LEGITIMIZING TECHNOLOGICAL INNOVATION ON SUSTAINABLE DEVELOPMENT

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ABSTRACT
How do organizations gain legitimacy for their technological innovations among stakeholders, in the market, and in the institutional environment? The paper departs from research emphasizing the political, discursive and social character of knowledge as well as research focusing the embeddedness of knowledge in market structures and institutional conditions. Empirically, the paper focuses on technological innovation in the area of biofuels, and how an innovation is legitimated through stakeholder dialogue. Various claims about knowledge and the nature of different phenomena are identified in speeches, presentations, reports and other documents. The analysis of these claims and the attempts at legitimization results in a model that explores the dynamics in legitimizing an innovation. It illustrates activities, accepted knowledge, interests, local beliefs, institutional and market conditions, and the processes that shape these phenomena. The processes described are active processes of moral, pragmatic and cognitive legitimization as well as responses and challenges to institutional and market influences.

1 INTRODUCTION
The liability of newness has been approached in several areas of research (Aldrich & Fiol, 1994; Schulz, 2001). This paper describes a particular situation of such newness, where innovation brings about new knowledge about process production, market development and changes in institutional conditions. More specifically, the paper focuses on knowledge fusion, where an innovation concerning technological knowledge as well as knowledge about ecological, economic and social sustainability is fused with existing market and institutional conditions; and how firms work to gain legitimacy for the technological innovation.

Calls for sustainable development are increasing, fuelled by continued reports about the state of our planet (MA 2005; WWF, 2006). As a consequence, producers of different technological products might find opportunities in changing their ways of production and the ways their end products should function, or even be forced to reconsider their entire direction (Hellström, 2007). In this process of change, the producers need to integrate their prior knowledge about technology and markets with knowledge about sustainable development, as well as achieve legitimacy for the new innovation and the knowledge it entails. This legitimacy must be developed both in the innovating organization, among important stakeholders and in the industry and the community where the innovation will be used (Bresman & Sölvell, 1997).

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The legitimacy of a project is decided in the interaction between the project and the institutional environment filled with rules, beliefs, norms etcetera, as well as different parts of the market (Bengtsson & Eriksson, 2002). However, changes towards sustainability can entail a questioning of current practices and existing views of what is acceptable knowledge (Robinson, 2005), which threatens existing power positions and belief systems. To complicate matters, a number of different fields of knowledge are involved when sustainability is discussed; different scientific disciplines, different occupations and different markets, and competing solutions can draw on different types of knowledge and have different basis for legitimacy. Further, the more radical the knowledge developed is, the more difficult it is to gain acceptance at the market (Hellström, 2007). It follows that the process of knowledge integration and the legitimization requires active translations and transformations across the boundaries of the organization and its environment (cf. Carlile, 2004).

Research on knowledge management has to a large extent focused on the community of practice, project or organizational level when studying and analyzing knowledge integration and how knowledge becomes legitimate and acceptable within established groups or collaborating partners (e.g. Brown & Duguid, 2001; Lindkvist, 2005; Swan et al, 2002; Wenger, 2000). Other research has focused on different types of innovation contexts and innovation systems (e.g. Fischer, 2001; Patrucco, 2003; Smith, 2003) and the role institutional conditions play in making new ventures and new innovations legitimate (Aldrich & Fiol, 1994). The first body of literature has a strength in examining processes of knowledge creation and translation of knowledge across boundaries, but has not really focused on the context of innovation and the implementation, whereas the second body of literature provide understanding of the political character of innovation and the acts of institutional entrepreneurship required in developing new technology (Garud, Jain & Kumaraswamy, 2002), but overlooks the role of agency and individuals in innovation. Combining these literatures, it would be possible to explore the connection between the legitimization of knowledge from an emerging innovation and how this process is related to institutional and market influences as well as to active attempts at shaping institutional environment and markets.

The purpose of this paper is to describe the legitimization of a technological innovation based on knowledge about sustainable development among stakeholders, in the market, and in the institutional environment.

The paper’s contribution is to present a framework for understanding the processes of achieving accepted and legitimate knowledge in the institutional environment and on the market. In doing so, the intention is to contribute to research on the political, discursive and social character of knowledge and innovation, and to the connection between innovation and institutional environments.

2 RESEARCH ON INNOVATION AND LEGITIMIZATION

Hellström (2007: 157) suggests that innovations in the area of sustainable development “must be supported by a corresponding evolution of social arrangements and institutional support structures”, in particular where radical innovation is concerned. This paper examines the legitimization of knowledge and innovation at a local as well as an
institutional level. It departs from research emphasizing the political, discursive and social character of knowledge (see e.g. Blackler & McDonald, 2000; Carlile, 2004) as well as research focusing the embeddedness of knowledge in market structures and institutional conditions.

But what are then knowledge and institutional conditions? There are many different views on knowledge, and the approach adopted here is to consider knowledge as expressed in activity, or practice (Cook & Brown, 1999; Blackler, 1995; Blacker & McDonald, 2000; Gherardi, 2006). The political perspective on knowledge is based on the assumption that claims about knowledge are inseparable from the activities and the interests of the actors involved (Blackler, 1995; Kellogg et al, 2003). Knowledge is situated, contested and the outcome of interests, negotiations, values and ideologies. The situated character of knowledge further makes what is considered acceptable knowledge closely intertwined with institutional conditions (cf. Blackler & McDonald 2000). Institutional conditions are here defined as norms, rules and belief systems that influence our actions and our discourse, the way we talk about different phenomena (cf. Glynn & Lounsbury, 2005). The link between knowledge, institutions and markets is activities; comprising everything from our talk to the actions taken.

Research on knowledge and knowledge integration has frequently focused on groups or communities, where a history of interaction can give rise to a common language that thus can be linked a specialist area of knowledge or practice (Brown & Duguid, 2001; Wenger, 2000). The development of a shared language and other codes of communication and interaction improve the fluidity of knowledge in all relationships. Research on an industrial or regional level also points to the role of shared norms and language in facilitating innovation (Fischer, 2001; Longhi, 1999; Smith, 2003), but it does not focus on the processes of achieving this state of fluidity. Much of the writings on organizational learning and knowledge integration may however be transferable to an inter-organizational context, in that the problems of sharing knowledge can occur between departments where the persons have do not share the same practices as well as between organizations. Nonetheless, differences in interests may be assumed to be higher between organizations than within organizations. Both approaches can however be criticized for ignoring the role of interests and power within a group and between individuals (cf. Fox, 2000; Smith, 2003). While interaction does facilitate understanding, it is rather a pragmatic need for coherence and consistency that create the appearance of unified knowledge (Blackler & McDonald, 2000). Power is always exerted when common knowledge is used, and when the abilities to use such knowledge differ across boundaries, inequality may arise (Carlile, 2004), which in turn may hinder the implementation of innovation.

Thus, when an innovation is to be implemented, relevant stakeholders must be identified and persuaded to accept the innovation and the knowledge it is based on. To overcome problems with knowledge sharing across boundaries, researchers have pointed out the need to translate and transform knowledge. While focusing on knowledge sharing, Carlile (2004) suggests that in early development stages, boundaries are likely to be particularly uncertain and complex. He combines three different perspectives on sharing knowledge across boundaries by relating each perspective, information processing, interpreting/translating and political/transformation with three corresponding complexities in boundaries; syntactic, semantic and pragmatic. In the type of change discussed here, most boundaries are likely to be both political and pragmatic. Kellogg et al (2006), also discussing organizational
knowledge sharing, argues that Carlile's typology might be less useful in changeful settings. Kellogg et al (2006) instead suggest that a trading zone is created, where translation of local information is not that prevalent. Similarly, instead of transforming knowledge into shared understandings, contributions are loosely coupled and connected through practices of “display, representation and assembly” (Kellogg et al, 2006, 38). Actors reduce the nuances of their practices and using project practices allows for a general understanding without detail understanding of the specific issues at hand. There is also a discursive integration, meaning that people are at least superficially talking about similar things in a similar manner.

Indeed, making stakeholders fully understand the innovation might at times be a difficult process, in particularly if the competencies are diverse and the innovation is radical. Swan et al (2002) showed how managers attempting to introduce a radical medical innovation were successful in creating a community focusing on the disease rather than the new treatment. The idea of a community of practice was here used to legitimize changes and convince important stakeholders to join the project, but no such community was actually developed. Focusing the role of managers in a nascent market, Santos and Eisenhardt (2004) question the possibility to manage dependencies and relate to key players when both dependencies and stakeholders are uncertain. Important priorities in this phase are about building the new market and defining and organizing economic activity focused on the identified opportunity (cf. Aldrich & Fiol, 1994). In a first phase, entrepreneurs use mechanisms of leadership signals, dissemination of stories and identity creation to “become the legitimate and leading player for the market, making the firm a cognitive referent” (Santos & Eisenhardt, 2004; 2). Change agents, entrepreneurs and visionary leaders have a particularly important role in the area of sustainable development and innovation (Rossi et al, 2000), where there are many different aspects of change that need to be made legitimate.

In legitimizing knowledge, there are different types of legitimacy to consider. Legitimacy can be defined as “a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (Suchman, 1995; 574). Suchman integrates research on legitimacy and identifies complementary traditions, resulting in three types of legitimacy†. First there is pragmatic legitimacy, rooted in self-interest for those primarily concerned. When self-interest evaporates, so does the pragmatic legitimacy. Moral legitimacy on the other hand rests on societal and individual values regarding right and wrong and therefore reflects social interests rather than pure self-interest. Moral legitimacy depends strongly on views that are fashionable at a given point in time. Finally, cognitive legitimacy is based on what we take for granted, which implies that cognitive legitimacy only arises over time, if at all.

Cognitive legitimacy is important and connected to institutionalization; once taken-for-grantedness has been achieved, it is more difficult to discard of the practice. As early steps and as constant reinforcement, however, adoption of specific organizational structures (Meyer & Rowan, 1977), adoption of certain goals and practices (D’Aunno et al, 1991), the use of rhetorical devices and other impression making acts (Arndt & Bigelow, 2000) might be more important, in order to achieve pragmatic and moral legitimacy. Edmondson (2003) points out that radical innovation is about framing the innovation, that is on shaping “assumptions and beliefs about a particular object or situation” (Edmondson, 2003; 35).

† The framework developed by Suchman is much more nuanced than described here.
The process of framing varies according to Edmondson from being passive and unconscious to active and conscious. Similarly, the approaches to legitimacy may range from acquiescence to manipulation regardless of which form of legitimacy that is concerned (Suchman, 1995).

An important part of (cognitive) legitimization, whether passive and unconscious or active and conscious, is the discursive connection to the institutional conditions; to prevailing norms, rules and belief systems. Such norms and beliefs etcetera derive from overarching ideas in society, such as the idea of markets, family or democracy, which we often take-for-granted. These ideas are so-called institutional logics which influence a number of issues such as the rules rendering specific actions legitimate and other actions by default illegitimate and what issues leaders find important to focus and solve (Friedland & Alford, 1991). A change towards a more sustainable society or the implementation of ecologically friendly innovations therefore entails a challenge to the existing order in that different issues need to be addressed.

Much research has focused on how market logic or market rationality replaces earlier logics (such as an editorial logic in Thornton, 2002) or is blended (with an aesthetic logic, Glynn & Lounsbury, 2005). When legitimizing innovations aimed to increase sustainability, the trend is likely to be reversed; much of sustainability logic would be expected to run counter to a market logic as a market logic is based on continuous growth and a never ending resource pool, where only prices provide the limits. In a sustainability logic, other mechanisms compete with price in coordinating and legitimating behavior. Thus, other stories are required to legitimate such technologies. However, a market logic is also frequently used to legitimate environmentally friendly technologies; arguments about “taking the lead”, improving efficiency etcetera are easily traceable to market thinking. Indeed, the requirement to be “rational” is important in the world of business; ‘Nonexperts’, including critics of business in environmental NGOs and lay publics, are portrayed as nonrational and unable to evaluate the contribution of scientific and business ‘experts’ to environmental policy …” (Eden, 1999: 1302-1303, in Kallio et al, 2007; 46) The quote illustrates how business rationality is depicted as realistic, whereas the NGOs talk about an ideal world; simplified, unreachable, unrealistic (Kallio et al, 2007).

The institutional logics as discussed above are fairly general and apply to many contexts, but they have slightly different impact on practice and activity depending on for example market conditions and context specific beliefs. Glynn and Lounsbury (2005) discuss the relationship between institutional logics and context specific beliefs in their on critics’ stories about a Symphonic Orchestra. They suggest that stories such as reviews are a mixture of local constructions and institutional dynamics or beliefs. The local constructions make sense of an ambiguous event or practice, but are constrained and shaped by a broader set of beliefs (institutional logics). In a similar manner, the stories told about the need for a change towards sustainability reflect local constructions as well as institutional logics. A difference might however be that the stories about innovation (in sustainability) are designed to challenge an existing order, that is, challenge the logics themselves from the bottom-up.

Traditionally, research on institutional influences focuses on a top-down approach. However, some researchers have emphasized the role of self-interest in shaping institutions, both as part of institutionalization and deinstitutionalization (DiMaggio, 1988; Fligstein,

The actors, such as the critics in Glynn and Lounsbury (2005), have vested interests to protect, and may therefore attempt to create or resist change in institutions. Radical institutional change may also be downplayed due to a lack of templates to model behavior on. For example, Blomquist’s (1996) studied a deregulation in a municipality, arguing that the new ideas were difficult to implement as the municipality had a lack of a “market practice,” where as the ideas of the market were more easily adopted and attached to existing practices. On the other hand, new practices can be connected to already existing ideas in a specific setting, thus embodying the practices with meaning (Barley & Tolbert 1997). In order to legitimize new practices following innovation, it could then be assumed that rhetorical and discursive strategies would be used to make the new practices appear less radical or at least in line with established ideas.

3 METHOD

The empirical data is from a pre-study for in-depth case study on technological innovation for sustainable development. The pre-study is focused on the development of ethanol fuel, production technology and the market implementation of biofuel, all in a particular region in northern Sweden. The project studied is from now on referred to as the Initiative. The Initiative was chosen for the pre-study as it is a case where the market making and the technology development have been strongly interlinked from the outset; it could even be argued that the market making activities surpass the development activities in terms of people involved and the number of activities organized.

Research Context

The Initiative encompasses the Swedish counties of Västernorrland and Västerbotten. It was established in 2002 and comprises some 30 organizational actors (municipalities, universities, state agencies, companies, and corporate networks). The Initiative’s vision is built on four different pillars. First, the aim is self-sufficiency in transport fuels by 2020. Second, the region is to be world leading in the area of cellulose-based biofuel, and third, to be in the top regarding knowledge development about biofuel and finally, to be a leader in the actual “development of technology, production and utilization of biofuel”. Put another way, the aim is to develop an entirely new industry based on renewable fuels from cellulose-based raw materials (biomass). The Initiative thus challenges the well established and competitive fuel market, and a key task is to change consumer preferences in addition to developing the production technology. The knowledge developed is as yet in an experimental stage where new innovations are important to ensure efficient use of biofuels in machines or processes whose operations depend on biofuels and also ensure that there are sufficient raw materials to carry out full scale production.

The Initiative is comprised of several interrelated projects. The main project is to development process production for biomass based ethanol. The other projects concern the stakeholder dialogue on many areas; ranging from raw materials, research to educational activities. The activities of all related projects are considered in this analysis.

Data Collection and Analysis

The emphasis in this paper is placed on how the legitimization of the knowledge gained is attempted through stakeholder communication and dialogue. Therefore, the data is based on examples of this stakeholder communication, and the different discourses used and claims
made in this communication. The specific sources are primarily documents of various types, although some verbal communication has been included as well:

- Speeches and lectures given by members of the Initiative and company visits
- Web material from the Initiative’s web site, as well as participating organizations
- Reports and educational materiel issued by the Initiative
- Research reports on the emergence of the Initiative

These materials have been gathered during a period of 15 months, although some of the reports and the educational material concerns events as far back as 2002. The documents are aimed at various stakeholders in society, but there is an under representation of presentations etcetera aimed at specialists in the field of biofuels, that, technicians/technologists. Otherwise, much of the presentation material is standardized, used by a number of presenters that add additional material depending on audience as well as their own area of expertise.

The data analysis has been primarily inductive, with the aim to generate insights into the processes of legitimization of a technological innovation based on knowledge about sustainable development. Qualitative analysis is a dynamic process, often iterative, with rereading of the data (Orton, 1995). This process is not fully captured in the analysis, in that there is a mutual shaping of theoretical assumptions and analytical results. A point of departure for the analysis was to summarize the data. During this process, the material was read looking for statements regarding the following main themes:

- Type of knowledge claims involved/arguments about the nature of different phenomena (which resulted in e.g. claims about technology (function, advantage), claims about markets and users, claims about climate change, etcetera)
- What stakeholders were addressed?
- What market conditions and what institutional conditions were addressed?

In a second step, relationships between claims and stakeholders, institutional conditions (logics, discourses etcetera) as well as market conditions were identified. The processes of legitimization were then identified and categorized based on the categories presented by Suchman (1995). This procedure then resulted in a model, figure 1 (presented in the analysis section).

4 RESULTS

In the documents and presentations examined, a number of claims were made with regards to the state of affairs or the nature of different phenomena in order to legitimize the Initiative. These claims were grouped and below follows a presentation.

Claims about climate change and environmental issues. In this category, we find knowledge about climate change, such as the “hockey stick curve”, a frequently presented graph which illustrates the rate of the warming during the last 1,000 years. The graph indicates a fairly stable level up until the 20th century, where a sharp increase in warming gives the curve its distinctive look. A number of reports are discussed, issued by e.g. The Intergovernmental Panel on Climate Change’s (IPCC) and the WEC. The main message
in all documents is that climate change demands a reduction in CO2 emissions. The solution offered here is to replace fossil fuels with renewable fuels, so-called biofuels.

These claims are directed to all stakeholders and they are presented in a way that focuses the urgency of the matter. The urgency is expressed through phrases such as “It is possible”, or “The situation is much more critical then most understand! However, it is not as difficult to fix as most believe! But, we are running out of time!” (Presentation by Initiative Chairman, 2006). Several presentations are also ended by showing pictures of children (sometimes relatives), to emphasize our moral obligation for action. In so doing, the project members explicitly draw upon responsibility for future generations and family. (The responsibility for future generations is strongly anchored in the discourses on sustainability and sustainable development, and relates back to e.g. the Brundtland Report (WECID, 1987)).

Claims about other driving forces. There are additional driving forces behind the Initiative. One important claim focuses on the notion of peak oil; that half of the world’s oil supply already has been used, that the most easily accessible reserves already have been used, and that the consumption of oil is drastically increasing. Pedagogical examples are used to illustrate this claim, leading up to the conclusion that the current consumption of oil cannot be sustained indefinitely.

As with the claims about environmental change, the other driving forces are presented to all stakeholders and the urgency is emphasized. The current oil dependency of society is elaborated upon. In some instances this reasoning is expanded to discuss the possible chaos and conflict that may occur when, not if, the shortage of oil becomes a fact. These discussions also focus on where the current supplies of oil are located (the oil triangle), the possibilities for Sweden to acquire oil, and ultimately conclude that this will be very difficult. “Europe is to 98 percent dependent upon oil for transport. The price of oil is rapidly increasing as the demand increases. How should we handle these challenges? Who will be the winners and who will be the losers?” (Educational material, 2005) While the project is embedded in a logic of sustainability, it also draws strongly on arguments that suggest business as usual, in depicting the oil dependency as a threat to our current patterns. With new and efficient technology, our living standard can be maintained.

These two first categories are used to frame why we need a change to use more biofuels. Biofuels is not necessarily depicted as the answer, but rather as one important solution, and in particular as an important solution that will benefit this specific region.

Claims about “industrial and regional development”. The claims made refers to job opportunities, to the number of facilities that may be built given full scale production and where they should be located, the potential for reduced import of fuel, issues of self-sufficiency, etcetera. The funding of the Initiative is also discussed as well as the regional development group with a number of members, primarily representing municipalities, universities, energy suppliers and firms working with environmental issues.

The potential to create successful clusters is particularly focused in some of the presentations, how companies may collaborate, and the current strong base in existing process industry and specialty chemicals as well as the supply of biomass in the region. The local development platform and industrial platforms for the Initiative are then presented in

relation to the regional development, both in terms of how the region contributes to the Initiative and vice versa. This category of claims is also aimed at most of the stakeholders; but primarily regional stakeholders and authorities. In relation to the regional development, there are descriptions about group processes and mobilization as well as team work between the shareholders, activities, vision etc. There are different working groups and many descriptions of societal actions.

Claims about supply of biomass. Another category of claims refer to the supply and use of biomass. These claims largely concern expert knowledge on forestry, and the potential for growth of biomass, current and future potential for biomass and biomass production. These claims point to an area of debate; how much biomass can be extracted from the forests today without degrading the total stock of biomass? How can more biomass be cultivated and how can the conservative forest owners of today be convinced to use more aggressive cultivation methods? It is suggested that it is possible to extract more from the forests, but that there are problems that need to be taken into account:

- “Increase growth in existing forests (silvicultural methods, nutrients)”
- Increase growth in new forests (plant material, genetics...)
- Silviculture is guided/controlled by economical choices based on different possible political and biological alternatives
- Price of raw material matter
- Costs for silviculture and harvest matter” (presentation by forest expert)

These claims are primarily directed to stakeholders engaged in forestry, environmental groups and competitors for the supply of biomass. The aim is to influence the beliefs of legislators, authorities, owners of forests and forestry managers to consider the values of increased extraction from the forests and to engage in alternative cultivation methods.

Claims about production processes concern the technology and the uniqueness of the pilot plant, its production capacity/process knowledge of the pilot plants as well as estimated future capacity given full scale production. Some aspects are very technical, e.g. discussing the “dilute acid process”. General steps in the process development are frequently explained, more in detail e.g. during study visits, as are the inputs and outputs of the production process. The discussions concern stepwise systems developments, feedstock efficiency, production efficiency, vehicle efficiency, distribution efficiency, efficient legal framework, efficient and dynamic market. The arguments about efficiency clearly relate technology, and production to the market and the market demands. If the technology is considered efficient, if the processes are efficient in terms of money, time and the ration of outputs to inputs, then it can be argued to be useful at the market.

The arguments in this category are directed to stakeholders at the market, partners and authorities. They all need to be persuaded that the Initiative is an efficient and effective alternative to fossil fuels.

Claims about alternative Biofuels and the efficiency of ethanol from biomass is related both to claims about biomass and production. The discussion concerns alternative raw materials for Biofuels and companies that produce them, as well as the situation in other countries – might it be more efficient to import ethanol? It is suggested that “Ethanol produced from

biomass will achieve much greater Energy and GHG benefits than other biofuels and that “Cellulose based ethanol and synthesis gas has the potential to reduce 90-100% of fossil CO2 ‘Well-to-Wheel’”; “Cellulose based ethanol and synthesis gas can be as cost efficient as any other major alternative to mitigate fossil CO2.” (Facts from international reports presented by one of the Initiative Board members).

Market claims. Claims about the market are in turn related to the previously mentioned efficiency claims, but are centered on the market development for biofuels, comparisons with the development in other countries and the market potential. It is suggested that there will be a leap in demand and that it is important be prepared for this leap. Other claims state that biomass has the potential to cover more than 2/3 of today’s demand for transport energy – globally, and suggest that ethanol from sugarcanes show a price level below the world market price on gasoline. International reports and EU efforts are cited to substantiate these arguments. As above, the arguments are directed to stakeholders at the market, partners and authorities, but also to consumers.

Claims about consumption & transport patterns is a subcategory of market claims but relate more to the activities at the market than the structural conditions. There has been some success with public transport, and a goal is a fossil free transport sector. Other attempts to legitimize the innovation focus on the usability for consumers; a campaign to introduce flexi fuel cars in Sweden was launched by project members a couple of years ago, and other campaigns have resulted in the introduction of flexi fuel pumps at the gas stations. Focusing on consumer behaviors, there have been educational groups. Topics in these groups concern for example “When do you use transports? What needs are fulfilled? Can these be fulfilled in another manner?” Research is also carried out to understand the changes in attitudes regarding biofuel.

In the educational material, reasons for the slow change are identified; values and attitudes; realities, and risk/uncertainty. A bottom-up approach to change that aims at changing societal systems is depicted as the solution, which is how the Initiative work with change. People are encouraged to be proactive in many different areas, both in transforming market conditions through changes in demand, and in changing laws and local policies by communicating with political officials. There are also some examples of successful lobbying.

5 DISCUSSION AND CONCLUSIONS

Legitimization of knowledge may be both reactive and proactive (cf. Suchman, 1995), and this study refers to a proactive attempt at legitimizing new knowledge on Biofuels, and facilitating the market implementation. The issue of Biofuels, while partially politically supported, is controversial. It is questioned on a number of grounds such as whether there really is a climate change to worry about, whether biofuels really constitute a more environmentally friendly alternative, what type of biofuel that is most efficient/efficient enough, etcetera. The legitimization of the project/knowledge focuses on a number of different stakeholders and is upheld by several very different discourses, discourses that are part of the institutional environment. These discourses concern for example:

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\[\text{Greenhouse gas}\]
- Need for action – intergenerational issue
- Oil dependency
- Environmental problems
- Regional opportunities
- Efficiency

These discourses represent a blend of the three categories of legitimization discussed by Suchman (1995), and each type is used more or less proactively in this study. Pragmatic legitimacy focused on various types of self interest is very evident in the descriptions focused on legitimizing the project as such. At the regional level, the focus on regional development, job opportunities etcetera is very strong and it is clearly directed towards a number of stakeholders that are invested in the region and the region’s well-being. But the while this is a regional effort, the pragmatic legitimacy claims is also focused on Swedish, possibly Western Society as well, in warning about the potential effects of oil dependency. The arguments focusing on climate change and future generations resembles moral legitimacy, focusing on societal values and the role of family. As climate change, somewhat cynically put, has come ‘into fashion’ during the past year, its usability as a tool of moral legitimacy increases.

The third type of legitimacy is cognitive legitimacy, which may be considered more in line with taken-for-granted assumptions about society. Cognitive legitimacy is not easy to control; it is difficult to know what we do simply because that is the way things should be done. In the Biofuel case, the claims about efficiency are used to present the initiative in a favorable light. Such arguments convey attempts to find legitimacy through relating to the existing market thinking, with a strong emphasis on efficiency (cf. Nelson, 1997; D’Aunno et al., 1991). Further, the market logic underpins current economic organization both consciously and unconsciously (Friedland & Alford, 1991). The references to market thinking also points to a possible contradiction; while the Initiative is built on concern for the environment often caused by current economic practices, the project leaders draw on market logic to legitimize the Initiative. Other research has however suggested that a sustainable society might require a change in values, such as the economic values (cf. Robinson, 2004) and the Initiative clearly emphasizes value change in some aspects of their work. There might thus be an inherent conflict in on the one hand suggesting a new vision of society but on the other hand using current market logic to legitimate the project (compare Kallio et al., 2007).

These legitimization processes and their different origins are illustrated at the bottom of figure 1. Following Suchman (1995), the existence of self-interest is seen as evoking primarily pragmatic legitimization processes, i.e. attempts to achieve legitimacy by playing on other’s self-interests. However, moral legitimization, drawing on social obligation, may also refer to self-interests; it is not positive for an organization to be perceived as immoral among other stakeholders. Interests influence what is considered acceptable knowledge through the pragmatic/moral legitimization processes, and vice versa, interests are influenced by what at a given point in time is considered acceptable knowledge. For example, stakeholders involved in the Initiative that start to include the innovation in their activities get more and more vested interests over time. These interests are also shaped by market pressures and market opportunities. When members of the Initiative are successful in developing the market for flexi fuel cars and flexi fuel pumps, the market and the interests are both subject to change.
At the bottom left of the figure, it is illustrated how cognitive and moral legitimization processes shape what is considered acceptable knowledge, influenced by beliefs and logics for how to act. In this case, the cognitive legitimization is exemplified in beliefs about how to produce high quality ethanol, beliefs about fuels in general and beliefs about what efficient forest production, production and transport of biofuels. Moral legitimization is rather concerned with the general values in society relating to the environment as well as to specific assets such as the forest, and what these values imply for production of ethanol. However, the values currently seem to conflict with the aims of the Initiative; the local beliefs about how forests are to be managed does not support increased cultivation. It is therefore difficult to use moral legitimization. Instead the focus is placed on changing the perceptions of increased extraction and cultivation. While not evident in the cases, there would reasonably be a possibility of a reversed influence; the processes of legitimization are influenced by the view of what constitutes acceptable knowledge and indirectly the prevailing beliefs.

![Figure 1. Dynamics of legitimization.](image)

The beliefs and values are in turn also shaped by responses to institutional pressures and institutional opportunities, as illustrated at the top left of the figure. An example concerns the arguments about efficiency that permeates many of the claims made in the results section; these claims illustrate the strong notion of market logic that affects local beliefs. It is difficult to discern what is related to the taken-for-granted character of the market logic and what is related to a conscious rhetorical strategy intended to manipulate the institutional influence (cf. Arndt & Bigelow, 2000). On the other hand, the beliefs about forestry exemplify how both market and institutional logics are affected by local beliefs. First, the supply of biomass (wood) influences prices and efficiency in terms of costs for the ratio of output/input, which are important features of the market. Second, rules as well as norms on a societal level may change following local initiatives. Certain lobbying

activities have had some success in the policy area and this type of influence is further clearly encouraged in the educational material and in different activities. When the institutional conditions are reinforced or strengthened, the response process from beliefs signifies institutionalization, and when the institutional conditions are altered or challenged, the response process signifies deinstitutionalization.

Similarly, the market response process may also challenge existing institutional conditions and thus signify deinstitutionalization of current conditions. Alternative fuel solutions, as they are put into practice, imply a deinstitutionalization of the dominating societal view on how we consume fuel, most notably oil/gasoline. In particular, dual influences from both local responses and market responses are likely to shape institutional change. The Initiative contributes to, and utilizes, such deinstitutionalization. Finally, examining the upper right of the model, self-interest also influences institutional conditions, not only markets, through the processes earlier described. Thus, a comparison can be made to the process of institutionalization and well as deinstitutionalization where self-interest may be a part of the early steps (DiMaggio, 1988; Fligstein, 1997; Suddaby & Greenwood, 2005).

Activities are at the centre of figure 1, in line both with the theoretical assumptions and the empirical data, because activities, even in the form of stakeholder dialogue, links beliefs to practices, to markets and self-interests to knowledge. The model illustrates how legitimization of new knowledge is part of several related changes, and it also explores the dynamics of the legitimization. It is possible to consider changes in the model as a clockwise change; starting with attempts to change market conditions through focusing self-interest; leading to acceptance of new knowledge. Then this new knowledge leads to changes in the belief systems as well as the activities which over time influences market structures and institutional conditions, illustrating a process of bottom-up institutionalization. Such a rational and simple approach is however unlikely, instead a number of iterative processes with mutual shaping and adjustment are to be expected.

Following Fox’s (2000) example of different groups within communities, such as masters, young masters and apprentices, each with different roles and varying degrees of legitimacy, the different stakeholders clearly have their individual roles and interests in influencing the Initiative. As people become increasingly involved in the activities of the Initiative, their opportunity to shape the development to suit their interests might increase. However, different stakeholders are not included as to become full members in a community; the interaction with a varied group of (local) stakeholders does not resemble attempts at creating a community of practice (cf. Wenger, 2000), even though many stakeholders are members in the Initiative.

Further, the dialogue and the legitimization do not go in-depth on the scientific arguments, but rather provide an introduction to a number of different issues. For example, general aspects of knowledge about ecological sustainability, social and economic sustainability are introduced. At times this knowledge is mixed with more limited technical knowledge aimed at specialists. But more important than detail knowledge is the specific set of values that is presented together with a problem to solve. A comparison can be made with Swan et al’s (2002) study of managers using the notion of a community of practice as something to gather around, rather than actually developing such a community. There is no transformation of knowledge from the project into the different stakeholder arenas (cf. Carlile, 2004); instead a general discourse with several more specific discourses and
concepts is presented. This development also resembles the trading zone discussed by Kellogg et al (2006) in that it is about creating a meeting point where people can engage in exchanges and have been taught to recognize the value of the innovation. The community necessary for legitimization of knowledge is thus a rather different community than the community engaged in the actual development.

Summing up, this paper departed with the notion that newness results from innovation, and that newness requires legitimization. Newness related to new knowledge about process production, market implementation and development as well as changes in institutional beliefs has been discussed. The analysis illustrates facets of this complex and dynamic process based on the stakeholder dialogue in a particular case. The project studied is a long-running, encompassing project, with strong regional connections. Does the model developed fit smaller projects which have more limited focus on the implementation? Additional data is needed to answer this question. Future research could for example also focus on the dual processes of achieving accepted and legitimate knowledge in the firm and on the market. Such an approach would also more clearly depict the formulating of different types of knowledge during the process.

REFERENCES:


