THE DYNAMICS OF LEGITIMACY BUILDING A CASE STUDY OF NEW VENTURES IN THE NORWEGIAN PETROLEUM

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ABSTRACT
Contrary to existing research paying attention to trust building and networks as important for building legitimacy in new venture creation, this article claims that early-stage firms presenting new technology in the market obtain cognitive legitimacy both through relational and technological fitness. Our argument is that cognitive legitimacy, i.e. how knowledge is understood and interpreted by their stakeholders, is dependent on both a firm’s technological and relational competence. Empirical results supporting this notion are demonstrated by a case study of three innovative companies, performing drilling and exploration activities in the Norwegian Petroleum Sector. The results further illustrate how firms either having a high degree of technological fit/ low degree of relational fit or high degree of relational fit/low degree of technological fit have troubles in gaining cognitive legitimacy. This supports a notion of a mutual dependency of both relational and technological fit for building cognitive legitimacy.

INTRODUCTION
Stimulating new technology start ups is considered important for economic growth and future prosperity. The path from the drawing board, laboratory and workshops to the finished commercialized product is long and winding. New enterprises face sombre challenges in commercializing their products, as they often are resource – deprived and possess few tangible assets (Delmar and Shane, 2004; Rutherford, 2009). Entrepreneurs introducing new technology face additional challenges; at the time as creating a new organization, they have to convince the market and stakeholders of the appropriateness and desirability of their new technology.

Research has pointed to legitimacy building as crucial for overcoming the challenges of the liabilities of newness and smallness entrepreneurs encounters (Hannan and Freeman, 1984; Aldrich and Fiol, 1994; Zimmerman and Zeitz, 2002). Of the several typologies of legitimacy (see Suchman, 1995; Aldrich, 1999; Scott, 1995), cognitive legitimacy has been argued to be of main concern for start up companies (Zacharakism, 2003; Deeds et al. 2004). Cognitive legitimacy refers to how knowledge is understood and interpreted by environment. For a company, cognitive legitimacy centers on approval in terms of understanding, belief and taken – for – grantedness by its intermediate ‘stakeholders’ defined as “any group or individual who act as the providers or withholders of legitimacy” (Cummings and Doh, 2000). New technology firms especially depend on being considered legitimate as their main challenge that their technology may be difficult to assess by their stakeholders.

Legitimacy studies have been criticized for being too focused at the industry level of analysis (Aldrich and Fiol 1994; Zacharakism, 2003). This study therefore focuses on micro level processes, i.e. entrepreneurs and their team members. Although recent studies have provided insights on the relationship between legitimacy and acquirement of resources (Zott and Huy, 2007; Deeds et al.,
2004; Zacharakis, 2003), there exist scant knowledge of the actual processes of legitimacy building. We argue that building cognitive legitimacy depends on parallel and mutually reinforcing processes that are technological and relational in nature. This view portrays legitimacy building as dynamic processes where entrepreneurs need to convince stakeholders about the superiority of their technology and at the same time develop relations and alliances to customer and industry actors. How do new enterprises build cognitive legitimacy through technological and relational fitness?

In answering this question this study examines early-stage firms presenting new technology to the marketplace in the Norwegian Petroleum Sector. This sector is often characterized as a conservative, capital intensive industry where safety and security is considered crucial. Hence, legitimacy becomes important when developing new technological solutions. Due to the explorative frame of the research question, a case study of three innovative firms operating within drilling and exploration activities in this industry was chosen. The paper proceeds as follows. First, the theoretical framework for exploring the dynamics of legitimacy building is presented. Second, the research method presents a comparative case study design and data collection strategy. The third section reveals our empirical results followed by a discussion. The paper ends with a conclusion presenting theoretical and managerial implications.

**A FRAMEWORK FOR EXPLORING THE DYNAMICS OF LEGITIMACY BUILDING**

New enterprises emerge when entrepreneurs succeed in mobilizing resources in response to perceived opportunities (Busenitz, 2001). Some entrepreneurs recombine the resources that they have at hand, but also need to acquire resources from external stakeholders in order to launch or grow their enterprises (Baker and Nelson, 2006). Resources refer to input factors such as human capital (e.g., employees, board members) and financial capital (e.g., external equity investment, revenues) that entrepreneurs need to create organizations. Stakeholders either provide the resources needed by the organization directly, or they provide the legitimacy necessary to acquire resources from others (Meznar and Nigh, 1993; Aldrich and Fiol, 1994). A recent study finds that entrepreneurs are more likely to skillfully and frequently obtain resources for new venture if they perform symbolic actions such as conveying the entrepreneurs' personal credibility, professional organizing, organizational achievements and the quality of stakeholders' relationships (Zott and Huy, 2007). Another study suggests that increased legitimacy increases the flow of capital into new technology enterprises (Deeds et al., 2004). Thus, the link between resource acquisition and legitimacy should be obvious.

A key source of the difference between established and new enterprises is that the latter do not possess a base level of legitimacy (Aldrich, 1994, Rutherford et al. 2009). A much used definition is “a general perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definition” (Suchman, 1995:575). Legitimacy based on cognition is called cognitive legitimacy and differs substantially from the rule bound types of legitimacy as it creates the room to contradict formal or informal rules based on a new, shared understanding of a concept (Scott, 2001). Cognitive legitimacy refers to how one type of knowledge or belief is spread, shared, interpreted and accepted across a society (Scott, 2001). Further, it describes a tacit form of legitimacy, in which stakeholders make legitimacy judgments based on comprehensibility, level of understanding and taken-for-grantedness rather than on desirability (Shepherd and Zacharakis, 2003; Rutherford et al. 2009). For companies this becomes important as customers need to understand and believe in the company. Further, the technology must assist customers in achieving their needs. For customers it may be argued that formal or informal rules may take second seat compared to the persuasion of a certain technology or competence (Zacharakis, 2003; Deeds, 2004). Indeed, as cognitive legitimacy for a certain product, competence or activity may first spread in certain networks, it may later influence other types of legitimacy through altering formal and informal rules. It is argued that knowledge of a company may exceed desirability when it comes to customer choice of partner/supplier. Indeed, cognitive legitimacy may be measured in the knowledge, understanding of, belief in and taken-for-grantedness of a concept, an organization, a management-team, a technology or a certain new knowledge (c.f. Zacharakis, 2003).

As new technology type enterprises are faced with the challenges of comprehensibility (Ranjelovic, O’Rourke and Orsato, 2003), this study extends the meaning of cognitive legitimacy to include...
potential preference and endorsement for a company’s technology. This is also in line with Hannan and Freeman (1986) and Aldrich and Fiol (1994) where cognitive legitimation means that people are knowledgeable about the product and service to such an extent that they are taken for granted.

Following the arguments above, a company needs to match the belief of the constituents in order to approve its cognitive legitimacy. Emtairah and Mont (2008) view legitimacy as a social construct that represents a match or mismatch between the organization and the shared beliefs of the society. Shaped by the individual firm, but possessed collectively once created, legitimacy is perceived by society and its multiple actors outside the organization (Emtairah and Mont, 2008). The constituents of new technology firms are shareholders, customers, industry actors, venture capital providers, governments, public interest groups who assess the appropriateness or legitimacy of the firms’ activities. Research on alliances show that relations to actors with substantial reputation and social status can provide organizational benefits (Wiewel and Hunter, 1985; Sharfman, Gray and Yan, 1991; Baum and Oliver, 1991; Larson, 1992; Uzzi, 1996). Dacin et al. (2007: 172) concludes that legitimacy of relations between firms may influence alliance performance of firms by generating support for the interorganizational relationship and enhancing the firms’ reputation. Thereby legitimacy increases the firms’ survival chances and its ability to procure critical resources or strategic advantages.

Despite of the increased research attention, few studies have been concerned with the processes through which cognitive legitimacy is obtained. Inspired by Helfat (2007) who introduces the level of a firm’s accumulated technological and relational capability as a firm’s fitness, we use the terms technological and relational fitness to characterize how new enterprises use technology and relations to overcome the lack of legitimacy. We define technological fit as the effectiveness of the technology or competence of the firm to solve a problem or a challenge of the potential customer firm. Thus, if the technology or competence of the firm can solve their customers’ challenges more effectively and efficiently than the existing technology, a high technological fit is identified. By demonstrating a high technological fit, the company is expected to convince potential customers of the advantage of the technology. Hence we propose a positive relationship between technological fit and cognitive legitimacy.

At the same time, Helfat (2007) argues that technological aspect should not be the only concern for a company. Relational capabilities, dealing with the ability to associate with stakeholders, are essential to a company’s success. In our framework the term ‘relational fit’ is defined as being able to attract relations and strategic alliances. Relations and alliances may provide cognitive legitimacy in that it facilitates the knowledge exchange and thus increases comprehensibility and further; taken-for-grantedness of a company and their technology. Thereby legitimacy increases the firms’ survival chances and its ability to procure critical resources or strategic advantages. Dacin et al. (2007: 172) concludes that legitimacy of relations between firms may influence alliance performance of firms by generating support for the interorganizational relationship and enhancing the firms’ reputation. Social network research provide support for structural characteristics conducive for entrepreneurs’ resource acquisition (Aldrich, Burt, Uzzi etc). However, network research has been critized for not conveying the processes by which resources are required, hence by introducing relational fit as a capability we claim that more processual aspect of relations can be covered. We propose a positive relationship between relational fit and cognitive legitimacy.

Building on the above arguments; we state that technological and relational aspects are of specific importance when intending to build cognitive legitimacy for a certain concept. Our conceptual framework, as illustrated in Figure 1, suggests that cognitive legitimacy is obtained both through a firm’s technological and relational fit. A new firm with weak technology and competence may deteriorate its reason for existing. At the same time firms with superior technology may struggle to survive to the same extent if they are not socially embedded. Thus, the model has no definite starting or ending point, it is entirely cyclical. As an initial cognitive legitimacy based on trust, belief and understanding of the technology is established, it becomes easier for firms to associate with stakeholders, i.e. they are likely to enhance their relational fit. In being socially embedded, resources may be acquired which again may increase cognitive legitimacy in addition to augmenting the technological fit. This cyclical process is represented by four arrows in the model in Figure 1.

***Figure 1 about here***
However, following recent research in legitimacy threshold (Rutherford and Buller, 2007; Rutherford et al., 2009) one may argue that these two aspects need to reach certain threshold in order to develop the process of legitimacy building. Threshold of legitimacy refers to where new enterprises need a certain level of acceptance in order to survive. More precisely Zimmerman and Zeitz (2002) define it as: "[the point] below which the new enterprise struggles for existence and probably will perish and above which the new enterprise can achieve further gains in legitimacy and resources." They further state: "An organization must achieve a base level of legitimacy that is dichotomous--it either does or does not meet the threshold" (Zimmerman and Zeitz, 2002:427).

Applied to our framework one can argue that threshold level are reached when the entrepreneurs have fulfilled certain criteria that are important to their stakeholders and that they, by fulfilling these criteria, make themselves more capable for further development. Hence, we agree with Rutherford and Buller (2007) that the threshold occurs when some significant stakeholders have legitimized them. Further, following Pfeffer and Salancik (1978) it is often the key customer or financier that grants this legitimacy.

The intended contribution of this model is to try out a more process – based (processual) perspective of legitimacy building than previously studied. Further, by indicating potential thresholds, we may be able to explore where in the dynamic cycle the progress in legitimacy building is stalled.

**RESEARCH METHOD**

**Context and Case Study Design**

The technology development in the petroleum sector has met new challenges, due to the offshore industry moving toward deeper waters, and partly more arctic environments. Hence, field development solutions change from fixed to floating production units and to smaller installations on the seabed. A particular feature of oil exploration and field development is the fact that every reservoir has its own characteristics. Developing offshore oil fields is costly. In order to maximise the return of each field, the licensees collaborate to adapt the best technological solution for extracting the petroleum resources. The result is an increasing demand for innovation. As exploration and drilling takes place in increasingly challenging environments, existing technological solutions approach their technical and cost limits, generating an increasing demand for new technologies. The need for further R & D within the petroleum industry enterprises in Norway makes a powerful and compelling case for an empirical study of new developing new technology.

In order to grasp the embedded, processual and contextual nature of legitimacy building, a case study design was chosen. We seek to counter the criticisms of case study research by demonstrating the potential of this approach for generating new ideas by producing rich data to inform theory (cf. Wang and Ahmed, 2007; Siggelkow 2007). Following the theoretical sampling of cases, we build on the suggestive arguments that multiple cases create more robust theory grounded in varied empirical evidence (Eisenhardt and Graebner, 2007). The cases vary in organizational size, somewhat in technology and market niche, leaving ample opportunities for exploring various processes of legitimacy building. We controlled for industry, type of company and type of innovation. The three companies selected are all within the exploration and drilling segment of the Norwegian petroleum industry, established to commercialize an innovation and have reached a stage in their technological development where commercialization activities had begun. The three firms, named Alpha, Beta and Gamma, have achieved high ratings in terms of technological innovation and development as well as support from various research programmes, economic development programmes and venture capital. The enterprises were established 3-5 years prior to the data collection ago; which is in accordance with studies of new entrepreneurial ventures.

This study encompasses in-depth individual, semi-structured interviews with numerous and highly knowledgeable informants such as the CEOs, CTOs, BM and members of the management teams, key informants in the companies’ environment and an industry advisor. Our informants were selected to provide a balance of opinions from different professional areas, and different levels of responsibility and seniority in an attempt to gather and integrate a variety of perspectives. Following Eisenhardt and Graebner (2007) it is unlikely that such a varied group of informants engage in retrospective sense-making or impression management. Semi-structured interviews were chosen since they allow for richer data and leave room for adjustments during the interview. Furthermore, unobtrusive measures of company information were gathered, such as information from business registries, websites, firm presentations, and press clippings.
Given the early phase of legitimacy building in new enterprises we follow the case studies potential for theory building (Eisenhardt and Graebner, 2007). With a purpose to contribute to understand the dynamic processes of legitimacy building we aim at analytical generalization, i.e. to generalize our empirical observations to theory rather than a population (e.g. Yin 1994). Statistical generalization, i.e. whether the empirical results are generic for all high tech manufacturing sectors in Norway, or specific for the petroleum industry as such, is not an issue here.

Data collection strategy
The data were collected during three rounds of interviews. The primary goal of the first round (October 2008) was to get to know the companies, their product history, their innovation process, the people involved, their background and skills and what they considered as their main challenges and resources.

The primary goal of the second round was to get a more detailed understanding of the firms’ activities that lead to increased cognitive legitimacy. The questions asked were about the firms’ perception of customers’ knowledge of the strength of technology and their understanding of the technology. In addition we tried to grasp potential scepticism and remonstrance among the firms’ customer. Further, we tried to uncover what the firms did to increase the customers’ comprehension and belief in the belief in the product/technology/organization. In order to retrieve various aspects of this information, interviewees in different positions were chosen, such as the CEOs, CTOs, BMs and members of management teams and two oil companies.

The primary goal of round three was to learn more about the industry setting and the conditions facing innovative companies in this particular industry. Hence, key informants in the companies’ environment were included, such as the leaders of the technology/research departments in two petroleum companies, as well as one board member/industry adviser with connections to one of the firms. In addition tree telephones interviews were conducted in the spring of 2009. Altogether 15 interviews were conducted, four within each company, two within two different oil companies and one with a board member/business advisor. In addition document analysis of newspaper clippings and public debate and industry journals were done.

Given the few empirical studies of legitimacy building of new enterprises, we were left with few prior operationalizations of the cognitive legitimacy concept. Given the close association between legitimacy and inflow of resources, we perceive cognitive legitimacy to be reached when there is an inflow of resources based on belief in, comprehensibility and taken for grantedness of the technology and the competence of the new enterprise. Thus investments and resources such as capital, employees, customers, suppliers, project funding, endorsement by stakeholders etc. get accessible when cognitive legitimacy is obtained.

Description of Alpha, Beta and Gamma
Alpha was founded in 2005 by a team of four, and based on a technology foresight process where several ideas were assessed. One of the technologies were of particular interest for the National Oil Company and on their request, a project was initiated. The business idea is based on a radical new automated solution within the drilling and exploration sector that is integrating cutting edge technologies. The idea was chosen based on an explicit market need, an enhanced technology to face the increasingly challenging environments in the Arctic and deep sea. The market targeted by Alpha is currently being developed and there are thus few direct competitors. Alpha’s strategic intent is to develop innovative technology, commercialize it, and eventually exit. In terms of commercialization, Alpha has started to commercialize the first module, which can serve both as an independent product and a vital part of the complete package they are developing.

Beta was founded in 2003, but the idea was “born” and patented in 1999 by a researcher having worked in this specific field. The idea behind the company is described as a radical new solution that will position itself as a “game –changer” in the market. The existing market is characterized by high-cost, high-risk solutions which are also damaging to the environment. Therefore, with increasing pressures on costs and on the environment, the market is disposed for new solutions. The company has developed in structured phases. First, the idea was brought to a venture company. A company with professional structure (board, management team etc.) was set up early on. The inventor quickly became a minor shareholder, and a team of different people worked with the idea. The company
raised substantial funds for the technology development through an initial public offering (IPO) early on. During our study Beta moved into the last stage of the product development. The strategic intent is to develop both the technology and the organization and to be a major player on the global market.

Gamma was founded in 2003. The product idea originated from the entrepreneur’s own experience from a technology development project that was shelved after the company could not make the technology work. The entrepreneur subsequently developed a simple solution that worked from the start. In terms of technology development the company has developed a first and second generation pilot technology. The main challenge is to find the right business partners and establish customer relations. The strategic intent is to develop the technology and the services as part of a larger established company. However, after 5 years of operations, the company has still not managed to negotiate an appropriate contract, nor has it started to grow, and the CEO is employed full time as a consultant for yet another company.

Both Alpha, Beta and Gamma are developing products that may be characterized as innovative. Whereas the idea in Alpha and Gamma are industry driven, the idea in Beta is clearly more research driven. The products are new in the market, where Beta offers the most radical one while Gamma’s product represents a new combination of existing resources. With regard to knowledge Gamma creates new possibilities for subsea operations, Beta uses brand new knowledge, contesting established “wisdom”. Alpha develops new technical solutions and technology where none exist. All firms are at a stage where the technology is mature enough for commercialization. This makes the three companies suitable as empirical cases for exploring the dynamics of legitimacy building. See Table 1 in Appendix for a presentation of resources, including firm assets and attributes of the firms.

**EMPIRICAL RESULTS**

This section contains a presentation and discussion of the empirical processes based on the conceptual framework. The interviews demonstrated various processes through which technological and relational fit were salient in augmenting cognitive legitimacy. In these new technological enterprises, three dimensions seem to demonstrate the level of technological fit; the firm’s level of innovation, its testing of technology and its ability to integrate technology with existing solutions. For relational fit, the following three dimensions emerged from the data: the firm’s ability to be visible, its ability to involve key people in critical position, and the ability to build relationship with main actors and organizations within the industry.

**Building legitimacy through technological fitness**

As cognitive legitimacy is related to knowledge and competence, a firm’s technological advantage must be communicated to the stakeholders, who in turn need to be convinced. Technological fit companies are expected to supply solutions that can substitute existing technology more efficiently. The three companies assess their technology with regards to different areas: the novelty of the innovation, the integration of the innovation and the testing of the new technology.

**Novelty**

Beta’s technology seems to meet the oil companies’ concerns with regard to cost, risk and environmental protection. Their technology is groundbreaking and encounters high enthusiasm among the stakeholders. It is further described as a game changer, indicating that Beta’s technology is regarded as highly innovative. The CEO explains:

“The oil companies say that this is a game changer that they don’t see the full extent of. . .” It’s clear that with our environmental profile and cost profile we can drill a lot for less so that….. The first oil company that has this technology will have a great advantage with governments… (CEO, Beta)

An international investor in the project describe their decision to invest as follows:

“ It’s a high risk – and high reward endeavour... It fits our company needs. To have that technology developed would benefit our company. We thought it was a good idea to support it. (Project manager, international oil company)

Alpha’s technology is also described as new, radical and provides spinoffs to other technologies. Alpha work with highly respected research institutes both nationally and internationally and fundamental new knowledge is being developed from their project::
“This is also a state of the art development. Cutting edge technology! We have many new technologies that come out of this development. It is a kind of a quantum leap what we are doing… “We have talked to those at ESA (European Space Agency). When you send a robot into space you have some of the same challenges on management (control) that you do down at the bottom of the sea, on the oilrig….So therefore we have some synergy there.” (CTO, Alpha)

Potential skepticism by customers is handled in that Alpha combines existing and well known technologies. Moreover, the focus of Alpha’s is on a market in the early development stage. According to our interviewees, there exist no current good solutions in the market and thus Alpha is not challenged by any major competitor.

“The petroleum industry is not used to…it is always scared with new things…so we just combine known technologies… “There are very few competitors …… it is actually us who have the most’ tangible ideas and who have come furthest ……. “ (CEO, Alpha)

Gamma’s technology is not fundamentally groundbreaking, but rather a combination of existing resources.

“I use the invention in a different way, but the invention itself is general. It just describes a way to make a telescopical cylinder. I have just built it into another tool.” (CEO, Gamma)

Of our three firms, Beta introduces groundbreaking technology that the market describes as a game changer. Alpha presents fundamental new technology for an emergent market and the value of their technology for the customer is considered quite high. Gamma is introducing new and advanced technology.

Integrating technology
Integrating technology may create a higher acceptance of the technology among potential customers. The level of integration may influence comprehensibility of the technology thus enhancing cognitive legitimacy.

“… we cooperate closely with customers in the introduction of new technology because we are dependent on that they stick their head out and say that ‘yes we take responsibility for the wells and integrate Alpha’s products with other partners…” (CEO, Alpha)

”… it should not be a year’s study to understand the technology. It should be simple…” (CTO, Alpha)

For Alpha it thus seems important that their system can easily be integrated with other equipment and existing technology. Their sales argument is to make the technology as flexible as possible. This enables the firm to fit their product to all existing technologies within drilling technology and in operations from other suppliers.

In contrast, Beta does not actively work toward integrating their technology to the existing solutions of their customers. The lack of emphasis on such processes reflects the characteristics of Beta’s technology. Described as a game changer their technology may revolutionize the industry, the focus is on the functionality of the technology, not on integration with existing solutions. The main challenge for Beta at this point, is to make the technology function in a satisfactory way. When it does, the advantages will be so great that customers are expected to adapt to the new technology, not the technology of the customers:

“When the world’s largest oil company says they must change their ways… then Beta has had and impact.” (CEO, Beta)

Conversely, Gamma’s technology, can not exist independently, but has to be integrated with existing technology. Nevertheless, the entrepreneur assesses the opportunities for strategic alliances with industrial partners as a better option than building a new organization from scratch.

“if I can be aligned with some company…they would have a lot of what I need.” (CEO, Gamma)
Based on these quotes we therefore assess Alpha as having the highest level of technology integration and Beta to have the lowest. Gamma is positioned in between Alpha and Beta when it comes to level of integration.

**Testing the technology**

Testing the functionality of new technology is an important part of the product development process. Testing is often carried out through building prototypes and carrying out different types of experiments. The firm may explore and deepen their knowledge through experiment testing, thus enhancing the belief in, the comprehensibility of and finally, the taken-for-grantedness of the technology. Alpha describes their process in the following way:

“We have to test some of these technologies on platforms, because they will be underwater and controlled from land... and that is the last part of the process... it is first tested in the workshop, then in research institutions and finally on an oil rig, probably next year.... Then we have qualified to take the big step down to the bottom of the sea” (CEO, Alpha)

Alpha also works with testing as a way of learning and improving their product in dialogue with the potential customer. Thus, testing enhances comprehensibility.

“Our partner has tested the machinery many times before and performed some drilling. Then they can give us feedback. One thing is pure performance, to get an objective assessment, another thing is the use, the application and utilization... a part of the challenge is to run and prove the functional security... That they can verify that we have met the criteria or that there are things we might adjust etc. We learn this way.” (CTO, Alpha)

Alpha experiences that the technology development and the testing goes far beyond their original plans and their previous experience.

“When I started in Alpha, the pace of product development was new to me. I have never experienced that a product like our technology has been developed this fast. I don’t know of any place where this has happened before. … everything works immediately” (CTO, Alpha)

There is immediately a somber attitude to the pace of the development, in spite of the good results

“We have actually not had large surprises yet, we haven’t. But we will of course. There is no doubt that we will be delayed, but this is due to our ambitious plans. We need to explain why we are delayed. However, is a part of the process.” (CEO, Alpha)

Thus, the CEO is explicit that their experience is too good to be true and that future delays must be expected and accepted by the stakeholders.

Beta’s project is characterized with a high level of technological development and testing becomes a crucial part of the project. Beta experiences some delay since some of the tests has not proved successful.

The product has no value if we can’t get it out in the market. From prototype to market it might be a ‘bumpy road’ with a lot of pilot testing. ”We have a project plan that initially was stipulated to three and a half years until a successful prototype. We are a year and a half behind.” (CEO, Beta)

Betas shareholders are following the process closely and discuss the progress on various websites. Some of shareholders show skepticism of Beta’s progress as illustrated in the quote below:

“Beta has certainly not kept the program at all. In 2007 they said that the commercial Beta should be finished by the end of 2008. And they have not even reached 3 m into the ground. I smelled the fuse” and sold most of my shares. This could drag out, and that would have been ok. But the chance of success is rather small.” (Shareholder, Beta)

Gamma underlines that testing reduces the risk for potential customers

“The risk is that my system is new. It is completely different way to do it. However, just one part is new, which is the tube; the rest is the same as in other equipment. In principle, the results should be the same. Therefore it is a qualifying project. I want to demonstrate that the results are the same.” (CEO, Gamma)
Originally Gamma had a consortium for executing a prototype test, however for final test one of the main partners withdrew because of internal challenges. The entrepreneur now attempts to develop a new consortium in order to finalize the testing. Two tests have already successful. One or two more steps of testing are needed until the product is finished. The last part of the testing has to be performed together with an external partner, potential customer or investor. Gamma judges their performance to be well received:

”… Together we proved the patent through the equipment that was built and tested at the golf course. We pushed this type 10 meter down in the ground with this equipment and then we had proved the functioning of the technology. …. I suspect they still believe in me despite of the fact that I have used long time and work alone with this… It doesn’t take more than if I do a good job for another oil company, it will turn around: Oh, it was actually possible after all!…. I have sort of delivered what I promised. I have made the technology work, delivered plans and even budgets. So I may have the goodwill ” (CEO, Gamma)

Alfa, Beta and Gamma have all, based on their initial idea and the sketch/prototype of their technology, been supported by the Norwegian Research Council. Further, they have been granted a larger sum of money by programs from oil companies. Hence, all three companies have been endorsed by public organization and private industry, thus achieving base line legitimacy.

The data show that the three firms can obtain cognitive legitimacy by various dimensions such as: the innovation level, the integration of technology and the technology testing and development. Table 2 below summarizes the main differences. Beta appears to have the most radical technology, at the same time their delayed test results may hamper obtaining cognitive legitimacy. Therefore Beta illustrates a case that may “infringe” the dynamics of the model, thus exemplifying lack of legitimacy threshold. 

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Table 2: Comparison of the firms’ technological fit.

**Building legitimacy through relational fit**

Relational fit describes the firms’ ability to attract preferred strategic alliances (customers, suppliers, investors etc.). Our model suggests a dual relationship between cognitive legitimacy and relational fit through the constant interaction with stakeholders in a mutual learning process. Relational fit in itself may give legitimacy to a new firm through positioning and social attainment within the industrial environment. At the same time, cognitive legitimacy makes it easier to attract, build and maintain relations and alliances. The data indicate three processes by which the firms build legitimacy through relational fit: involving key people in strategic positions and boards, developing relations and alliances with key people in the industry and being visible.

**Involving key people**

Cognitive legitimacy implies that a firm’s stakeholders prefer the firm’s technology over others. To achieve this, companies have to show that they understand the industry they are in and the needs of their potential customers. Involving key people in the industry is therefore one way of achieving cognitive legitimacy.

Potential investors and customers evaluate firms also by checking the board of directors (refer to research ***). Thus, having well a reputed and connected people on the board of directors may provide a company with an assured legitimacy. The board of directors contribute not only with their expertise, but also lend their personal reputations to the company, as a kind of in tangible resource.

“I think it’s very important to have a strong organization all over the place. …. you may survive without a good board of directors, but it’s certainly opens up a lot of networks and makes things a lot easier…” (CEO, Alpha)

Further, the importance of having a good project with interesting technology is seen as being important for attracting good people. A board member states:
“It is obvious that when you have an exciting thing (interesting technology, authors note) going, that you get interesting people involved.” (Boardmember, Alpha)

“Our board is experienced in the world of finance and understands which buttons to push and the value of obtaining capital.” (CEO, Beta)

In contrast, Gamma’s board appear almost coincidently put together and consists of people they already know well. Although Gamma’s board involves representatives from stakeholders such as oil companies and a potential partner, Gamma does not express the same appreciation of the significance of the board and does not communicate a clear strategy of attracting potential key board members.

Building relations and alliances
All three companies realize the importance of developing relations and alliances with key actors in the industry. Beta formulates this very clearly:

“It’s always comfortable with a solid economy, but it’s not decisive ………the main challenge is to find someone on the other side of the table. An industrial partner or a technology expert who understands the need for the idea and senses it. One who is willing to join the owner of the idea and to take it further. If you don’t have that link, call it customer based or industrial based innovation development, at best it remains a good theoretical idea. What gets everything rolling is when the customer or the industrial partner says: Yes, this we will go for... You need a customer who saying: Yes, we are willing to try his out.” (CFO, Beta)

Beta has integrated three potential main customers in their technology development project. Communication with these three is far more open than with other actors. There is, however, a non disclosure agreement underneath.

“On the customers’ side, the three respective operator partners have each a member in the project’s steering committee, due to of their participation financing the development project. They know exactly where we are and our main challenges. This makes it possible for them to say that’ here we can contribute with resources’. ” (BM, Beta)

“...as a petroleum engineer having worked in all stages in drilling and sea bed activity I understand the oil companies’ needs and the way they talk. We position ourselves according to this. We have the same view of the reality as the customer. It is a good thing to “speak the same language.”” (CEO, Beta)

The CEO in Alpha describes how they identify key positions in the customer organization and present the product for them. This represents a tangible step in the commercialization process. Alpha highlights the importance of working on different levels in the industry.

“We are going to find ten – fifteen people we want to work with in the oil companies. We will present the project to these people and find out if they are the right people, and build on from there. We are going to identify the right people, probably on the platforms as they are likely to be the first users, and then we will have presentations for them It’s a comprehensive and time consuming process.” (CEO, Alpha)

Gamma fully realizes the importance of building relationships and having strong partners, finding a partner is a key strategy.

“…When we are entering the commercialization phase, the customer will not automatically say: yes, we will use your system. You have to find a commercial solution that is acceptable beyond the economical aspect but also technologically and operationally prudent. So I need an industrial partner…. I am just one man, but to win a soccer match you must be a team…” (CEO, Gamma)

The founder has a good network but has not established a formalized partnership with any of the companies he is talking to. Gamma has attracted interests from potential partners, but the negotiation stops because of the disagreement of valuation and the terms for partnership. Gamma is experiencing
difficulties in attracting a partner. Potential partners are risk averse and in trying to negotiate the contract, the following description was given of the potential partner:

“I think they have used too long time. I think they are too careful... we try to define a phase of two, three years, where they will be more comfortable with the market aspect of this...and then they start thinking ‘dark’ thoughts.....and then they set so many limitations that they scare Gammas’ founder too.” (Stakeholder, Gamma)

This quotation illustrates the potential partner’s limited belief in Gamma’s project. A convinced partner would have been more inclined to see opportunities of Gamma’s technology and have questioned less formal aspects such as insurance and price issues. An illustration of Gamma’s legitimacy challenge is illustrated by the situation of a potential strategic alliances doubting Gamma’s capacity:

“In the minutes of the meeting they wrote in March it said that ‘he is just one person and full time engaged at another company, so therefore they couldn’t expect too much... I don’t have a level of trust in the seismic milieu. I need to work together with a large actor who I trust. The seismic milieus don’t listen to me because I am not an expert in the field of seismic. I have just developed the equipment.....and I know that many people in this business favour alternative technology.” (CEO, Gamma)

Gaining visibility
One way of meeting the challenge of legitimacy is to become visible, to create a name and a good reputation. Alpha illustrates how third party approval of their product idea has been important in building legitimacy for the company.

“The innovation prize says,” ok maybe you’ve got something here”. The patent says “this is innovative”. When Norwegian Oil Company commits research money, then it’s definitely worth having a look at. Also when The Research Council says “this is on top of our list, and within the area we support”. Then it’s a validation for us, which is very important to us...if you go to one guy in an oil company and you know he has never heard of it, then you start explaining what it is, but he is likely to be negative. If he just read about yesterday in the newspaper then it will be a totally different thing. Then it’ll be ‘oh yeah, I read about it, very interesting’. Then you have a much better chance....Being in the papers, and on the ONS (Offshore Northern Seas), exhibiting and so on is extremely important because then people have at least heard the name before. To always be visible is an important part of our strategy.” (CEO, Gamma)

Being visible to the industry also means that potential customers get more familiar with the technology, thus making it more for granted. Therefore, they may perceive the technology as less risky to implement. Being visible helps building legitimacy for innovation, especially when the firm or technology is presented in a positive manner. Alpha has been successful in making itself interesting for the press and has exposed itself in various media and on different arenas.

Beta also has funding from the Norwegian Research Council as well as from three large petroleum companies, they have won an innovation prize, they participate in exhibitions, periodically report progress and financial situation to their shareholders. Further, Beta has developed a routine for being visible as a result of being on the stock exchange. Being publicly listed also means they have to be careful with how information is communicated and to whom, to avoid insider-trading. However, the technology is still openly discussed with the technology partners, as a way of building trust, but also to exchange technological know-how. This company has a relatively high profile, and appear so far to have a successful reputation. It has been presented as a good example in different forums. They also try to create enthusiasm for their innovation.

“In general the CEO and the CFO speak for the company externally. Being a joint stock company it has to be that way. In our customer relations we are very concerned that they have good knowledge of the technology as possible. That they are familiar with what we are developing, and that they talk about our collaboration partners. We’re sort of doing “missionary work”, and informing in wide forums to create enthusiasm, rapture and resources. ” (BM, Beta)
Being visible is a way to handle the challenge of legitimacy. Legitimacy can be enhanced following the accepted “rules” in this industry. Being in newspapers, showing up on exhibitions and other activities provide the “signals” to their potential users. Being on the stock exchange, Beta receives much attention. Shareholders are following closely Beta’s performance and our analysis of the active discussions on web for suggests high expectations and also some scepticism with regard to the breakthrough of the technology. This is illustrated with a quote from one of the shareholders from the web:

“Many "experts" come forward, here on the web, with issues that people in Beta of course already knows. After all, they have worked on this from 1999 to the patents in 2003. Extensive expertise comes from working with oil companies, still believing in the concept and willing to continuously contributing after the final test is completed. Instead of looking at the technological challenges that I believe most of us have no qualified opinions about; check the following: professional people, managers, investors, partners who all for years have followed Beta’s progress and that still hold on to it. The management has large shares themselves and has not sold out.” (Shareholder, Beta)

The entrepreneur in Gamma is very explicit in portraying the vulnerability of being small, and states that he has no excessive capacity:

"I am not very good at being visible in the market, but this has to do with my capacity...."(CEO, Gamma)

Gamma’s web site has not been updated in the three last years and the entrepreneur is seldom a figure in the newspapers or media. However, when talking to industry experts in the research parks and he appears to have a good standing. This is likely due to his fulfillment of the company’s deals and that his technology works.

To conclude: While Alpha experiences that the technical development runs smoothly, Beta has its major obstacles in technology testing and to make it function optimally. As a result, Beta is somewhat delayed. Both Alpha and Beta succeed in building relations and alliances and acquiring key people into their organizations either as employees, consultants or board members. The main challenge for Gamma consists of finding the right business partners and establishing customer relations. After five years of operations, the company has still not started to grow, and the CEO is employed full time as a consultant for another company. In relation to the dynamics of Figure 1, Gamma appears to lag behind when it comes to relational fit, thus Gamma has not reached the necessary threshold of legitimacy. The main differences between the companies are illustrated in Table 3.

<table>
<thead>
<tr>
<th></th>
<th>Level of key people</th>
<th>Level of relations and alliances</th>
<th>Level of visibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Beta</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Gamma</td>
<td>Low Medium</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

Table 3: Comparing the companies’ relational fit.

Discussion and conclusion
The data indicates that Alpha, Beta and Gamma exemplify various dynamics in the suggested model in Figure 1. The initial basis of Alpha was relational in terms of a team and an alliance to Norwegian Oil Company. On the basis of this collaboration, the idea of the technology emerged. Hence, in that firm relational fit was a precursor for technological fit. Being aware of the time factor as a critical resource for such a large project, the company deliberately divided the major project into operations and components. Thus, Alpha met all deadlines. In addition all testing proved significant. Last, Alpha is very concerned about integrating the technology in order to enhance customers’ understanding and belief for a comprehensive system.

It thus seems that Alpha increases customer belief in and comprehension for their technology. Further customers’ inclination for taking the technology for granted is increased. Alpha achieves first mover advantage and thereby setting a standard in the industry. Based on this, we assess the cognitive legitimacy of Alpha to be rather high, demonstrated by an inflow of resources by a large stakeholder’s investment. Following the dynamics in the model, Alpha has been aware of the
importance of collaborating with knowledgeable, well reputed and connected actors. Moreover, they have been visible in the press and on main industrial arenas. Finally, Alpha demonstrates a feedback loop from relational fit to cognitive legitimacy. Relational fit demonstrates who the company is and what they may accomplish. Hence, the firm’s reputation is strengthened. New alliances and connections also become easier available (i.e. due to the collaboration with the oil company Alpha obtained well regarded suppliers) this, in turn, strengthens the technological fit.

The initiation of Beta was based on a highly technology advanced idea patented by an experienced and well regarded researcher. Thus, the idea initially had some cognitive legitimacy. A formalized process of organizational building and developing took place. Further, the idea gained interest from three major oil companies that early on wanted to invest in the company. A professional organization was set up to focus on innovative employees and well reputed managers and board members. Thus, a high relational fit was obtained on an early stage.

Based on the high level of investment in the company, Alpha had economic freedom allowing them to acquire key technology and build up an sophisticated organization, which facilitates further technology development. However, their ambitious project met obstacles in implementation. The tests have not given sufficient results and are lagging 18 months behind schedule. Given the complexity of the project, the delay is not dramatic, however not desirable. Additional data from newspaper clippings and industry debates show an emerging criticism towards the Beta’s development. We assess that this may reduce Beta’s cognitive legitimacy. On the one hand, Beta illustrates a highly innovative company. On the other hand, Beta’s high ambitions seem to cause troubles in prototype testing. The lags in final tests prove a slower dynamic of obtaining cognitive legitimacy.

Gamma’s project was based on a high technological competent founder, acknowledging an easier way of solving a specific technological problem. The idea was well founded and relevant for the industry, hence the entrepreneur received high attention and acceptance and was invited into the regional industry incubator. The incubator gave Gamma access to a recognized R&D program which funded the initial testing and the opportunity for a larger network. The tests proved successful and the expectation for further testing was very positive. Gamma’s challenge became now to ally with a partner due to that their technology is only complimentary to other existing technologies. Gamma’s legitimacy seems rather low for several reasons. First, the technology is new and supporting it is highly risky. Second, the company exists only through the founder who is more technological than organizational competent. Compared to the other companies, Gamma has few key people associated in the role as board members or business advisors. Gamma is also much less visible than the other firms. Thus, a relational fit is not well developed, and cognitive legitimacy is not cultivated. This is shown through the lack of confidence of Gamma’s potential business partners. Thirdly, Gamma is totally dependent on a partner to do the final tests. Consequently, the process of business development is slowed down until a relational fit is more developed.

Our conclusion is that the dynamics of the model illustrate important obstacles in legitimacy building that is both technological and relational rooted. This may hamper the flow of resources into the company and thus decrease the competitive advantage, as backed up by the data in this study. The comparative analysis of the cases illustrates where in the cycle the processes seem to stop. Our main argument based on the analysis is that this study suggests further theorizing of cognitive legitimacy building in processes rather than linear and causal models. Further studies are needed to advance this framework.

Future research may want to take the observation that the three firms score very unevenly on the various technological and relational dimensions, hence the precursor for cognitive legitimacy may be fragile due to external factors not factors taken into account in our model. The possible antecedents of why firms differ in technological and relational fitness, may represent an interesting follow up of this study. Furthermore, the results in Alpha points to that a first mover advantage in creating barriers of entry may set a legitimacy threshold that may have significant impact on the followers’ legitimacy building processes. Hence, legitimacy becomes a feature of a social system where first movers lay the premises for new entrances as well as stakeholders in general.

REFERENCES


**Figure 1. The dynamics of legitimacy building**
### APPENDIX Table 1: Characteristics of the firms

<table>
<thead>
<tr>
<th></th>
<th>Alpha</th>
<th>Beta</th>
<th>Gamma</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Founded</strong></td>
<td>2005</td>
<td>2003</td>
<td>2003</td>
</tr>
<tr>
<td><strong>Idea</strong></td>
<td>Industry based (from technology foresight)</td>
<td>Research based</td>
<td>Industry based (from practical experience)</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>Patented</td>
<td>Patented</td>
<td>Patented</td>
</tr>
<tr>
<td><strong>Competence of CEO</strong></td>
<td>CEO with engineering and business degrees, 10 year experience</td>
<td>CEO with background from petroleum company and supplier industry.</td>
<td>CEO civil engineer.</td>
</tr>
<tr>
<td><strong>Competence of Team</strong></td>
<td>Team with different industrial backgrounds and experienced in technology development.</td>
<td>Seniors with long industry backgrounds, combined with “fresh” PhD’s</td>
<td></td>
</tr>
<tr>
<td><strong>Board</strong></td>
<td>Board of directors: “seniors” from industry, and investors. 4 board members hold total of 48 board memberships.</td>
<td>Board of directors: “seniors” from industry, and investors. 5 board members hold total of 46 board memberships.</td>
<td>Board of directors: CEO, investment fund, and one other member.</td>
</tr>
<tr>
<td><strong>Market niche</strong></td>
<td>Drilling and exploration technology</td>
<td>Exploration technology</td>
<td>Installation of equipment on seabed.</td>
</tr>
<tr>
<td><strong>employees</strong></td>
<td>6 employees, 6 consultants</td>
<td>17 employees</td>
<td>0.</td>
</tr>
<tr>
<td><strong>Founder</strong></td>
<td>Actively involved</td>
<td>Owns 1.3% of company, not active majority shareholder.</td>
<td>Founder: 89%, technology park 8%, chair of the board 3%.</td>
</tr>
<tr>
<td><strong>Ownership structure</strong></td>
<td>Venture fund: 28%Founders: 14% each Others: 15%</td>
<td>On Oslo stock exchange</td>
<td>Negotiating</td>
</tr>
<tr>
<td><strong>Planned commercialisation</strong></td>
<td>2009 (first product)</td>
<td>Planned start 2009, postponed</td>
<td>Started autumn 2008</td>
</tr>
<tr>
<td><strong>Relations with potential customers</strong></td>
<td>Petroleum company has bought substantial share in company</td>
<td>Has development- and right of first refusal contract with three petroleum companies</td>
<td>Negotiating</td>
</tr>
<tr>
<td><strong>Prototype made</strong></td>
<td>yes</td>
<td>Sept. 2008</td>
<td>1st and 2nd generation prototypes made</td>
</tr>
<tr>
<td><strong>Product estimated ready for market</strong></td>
<td>First product spring 2009. Complete product in 2013</td>
<td>End of 2010</td>
<td>Approx. 6 months from signing contract</td>
</tr>
<tr>
<td><strong>Strengths of technology</strong></td>
<td>Minimizes cost and increases safety, less environmental damage. Increased automation, reduced risk to personnel.</td>
<td>Minimizes cost, less environmental damage.</td>
<td>Lower costs, less harm to environment, increased reliability.</td>
</tr>
<tr>
<td><strong>Integration</strong></td>
<td>Independent technology but still integrated with existing interfaces.</td>
<td>Not integrated: Radical new technology (game changer)</td>
<td>Integrated with existing technology.</td>
</tr>
</tbody>
</table>