FACILITY SITING: THE THEORY-PRACTICE NEXUS

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Abstract

The paper focuses on the relationship between the production and utilisation of knowledge in the siting of facilities. It suggests that the siting literature has evolved over time and has moved away from seeing siting as a technological problem to seeing siting as social and political problem facing all nations. It has developed into a fully-fledged literature which uses a full range of theoretical and methodological approaches to explore siting conflicts and their management and has produced a variety of middle-range theories to explain the management of siting conflicts. The literature is highly policy relevant and can provide not only important conceptual insights to siting practitioners in terms of basic perspectives and orientations, but can also offer important instrumental insights in strategic and functional terms. The challenge for the literature in the future will be to build on these achievements and address several theoretical and empirical shortcomings in ways which are seek to fulfill the needs of siting practitioners.

1. INTRODUCTION

Being a siting practitioner is not an easy task.

The siting and development of a range of projects, such as waste repositories, prisons, energy facilities, airports, and industrial projects, has and continues to be a lightening rod for social and political conflict in all nations alike. States and firms may need to develop such projects to provide a range of social and economic benefits for the national community. Yet, while local community interests may agree with the broader social need for these projects, they often oppose them vigorously as they perceive them imposing significant costs, such as environmental degradation, unacceptable levels of risk and disruptions to social relationships, on their communities. These responses often create considerable conflict and can delay or even cause abandonment of facility plans.

Siting is clear a case of contentious politics which can impose significant costs on stakeholders. Siting is a significant policy issue, which impacts on the achievement of state, corporate and community objectives. Disputes have been costly for states particularly where projects are needed for national technological, economic and security objectives. Conflicts have often been costly for developers and include increased uncertainty over capital cost escalations due to inflation and interest repayment burdens. They have also be costly for local communities as they have, for example, altered existing social and political relationships and levels of social capital within those communities. Such outcomes might be beneficial, since the grounds for opposition might be well-based, but they may be, in other cases, socially undesirable since failure to site such facilities might carry opportunity costs which are felt by other communities.

Practitioners confront a complex range of information, much of which in incomplete and ambiguous when contemplating the siting of facilities. They may have incomplete information about the about the magnitude of changing societal needs for projects they are planning. They may not be clear about the character of the stakeholders with whom they will need to negotiate in

order to win agreement for the siting of projects. They are more than likely to be uncertain about the preferences and underlying motivations of these stakeholders and how they will respond to siting processes. They may have conflicting information about which strategies and policy tools might work and which ones might not work. Furthermore, in many cases, as the stakes involved in these conflicts are large, such as capital expenditures, getting any of these things wrong can be extremely costly for stakeholders.

Reflecting the increasing importance attached to siting as a social and policy problem, there has been a growing literature on the *production of knowledge* about the origins and management of conflict in the development of unwanted projects. Overt the last thirty years or so, social scientists, including economists, geographers, historians, political scientists, sociologists and psychologists, have developed a range of theoretical explanations which seek to account for recurring patterns of behaviour and discourse in siting controversies over time and across space. They have offered diverse explanations of siting processes, issues and outcomes using a wide range of political, economic, demographic and technological variables. They have used a various competing theoretical and methodological approaches in seeking to explain and interpret siting controversies. While the field is relatively new, it has developed into a rich multi-disciplinary field of inquiry.

Contemporaneously, there has been a growing literature on the *utilisation of knowledge* by a range of social scientists in a variety of policy fields, both domestic and international. This literature has sought to explain the relationship between knowledge production and utilisation in policy processes. It has sought to a range of develop models to investigate the use and impact of research on practical politics and policy and the processes through which knowledge production finds it way into knowledge utilization (Stone et al., 2001). One recurring theme in this literature relates to understanding and analysing the factors, such as the cultural gap between scholars and practitioners, the validity and reliability of research and the ways in which research is useful for practitioners involved in practical political processes.

How is it possible to make sense of this diverse scholarly siting literature and its possible usefulness to siting practitioners? What have been the major developments in the siting literature and what does the evolution of literature tell us cumulatively about siting? Have siting scholars developed theoretical explanations which are robust? To what extent have scholars of siting left their ivory towers and have produced explanations of siting processes and outcomes which are of practical relevance to stakeholders? If so, what does the knowledge utilization literature say about the potential utility of scholarly literature for practitioners? How can we understand the ways in which the production of knowledge can be utilised by siting practitioners? This paper brings together these two literatures and investigates the relationship between theory and practice in siting.

2. KNOWLEDGE PRODUCTION

The social science literature on siting represents an effort by social scientists in knowledge production by seeking to account for issues, processes and outcomes involved in the siting of a wide range of facilities. Social scientists are not unified in positions and approaches to the production of knowledge. They have differing ontological views (whether there is a real world out there or whether that world is socially constructed), epistemological orientations (how do we know what we know about the real world), theoretical views (what are appropriate theories and what variables should be included), and methodological views (what are the most useful methods for understanding the social world). These differences produce varying, yet, important explanations of siting controversies and their management.

2.1 Subject Matter

The facility siting literature covers a wide range of projects, both domestic and international. Of particular importance has been coverage of controversial, high-risk projects such as nuclear power plants, waste repositories, and large-scale industrial projects such as chemical facilities. It also has analyzed other a host of other projects which might appear at first site to be less controversial, but can actually generate significant community conflict. These include libraries, wind farms, hospitals and other medical facilities, museums, movie production facilities, and bridges. While domestic projects constitute the bulk of the literature, it has also covered projects that cross borders of sovereign states or whose impacts are perceived to cross those borders. These include nuclear facilities that are located close to other states (Loefstedt, 1996) and oil and gas pipelines which transit two or more states (Hansen, 2003).

Developing projects generally requires a planning stage (site selection) and an implementation stage (public acceptance, licensing, construction, operation and decommissioning). While it is often not possible to separate out these stages analytically because of overlap, it is possible to highlight the key features of them. Site selection typically involves the use of technical criteria, such as the existence of suitable terrain, and the availability of resources such as land, to establish a pools of least-cost candidate sites from which a site would be eventually selected. Public acceptance generally involves political processes aimed at securing community acceptance of projects at selected sites. Licensing involves a regulatory process of government seeking to balance the expected social and economic benefits and risks of facilities. The subsequent stages of project implementation typically involve optimisation processes, whereby developers seek to minimise construction, operation and decommissioning costs (Lesbirel, 1998).

The earliest comprehensive review of the siting literature focused on planning and site selection, particularly the use of numerical methods to select least-cost sites on which to develop projects (Jopling, 1974). It surveyed the site selection literature focusing on the use of technical criteria in site selection such as the existence of flat and stable terrain, the availability of cooling water, a relatively low population density (particularly for nuclear plants), accessibility to transportation routes, and proximity to major load centres. It also investigated the use of different numerical methods (attaching numerical scores to site selection criteria) in establishing pools of least-cost candidate sites from which a site would be eventually selected.

Since that time, the siting literature has grown significantly and is still growing. Several books have been written about siting and articles on siting can be found in many journals. The bulk of this growth in the literature has focussed on the social and political aspects of siting particularly during the public acceptance stage. This has reflected the increased political difficulties of siting and an attempt by social scientists to explore the origins and management of siting conflicts. Examinations of the other stages of implementation have tended to take a back seat in the literature. This is perhaps not surprising given that the regulatory and economic optimisation processes involved in implementation (including decommissioning) only become relevant once public acceptance has been achieved, in whatever form. It is timely to review the literature in the context of social science.

2.2 Theoretical Approaches

We can understand this growing literature by reference to the ontological and epistemological approaches to the production of knowledge (Hay, 2002). Ontology is a theory of being. The key question is whether there is a real siting world out there that is independent of our knowledge of it. For instance, are there *fundamental* differences between the risks of nuclear projects and wind farms? Foundationalists might agree and argue that these differences persist across space and time and that these differences provide a critical foundation upon which to explore siting

disputes. In contrast, anti-foundationalists would most likely argue that these differences are not *fundamental*, but are particular to different times, cultures and circumstances. They would argue that there are not objective differences between the risks of different projects but that any differences are socially constructed and that these social constructions have a significant bearing on siting processes.

The ontological positions that social scientists adopt influence their epistemological positions on scientific claims or what we can know about the siting world and how we can know it. For example, are there real or objective relationships between risks and the degree of difficulty in siting different projects, and can we observe there relationships directly. There are three general positions. Positivists would argue that it is possible to understanding this relationship through theory and to test that relationship by direct observation (Halfpenny, 1982). Interpretivists would argue that that the world is discursively or socially constructed (Foucault, 1977), it is not possible to observe siting phenomena directly, and that it is crucial to identify the subjective interpretations or meanings attached to the risk-siting difficulty relationship. Realists sit between positivists and interpretivist (Sayer, 1992). They would argue that there is a real and objective risk-siting difficulty relationship, but that there are also deep but unobservable, social, economic and ideological structures which would account for differences in siting phenomena.

These competing ontological and epistemological positions underpin a diverse range of theoretical and methodological approaches used in analysis of siting conflicts. I use a framework contained in (Marsh & Stoker, 2002) to review briefly the siting literature in terms of these competing positions and approaches in the social sciences. It treats institutional, behavioural and rational choice theory as the dominated foundational approaches contained in the siting literature. It categorises feminist theory as a foundationalist approach, but recognized the increasingly strong tendencies towards anti-foundational approaches. Interpretive theory is classified as the anti-foundational approach. Finally, it considers normative theory from the perspective of both ontological approaches.

Institutional approaches to siting are concerned with exploring the institutions, rules, procedures of the political system and the impact on siting politics through organized knowledge which is theoretically informed. They cover organisational structures and relationships between different arms of government as well as the impact of policy networks on politics and policy outcomes. An important perspective is that they treat government, not in organizational terms, but as an association of heterogeneous political actors in their own right with their own political interests. Weingart (2001) shows that the nature and structure of state institutions influenced the inability to site low level radioactive waste sites in New Jersey in the second half of the 1990s. While the state government was creative and flexible, and while there was some organized resistance, there were significant bureaucratic constraints resulting from different policy goals and overlapping jurisdictions which ultimately prevented the state from managing siting conflicts. McAvoy (1994) highlights how the siting of waste facilities in Minnesota was problematic even when strong elite policy networks comprising government, industry and environmental groups (led by the Sierra Club) agreed that solutions were acceptable. While local citizens' groups did not impact on state autonomy, they were able to derail siting processes and influence significantly the capacity of the state to achieve its siting objectives.

Behavioural approaches seek to explain political behaviour of different stakeholders involved in siting conflicts through the development of falsifiable statements which are then tested against the evidence. They emphasise the question of why people at the individual and aggregate levels behave politically the way they do and how do we account for their behavior in siting conflicts. They focus on observable behaviour and use of theory and explanation to develop a casual account of the relationships between behaviour and siting, using systematically all the relevant evidence. Lober (1995) discovers that behavioural opposition declines more quickly with distance than attitudinal resistance, suggesting that self interest rather than attitudes

are crucial in explaining varying behavioural responses to siting facilities. Dear (1992) and Hunter and Leyden (1995) provide some evidence to show that more educated, younger residents with higher income are more likely to oppose facilities. This provides some explanation to explain why some observers have suggested that project developers seek to locate unwanted projects in poorer areas which are characterized by less educated and non-white residents (Bullard, 1990; Been, 1994; Kruize et al., 2007).

Rational choice theory focuses on political choices made by rational, self-interested individuals and seeks to develop general laws regarding these choices. It argues that political actions by stakeholders involved in siting can be understood in these terms. It assumes a rational capacity by stakeholders to choose among alternative course of action the one that they believe is likely to have best overall outcome. It therefore seeks to explain political choices that stakeholders make and the resultant outcomes in terms of courses of action or strategies given preferences over goals and beliefs about what influences the preferences of other actors. Frey and Oberholzer-Gee (1997) use rational choice theory to explain the crowding-out effect of monetary compensation. They found that in a Swiss case that the level of acceptance to facilities drops when compensation is offered because intrinsic motivation is partially destroyed (reducing the option of indulging in altruistic behaviour) when price motivations are introduced. (Hamilton, 1993, 2005) uses a discrimination model to explore locational features of projects. He argues that profit-maximising firms are likely to select sites where there are low income and education levels as there is a relatively low willingness to pay for the environment. As firms care about political opposition, they prefer to locate in minority areas as a lack of or weak collective action requires relatively less internalization of negative spill over effects.

Feminist theory stresses the impact of and challenge to the structure of patriarchy (rule by males) as a form of power in political processes. It argues that there has been a gender blindness in foundationalist approaches and explores the nature and importance of gender in understanding siting conflicts. The theory expands the political debate from the *public* to the *private* sphere. Given evidence that women tend to attribute higher risks to siting-related activities than males Slovic (2000), it provides insights into the relationship between gender, power and the management of siting conflicts. Brown and Ferguson (1995) argue that women constitute the majority of both the leadership and the membership of local toxic waste activist organizations, and show how women activists transcend private pain, fear, and disempowerment and become powerful forces for change by organizing against toxic waste. Bantjes and Trussler (1999) agree, arguing that the fit between the community health focus and women's traditional role (the motherhood effect) enables women to play a central organizational role in anti-waste movements. They conclude that women have greater structural availability than men do in fighting toxic waste projects as they are less likely to be in the labour force and that housewife activists can form stronger local female networks, based on ties of kinship and domestic labour, to provide powerful opposition.

Interpretivist theory represents the anti-foundationalist approach and generally rejects foundationalist approaches to social science. Dismissing the notion that a real world exists, it focuses on the structuring of social meaning as central act in siting controversies and argue that the system of meaning (discourses) shape way people understand political activity involved in siting. It sees political actors, institutions and practices as only making sense within particular discourse in terms of the use of language, symbols, and the structuring of siting debates. Siting conflicts are viewed in terms of the production, functioning and changing of discourses relating to key aspects of siting processes, such as equity and identity. These conflicts are conflicts between different forces trying to impose ideas (structures of meaning) on each other. Hubbard (2005) applies discourse theory to the siting of an asylum facility in England. He clearly demonstrates how opposition could create a dominant discourse between self (local citizens) and others (asylum seekers) by emphasizing a social construction of the "other" as a burden on the

community and a potential security risk, thereby threatening the identity of the English countryside. Haggart and Toke (2006) show how opponents to wind farms in Wales were able to dispel claims of NIMBYism by developing a discourse which challenged wind farms as clean technology by appeals to the notion of intrusion into unspoiled areas and the use of the language such as wind energy power station (image of large factories with smoke) as opposed to wind farm (images of being part of the countryside).

Normative theory concerns the discovery and application of moral notions to siting practice. It explores the goals, values and processes of society that should be pursued such as equity (equal distribution of benefits and burdens), liberty (rights of government to interfere with choices by local communities) and efficiency (maximizing siting outcomes with least costs). In short, it addresses a central question of what ought to or should be and examines alternatives open to society by elaborating a "best blueprint for society." Foundationalist and anti-foundationalist approaches all have range normative perspectives. Institutional, behavioural and rational choice approaches generally stress the need for approaches to siting which are fair, workable, just, transparent and legitimate and the importance of institutions in achieving these normative goals. The feminist literature has stresses gender and other inequalities in terms of the siting of projects. Interpretivists stresses the discursive aspects of siting and view siting conflicts as importantly being a contest of competing ideas and discourses, all of which have normative foundations.

It is important to note that these competing theoretical perspectives are not mutually exclusive. The literature contains a variety of examples of multi-theoretic approaches to examining siting conflicts which attempt to provide more theoretically integrated approaches to understanding this issue. (Hecht, 1998) uses both institutional and behavioural analysis to explore the interactions between fragmented institutional decision making and the behaviour of stakeholders in managing siting conflicts in rural France. (Sakai, 2005) combines social choice and normative theory to develop a formal model of siting which posits site selection in a way which maximizes social welfare and to share the value equally through monetary compensation and that such a approach would be robust to strategic manipulations. Haggett and Toke (2006) explore wind farm siting conflicts in England and Wales and show how siting discourses related to the behaviour of key stakeholders.

2.3 Methodological Approaches

The literature also employs competing methodological approaches to the analysis of siting conflicts and their management. The literature is replete with the use of qualitative analyses which have generally used case-studies and narratives (often based on interviews and focus groups) to explore siting conflicts. These have been particular useful in examining siting decision processes and outcomes, policy tools that states use in managing siting processes, motivations and strategies supporters and opponents in siting disputes, understanding the experiences of stakeholders in siting conflicts and the meanings they attach to these experiences, and in drawing attention to the broader social, political and historical contexts in which siting conflicts are played out.

The use of quantitative approaches is also abundant in the siting literature. These methods include univariate, bivariate and multivariate techniques to provide statistical insights into siting conflicts. They seek to explore statistically relationships between a dependent and explanatory variable and assess the strength of those relationships, using both experimental and observational data. They have been useful for analysing the socio-economic locational characteristics of projects in terms of environmental justice (Been & Gupta, 1997) and levels of social capital (Aldrich, 2007), the relationship between compensation offers and the crowding out of civic duty in siting facilities (Frey & Oberholzer-Gee, 1997), the relationship between auctioning strategies

and compensation costs in siting (Quah & Tan, 2002), and the relationship between public acceptance times and the structure of the bargaining environment (Lesbirel, 1998).

Finally, the siting literature has also used comparative methods to further enhance our understanding of siting processes and outcomes. These methods aim to explore explicitly and systematically differences and similarities between siting processes and outcomes and can involve intra- or inter-country comparisons, both across space and over time. Much of the earlier siting literature focussed on North American cases, although over time the country coverage has expanded to include a wider variety of settings in Europe, Asia-Pacific and elsewhere. Many of these studies are comparative in the sense that they compare different siting outcomes within these nations. An important development has been the increase of inter-country comparative analyses, include alternative siting strategies in the US, Canada and other advanced nations (Rabe, 1994; Munton, 1996), failure and success in siting (Vari et al., 1994), transaction costs and institutions in industrialised nations (Lesbirel & Shaw, 2005), state management of civil society in advanced nations (Aldrich, 2007).

2.4 Explanatory Utility

The range of theories used in the siting literature represent attempts by social scientists to account for recurring processes, issues and outcomes involved in facility siting. The extent to which these theories are useful in explaining the real world of siting will be importantly determined by the empirical validity of causal relationships between the variables contained in those theories, and the extent to which the theories explain siting phenomena in general terms.

The literature has identified a wide range of variables to understand the origins and management of siting conflicts. These include: risk, trust, distribution of burdens, demand for environmental quality, compensation and mitigation, legitimacy, public participation, power, political party structure, social capital, strategy and the like and has explored the empirical relationships between these variables and siting difficulties. For instance, Jenkins-Smith and Kunreuther (2005) explore the relationship between the use of compensation and changing degrees of opposition for projects of differing perceived risk levels in the US. They find that there is likely to be less resistance to the use of compensation for projects which are perceived to be less risky. Kraft (2000) stresses the importance of policy design in siting nuclear waste repositories in the US and Canada. He concludes that Canada had adopted a more deliberate pace of policy development (including extensive public participation) while the US had adopted a more rushed pace with respect to its policy development.

While uni-causal explanations in the social sciences might provide useful, partial understandings of siting processes and outcomes, the literature has developed sophisticated multi-causal models which highlight interactions between different independent variables. Such models generate better explanations of siting conflicts. Rabe et al., (2000) shows explores the relationship between voluntary siting strategies and trust, legitimacy and risk and shows how siting became derailed when authority shifted from a public to private implementing agency. Aldrich (2007) explores the relationship between demographic, political and civil society variables and probable siting outcomes in Japan, demonstrating the state-planned projects are more likely to be located and implemented in communities where civil society is less concentrated and relatively weak.

An important feature of the siting literature is that there is no general theory of siting, but rather a variety of middle-range theories. General theories are wide in the scope of their general applicability and are characterized by little conditionality in their conclusions. They explain broader patterns of behaviour and discourses that persist, both across space and over time, with the use of a relatively small number of explanatory variables. The siting literature has not yet produced general theories such as positivist or interpretivist theories of siting. In contrast, the

siting literature is replete with a variety of middle-range theories which are which narrower in scope and have more conditionality in terms of their conclusions. Such theories tend to be more problem-oriented and focus on specific set of issues, strategies, policy instruments and the like in specific social and historical contexts. While they are related to more general social science theories and provide important insights, they are often based on a limited number of observations or cases and tend to produce contingent generalisations (Lane, 1990; Wilson, 2000; Jentleson, 2002).

Cumulatively, the siting literature has explored the origins and management of conflict in the siting of a wide range of facilities. It covers a full range of theoretical and methodological perspectives, although the literature is dominated by foundationalist approaches. It identifies a key set of variables and, importantly, demonstrates reasonably well how the inter-relationships between these variables influences siting processes and their outcomes in complex ways. These analyses have enhanced our theoretical knowledge of different aspects of siting in a host of different social, political and historical contexts. While the literature has not developed general theories of siting, it has developed a range of middle-range theories which are important in understanding issues, strategies and policy instruments.

3. KNOWLEDGE UTILISATION

A continuing theme in the knowledge utilization literature relates to the nature and extent of a cultural gap between academia and policy practitioners (Stone et al., 2001). This is often referred to as a *two communities* model (Caplan et al., 1975). One view is that this gap is due to the different ways that both camps produce knowledge. Scholars generally see knowledge as deriving from theory. Policy practitioners generally view knowledge as stemming from experience and commonsense based on their involvement in real-world social and political processes. One observer has gone so far as to say that academics are from Mars while policy makers are from Venus (Birnbaum, 2000). This model posits that that academic and policy communities are distinct, that there is very little interaction between the two, and that there is limited use scholarly knowledge by policy practitioners (Caplan et al., 1975; Booth, 1988; Eriksson & Sundelius, 2005).

Policy practitioners, just like academics, also have theories of their own relating to the management of siting controversies. Practitioners have theories which guide them in identifying goals in siting processes and considering, evaluating and choosing alternatives courses of action to develop projects. In doing this, they have to decide, amongst other things, which information to use, which stakeholders matter, which events need priority, which strategies they will employ and in what order, and which policy instruments and in which combination they will use to achieve their goals, whatever they may be. These theories might derive from insights contained the scholarly literature, previous experience in the siting of facilities by them or others, rules of thumb or some combination of these.

Indeed, Hamilton (2005) notes that siting policy debates amongst practitioners in the United States can be understood in terms of competing theories to which policy practitioners subscribe. He observes that some decision makers expressed a preference for an approach which generally left siting in the hands of private developers but specified a process of explicit negotiation between developers and communities, buttressed with compensation mechanisms that sought to offset negative expected social and environmental costs to local communities. He notes that others advocated an approach which involved centralised decision making power where the state had the authority to initiate siting processes and would have preemptive powers whereby it could override the zoning powers of local governments. Hamilton argues that these policy debates centered on whether states approached the management of siting conflicts through a market model or a firm's decision making model.

How can we evaluate the potential utility of scholarly research for siting practitioners? The knowledge utilization literature provides a useful entry point. It identifies two major uses of research. The first is *conceptual* use of knowledge and the ways in which it can assist practitioners in the basic orientations and broader perspectives to resolving social and political problems. The second is *instrumental* use of knowledge and concerns the ways in which the literature can assist practitioners in more strategic and functional ways (Caplan et al., 1975; Weiss, 1977; Jentleson, 1990; Walt, 2005). I apply these notions to evaluate the ways in which the siting literature can be helpful to siting practitioners.

3.1 Conceptual Utility

The history of the siting literature reflects a major paradigm shift during the 1980s and 1990s. As a result of the emergence of siting difficulties in the 1970s and 1980s in democratic nations, there was a basic change in awareness and a theoretical reorientation from one which stressed coercive approaches to siting to one which emphasized more participatory democratic approaches. The use of numerical least-cost approaches to site selection was closely associated with DAD (decide-announce-defend) approaches to managing siting conflicts. Developers, after selecting least-cost sites, would either sought to ride out community opposition or attempt to override community interests. Typically, secret discussions would occur between developers and political and other commercial elites in local communities with no public consultation. Developers would obtain relevant preliminary construction and other licensing permits. Once siting proposal became public (either by accident or by intentional leaks), developers would either seek to ride out any community opposition that emerged. Where this opposition was perceived to be strong or likely to become more intense, local governments would also seek to override that resistance through the use of zoning and other laws such as eminent domain (Kunreuther, 1995; Munton, 1996).

As the literature demonstrates, such coercive approaches to siting have generally not worked for some time (Kasperson, 2005), although Aldrich (2007) provides some qualification, suggesting that states do use coercive methods in siting some facilities. In democratic countries, communities are generally powerful enough to delay or stop the development of projects that they perceive to be risky. Many states still have the legal and constitutional authority to impose environmental burdens on community interests (through the use, for example, of eminent domain). Yet, increased demands for more voluntary and democratic processes, power sharing, and transparency, coupled with more awareness of environmental risks, equity issues and mistrust in public institutions, have effectively meant that communities have veto power over project placement decisions. As Morell and Magorian (1982) conclude, governments can strip away a the legal power of communities, but they cannot strip away their political power.

An important feature of the literature is that it is highly policy relevant and has provided overarching perspectives which seek to assist practitioners in the management of siting conflicts. The most seminal in this regard is the *Facility Siting Credo* (Kunreuther et al., 1993). The fundamental theoretical orientation of the Credo is that the key features of siting conflicts are disagreement over values and goals, a tendency to wish to maintain the status quo and a lack of trust. Based on this, the Credo suggests a range of guidelines with the aim of achieving a more deliberative, workable and fairer siting process for all stakeholders. The Credo has formed the basis for subsequent policy-relevant research on siting. Many analyses of siting have tested the validity of the Credo or have used it as a basis, either implicitly or explicitly, for developing further analysis and practical recommendations.

Particularly noteworthy is the development of a stepwise approach for nuclear waste facility siting which draws heavily on the Credo (OECD, 2004; Pescatore & Vári, 2006). This approach stresses the reversibility of decisions after reconsideration of one or a series of steps at

various stages in the siting process. The key theoretical perspective relates to participatory democracy and new forms or risk governance and in particular that decision making should be open and provide the flexibility to adapt to contextual change, that social learning should be facilitated, and that there should be public involvement in siting processes. Importantly, the study argues that siting decisions are already being made in a stepwise and participatory way and that there has been a significant move to increased participation in siting processes in Europe and elsewhere.

These guidelines highlight the importance of interactions between scholars and siting practitioners in providing broader conceptual perspectives and insights into the management of siting processes. The Credo was generated from a workshop which included scholars principally from MIT, Harvard and Pennsylvania universities and practitioners from the public and private sectors in the US and Canada. The development of the stepwise siting approach involved contributions from several scholars in Europe and policy makers associated with the NEA. The Report itself stressed the importance of the scholarly literature in the development of this approach by a major international organisation. This suggests that the literature is providing important insights and finding its way onto the desks of some siting practitioners.

3.2 Instrumental Utility

This discussion supports a contention in the knowledge utilization literature which suggests that a major role of scholarly research is an enlightening one whereby knowledge production can provide useful conceptual insights which can and does, over time, have an impact on the broader orientations and perspective of practitioners (Weiss, 1977; Booth, 1988). Yet, an examination of the siting literature also reveals that it can provide useful instrumental insights in strategic and functional ways. Walt (2005) and Jentleson (1990; 2002) suggest a useful way for examining the usefullness of theory to policy practitioners by reference to its diagnostic, predictive, prescriptive and evaluative utility. I apply that approach to evaluating the instrumental utility of the siting literature.

Siting theories can assist practitioners in *diagnosis* or attempting to understand what phenomenon they are facing. For instance, theory can help policy makers understand if the motivations of those opposing projects is based simply on emotional concerns about projects, green ideology or, indeed, simply to extract more benefits out of project developers (Welcomer et al., 2000). While there may be some element of truth in these assertions, siting theories suggest that resistance to projects is based on motivation which are much more complex and nuanced (Wolsink, 2007). It also has a lot to do with real and legitimate concerns with the possible and often negative aspects of projects on local communities (including both physical and non-physical harms), the nature of participatory decision processes involved in siting those projects, and a lack of trust in institutions governing siting processes. Such diagnosis has significant implications for devising an approach to siting and the management of conflict.

Theory can help in an understanding and interpreting historical siting experience and guide practitioners in their responses to the future. It provides a broad set of useful diagnostic options for decision makers. International experience reveals that most industrialised nations generally have generally abandoned DAD approaches in favour of more democratic approaches to locating unwanted facilities. While there is no single model of siting has emerged, the literature highlights various participatory and deliberative responses to siting in democratic nations such as Austria (where strong hierarchical traditions persist), France (where the state has tried to embed itself in local communities), Japan (where the state uses an array of compensatory and other policy tools), and Germany (where cooperative discourse approaches have been attempted) (Lesbirel & Shaw, 2005). While there are variations in the effectiveness of these approaches

(they have worked in some cases, but not in others), they do provide practitioners will a useful set of potential diagnostic possibilities.

Such diagnosis, based on siting theories, can also point practitioners in the direction of additional information that is likely to be important in the management of siting conflicts. For instance, competing views of procedural fairness will be an important determinant if siting outcomes. As Linnerooth-Bayer (2005) points out, fairness can be understood in the context of major forms of social organisation (hierarchy, market and egalitarian). Hierarchical approaches stress authority and procedural rationality, where fairness is settled by administrative determination. Market approaches are distinguished by an emphasis on personal rights, freedoms and economic rationality where distributive issues are settled by market interactions. Egalitarians reject the unequal social relations contained in both hierarchical and market views of fairness and abhor morally any procedures that perpetuate social inequalities such as sited facilities in poor and minority communities on environmental justice grounds. While there is no precise and unambiguous way of measuring fairness and equity in siting processes, her conclusions provide a way of helping siting practitioners in their search for additional relevant diagnostic information in terms of approaching siting processes.

Theory can also assist siting practitioners in *prediction* or anticipating conditions, events and trends which influence the broad environment in which siting occurs. Hunold and Young (1998) highlight the importance of changed levels of cynicism towards the capacity of democracies to promote justice in terms of communicative participation as a key contextual variable influencing facility siting. Kasperson (2005) highlights the importance of a changed social and political context where changed perceptions of risk (including the amplification of risk), trust and confidence in siting institutions, and equity and environmental justice concerns have created a different context in which siting process now occur in democratic nations. Aldrich (2007) stresses the level of social capital in communities as an overall determinant of the locational characteristics of a range of projects in industrialised nations. While siting practitioners might not be able to influence the broader environment in which siting occurs, being able to provide some reasonable predictions will assist them to anticipate how historical, social and political contexts in which they operate might influence siting processes and strategies.

Such predictions also help stakeholders to prevent or manage unwanted, or reinforce wanted, developments in siting processes. Barthe and Mays (2005) provide an excellent analysis to highlight unintended consequences of legislative changes which required more communicative process in facility siting. It shows how such communicative processes, if perceived as not only providing information *to* the public, but also *on* the public, can opened up a forum for opposing voices or interests that can derail siting attempts. The siting of the Bayer chemical project in Taiwan during the 1990s shows the importance of anticipating electoral outcomes in siting processes. While the company had made significant efforts to increase local community support for a factory, it was not able to prevent the key leader of the resistance from continuing to politicise the dispute and win a seat in elections, thereby changing power structures which ultimately forced the company to abandon the project (Personal Communication, 2002).

Siting processes are not static, and the relationship between predictive theories and real world developments is highly dynamic, making predictions highly problematic. For instance, O'Hare (1977; 1983) highlights the strategic importance of compensation in reducing resistance to projects. Yet, as several scholars have subsequently observed, such predictions can be inaccurate as compensation can inject instabilities in siting processes. It can do this by changing levels of altruism (Frey & Oberholzer-Gee, 1997), increasing concerns that the risks of projects are high and that developers are paying "blood money," especially if mitigation measures have not been employed (Gerrard, 1994; Kasperson, 2005), and changing power relationships and the scope of conflict in siting disputes (Lesbirel, 1998). The may help to understand why many

observers argue that economic inducement strategies are ineffective or only effective under limited conditions in managing siting conflicts. While perfect predictions in the social sciences are not possible because of relationship between those predictions and behaviour, the theory can sensitise practitioners to anticipate the likely consequences from their actions and to account for those in fashioning their approaches to siting.

Siting theories can also facilitate practitioners by providing useful *prescription* or policy approaches to achieve desired results. The literature offers a range of examples of siting guidelines which have been based on theory. As discussed earlier, perhaps the best known is the Credo. While it provides conceptual insights, it also provides important instrumental insights which are grouped into three areas. The first relates to goals and objectives such as instituting a wide participatory process and working to develop trust. The second set concerns appropriate outcomes such as guaranteeing stringent safety standards will be met, addressing negative aspects of the facility and making the community better. The third relates to steps in the process such as using a volunteer process, seeking to achieve geographical fairness, and keeping a range of options open at all times (Kunreuther et al., 1993).

Other approaches have suggested siting in stages or steps and have highlighted different aspects of the Credo. Sequential multi-stage siting processes provide an illustration of a comprehensive stage-based approach. It includes such site selection, environmental impact assessment, benefit-cost analysis, mitigation, public hearings, negotiations, and an auctioning process to determine relative compensation requirements (Quah & Tan, 1998; 2002). Stepwise siting involves the development of steps in the siting process that are reversible. The guidelines specify a set of goals, such as having open debate, developing an understanding that the status quo is unacceptable, identifying one more acceptable sites, negotiating tailor-made compensation packages and fully respecting agreements, as crucial in implementing siting solutions that are regarded as legitimate (OECD, 2004). Cooperative discourse approaches entail the three major consecutive steps: identification and selection of concerns and evaluative criteria by relevant interests, identification and measurement of impacts and consequences related to different policy options and establishing expert consensus on these consequences and options, and conducting a rational discourse with randomly selected citizens as jurors on citizen and representation of interest groups as witnesses, with citizen panels ultimately deciding on the various options (Schneider et al., 2005).

These various siting prescriptions provide useful strategic insights for siting practitioners. First, they help identify goals and objectives of siting processes, such as equity, efficiency and liberty, and trade-offs between those goals. Second, they assist in exploring the different problems involved in siting conflicts such as assessing the costs and benefits of projects and dealing with different interests which become involved in siting processes. Third, they help in identifying policy instruments, such as inducements, rights and persuasion, for managing siting conflicts. While there is no strategic approach which is unambiguously favoured among scholars, these prescriptions provide important starting points for practitioners in the strategic crafting of approaches to siting projects.

A final way that siting theories can assist practitioners is in *evaluation* or specifying benchmarks for assessing the success or otherwise in accomplishing siting objectives. While the concepts of success and failure have often been used very loosely by siting scholars, perhaps reflecting their slipperiness as concepts and their normative connotations (Smith, 1989), the literature suggests at least four important factors are important when making judgements about success or failure in siting. The first is that siting policies can be judged in terms of design and how they were formulated with success or failure assessed on values and interests. This would entail judging siting policies in terms of whether they were based on appropriate and acceptable values, such as equity, justice and participation (Linnerooth-Bayer, 2005). The second is that siting policies can also be judged in terms of their execution. For instance, success or failure

could be assessed on the efficiency (including social efficiency) and the degree to siting approaches yielded siting outcomes consistent with their design (Kraft, 2000). The third is that siting policies can be evaluated by the extent to which they were effective in achieving goals and leading to solutions to a societal problem (Kunreuther et al., 1993). For instance, success or failure could be assessed on the extent to which siting policy meet societal needs for those projects without leading to other societal problems, both foreseen and unforeseen. Finally, siting policies can be judged on the overall normative positions of the stakeholders involved. As Lindblom (1959) notes, the only test of a good policy outcome is a consensus that it is good.

4. CONCLUDING REMARKS

This paper started out with the observation that being a siting practitioner is not an easy task. Scholars rarely do siting, but they do produce knowledge about siting processes and outcomes. It is hoped that this paper has clarified the nature of the knowledge that they produce and how that knowledge can be utilised by practitioners in conceptual and instrumental ways. It is through the production of ideas and knowledge that scholars can contribute to helping practitioners in their desire and mission to make siting a more manageable task.

The analysis suggests two principal conclusions. The first is that the siting literature has evolved into a substantive one. It has used a full range of theoretical and methodological perspectives to explore siting processes and outcomes for a wide range of facilities. It has generated a variety of middle-range explanations which have enhanced our understanding of siting processes and outcomes in quite rigorous and sophisticated ways. The second is that the knowledge that siting scholars have produced is policy relevant. It offers a range of conceptual and instrumental insights which can assist practitioners in the management of siting processes. Importantly, there is some evidence that these insights have been based on two-way interactions between scholars and practitioners and that they have found expression in observed approaches to siting in many democratic nations.

While the siting literature can offer and has provided useful insights, the challenge will be to build on these achievements by addressing several theoretical and empirical shortcomings in ways which seek to enhance its utility to practititioners.

The first issue relates to the practical utility of contestable theories in the literature. A key feature of the literature is contestability. Indeed, it is the contestable nature of the literature that has allowed it to develop and enhance its explanatory power. Yet, ironically, this process, while extending our knowledge of siting conflicts, might actually act to reduce the practical utility of the literature. Practitioners will be confronted by competing analyses by scholars who are recognised in the field and whose work will be quite compelling from the perspective that they are taking. However, they may very well be reluctant to use these theories because they may not know how and when to emphasise one theory over another or to how to combine these different theoretical perspectives into one. For instance, practitioners will need to know when to emphasise institutional approaches (which focus on rules) over interpretivist approaches (which focus on the structure of meaning). An important area for future research would be to explore how the siting literature can provide policy practitioners with more guidance on the utilisation of contestable explanations of siting conflicts and their management.

The second issue concerns the effectiveness of existing participatory approaches to siting. There are contending positions in the literature. Some authors suggest that existing approaches have not been effective and there is a need to change institutional structures (Shaw, 2005); others argue that it is too early to really test their effectiveness (Kasperson, 2005); still others have argue that there is some evidence of such democratic approaches can work effectively to resolve siting conflicts (Rabe et al., 2000). Reconciling these debates will require addressing biases in the literature. With some notable exceptions, it is still heavily biased towards exploring the

difficult cases. While these are important, it is equally critical to explore the easier cases. For example, while there continues to be studies which analyse why nuclear projects are abandoned, there are few studies which explore why others have been developed. Currently, there are 33 reactors under construction in a variety of nations such as Canada, China, Finland, France, India, Russia, South Korea, and Japan (IAEA, 2007). Yet, there appears to have been no extensive siting studies which explain these cases collectively. Practitioners will not only want to know about the difficult cases; they will also want to know why other cases were resolved. An important issue for future research will be rectifying these selection biases in the literature and testing such outcomes against the approaches proposed in the literature.

The third issue concerns the contingent nature of middle-range theories and their relative strategic and tactical utility. Siting scholars will often be happy with middle-range theories which produce contingent explanations of the form that a X percent increase in trust will lead to a Y percent increase in the probability of reaching agreement. While such conclusions will be acceptable to scholars and might provide useful strategic insights, practitioners will also wish to know how to address more immediate tactical needs. They will need to know how to overcome the problem of trust. But they will also need to know whether the relationship between trust and probability of acceptance fits the particular circumstances they are confronting and whether that circumstance is an outlier. While some research has pointed to the importance of tactical needs in the development of policy guidelines (Kasperson, 2005), there is considerable scope for future research on making the siting literature more useful to policy makers in terms of their day-to-day tactical needs.

The final issue relates to the utility of conceptual and instrumental insights to the management of siting conflicts more generally. The dominant insights found in the literature relate to North America and Western European experience. Yet, there is very little analysis of whether such insights will be useful to practitioners in Asia, a region characterized by nations of differing political systems and levels of economic development. While there is some evidence that existing insights are likely to be relevant to nations such as Japan, South Korea and Taiwan, practitioners in Asia will wish to they are applicable to other nations. For instance, an interesting article on siting in China suggests that local governments and host communities can block the establishment of waste facilities as a result of increasing decentralisation of decision making power as local governments are granted more autonomy in decision making (Chung et al., 2002). There is also some evidence that siting is becoming an important issue in Vietnam, especially with increased citizen concerns after construction (Cuong, 2003). A critical area of future research relates to the extent to which Western-based siting insights are likely to have any applicability in Asia and the extent to which practitioners in different nations can learn from other siting experience and encourage the transfer of knowledge.

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