as the dependent variable.

As independent variables, we also dummy-coded the two *technology development* variables: “proof of concept” is operationalized with the presence of a prototype, and “proof of viability” is operationalized with a presence of a full scale demonstration model. We originally also included the presence of an “initial” model, but it introduced computational challenges so we simply removed this variable. Furthermore, we dummy-coded two co-creation variables from year of their agreement/achievement; one on early-stage capital (H2a), and the other one on international alliance partnerships (H2b). Recall, we do not imply that these variables are exhaustive, but they serve as reasonable co-creation business development/resource acquisition alternatives.

Since *time to market* also is an issue, we controlled for the firm’s time since inception to ensure that the effects not are a function of time alone. We also included this variable since one alternative explanation for the effect sought could be that business development naturally follows technology development as the business mature. Due to the relatively small global sample, representing more than half of the known global population of offshore energy firms, we made a choice not to enter more variables into the equation, due to the obvious limitations affiliated with smaller degrees of freedom.

Again, this is a sample of the population of emerging new firms in a burgeoning industry. Thus, the statistics may be read as actual numbers, but generalized to the remaining population; we need to keep an eye on the calculated significance level.

## 6. Main Research Findings

In order to test the prioritized relationships, we employed a hierarchical logistic regression. Binary logistic regression is most suitable when trying to determine the event probability for a categorical variable with two possible outcomes. Table 1 exhibits the initial correlation analysis. These initial analyses show that bivariate correlations between the independent and the dependent variables are moderately correlated with the exception of the “proof of concept”. That is, with the exception of the relationship between the presence of a prototype and the first pilot customer. However, the technology variables are moderately highly correlated, as well as the proof of viability and the alliance variable.

**Table 1.** Descriptive statistics and Pearson’s correlations.

<i>N</i> = 50	<i>Means</i>	<i>SD</i>	(1)	(2)	(3)	(4)	(5)
Firm age (1)	6.12	5.79					
Value capture (2)	0.48	0.50	0.078				
Proof of concept (3)	0.66	0.48	0.081	0.014			
Proof of viability (4)	0.34	0.48	0.077	0.240 †	0.515 **		
The alliance variable (5)	0.46	0.50	0.072	0.318 *	0.408 **	0.269 †	
Early stage capital (6)	0.66	0.48	−0.397 **	0.267 †	0.198	0.337 *	0.239 †

\*\* Correlation is significant at the 0.01 level; \* Correlation is significant at the 0.05 level; † Correlation is significant at the 0.1 level.

When running the logistic regression analysis, we entered the independent variables stepwise (see Table 2). The first model (Model 1) only contains the control variable “firm age” and this model is not significant. Model 2 incorporates the two technology development variables. The demo variable turns out to contribute positively to the probability of gaining a pilot customer (at the  $p < 0.05$  level). In Model 3 we also entered the business development variables and the model significance increases to the  $p < 0.05$  level. We see that only the alliance variable is significant. It is also interesting to note that the significance of the technology variables is reduced and becomes less important with the inclusion of the business development variables.

The results of this quantitative analysis show that technology development has a significant effect on the dependent variable—the probability of gaining a pilot customer. However, when introducing the business capabilities—the presence of early stage finance and the alliance variable—the logistic regression results show that the alliance variable dominates and contributes far more to the probability of obtaining the first sales contract. Also by looking at the *odds* we see that the presence of an alliance partner increases the likelihood for value capture by approximately four times ( $\text{Exp}(B)_{\text{Alliance}} = 4.358$ ,  $p < 0.05$ ). That is, new firms in nascent industries with an international alliance partner are four times more successful in capturing the first customer than those without such alliance partners.

**Table 2.** Results from logistic regression on value capture (ExpB).

Independent Variables	Model 1	Model 2	Model 3
Firm age	1.028	1.043	1.084
Proof of concept		0.468	0.199 <sup>†</sup>
Proof of viability		4.409 *	3.556
Early stage capital			3.549
The alliance variable			4.358 *
Constant			0.222 <sup>†</sup>
Model Chi-square	0.302	4.417	12.690 *
−2 log likelihood	68.933	64.818	56.545
Overall predictive accuracy	54%	64%	78%
Cox and Snell R <sup>2</sup>	0.006	0.085	0.224
Nagelkerke R <sup>2</sup>	0.008	0.113	0.299
Number of firms	50	50	50

<sup>†</sup> =  $p < 0.1$ , \* =  $p < 0.05$ , \*\* =  $p < 0.01$ .

### Robustness Checks

Bootstrapping is a method that facilitates robust estimates for odds ratios, amongst others. The bootstrap procedure samples with replacements from the original dataset, and is a useful tool when the data is weak or the assumptions are questioned. In our case, the somewhat low number of firms could indeed be questioned. We therefore created 10,000 bootstrap samples with 95% percentile confidence intervals (bias corrected and accelerated), and retested the hypotheses on this sample. The bootstrap results show a slight improvement in the significance levels of the co-creation variables, maintaining the alliance variable's level of significance (at the 0.05 level), whereas the finance variable is now also supported at the 1 level of significance. All the coefficients, however, remain the same. This shows that our findings are robust across samples.

## 7. Discussion with Implications

In this study, our point of departure was entrepreneurship as subjectivism [6,18,35,36]. The results show that for newly established technology-based firms in an industry with high levels of uncertainty, business development is more important for value capture than predominant focus on technological development. These findings resemble the findings of Brinckman and Hoegl [37] who found that management's *external relational* capability in new technology-based firms is more important than their *initial* team capabilities. In other words, independent technology entrepreneurs that develop technological myopia and prioritize development of technological artifacts instead of developing the business case by attracting investors and/or alliance partners are not likely to be very successful, basically because they will lose the race before they even get started. It should be pointed out that independent new ventures are more exposed to such challenges than larger, more robust, companies.

We have seen that the main ideas from Penrose's theory of the growth of the firm may fruitfully be employed at the earlier stages of new venture development, and the main vehicle for development appears to be through more robust means-ends relationships. The latter seems to be a core characteristic shared by successful technology entrepreneurs and growth orientated management teams. In this way,

managerial energy may be centered on value capture. In reality, this is the *subjective* approach to entrepreneurship, advocated by Foss and Klein [6], Kor, Michael, and Mahoney [20], and Mahoney and Michael [38]. However, the *intersubjective* approach, advocated by Sarasvathy (and colleagues) relates to co-creation together with important others (other stakeholders). The idea of intersubjectivity derives from Sarasvathy's [29,39] research in which she interviewed 27 expert entrepreneurs. Her main research finding was that successful entrepreneurs co-create their new firms with other stakeholders who self-select to co-create the future, and that the entrepreneurial process is about transforming *available means* into a new desired state (*i.e.*, new products).

What is intriguing is that these two contrasted approaches may be combined by means of *decision-making heuristics*. That is, decision-making heuristics derives from the judgment approach (entrepreneurship as subjectivism), but decision-making heuristics about co-creation (entrepreneurship as intersubjectivism) combines the two approaches. As we learn from Davis, Eisenhardt and Bingham [33], the optimal use of decision making heuristics in unpredictable markets is to employ just a handful of them.

We have seen that hybrid governance—or partnering up with self-selected stakeholders—is a viable ingredient of new ventures' portfolio of heuristics in unpredictable markets. In other words, this study contributes to our understanding of strategy as a “portfolio of simple rules”, not from a simulation perspective (as in Davis, Eisenhardt, and Bingham [33]), but based on two distinct approaches to the theory of the firm, namely Sarasvathy and Dew's [7] empirically-based entrepreneurial theory of the firm, and Foss and Klein's [6] more theoretical-based theory of the firm. These two epistemologically different views may be combined by a wider and broadened understanding of the subjective. In other words, a *subjective* epistemology is here synthesized with an *intersubjective* epistemology. These two views may also be contrasted with the *objective* view advocated by Shane [40,41], as opportunities then are found “out there”.

This study has implications for practitioners seeking initial market acceptance in nascent and technology driven markets. In order to obtain initial market acceptance, technology entrepreneurs must prioritize developing business capabilities such as securing investors, forging international alliances, and leapfrogging traditionally defined stages in the technological development processes. We therefore recommend that technology entrepreneurs in nascent markets reflect over their portfolio of value capturing heuristics.

Policy makers have strong incentives for speeding up the development and commercialization of new renewable energy solutions and should also mark the findings from this study. For example, support systems that encourage early stage funding, and international business cooperation, should be facilitated to a larger extent, not only R&D. This will not only increase the probability for successful commercialization, but will also contribute to increase the global diffusion of renewable energy innovations.

## 8. Research Limitations and Future Research

As always in theorizing, the results are tentative [42]. First of all, the sample is small, but this is due to the early phase of an industry in emergence; to call for a larger sample would be meaningless in a nascent industry context. We have a good response rate, and the sample represents more than half of the total estimated population of such global firms. As with all emerging industries, task and environmental

uncertainties are extremely high; this makes it challenging to secure data with sufficient quality. Still, it is in this context that we find it worthwhile to explore good practice, as these practices are fruitful for theory development. A caveat is that we have only looked into what it takes to make the first sale; future studies should seek to follow up and assess the types of new ventures that eventually succeed and develop full-scale parks, that is, those that cross Moore's [43] chasm. Having made the first sale does not—by any means—guarantee overcoming the scalability hurdle, but elaborating on that is another story.

## 9. Conclusions

The main objective of this study was to uncover the priorities successful technology entrepreneurs in the emerging international offshore renewable energy sector make use of. Our interpretation is that independent technology entrepreneur's benefit from their idiosyncratic entrepreneurial judgments, and that co-creation heuristics plays a major role.

The findings indicate that green technology entrepreneurs benefit from prioritizing the development of business capabilities and rather leapfrog traditionally defined stages in the technical development processes. That is, *independent* renewable energy entrepreneurs should seek to prioritize further technology development *after* securing wider commercial commitments. Otherwise, they will not make it through the technology development-commercial chasm, despite the overall quality of the technology. Indeed, researching emergence represents a challenge not only with regard to data capture, but also to its interpretation. As such, the results are—as always when theorizing—tentative. Irrespective of the nature of the mechanisms, entrepreneurship may however serve as a viable change mechanism towards sustainability regardless of how it is conceptualized or defined [44].

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## Author Contributions

Nicolai Løvdal has contributed with the job of collecting the data for the present study. The rest of the job of executing the study and writing the article is a collective effort shared equally among the authors.

## Conflicts of Interest

The authors declare no conflicts of interest.

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