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Corporate Responses to Climate Change: The Role of Internal Scientists as Institutional Entrepreneurs

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#### ABSTRACT

In this paper, we argue that institutional discourses and practices do not pass undisturbed across organizational boundaries. We look at how corporate scientists in the automobile industry, acting as institutional entrepreneurs, influence way in which corporations perceive and respond to climate science.

#### Introduction

The efforts of the fossil fuel industry to cast doubt on claims that greenhouse gases are causing dangerous changes to the climate system are by now well documented (Gelbspan 1997; Franz 1998; Levy and Egan 1998). These efforts are generally interpreted to be strategic manipulation of scientific uncertainties and standards of proof; companies recognize that their economic interests are imperiled by potential measures to address climate change, and challenging the science is a time honored strategy for delaying or averting regulation (Jasanoff 1990). Corporate perspectives on climate science and the market potential for mitigation technologies are likely to be influenced by a number of institutional actors.

These actors constitute an organizational field, in the language of institutional theory, which, over a period of time, establishes norms, policies, and standards of accepted behavior that shape a particular company's discourse and practices (Powell 1991; Scott 1994). The core insight of the institutional perspective is that organizations are embedded within institutional fields with important cultural, symbolic, and regulatory dimensions. Organizations derive legitimacy as well as

resources through conformity with their environments, and this tendency toward convergence, or isomorphism, operates through coercive, mimetic, and normative pressures (DiMaggio and Powell 1983). The institutional approach accounts for the persistence through time of organizational practices and discourses even when they have little direct economic value. Organizational boundaries are not considered to be major hurdles to the free and undistorted diffusion of practices and discourses, as dominant institutional cognitive, normative, and operational structures are presumed to create strong pressures for convergence across the organizational field.

In this paper, however, we argue that institutional discourses and practices do not pass undisturbed across organizational boundaries. Each company interprets institutional history through its own unique lens, which is a product of its own institutional history and organizational culture. Critical in this process is the action of boundary spanners, individuals or units that serve to link organizational structure to environmental elements, whether by buffering, moderating, or influencing the environment (Thompson 1967; Aldrich and Herker 1977; Leifer and Delbecq 1978; Fennell and Alexander 1987). DiMaggio (1988) and Fligstein (1997) both stress the role of boundary spanners, called "institutional entrepreneurs," who are actors with sufficient power and resources to realize interests and change institutions (DiMaggio, 1988). Boundary spanners are central in institutional dynamics because, not only do they attend to and filter information about the organizational context, but they also maintain organizational legitimacy through their interactions with stakeholders (Aldrich and Herker 1977).

#### Method

This paper draws primarily from the experiences of two US automobile manufacturers. Data acquisition was acquired in a number of manners. Personal interviews were conducted over the course of several visits to firms in the automobile industry. Interviews were conducted with a cross-section of firm employees, including environmental staff, strategy, product development, marketing, and R&D. Other interviews, particularly those that focused on the more historical data, were performed over the phone, using a pre-developed semi-structured telephone interview format. Additional material was gathered through an extensive review of secondary source material.

#### The Corporate Scientist as Monitor and Filter: GM and Ford

The American automobile industry has been among the most vocal opponents of mandatory controls on emissions of greenhouse gases, though it has not, of course, been alone in this opposition. Automobile companies construct perspectives on climate science based on multiple sources of information, both inside the company and in the external environment. Critical in the development of these perspectives are organizational boundary spanners, individuals who scan the external environment for new information and translate it to the rest of the organization, as well as attempt to influence the constructions of this information in the external environment. Most climate science information in the automobile industry is

formally filtered through such boundary spanners, often located in the R&D or environmental science department. For the climate issue, both Ford and GM use internal scientists to monitor the issue, filter and analyze the voluminous literature, and make presentations and recommendations to management. It is the job of the internal scientists to relay the state of the science to others in the organization. Therefore, scientists inside companies can play an important role in shaping corporate perspectives on particular issues.

Environmental scientists are usually trained formally in the sciences, such as atmospheric chemistry, and are actively involved with the external scientific community. GM, for example, employs a small group of environmental scientists who publish in peer reviewed journals, attend conferences, and participate in governmental panels. It is through their interaction with the scientific community that these internal scientists became the first employees to be aware of the climate change as a potential concern for the firm.

With a large and independent research staff, GM appears to have been the first company to follow climate science in a serious manner. The VP of Environmental Activities at GM heard about a 1971 scientific article concerning the role of particulates and greenhouse gases in the global climate system, and he took an interest in their potential contribution to atmospheric cooling, the predominant climatic concern of the period. Ruth Reck, a scientist working in GM's research laboratories was assigned to examine the question. Climate change did not become a high-priority issue beyond GM's relatively autonomous research laboratories until 1988.

Interestingly, early awareness of the climate issue in GM occurred through research involvement in other basic scientific issues, such as smog formation, tropospheric ozone, and CFCs, and particulates. Remembered one VP of R&D at GM,

Although most of the action had to do with tropospheric air pollution and emissions, there were several people who were real players in air mass movements and so on, so that there was a base of sophistication about atmospheric science systems. The first time it came onto my radar screen was in the 60s and 70s. I was certainly conscious of the worries that the world was about to freeze to death, so I thought I would follow it along. At GM it was around me as a developing issue, but that was more as a scientist than specifically as a manager.

Managers and scientists at both Ford and GM recalled James Hansen's testimony before the US House Energy Committee in June 1988 as the catalyst that catapulted climate change onto corporate radar screens. As a result of this testimony and the high level of attention to the issue in the popular press, one industry climate specialist at Ford described his shock at how quickly "climate went from zero to sixty". At Ford, prior to 1988, while Ford managers had held a number of discussions on the subject, they did not have anyone specifically assigned to tracking the climate issue. In 1988, however, Ford formally assigned an internal

scientist to track climate science, and an engineer to monitor and participate in the negotiations over a climate regime and the IPCC process.

As we can see in the case of GM, interaction of corporate scientists with the scientific community is an important mechanism for early and continued awareness of the climate issue. This interaction takes a number of forms. The most commonly cited activity was the regular scanning of journals such as *Nature* and *Science*. Membership in scientific associations and associated activities also brought scientists in contact with the climate issue. IPCC style assessments appear to be less important for the internal scientists in determining the state of the science. Instead, companies are more likely to obtain scientific "assessments" by interaction with outside academic experts. Companies might also obtain information through interactions with government agencies, particularly in the US DOE and EPA, and through participation in programs such as Climate Wise or the voluntary EPA GHG reporting system.

We can also see from the two cases that the role of the corporate scientist spanners can vary significantly. Some of the information transfer is done on a more passive level, where the scientists serve as a resource rather than an active proponent of certain scientific concepts. When the issue becomes hot in the popular press, for example, scientists are often turned to for advice. Similarly, an internal scientist might be called upon to review material if an executive was going to testify to congress or speak publicly about climate issues. At Ford, a member of the environmental engineering group was active in monitoring the IPCC process. This position was created when he advocated for his participation in major assessment processes, such as the UN negotiation sessions and the IPCC. As recalled by the VP of Environment, "[He] recommended that if we wanted to understand the human, political, and scientific dynamics of the issue, he really needed to be there." Interestingly, he performed this external monitoring function on behalf of the US auto industry and was funded and reported through the AAMA. As explained by the Ford's VP of Environment, "He was our window on the issues coming over the horizon."

Sometimes, however, internal scientists take a more active role in educating the organization regarding the state of climate science. This more active organizational role taken by environmental scientists (both internal and external to the organization) is reflective of what we discussed earlier as "institutional entrepreneurs." The clearest example of this more active approach is seen in General Motors. As noted earlier, Ruth Reck, a scientist working in GM's research laboratories, was assigned to examine the climate issue. It is interesting to note that, at the time in GM, air quality was considered the more important and prestigious topic on which to be working. Nevertheless, Reck quickly became a world leading authority on particulates and on cloud formations, and was accepted into the closely-knit climate scientific community. She published in refereed scientific journals, and presented at numerous conferences and workshops. As chair of the first symposium on atmospheric chemistry in 1973, she actually turned down

a submission from Sherwood Rowland on CFCs, and later served as a reviewer for his landmark article in *Science*.

Reck, initially a climate skeptic, became an internal advocate for the issue by the mid 1970s, and also served as an important source of internal expertise, with regular access to top management. As remembered by Jimmy Johnston, GM's former VP of Government Relations, "[The environmental scientists] were very influential in putting the [climate] issues on the agenda. Ruth pushed what was really important, and was one of the more energetic people." In an effort to alert the company to the climate issue, and to find out what product divisions were already doing concerning GHG emissions reductions, she organized a large GM conference on the subject in 1985, which was attended by more than 700 company personnel. External climate scientists were invited to give presentations, notably excluding skeptics, whom she considered dishonest. Product managers were asked to speak about what they were already doing with respect to emissions and how this would be valuable in terms of reducing greenhouse gas emissions. Reck understood that she "absolutely had to sell this issue", and used this and other company forums to that end.

The differing role of corporate scientists in the "filtering" of climate science and assessments may help to explain differences in response between Ford and GM. At GM, where the corporate scientist was involved at an early stage with climate change research, the "surprise" at the response to the Hansen testimony was much less pronounced. Similarly, while all US companies were taking a more "wait and see" attitude to the science, GM, with an institutional entrepreneur that was an internal advocate of climate science, was the only company of the big three to refrain from strong direct attacks on the science.

#### Skepticism toward Climate Science

While to a differing degree, all three major US automobile companies, through their industry associations and independently, questioned mainstream climate change research and advocated a "wait and see" attitude. Ford's Trotman and Chrysler's Eaton were especially vociferous in the early '90s, through speeches and editorials, in castigating concerns about climate change and emphasizing the high cost of precipitate action in the face of uncertainty. The interviews revealed that these views were not just those of top management, but had permeated throughout various departments and management levels. One manager commented, "We have followed the science as a company and we would like to see more science and less hot air! What we'd like to see is good science driving good policy." In the mid to late 90s, the automobile industry followed the GCC in focusing on climate model uncertainties. In a 1998 paper, Ford environmental scientists stressed that the most significant oversight in current climate assessments appears to have been inadequate study of the role that the Sun may have played in climate change. They state (Petrauskas and Shiller 1998, pg. 6):

"Because of this, confirmation and quantification of the human

capacity to influence climate beyond natural variability remains blurred. This fact alone does not completely eliminate all reason for concern, but it does loudly cry out for the scientific knowledge necessary to support far reaching global policy decisions... Real science needs to be verified first before such massive global changes in emissions ever could be justified in the future."

The predominant voice within the automobile companies was one of skepticism that the climate change was a major concern requiring significant private investment or government regulation. The corporate perspectives that we encountered across many interviewees at various levels of these organizations cannot all be attributed to interest based posturing. Managers in departments responsible for public and government relations might be more comfortable with putting a particular spin on the science, but there also appears to be a process of internalization of these perspectives. Even the differences across departments can be attributed to an internalization of the interest-based perspective. For example, one climate scientist in GM recalled that, "Jimmy Johnston [the former VP of government relations at GM] was a skeptic. He had to assume this position because he was the chief lobbyist. I understand where he was coming from." While even Johnston would admit that the adversarial political system in the US required some strategic exaggeration, it was clear that he was sincere in his skepticism about the science and the role of government regulation. After retiring from GM, Johnston joined the American Enterprise Institute where he wrote a book on his experiences (Johnston 1997).

Despite their adherence to the scientific norms of objectivity and rationality, we found that with the exception of Reck, the internal scientists tended toward the skeptical end of the spectrum of legitimate opinion among respected climate scientists (Morgan and Keith 1995). They all interpreted scientific uncertainties in a conservative manner, viewing them as a rationale for further research rather than seeing the potential for climate shocks from positive feedback or threshold affects. They pointed to the long time frame of atmospheric accumulation of GHGs a comfortable margin of time for reducing uncertainty rather than an urgent reason for early precautionary action.

The process by which these conservative viewpoints are institutionalized is not easy to document in concrete terms. As noted above, the managers and scientists work within an organization that feels threatened by the prospect of regulatory action to address climate change. There appears to be a subtle process of negotiation of identity between perceptions of corporate or departmental interest and an individual's own viewpoint. There is no clear boundary between them. As one ex-R&D manager expressed, "There is social pressure. For the [internal scientist], they are around people who don't pay attention to the climate issue and don't want to hear it.... People on the operational side are more conservative." He also suggested that there might be some element of self-selection in terms of who is willing to be a corporate scientist. Another executive discussed the pressure to adopt a bottom-line perspective. She recalled that there was a need for credibility with the line guys.

Lastly, one person who has worked closely with GM on these issues commented that it might have to do with where they get their information. If they are reading GCC literature and the Wall Street Journal, then they get a particular impression of the issue."

#### The Internal Scientist in Context

In order to understand the ways in which internal scientists interpret and communicate environmental science, and subsequently influence the rest of the organization, one must consider the context in which they operate. While companies attempt to speak with a single authoritative voice in public or to regulators, there are frequently significant internal tensions over controversial issues. Managers in different functional areas generally adopted perspectives consistent with their departmental interests. People responsible for advanced automotive technologies tended to see climate change as an opportunity. In contrast, managers responsible for product divisions and strategy were particularly concerned about the high cost of low emission technologies with little value to consumers. These tensions had bedeviled the development of GM's electric vehicle during the early 1990s (Shnayerson 1996).

Given these competing interests within the firm, the organizational location of the internal scientist becomes very important. The greater the level of accountability of the scientific staff to these other factions, the stronger these institutional pressures (DiMaggio and Powell 1983). Reck, who was the strongest proponent of climate change, operated in the GM labs for the most part as an independent researcher, evaluated as an academic rather than as a business manager, with promotion dependent on external publications.

One of the key factors for an institutional entrepreneur is that they have the power and resources to effect change. Reck's unique access to information, for example, put her in a strong position in this regard. She recalled, "I was only one working on climate. Everyone in corporation have to come to me, as I was the clearinghouse for information. This was a powerful position." The credibility and authority of internal climate scientists was also enhanced by the aura of scientific objectivity. This status, however, appeared to be a double-edged sword. The scientists were also seen as remote from the core profit generating activities of the company, and their location in R&D labs or headquarters staff tended to isolate them somewhat from managers with line responsibility for product design and development. This was particularly true for the "research" arm of the R&D departments, whose research may or may not relate directly to near term product development. As explained by one R&D manager, "Most of the time the R was separate from the D. 97% of the R was in [the] laboratory. D was sort of a molecular film spread out over the company." This was particularly true in GM with its highly decentralized structure; the relative autonomy of GM's R&D and basic science led to an overall perception that the scientists were not contributing to the needs of the firm. Therefore, while decentralization of R&D enabled corporate scientists to pursue their interests in climate and maintain autonomy and credibility, it may have also

reduced the ability of these scientists to influence corporate policy or product strategy.

Not only must internal scientists negotiate inside a firm with multiple coalitions, but they also need to balance their business role with the one they play in the scientific arena. Therefore, corporate scientists adhere to the norms of objectivity, rationality, and free investigation while being embedded in the business culture of bottom-line accountability and hierarchical subordination. This bridging of two cultures necessitates a subtle process of negotiation of identity for these scientists, who are not quite at home in either setting. The corporate scientists interviewed were particularly emphatic about their objectivity and independence, relating stories to demonstrate their refusal to be curtailed by narrow corporate interests. Ruth Reck was on an EPA advisory committee, and in her words "GM desperately wanted to remove me from it. They thought I was not toeing the GM line. But I was an independent scientist and I have refused ever to be bought in my whole life. I was never on anything representing General Motors." Although not threatened with her job because of her independence, Reck knew there was dissatisfaction with this role. With their loyalty to the corporation in some doubt, corporate scientists needed to negotiate the border between these two cultures with some careful diplomacy. Reck recalled that "you had to speak strictly in terms of facts. Lots of people got into trouble for saying controversial things. I lived by the rule that anything you say might appear on the front page of the New York Times. Anything I said could always be backed by a reference."

Corporate scientists felt even less trusted in the public realm. Another industry climate specialist was chairman of EPA's Clean Air Advisory Committee, and became heavily involved in overseeing a review of air quality standards. This was the first time the EPA had used an industry person in this capacity, and for two years he spent most of his time on EPA work. This arrangement, however, was not wholly successful. From the perspective of the specialist, EPA had already made up its mind and didn't follow his advice in part because of his industry affiliation. Another industry specialist recounted an incident during an IPCC plenary session that was negotiating text of the Second Assessment Report, in which he suggested a particular change, which was supported by one of the lead authors and then endorsed by a plenary vote. The IPCC chair, Bert Bolin later reportedly then took that lead author aside and warned him not to support other industry interventions.

While participation in EPA and IPCC panels might be considered prestigious professional activity for academic scientists, the corporate culture views it not just with suspicion but as a waste of valuable corporate resources. A number of scientists mentioned that external activity was viewed as unproductive, and that their corporate departments were reluctant to bear such a "tax". In this atmosphere, it is not surprising that the IPCC has had difficulty recruiting authors from industry, despite IPCC chair Robert Watson's re-doubled efforts to do so.

## Discussion and Conclusions

Despite dependency within both Ford and GM to institutionalize conservative and skeptical perspectives on climate change, at the very top levels in both companies there does appear to be a genuine concern to "know the truth". As one put it, "The trick from a management standpoint is how to get information through the layers of the organization and be able to make a judgement. We want to know what's really going on, not just what we want to hear." Managers acknowledged that if the more pessimistic forecasts were borne out, the Kyoto commitments would need to be substantially strengthened, with drastic implications for the industry. Another executive commented on how top management prefers certainty, even if the news is unwelcome. Recalling the story of DuPont and CFCs, he stated, "[There,] the head scientist came back and said - 'guys - I am convinced it is real.' Then DuPont could move. In a sense, if the scientists were able to say 'I saw yesterday's data and it's certain', the industry would breathe a sign of relief.... But as it stands, we are uncertain about the science and what the politicians are doing."

In an ironic twist, top management expresses a sincere desire to understand the true scope of the climate problem in order to make strategic plans, yet the automobile companies are constrained by institutional perspectives that reflect the perceived threat to their interests. Corporate scientists do not deliberately distort the scientific literature, but this research does suggest that, through their role as filters, monitors, and advisers, the companies are perhaps not receiving access to the full spectrum of opinion. This problem may be exacerbated, as there are efforts to further integrate environmental scientists with the rest of the organization at both companies. In the early 1990s, there was an effort to increase the market relevance and accountability of research, and research projects were required to gain the sponsorship of a product division. Both GM and Ford substantially eliminated basic scientific research during this period and by the mid-1990s, neither Ford nor GM had internal scientists who were major players in the climate science community.

## REFERENCES

- Aldrich, H. and D. Herker (1977). "Boundary spanning roles and organization structure." *Academy of Management Review*, April: 217-230.
- DiMaggio, P. (1988). Interest and agency in institutional theory. *Institutional Patterns and Organizations: Culture and Environment*. L. Zucker. Cambridge, Ballinger Publishing Co.: 1-20.
- DiMaggio, P. J. and W. W. Powell (1983). "The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields." *American Sociological Review* 48(April): 147-160.
- Fennell, M. L. and J. A. Alexander (1987). "Organizational boundary spanning in institutionalized environments." *Academy of Management Journal* 30(3): 456-476.
- Fligstein, N. (1997). "Social skill and institutional theory." *The American Behavioral Scientist* 40(4): 397-405.
- Franz, W. (1998). *Science, Skeptics, and Non-State Actors in the Greenhouse*. Cambridge, MA, Harvard University.
- Gelbspan, R. (1997). *The heat is on*. Reading, MA, Addison Wesley.
- Granovetter, M. (1985). "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91: 481-510.
- Janasoff, S. (1990). *The fifth branch*. Cambridge, Mass., Harvard University Press.
- Leifer, R. and A. Delbecq (1978). "Organizational/environmental interchange: A model of boundary spanning activity." *Academy of Management Review* January: 40-50.
- Levy, D. L. and D. Egan (1998). "Capital contests: National and transnational channels of corporate influence on the climate change negotiations." *Politics and Society* 26(3): 337-361.
- Morgan, G. M. and D. W. Keith (1995). "Subjective judgements by climate experts." *Environmental science and technology* 29(10): 468-476.
- Petrauskas, H. and J. Shiller (1998). *Climate Change Transportation Policy*. Paris, France, 1998 FISITA World Automotive Congress.
- Powell, W. W. (1991). *Expanding the Scope of Institutional Analysis. The New Institutionalism in Organizational Analysis*. W. W. Powell and P. DiMaggio. Chicago, University of Chicago Press: 183-203.
- Rothenberg, S. and J. Maxwell (1995). Industrial response to the banning of CFCs: mapping the paths of technical change. *Technology Studies* 4(2), 1997.
- Scott, W. R. (1994). *Institutions and organizations: toward a theoretical synthesis. Institutional environments and organizations*. W. R. Scott and J. W. Meyer. Thousand Oaks, Cal., Sage.
- Shnaverson, M. (1996). *The car that could*. New York, Random House.
- Sorge, M. and J. McElroy (1997). Ford: grappling with global warming. *Automotive Industries*. 177: 50.
- Thompson, J. D. (1967). *Organizations in Action*. New York, McGraw Hill.