

Dynamics of Green Building Regulation: A Grounded Theory Study of Industry Practice Change

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Abstract: This research project studied the perceptions of climate-focused regulation and business practices to derive a grounded theory about the way change propagates through companies in the building construction industry. Qualitative data was gathered from interviews with real estate executives in two major metropolitan areas. After the multi-pass coding of this data, a casual mapping analysis led to a grounded theory about the way green building regulation impacts the fragmented business ecosystem of real estate development, design, and construction in urban areas. The findings of this research suggest the ways that regulation impacts marketplace demand and motivates professionals to adopt competencies and practices to become more competitive in the market for services.

Keywords: Climate policy, Green building, Business practices, Causal mapping

Introduction

The U.S. Conference of Mayors endorsed the Climate Protection Agreement at the 73rd Annual Conference of Mayors meeting in 2005. Over one thousand mayors eventually signed this agreement (U.S. Mayors Climate Protection Agreement, 2005). To act on climate protection and make good on the agreement, local-level policymakers in the U.S. enacted regulations to make cities more sustainable. The built environment is a high priority focus of these efforts. Buildings account for 40% of greenhouse gas emissions, according to the U.S. Department of Energy, and this percentage is even higher in dense cities such as New York and Boston. This awareness led cities to implement a range of policies specifically focused on the built environment among their climate actions.

In 2009, a document issued by the American Institute of Architects reported that 138 out of 661 US cities with populations over 50,000 surveyed had adopted green building policies (Rainwater, Martin, and Kara, 2009). In 2016, researchers identified that U. S. cities had promulgated 397 regulatory mandates, 245 incentive programs, and 189 initiatives to make buildings more sustainable (Matisoff, Noonan, and Flowers, 2016). These policies include incentives for specific types of development, formal restrictions, and building codes, driving change in land use, design, construction, and operation of new and existing buildings. In some cases, policies have been challenged legally (Wolf, 2010).

These policies represent significant social, environmental, and economic impacts on individuals, businesses, and communities. This understanding is especially critical as code changes oriented toward green buildings are under consideration by cities and states. The number of green building mandates and incentive programs in U.S. cities is growing. Some communities are enacting second or third generation policies with increased stringency (Matisoff, Noonan, and Flowers, 2016; Dodge Data & Analytics, 2018). Research which examines the nature of the business response to sustainable building policies can provide insight to policymakers shaping the next generation of regulation.

The effectiveness of these policies largely depends on the informed participation of the companies which develop, design, and construct new buildings and urban complexes. There is a need to understand the dynamics of the policy-business interaction and to shed light on the impact that policy implementation has on building capital investment decision-making in real estate firms. The goal of this research was to shed light on the way green building regulation impacts business decisions and professional practices in real estate firms. As clients of the specialist firms in the construction industry, these companies drive the design and construction process by initiating and funding building projects, defining requirements, and driving the sustainability of building projects through their oversight and approval roles (Häkkinen, T., & Belloni, K. (2011).

Theoretical Framework

Researchers have studied many aspects of the interaction of policymakers, regulation, and companies. Parker and Nielsen (2009) highlighted features of regulatory capitalism, noting that policymakers held businesses responsible for regulating their activities. to develop processes and outcomes which helped the community achieve policy goals. Clarke (2000) observed the way that corporations respond to regulation, which impacts the marketplace for a business opportunity. Companies may fight or evade regulation, comply, might take action to shape, influence policy, or determine ways to leverage regulation for business advantage. In studies of the impacts of environmental regulation, researcher J. F. DiMento described a cycle of relationships between government regulators, business targets of compliance, and support groups (1986). DiMento identified policy effectiveness factors such as the application of clear, consistent communication that enabled businesses to understand policy requirements, along with continuous, adequately-funded enforcement.

Lopatta and Kaspereit investigated the way that corporate investments in sustainability impacted market perceptions of the value of the firm (Lopatta and Kaspereit, 2014). Analyzing financial and market data from an international rating agency, the researchers observed that the market perception of firms making investments in sustainability shifted over time, ostensibly influenced by changes in public opinion. The researchers applied three theories for firm value in the analysis, the resource-based view, legitimacy theory, and stakeholder theory of firm value. The *resource-based view of the firm* assesses the value of investments based on whether they improve the firm's assets, including intangibles such as social reputation or process knowledge leading to efficiency. In applying Suchman's *legitimacy theory*, the researchers suggested that the alignment of the firm's norms, values, beliefs, and definitions in their application of sustainable initiatives influences financial performance. Alternatively, a consideration of *stakeholder theory* discusses the impact of "moral" or "social capital" gained through sustainability initiatives on the engagement of employees, investors, and others directly connected to the success of the firm. (Harrison, Freeman, and Abreu, 2015; Gupta and Krishnamurti, n.d.)

Theories relevant to professional behavior were incorporated into the study since the decisions made by real estate organizations are executed and implemented by individuals with specialized training, experience, roles, and responsibilities. The theories of *planned behavior* and *reasoned action* guided the exploration into the perceptions and potential for behavior change on the part of decision-makers responding to green building regulation. Qualitative data collection and analysis incorporated a focus on the background, beliefs, norms, intention, and behavior. (Ajzen,1991; Fishbein and Ajzen, 2012)

Dynamics of Sustainable Construction and Green Building Regulation

Both knowledge and adoption of sustainable building practices have increased over time. In 2011, researchers surveyed the building renovation market. They found that 14% of renovation investments were directly tied to sustainability (Kok, Miller, and Morris, 2011), with an additional 18% furthering sustainability in support of other business objectives. Statista, a market research firm using Dodge Data and Analytics statistics, estimated that revenues of the building efficiency market, including commercial renovations that replace outmoded systems and materials with more energy-efficient and sustainable products, had more than doubled from 2011 to 2018. A 2018 industry report underscored the growth in sustainable construction over the past decade, stating that new commercial construction was the biggest driver of green construction, followed by new institutional construction and building retrofit, which described renovations aimed at improving sustainability. The report highlighted client demand and environmental regulation as the top two drivers for these investments on the part of property owners and developers (Dodge, 2018). Given the growth in sustainable construction and the influence of regulation in driving this growth, the study focused on the firms which initiate these projects, commercial real estate owners, and developers. To clarify the impact of green building policies, the study focused on one stakeholder group which drives the building construction project, represented by real estate developers and owners of commercial buildings.

Green Building Policy Instruments for Climate Action

Linder and Peters developed a framework to describe categories of instruments in public policy, such as the direct provision of public resources, rating systems, incentive tax regimes, certification, codes, and licensing (Linder and Peters, 1990). Green building regulations implemented by cities across the United States apply these approaches (Matisoff, Noonan, and Flowers, 2016). In research on policy effectiveness, assessment methods consider the degree to which regulations are adopted, whether outcomes achieve the goals and

objective, or whether economic benefits exceed costs. Regulations are often based on idealistic economic models. However, policy research suggests that assumptions about utility maximization don't always accurately predict behavior (Schneider & Ingram, 1990). Baumgartner and Jones research on the dynamic aspects of policy suggests the value of applying qualitative research and causal mapping techniques to better understand mental models of decision-makers (Baumgartner & Jones, 2002).

Research Questions

The study delved into the perceptions of professionals in real estate decision-making roles facing green building regulation. Across the United States, cities have employed voluntary, market-based mechanisms, such as accelerated permits for more sustainable projects. Some jurisdictions have required compliance with commercial buildings rating systems, defined by non-governmental organizations such as the United States Green Building Council (Palmer & Walls, 2017). Another green building tactic, building energy asset labeling, requires owners to disclose energy usage to drive higher levels of compliance through marketplace competition (Asensio & Delmas, 2017). Stringent performance-based building codes are available for cities to force commercial sectors toward higher levels of sustainability.

The questions of the study were three-fold:

RQ1: How is the system of policy and market forces perceived by individuals who execute urban development or renovation projects?

RQ2: How do professional attitudes, beliefs, and norms impact the decisions and behavior of individuals experiencing real estate practice changes related to green building policies?

RQ3: In businesses which affect the urban built environment through property development and management, how do individuals respond to green building regulation? The questions delved into perceptions related to specific regulations.

The questions aim to build a deeper understanding of the perceptions and impact of green building policies on the professionals who develop, design and construct buildings, in the hope that this insight could inform policymakers.

Methodology

In interviews with decision-makers, the study delved into perceptions about green building regulations to understand the dynamics of business response. The qualitative method of grounded theory was selected to gain insight into professional practice change and formulate a theory about green building policy impact on the real estate developer/owner. Empirical observations and interview transcripts were coded multiple times to analyze factors. Memos observing details about each conversation were written and assessed. Data categories and cross-category comparisons took place at the same time as theory-building. A causal mapping analysis drew from previous studies on the impact of policy on natural resources issues. (Morecroft, 2007) (Deegan, 2011) (Deegan, 2009) (Kim, 2012).

A theoretical sampling strategy drove the collection of data from twenty-four professionals in decision-making roles with real estate development companies located in New York City or Boston. These individuals represented companies developing large commercial or multi-family construction projects, defining a sample that emphasized urban growth and development in compliance with green building policies in both jurisdictions. Each subject participated in a live or phone-based interview, which started with questions about the interviewee's background and role, general description of the affiliated company, and business strategy for customers and products. The conversations varied as subjects were given latitude to bring up anecdotes or perspective which they deemed relevant. A discussion about projects, challenges, decisions, and processes inquired about permit streamlining, financial incentives, third party rating system regulation, benchmarking or labeling regulation, and building codes. The researcher gathered information about each interviewee's perception of the market, trends, and issues, including the way regulation affects the business. Notes captured whether the interviewee expressed perspectives about the company or the industry.

A third party service transcribed the text from each interview. The resulting text was imported into nVivo, a software tool for qualitative analysis. The text data was coded four times, first to detect cause/effect factors, second to detect business model factors, third to detect business practice factors, and fourth to detect the factors in the regulatory environment and marketplace factors of the ecosystem.

- Preliminary Analysis
 - Audio recorded and transcribed all interviews
 - First pass - open coding of interviews, categories, concepts
- Causal Mapping Analysis
 - Second pass - Cause/Effect analysis of data
 - Identify and tag causal excerpts
 - Aggregation of Cause/Effect excerpts
- Reasoned Action Analysis
 - Background, Belief, Attitude, Perception/Norm, Intention
- Grounded Theory Analysis
 - Second, third passes - Axial coding (related categories and concepts)
 - Selective coding (core category)
 - Constant comparison, the ongoing development of memos

The causal mapping analysis was conducted by identifying and tagging causal excerpts, interpreting the text based on the context, and applied knowledge of the industry to conclude the cause and effect implied by the speaker. For example, when the interviewee said “So for me it’s an opportunity to be somewhat more daring because I have some equity to spend down”, this was interpreted to represent the fact that “Financial Resources” (Cause) is a condition which leads to (Openness to) Risk (Effect on a Resource) (see Table 1).

Table 1. Cause / Effect Table

ERH- Cause/Effect Table								
Causal Link ID	Cause	Effect on Resource	¹	Evidence	²	Description	Comments	#
14062 4-1A	Financial Resources	(Openness to) Risk.	+	So for me it's an opportunity to be somewhat more daring because I have some equity to spend down.		Having financial resources available, cash or access to funding for innovation, to invest in practice changes.	Being open to risk; Taking opportunity to innovate; (positive = willing to accept risk)	1
14062 4-1B	Ambition of Project Goals	Demand for Technical Expertise	+	We setup a goal of building a building which would cut into use by 80% and we had architects who were very willing to say that they could do that and they could not -- we went to five architects. ... and so this became a Passive House building and we brought in German Engineers to help design it. So they can do it, no question. The architects -- the local architects who sort of bought on and that includes COMPANY were completely incapable of doing it and once they were dragged through it they weren't capable of doing that in a cost effective way.			Change technical knowledge in community	2
14062 4-1C	Divergence of Project Goals from Policy Requirements	Project Requirements and Cost	+	The architect or is it that Passiv House in general is hard to build, but they essentially overdesigned it in order to make sure they met it's certification program and huge amount of superfluous work.		When client goals are not aligned with policy requirements, even if they are both aiming for the same result, developers face practice challenges.	Rigor of Requirements for design and construction of a specific project	3
14062	Ambition of	Project Cost	-	So we were looking at Passive House pricing at 20% to 30% above			Ambitious goals for	4

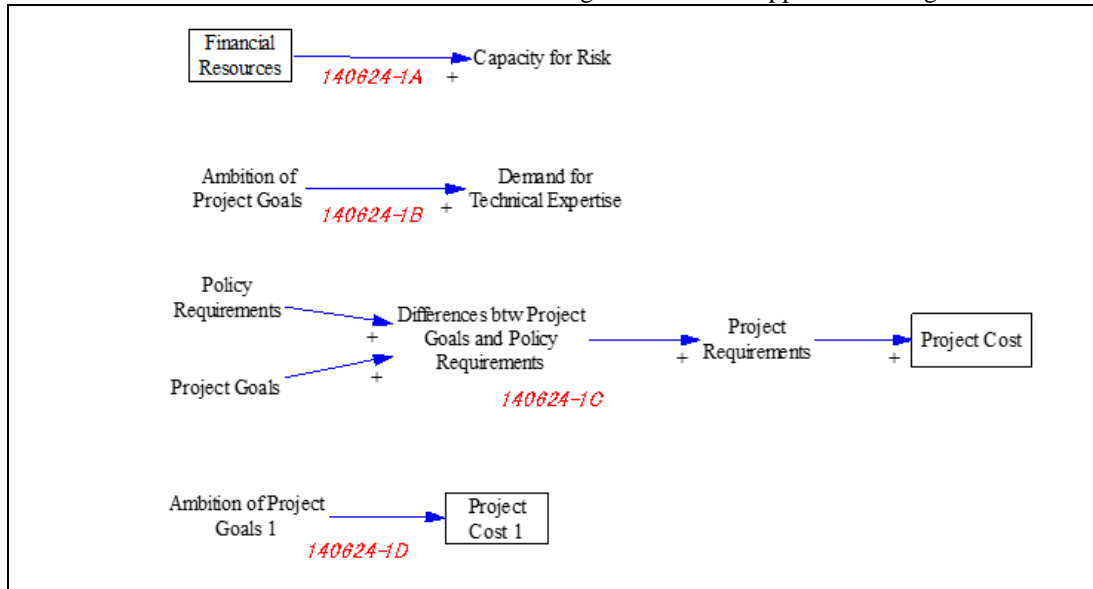
Results and Discussion

Policy Change across an Industry Ecosystem

The first research question focused on perceptions of policy and market forces connected to green building regulation. The coding of transcripts for cause and effect resulted in a table with eighty-three cause/effect entries, each associated with evidence in the form of an interview subject quote, a description or interpretation of the evidence, and comments associating the evidence with one or more of the categories identified through the first open coding phase (see Table 2). This cause and effect coding shed light on the mental models of the subjects, revealing perceptions of the economic, social, and technical systems which governed their work and constrained their decisions. The interviewees commented on the relationships between policy, market, ecosystem, and project factors.

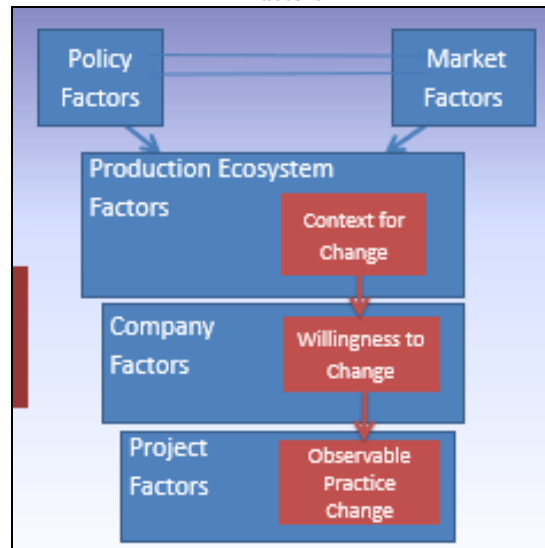
Three theoretical codes emerged – Discovering Opportunity, Experiencing Difficulty, and Changing Practices. The resulting theory described the way that green building policy functions as a mechanism to drive practice change across the fragmented industry of firms that form production ecosystems to develop and improve the urban built environment. Real Estate professionals play a vital role in this ecosystem as initiators of the design and construction process.

Table 2. Cause and Effect Entries were Diagrammed and Mapped into Categories



Both sets of forces - Policy and Market – are drivers for practice change, dynamically propagating through the work of project execution by real estate, design, construction, building operations, and other participating firms (see Table 3).

Table 3. Cause and Effect Fragments were collated into a Theoretical Map of Connected Cause and Effect Factors



Professional Attitudes, Beliefs, and Norms

The second research question delved into the impact of the professional attitudes, beliefs, and norms of individuals, structured along the lines of the Theory of Reasoned Action (Fishbein & Ajzen, 2010). A discussion of the formation of professional norms reoccurred in several conversations, the code “attitude about practice change” captured individual progression through a social space of professional expectations. The connection of this attitude to existing theories about behavioral change, such as the Theory of Reasoned Action (Fishbein & Ajzen, 2010), aided in understanding and led to theory-building. The data shows that individuals who operate as professionals in individuals in real estate companies follow patterns which are defined by established norms and practices and that these individuals perceive the forces of policy change through the filters provided by their professional experiences and identity, and respond to these forces accordingly.

“I imagine that sustainability and resiliency will be a part of both of those projects. They’re both waterfront ..sites. And it’s something that’s very important to me, so I’m going to be pushing to include as much of that as I can.”

“Which we’re excited about, and it makes sense, it saves a lot of energy and it’s good for the environment, the whole thing.” – interview subject

This comment illustrates a lens through which developers perceive policy and make their routine decisions. In addition to the practices established by professional norms, developers incorporate the underlying values which they associate with their work as a contribution to society by improving the urban fabric. Developer perspectives from background to behavior can be studied through the *theory of reasoned action* model. Although interviewees were drawn primarily from two distinct geographic regions, there was diversity in terms of individual roles, company size, and focus on different types of building projects. Nevertheless, common themes emerged.

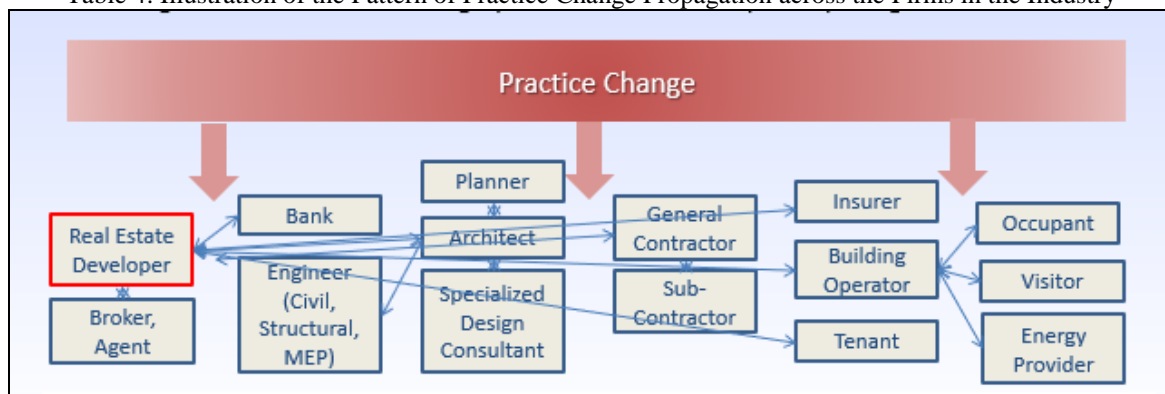
Statements about the behavior of sustainable policy-compliant practice change suggest that real estate developers pay attention to regulations, because of the business need to align with societal shifts. These shifts are indicators of potential market change. At the same time, developers are skeptical and want proof of value in economic terms. The attitudes about practice change incorporate awareness of changes in the production ecosystem, the fact that not all components of the ecosystem move at the same rate or in the same direction. As the instigator of the project, developers perceive they are in control and can get what they need from the production ecosystem. However, these individuals are also aware that there may be technical or economic barriers which can limit results and pose a risk.

This analysis of data about the role of professional attitudes, behaviors, and norms indicates that developers perceive policy change through the lens of professional training and identity. Background and personal values can impact the calculus of making positive decisions for their companies. Also, developers are sensitive to the fact that policy change can signal market change, and this awareness can impact the willingness to change practices within their companies.

Theory of Practice Change across a Production Ecosystem

In terms of the third research question, business action in response to green building regulation, analysis of the data resulted in a theory of practice change propagating through the components of the building design and development ecosystem. The data suggest that green building policy change is a mechanism for influencing the market, and in turn, transforming the entire industry of firms that interconnect on a project basis (see Table 4). The theory incorporates causal loop diagrams representing the cause and effect relationships articulated by interview subjects. The diagrams connect the three modes which each real estate owner or developer experiences on building projects (“Discovering Opportunity”, “Experiencing Difficulty”, and “Changing Practices”). Observations about the drivers of individual professional behavior suggest that developers understand policy and market interactions, and they devise strategies that leverage those interactions and enable success in a competitive marketplace.

Table 4. Illustration of the Pattern of Practice Change Propagation across the Firms in the Industry



Real estate developers are aware of the risks. Yet, they remain positive. Interviewees acknowledged the need to nurture positive working relationships with the public agencies and stakeholders impacting building project

success. They understand that all parties share an interest in positive economic outcomes for the community, although at times, they sit on opposite sides of negotiations. The findings suggest the opportunity afforded by this research method to support further investigation into the economic and social impacts of energy efficiency and resiliency policies on this industrial sector.

Conclusions

The objective of this research was to gain a deeper understanding of the impact of green building policy change and to study policy effectiveness through direct engagement with the targets of the policy, real estate developers. Data supports the argument that policy is understood as a set of elements that echo through the production ecosystem of the built environment as causes and effects. To be effective, policy must be designed and implemented to impact the entire production ecosystem with an awareness of the sectors which comprise it.

The opportunities for future research lie in applying this methodology to the related segments in the ecosystem. This methodology could be applied to gain perceptions from the other members of the production ecosystem, such as design firms, financial firms, construction firms. A holistic model could shed light on the nature of practice change, which each discipline is experiencing, detects points of friction, and suggests ways to remove obstacles to accelerate progress. A broader understanding of the pace and progress of the transformation of the entire ecosystem could help drive policy change toward more sustainable urban environments.

The real estate developer has an enormous impact on society by shaping the world in which we work and live. The policymaker constrains and influences the developer and helps to transform the production ecosystem for buildings. This dynamic creates opportunities for innovation, through which developers can achieve a built environment that sustains our aspirations as well as our economic health and natural resources.

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