HOW Standards enable the emergenCE OF sustainable

construction AS A NEW ORGANIZATIONAL FIELD

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**Abstract**

This paper examines the role of standards in the emergence of new fields. We analyzed the current formation of sustainable construction as a new field within the Danish construction sector. Data were derived from four qualitative studies on mandatory and voluntary standards pertaining to sustainability. On the basis of these studies, we propose that standards shape the emergence of new fields within an existing 'parental' field by 1) stimulating innovation and encouraging other actors to adopt this innovation, 2) generating boundaries around a distinct actor group that become associated with a new field, and 3) drawing legitimacy from central actors and creating networks that facilitate the mobilization of new field members. We conclude with implications for institutionalist research on structuration and field formation as well as implications for the practice of sustainable construction.

**Keywords:** organizational fields, sustainability, standardization.

HOW Standards ENABLE the emergenCE OF sustainable construction AS A NEW ORGANIZATIONAL FIELD

How do standards contribute to the emergence of new fields? Standards shape norms, expectations and categories of meaning and are therefore important for the structuration of a new field. Structuration occurs when organizations begin to adopt similar structures, beliefs, norms and practices (DiMaggio & Powell 1983), resulting in some organizational forms becoming taken for granted. Standards may contribute to this structuration process in different ways. For instance, they may help define ambiguous phenomena and establish points of reference, align organizational practices, pattern interactions among actors, and construct boundaries to adjacent fields. While the diffusion of standards is already widely recognized and researched, the processes through which they shape the emergence of new fields is less well understood.

Our aim in this paper is to identify some of the ways in which standards contribute to the structuration of emergent fields. A field refers to “those organizations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products” (DiMaggio & Powell 1983:147). Emergent fields are characterized by loose structures; there are no leading organizations to imitate (Trist, 1983), no widely shared agreement as to what is appropriate practice for actors in the field (Hardy, 1994) and no shared understandings of constituent elements, actor roles and field boundaries (Maguire, Hardy & Lawrence, 2004). While institutionalist research has illuminated several elements of structuration, such as theorization (Strang & Meyer 1993; Greenwood, Suddaby & Hinings 2002) and the isomorphic institutional pressures through which organizations come to ressemble one another (DiMaggio & Powell 1983; Tolbert & Zucker 1983), we know surprisingly little about the very early processes that spark the formation of a new field. We target for analysis the role of standards in these processes.

The emergent field that we target for analysis is that of sustainable construction (Markard, Raven & Truffer, 2012). Novel design practices and technical developments have in recent years given rise to a plethora of new ideas and professional domains, e.g., zero-net-energy housing, eco-cities, and sustainability certification of buildings. Taken together, these activities, tools and new knowledge bases may be characterized as an emergent field at the fringes of the traditional construction sector. The emergent field of sustainable construction is becoming an arena for the encounter of novel ideas, ambitious goals, collaborative construction practices, and new forms of (sustainability) expertise. Interest and activity in this field have developed exponentially in recent years and calls have been made to clarify what it means that a building, a neighborhood or a practice is ‘sustainable’. In response to such calls, actors within this emergent field have taken initiative to formulate standards of various sorts. Laws are being introduced to cap energy consumption of new buildings in an effort to limit their CO2 emissions; voluntary sustainability certification schemes are being offered to building contractors and developers of neighborhoods, and sustainability tools are being employed during the construction process and in ensuing evaluations of construction projects. Construction actors are thus fully engaged in the structuration of this emergent field. The structuration process is actively unfolding in the sense that standards are currently being introduced, contested and tested in practice in conjunction with other changes. Some of these initiatives appear to be (temporarily) stabilizing into a semi-institutionalized form. It is thus an ideal point in time to examine the processes through which standards contribute to the structuration of an emergent field.

Our empirical study of the role of standards in field formation has been undertaken in Denmark, a Northern European country that takes pride in its sustainability leadership on the global stage. For instance, Denmark adopted earlier this year a national policy that seeks to generate 50 percent of national energy needs from wind power by year 2020. More than half of that ambitious goal has already been attained, making Denmark an exemplar of sustainable energy production. This initiative reflects the general support for sustainable development in Denmark. Given that the vast majority of CO2 emissions come from buildings, it is not surprising that many actors are actively engaged in promoting sustainable construction. Much of this activity pertains to developing, or complying with, standards for sustainable construction.

Two types of standards, mandatory (regulatory) and voluntary, are at play in the structuration of the field of sustainable construction. We look at mandatory standards (laws) as a backdrop for sustainable construction and two forms of voluntary action – initiatives to go beyond compliance and standards as manifested in sustainability reference tools/guidelines. Our main analytical focus is placed on voluntary standards and their interplay with and relation to mandatory standards. To capture the emergent nature of sustainable construction as a field, we examine (a) the ideational components of each type of standard as formulated in text and b) their implementation in real-time in a two select construction projects. This orientation provides a two-by-two matrix structure for our study that, thus, includes four empirical studies. These studies were conducted in parallel from 2009 to 2012 and rely on observations, interviews and textual data. Presenting integrated findings from these four empirical studies, this paper identifies processes that exceed the insight we derived from each study separately.

Our core findings consist in propositions about the processes through which standards shape the emergence of new fields. We propose that new fields emerge endogenously within an existing 'parental' field and that standards contribute to this process in three ways, namely by 1) stimulating innovation and encouraging other actors to adopt this innovation, 2) generating boundaries around a distinct actor group that become associated with a new field, and 3) drawing legitimacy from central actors and creating networks that facilitate the mobilization of new field members. These processes, we content, may unfold with or without conscious deliberation.

We believe these findings to be an important starting point for formulating theoretical propositions about the role of standards for the structuration of emergent fields. They may also inform research on field formation more generally. Our scope is limited to formulating propositions about standards and structuration in emergent fields on the basis of our four empirical case studies, which we juxtapose with existing literature on the topic. Since our study is conducted within a single emergent field and in a single national context, our propositions should be compared to the emergent field of sustainable construction in other countries and eventually to other emergent fields. Our study also carries some implications for the practice of sustainable construction. The propositions we offer about the role of standards in field structuration may give rise to reflections about the current development of standards in the field of sustainable construction.

Before we embark upon the study, let us introduce the sections to follow. We start with a review of the notions of structuration, emergent fields and sustainable construction. We then proceed to the methodological procedures, including the four empirical studies and their relationship to one another. Our findings, presented subsequently, highlight our propositions and associated empirical case material from the four empirical studies. The paper concludes with a discussion of our propositions in relation to the existing literature on standards and structuration, including suggestions for future research and implications for practice.

STANDARDS AND STRUCTURATION OF EMERGENT FIELDS

**Standard Formation**

Standards are a ubiquitous feature of organizational life (Brunsson & Jacobsson 2000; Brunsson et al. 2012) with a long history in science, manufacturing and trade. Standards provide a point of reference, prescribe particular forms of behavior and can, thus, serve as a means of coordination. They can, needless to say, take on many forms. Their form depends on what they are seeking to standardize, e.g., terminology, design, performance or procedures (Timmermans & Epstein 2010, p. 72), and on how they have been created, that is, whether they are legally mandated or voluntarily (negotiated) ways of regulating behavior.[[1]](#footnote-1) Subject to both contestation and negotiation, standards are often, at least for a while, highly visible aspects of organizational practice. However, over time, they may either fall to the wayside or fade from vision as they become a taken-for-granted feature of ‘doing business’.

How do standards come into existence? As we alluded to above, there are roughly two (ideal-type) mechanisms through which standards emerge: government action and/or collective action on the part of various industrial organizations (in national and international standard setting committees or standard development organizations). More often than not, standards emerge through a combination of both mechanisms. The collective, voluntary approaches are often heralded as more effective than government regulation because of the likely accept that comes from their having been negotiated and agreed upon collectively. In contrast, government regulation is associated with information asymmetries and substantial transaction costs. This is not to say that the development of voluntary standards is always consensual. As other forms of collective action, standard development is also subject to power struggles, conflicts and free-rider-problems (Garud et al. 2002) just as they are likely to be subject to critique from actors not directly involved in the development processes.

The rationales that underpin the development of standards revolve around ensuring public goods, such as improving health, safety and environmental conditions. The public good can also take the form of reasonable consumer prices for certain products and services. Standards may be introduced to ‘level out the playing field’ in order to enhance competition or they may seek to enable coordination and the spread of ‘best practices’ in an effort to reduce production costs. Whether standards are indeed successful means to these ends is an object of intense debate.

Although the rationale for the development of standards may be to protect public goods and/or regulate market relations, standards may also have other effects, whether intended or unintended. One of these effects is innovation. Standards can promote innovation by staking out new, legitimate directions for development that firms not yet adhering to the standard can exploit. Another effect, the exact opposite, is to stifle innovation. Standards may inhibit innovation or produce only ‘standard solutions’ if firms stick too strongly to standards for fear of loosing legitimacy or of being incompatible with the existing structures. A third effect can be to provoke institutional change in the organizational field. Standards may, if widely adopted, contribute to a partial deinstitutionalization of existing institutional structures and thus pave the way for institutional change. Finally, a fourth effect of standards is the emergence of a new field. Standards may divide an organizational field into two segments: adopters and non-adopters of new (voluntary) standards. Their co-existence, if constraining, may lead adopters to ‘break out’ and form a new organizational field of their own.

**Structuration Processes and Standardization**

Structuration refers to the processes by which organizations become structurally similar to one another (DiMaggio & Powell 1983). Structural similarity manifests because:

“organizations, and the individuals who populate them, are suspended in a web of values, norms, rules, beliefs, and taken-for-granted assumptions, that …/… provide blueprints for organizing by specifying the forms and procedures an organization of a particular type should adopt if it is to be seen as a member-in-good-standing of its class” (Barley & Tolbert 1997, p. 94).

According to DiMaggio (1982) and DiMaggio and Powell (1983), structuration occurs when organizations in an emergent field increase the extent of their interaction, inter-organizational structures of domination and patterns of coalition become clearly defined, the information load in a field increases, and organizational actors in an emergent field begin to recognize that they are involved in a common enterprise. It is through repeated interactions that groups of organizations in emergent fields come to develop the shared understandings and patterns of practice that make up the institutions, which, in turn, structure their interactions within this field (Maguire et al., 2004: 659). Decades of research have shown that the three isomorphic pressures of mimesis, coercion and norms contribute importantly to such processes of structuration (Boxenbaum & Jonsson, 2008).

Standards have structurational properties as well in that they provide producers and users with development opportunities while simultaneously giving these developments direction (Garud & Jain, 2002:198). Collective beliefs, norms and laws that circulate in the form of standards can thus be approached as vehicles for isomorphic pressures and field structure. They are, however, not likely to be fully formed at the beginning of a structuration process. At the early stages of structuration, such elements may be ambiguous and take shape during social interactions and through organizational implementation (Edelman, 1992; Maguire et al., 2004).

Processes of structuration have been largely neglected in empirical research (Barley & Tolbert, 1997). Institutional theorists have not addressed how structures emerge from, or influence, action (Barley & Tolbert 1997, p. 96) while structuration theory as formulated by Anthony Giddens constitutes a process theory of such abstraction that it largely prevents empirical study (ibid: 94). Practice innovation is uncommon in highly institutionalized fields because “institutions set bounds on rationality by restricting the opportunities and alternatives we perceive and, thereby, increase the probability of certain types of behavior” (Barley & Tolbert 1997, p. 94). Recently, attention has turned to the emergence of new practices within institutionalized fields (Lounsbury & Crumley 2007). Two factors seem to be potentially influential in practice innovation: facilitating field conditions and institutional entrepreneurs.

Research on facilitating field conditions suggests that novelty may arise in a field when a major event jolts the institutional order and prompt a search for alternatives (Greenwood, Suddaby & Hinings 2002). The existing institutional framework may also be deemed inadequate for resolving a (socially constructed) problem (Oliver 1991). In both scenarios, it is field conditions that inspire actors to search for, or develop, innovations. Prompted by favorable field conditions, actors may import institutional elements from other sectors or countries (Boxenbaum & Battilana 2005) and/or combine elements of existing templates that were not previously associated with one another into a novel form (Boxenbaum, 2006; Maguire et al., 2004).

Another approach to practice innovation emphasizes the role of institutional entrepreneurs, i.e., the actors that take the initiative to produce innovation and change in institutionalized fields. The notion of institutional entrepreneurship refers to the characteristics and actions of organizational and individual actors who develop and push alternative institutional arrangements (Battilana, Leca & Boxenbaum, 2009). Lounsbury and Crumley (2007) argue that a strong focus on individual actors distorts our perception of how new practices emerge in institutionalized settings. Novel practices are created, they argue (ibid), by a multiplicity of actors that interactively produce change, not by all-powerful individual actors with great ideas. Research on institutional work tries to embrace a practice perspective by analyzing how actors, through the work in which they engage, maintain, create and change institutional arrangements (Lawrence, Leca & Suddaby 2009).

While practice innovation is attracting scholarly attention, little research examines the processes that spark the formation of a new field. We examine this topic empirically and argue, on the basis of our findings, that new organizational fields may come into being through elaboration upon already existing elements within an existing field, such as standards.

SUSTAINABLE CONSTRUCTION AS AN EMERGENT FIELD

Although the notion of sustainable construction has been around for quite some time, at least since the early 1990s (Kibert & Fard 2012), both the professional literature and the academic literature are replete with calls for more clear-cut definitions of sustainability. Without clarity, they argue, it is not possible to identify whether construction qualifies as being sustainable. There is, however, still much uncertainty as to whom and what this field entails, and the sheer complexity of the construction field only adds to this conundrum.

The construction industry involves a wide range of actors, notably those involved in designing, building and operating buildings (Winch 1998). Each of these activities involves a host of different actors ranging from clients, architects and specialist designers to engineers, contractors, developers, material/ component suppliers and consultants, not to leave out occupants and facility managers. Also, associated with the industry and adding to its complexity are a variety of actors from government, professional organizations, real estate, finance and insurance industries, all of whom are – in one way or the other – contributing to regulating the construction industry. Hence, the scope of this industry is quite extensive. Adding the adjective ‘sustainable’ in front of construction only adds an additional layer of complexity, ambiguity, and supplementary actors.

Regardless of its complexity, sustainable construction appears to be taking shape as a field. It has become a key policy domain within the EU and across the EU-member countries and it is increasingly becoming a private sector domain as well. Sustainable construction was initially associated with construction processes and outputs (i.e., buildings) that are less polluting and more resource efficient, particularly with regard to energy use (Lowe 2010; Ryghaug & Sørensen 2009). Relatively little attention was paid to other concerns such a biodiversity, livability, affordability, community support/ engagement, and the ways in which buildings and the physical infrastructure together shape cultural and social development. However, with the proliferation in the past two decades of professional and academic publications, products, technologies, and analytical tools that support some form of ‘sustainable construction’, this notion has come to encompass issues pertaining to construction as well as urban regeneration and development. Although it is possible to identify the realm of sustainable construction, locating and characterizing its boundaries is not a straightforward task. One way in which the emerging field is being structured is through the development of mandatory and voluntary standards.

**Mandatory Standards in Sustainable Construction**

National legislation asserts coercive pressure on the construction industry through building regulations that are obligatory for the main actors engaged in the construction or the refurbishment of buildings. Building regulations apply to the construction industry as a whole, including the emergent field of sustainable construction. In parallel to national legislation, the European Union has taken a number of initiatives such as the *Energy Performance of Buildings Directive* (European Council and Parliament, 2002/2010). This directive, which has been tightened significantly in recent years, sets targets for national energy performance, but it is up to the member countries to determine how these targets will be met. It also encourages the construction sector to investigate the technical, environmental and economic possibilities for developing and implementing alternative energy systems. Furthermore, it stipulates that all new buildings must use nearly zero energy by 2020. Although the thrust of these mandatory standards has been to increase energy performance within the construction sector, the technical nature of these measures appear to have indirectly encouraged some construction actors to become specialists and to pursue even higher ambitions in this area. Moreover, it appears to also have spurred some actors to engage in the development of e.g. new designs, new materials and other forms of resource efficiency. Continued development within these areas may contribute to the formation of a new field for sustainable construction.

**Voluntary Standards in Sustainable Construction**

*Reference tools*

The adoption of certification and reference systems for sustainable construction represents an important way in which standards shape the field of sustainable construction. Perhaps the most widely recognized reference system is the *Leadership in Energy and Environmental Design* (LEED), which is intended as a way to ease the process of implementing legislation. Originating in the United States, LEED focused initially on the creation of universally understood and accepted standards, tools, and performance criteria for buildings (U.S. Green Building Council, 2009). It encourages the integration of design and electricity sources, reflecting the concepts of net-zero-energy and zero-carbons-emissions, both of which seek to integrate alternative energy sources (e.g., photovoltaic technologies) with materials and architecture that lower the need for electrical light (e.g., high reflection paint) and air conditioning (e.g., slap radiant cooling) (Lewers, 2008). It has since 2009 evolved to encompass community assessments (LEED for Neighborhood Development). *Building Research Establishment Environmental Assessment Method* **(**BREEAM), developed in United Kingdom, represents another internationally known reference system for sustainable construction. Similar to LEED, this standard was initially directed towards the assessment of building performance, but it has recently become an integral dimension in the UK government’s procurement policy (DEFRA 2005). These voluntary standards co-evolve with mandatory standards in the sense that new legislation is incorporated into voluntary standards and sometimes vice versa.

Apart from establishing certain criteria for what sustainable construction can entail, these standards are also used as ranking systems that can certify whether a building or a neighborhood qualifies as (more or less) sustainable. The ranking systems vary in comprehensiveness, i.e. in terms of whether they include all or just parts of the planning/design, construction and use phases and in the number of indicators included; and with regard to what it takes to get a high ranking.

Certification is considered to have a number of positive effects: One is a more efficient resource use, which can lead to lower operating costs and to greater returns on investment. Another is the reputation effect. This effect applies to the buildings that become certified as sustainable as well as to the actors who subject themselves to the voluntary requirements associated with certification. Certification confers legitimacy upon sustainable buildings and upon the actors who construct them, which increases their respective market value. The status of the certification tools and the actors who produce them increases in this process, prompting the development of more certification tools and increasing the competition among them. This dynamic prompts frequent change and update to certification tools.

METHODS

**Research Design**

The research design consists in a two-by-two matrix. One axis represents the type of standard in question: mandatory or voluntary; the other axis reflects the analytical object: content of standard and its implementation in particular settings. One empirical study was carried out simultaneous for each quadrant, resulting in four studies: 1) the content of mandatory standards, 2) the content of voluntary standards, 3) the practice of mandatory standards, and 4) the practice of voluntary standards. Since all new construction projects are subject to mandatory standards, we selected for study a project (1b) that not only complied with mandatory standards but also embraced the most ambitious, voluntary measures contained in the Danish Building Regulation.

The purpose of this research design is to generate robust findings on the formation of both mandatory and voluntary standards, including their mutual relationship, in emergent fields. We conducted the four empirical studies in real-time to capture structuration processes as they unfolded.

**Data Sources and Data Collection**

The sources of data material for each quadrant of the matrix are indicated in the table below.

|  |  |  |
| --- | --- | --- |
| Data sources | 1. Mandatory Standards | 2. Voluntary Standards |
| A. Content analysis | Danish Building Regulations since 2008 (BR08, BR10) | Danish sustainability tools for eco-districts (national) |
| B. Practice analysis | Architectural competition for a new university building (beyond compliance with BR2008) | Architectural competition for an eco-district (using Realdania City’s sustainability tool) |

*Mandatory standards and associated voluntary measures*

To gather insight into mandatory standards in sustainable construction, we analyzed BR08 and BR10, which are the two most recent versions of the Danish Building Regulations from respectively 2008 and 2010. This code has been applied to all construction projects undertaken in Denmark since 1961. It is revised every two-five years and contains all mandatory standards to be respected during (sustainable) construction in Denmark. We sampled all elements within BR08 and BR10 that regulate elements associated with sustainability. For instance, section 7 of the Danish Building Regulations covers an extensive set of energy efficiency requirements, which are mandatory for all new buildings in Denmark.  This section “sets maximum energy use standards by floor area and building type, as well as standards on all relevant building elements including thermal insulation and fenestration“ (BR08)[[2]](#footnote-2).

Both BR08 and BR10 are performance-based standards. In the 2006 revision of the building code, the notion of low energy housing that had initially been introduced in the 1980s was specified as entailing two forms: Low Energy Class 1 and Low Energy Class 2, the latter being the more stringent standard of the two. This revision introduced a general baseline for energy performance and added two aspirational targets for beyond-compliance design, i.e. two (voluntary) low energy classifications that entailed substantially higher targets. Low Energy Class 2 tightened the mandatory standards to 75% of mandatory levels and Low Energy Class 1 doubled that reduction to 50% of mandatory levels. The provision was that these measures would progressively be incorporated into future building regulations, thus sending a strong signal to the field as to what could be expected.

To study the practice dimension of building regulations (1b), we selected a sustainable construction project that should have been subject to the Danish Building Regulations 2008 (BR08). However, from the on-set of the project it was clear that the client wanted – voluntarily – to go beyond compliance and adhere to the more stringent of the two aspirational performance requirements indicated in BR08. The selected project was a new sustainable university building to be constructed following a public tender process. The design of the building was initiated through an architectural competition. A pivotal element in the brief required the buildings to adhere not only to the Danish Building Code 2008 but also to the voluntary standard of Low Energy Class I as defined in the Danish Building Code 2008. This voluntary standard set at that time the maximum energy consumption of a building to 45 kWh/m2/year of primary energy, i.e. 50% lower than the norm. Any possible means could be evoked to achieve this reduction, including the use of renewable energy sources located on the same building ground and energy-saving building technologies and forms.

We collected data on the design process through observations, interviews and documents such as technical studies, meeting notes, memos and e-mails. Frequent, often daily observations of the architects’ work were undertaken during the first three months of the post-competition design phase in 2009. Data on the competition phases comprise documents and retrospective semi-structured interviews. We carried out five retrospective interviews with respectively the leading architect, the leading project manager/construction engineer, two energy consultants in the architect firm and an energy engineer in the engineering firm.

*Voluntary standards*

Our study also comprised a component in which we examined voluntary standards developed collectively by actors in the field and their effect in practice. To this end, we collected eco-district reference tools developed within Denmark for national use. An eco-district refers to a built community that is sustainable in a holistic sense. The exact components of an eco-district and its associated construction practices have not (yet) solidified into a commonly accepted definition. There are multiple reference tools, i.e. methodologies or evaluation systems for designing eco-districts and assessing their performance, which have been introduced in recent years, but many are still under development. These reference tools present the dimensions of sustainability to be taken into consideration in an eco-district, the measures to be privileged in the assessment of each dimension, and/or the processes through which an eco-district should be conceived, built and evaluated. Although they differ from one another in terms of specific indicators, all of these reference tools take their point of departure in the Brundtland Commission’s (1987) definition of sustainable development, which emphasizes environmental factors, social factors and economic factors. Danish construction actors have, like many of their equivalents in other countries, opted to develop new tools rather than to use tools developed for another social and national context. We selected for analysis all Danish eco-district reference tools that aim for national level application and identified Realdania City’s sustainability tool, the consultancy Niras’ reference tools for Copenhagen Municipality and a recent reference tool developed by two well-known consultants for a religious community, Diakonisse-stiftelsen. We collected these tools in their 2011 version and conducted interviews with some of the actors involved in their development or dissemination.

The study of practice focused on the application of an eco-district sustainability tool in the context of an architectural competition that marked the start of a city development project in 2010. The tool was developed in a public-private partnership spearheaded by Realdania City, which is a subsidiary developer company of Realdania, a private philanthropic foundation with a public mission in the Danish construction sector[[3]](#footnote-3). The city development project is also based on a public-private partnership between the municipality in which the city is located and Realdania By. The competition brief stipulated the use of this tool and offered assistance with its application.

We collected data in connection with the competition – during and after the competition. Apart from a variety of documentary sources (e.g. the competition brief, background documents, competition entries, etc.), we used participant observations at a number of meetings and seminars during the competition and conducted nine retrospective interviews with the client, the client’s consultants and one or two representatives from each the participating teams. We observed and interviewed actors involved in this project to understand how the tool was applied in practice. Data collection extended for a little more than one year.

**Data Analysis**

We started by analyzing each of the four empirical studies separately, using open coding. This process revealed some patterns in each empirical focus area. We subsequently compared and contrasted findings across the four empirical studies in order to identify some crosscutting patterns of potential general relevance to the formation of standards in emergent fields. These identified patterns were subsequently compared to existing literature on standard formation and field emergence. This process helped us sharpen the theoretical contribution of this study, which we present as a starting point for further inquiry into how standards are formed in emergent fields.

FINDINGS: HOW STANDARDS CONTRIBUTE TO FIELD FORMATION

In this section we present some of the core theoretical propositions that result from our integrative analysis of the four empirical studies. They pertain to three dimensions of standards: their ability to stimulate innovation that, in turn, may trigger the formation of a new field, their role in creating boundaries around an emergent field, and their capacity to mobilize actors to confer legitimacy upon the standards and/ or to join the new field in formation.

**1. Mandatory and Voluntary Standards Encourage Innovation**

Mandatory and voluntary standards that exceed the previously achievable level of performance seem to carry within them a grain of field formation. Both types of standards can encourage and enable knowledgeable actors to move beyond the business-as-usual work methods, tools and technologies and produce innovations that trigger the formation of a new field. Since successful actors inspire other actors to imitate them, standards can also lead to uptake of innovations that further support the formation of a new field (see also proposition 3). Standards may thus produce innovations that become an important catalyst for the formation of a new field. Voluntary standards are perhaps more likely than mandatory standards to have this innovative effect since public actors rarely introduce mandatory standards that require performance levels beyond what has already been achieved in practice. The Building Regulation’s strong signaling of regulation to come in the future appears, however, to have prompted some actors to ‘go beyond compliance’, even though the majority of actors continue to meet the regulatory requirements with known technology. The rise of some ‘leading’ companies will provide actors subjected to new mandatory standards with real-life examples that can be copied instead of searching for new solutions themselves.

In the case of the sustainable university building, the level of ambition defined by the client’s performance requirements (Low Energy Class 1) provoked dynamics of exploration beyond those habitual in the field of construction. The competition brief stated an ambitious energy performance requirement for the building: not only should the building conform to mandatory standards contained in the Danish Building Code 2008 but it should go beyond this level and meet the voluntary Low Energy Class I requirement defined in this document (see p. 14), that is, maximum 50% of the maximum energy performance requirements in this legal document.

The client’s clearly stated ambition provided a framing according to which more ambitious energy measures had to be embraced. In practice, the design team saw two options: either to integrate energy issues throughout the design process or to add innovative technologies like solar panels to compensate for the electricity used.

They opted for the former and embarked upon a process inspired by a principle well known in sustainable construction, namely the bioclimatic design principle. The team included a few engineers and architects with expertise in sustainable construction; all of whom explored various options for meeting the voluntary standard, Low Energy Class 1. The design process was characterized by uncertainty, because they did not have a preconceived definition of what an energy efficient building would entail. This meant that the design was gradually optimized, simultaneously to its development; a process that is common in design projects. Given the client’s very ambitious energy requirement, it was introduced already in the competition phase, in keeping with one of the principles of Integrated Energy Design Method also associated with the field of sustainable construction.

The design team adopted innovative methods and principles that would allow the sustainable university building to meet the requirements of the standard Low Energy Class 1. These methods and principles were part of an expanding ‘tool kit’ for sustainable construction consisting of particular methodologies, technologies and approaches. Moreover, the employment of the voluntary standard prompted the use of several innovative elements from the emerging field of sustainable construction, such as building orientation and design, roofing and building envelope, heating and energy supply, and in-house monitoring of resource consumption. The combined use of these different tools for energy efficient construction within one project may have contributed to strengthening the interrelations of these already existing but not yet integrated elements of sustainable construction, thereby enabling the formation of a new field.

In the case of eco-district reference tools, we found voluntary standards to have a softer, more indirect impact on innovation. Most of the indicators in all the reference tools that we analyzed are vaguely formulated, such as ‘the eco-district has a system in place for dealing with waste’. The sharpest formulations, such as those related to energy consumption or rainwater re-usage, are imported from mandatory standards or explicit public policy. The many vague formulations do not prescribe specific objectives or technical solutions that, like mandatory standards, can push actors to find innovative solutions. Instead they seem to promote innovation at another level: through collective learning processes.

Reference tools provide interpretive flexibility and encourage actors to think differently and to experiment. Rather than prescribing definitive solutions, these guidelines act as broad cognitive tools for organizing a project, sharing practices, and building networks of actors and competencies around a common project. The innovative effect, if it occurs, consists in constructing collective networks and in reframing the field of construction. An important issue seems to be the process of building collective groups and developing a shared vision of the notion of eco-districts; only then does the prescription of performance constraints make sense. This soft approach may explain in part why actors use the term ‘reference systems’, guidelines or ‘tools’ rather than ‘standards’ *per se.* In fact, such broad objectives and soft verification procedures may encourage actors to engage collectively in innovation at the early stages of field development.

Based on these findings, we suggest that voluntary standards can promote innovation in two ways. If they are highly ambitious, precise and motivating for actors to reach, voluntary standards can incite actors to innovate new practices and technical solutions that may inspire adoption among other actors. Innovation may refer to novel use or recombination of existing practices and technologies. This dynamic can lead to the emergence of a new field, the transformation of the existing field, or to no structuration or transformation effect. In contrast, if voluntary standards are collaborative, ambiguous and inspiring for actors, then they may encourage collective experimentation, which may also lead to new field formation. Our point is that voluntary standards have a potential field formation effect that mandatory standards may not have for the majority of actors within construction, given that these standards are a codification of existing practices. Voluntary standards can catapult actors into innovative spaces. Obviously, for innovation to lead to institutional change or the formation of a new field, other actors would have to imitate, or be forced by subsequent mandatory standards, to embrace any novelty that may result from the adoption of voluntary standards.

*Proposition 1a: Highly ambitious, performance-based voluntary standards stimulate actors to search for solutions beyond the habitual ways of working in the ‘parental field’, thereby acting as a catalyst for the emergence of a new field.*

*Proposition 1b: Ambiguous and collectively oriented voluntary standards encourage actors to experiment collaboratively and produce innovations that lead to the formation of a new field.*

**2. Voluntary Standards Contribute to the Formation of Field Boundaries**

Sustainable construction seems to be emerging endogenously from within the field of construction as somewhat distinct from this field with its own metrics and methods that work to establish a common domain. The field of construction can thus be conceived as a kind of ‘parental field’ to sustainable construction in the sense that sustainable construction, ‘born’ within the field of construction, gradually distinguishes itself from its parental roots as it grows larger and gains more legitimacy. Voluntary standards appear to play a role in this differentiation. When actors adopt voluntary standards that exceed mandatory ones, they create identifiable boundaries around a subset of actors within the parental field, which enables the emergence of a new field.

In the empirical case of the university building, the compliance of the building with the Low Energy Class 1 indicated its sustainability in terms of energy use. In practice this meant that its maximum energy consumption should be 45 KwH/m2/year, i.e. 50 percent of the legal maximum in BR08. In setting a significantly higher performance standard than legally required, the brief ensured that the university building would stand out as distinct from ‘ordinary’ buildings. The university deliberately sought to exceed legal requirements for energy consumption, even if these are indeed very strict and difficult to attain. The brief’s requirement of conformity with low-energy class 1, the most ambitious voluntary standard within BR08, conferred upon the university building the status of ‘sustainable’. In light of the select number of construction actors who have the necessary expertise to ensure that this standard is achievable, then those who succeed in achieving this ambition will have the opportunity to market their capabilities and establish a position within the emergent field of sustainable construction.

In this example, the strict legal requirements outlined in BR08 provide the baseline that applies to all construction actors in Denmark. The interesting element is that a higher voluntary standard, Low Energy Class I, builds directly on the mandatory standard. In addition to having the mandatory energy performance level as a reference point, the Low Energy Class 1 employs the very same parameters of energy performance calculation and the same verification tools and calculation procedures as the mandatory standard. The demarcation of sustainable construction from its parental field is anchored within an already defined framework: the level of ambition in terms of the threshold for energy use. The Low Energy Class 1, being constructed as a direct extension of the mandatory BR08, stipulates specific ways of demarcating the difference between business as usual in the construction field and novel practices associated with the emergent field of sustainable construction. Rooted in the same building code framework, the voluntary standard Low Energy Class 1 is sufficiently similar to the mandatory standard to enable easy comparison between them. Such comparison makes it possible to ‘singularize’ (Callon, Méadel, & Rabeharisoa, 2002) or demarcate building projects as sustainable and thus to differentiate sustainable construction from the field of construction.

In our study of eco-district reference tools, we found a similar pattern. The sustainability tools that we have analyzed adopt the canonical Brundtland definition (1987) of sustainable development as involving environmental, social and economic development. These dimensions, which are further elaborated in a number of indicators that specify the details of each dimension and contain, reflect a number of recurring (or standard) themes, e.g., the environmental dimension includes energy, transport, water, and waste, whilst the social dimension refers to diversity and the economic dimension to project costs and assessment of the local economic consequences of developing an eco-district. Some indicators are based upon existing legislation, another indications of the interface between voluntary and mandatory standards.

Although many of the indicators are cast in rather vague terms, they nevertheless provide users with an interpretative framework, which they can use to assess their (respective) endeavors and make sense of the ongoing debate as to what sustainable construction and cities entail. One apparent effect of these standards is to sustain a group identity around actors involved in sustainable urban development; such an identity can contribute to the establishment of field boundaries. However, for this effect to occur, actors must be convinced of the benefits associated with abiding by these voluntary standards. Producers of such standards may find it particularly difficult to convince broad actor segments to adopt voluntary standards in an emergent field where members, expertise, relationships and activities are uncertain and contested (Maguire et al., 2004), and where it is likely that there will be many competing ‘agendas’ and sets of voluntary standards.

As these case examples show, the emerging field of sustainable construction forms as an extension of already existing standards in the ‘parental’ field of construction. A related point is that new fields, in order to emerge as distinct from a ‘parental’ field, seem to require the simultaneous presence of mandatory and voluntary standards. While the mandatory level applies in the parental field as well as in the emergent field, the higher level of voluntary standards serves to give a sense of direction while simultaneously creating boundaries around actors associated with the emergent field. Actors are likely to opt for the higher voluntary level only if the difference between these two levels appears significant enough for actors to gain additional legitimacy or opportunities from doing so. If legislation catches up rapidly with voluntary standards (as originally intended in the Building Code’ introduction of Low Energy Class 1 and 2--see section on mandatory standards on p. 14) or if actors begin to widely adopt voluntary standards above the legal requirements, then the parental field will probably evolve rather than split into two segments. It is the ‘splitting’ of actors into identifiable segments that may lead to the formation of a new field.

*Proposition 2. Voluntary standards that consistently exceed the level imposed by mandatory standards participate in generating boundaries around a segment of actors in a field. Such boundaries facilitate the emergence of a new field through comparison to other buildings and actors and the formation of an attractive group identity.*

**3. Standards Secure Legitimacy and Help Mobilize Actors Through Networks**

Voluntary standards are usually developed by other actors than government, such as actors’ associated industries, nonprofit organizations, and trade associations. These sets of rules or requirements concerning the definition of terms are not mandatory; neither are the specifications and delineation of materials, processes, and performance, or the measurement of effects. The relevance and/or importance of adhering to a particular standard must thus be convincing to actors who are not involved in developing the standard. The legitimacy of the actors who develop them represents an important element in their adoption and diffusion.

In our case study of eco-district reference tools, the legitimacy of key actors and the networks among them played an important role in the adoption and the diffusion of new tools.

Key actors in Danish urban development were involved in developing the three sustainability tools for eco-districts that we studied. Well renowned consultancies developed two of the tools whilst the third tool (analyzed in implementation as well, case 2b) was developed by a small group of private developers, one of which is among the most influential actors in urban re-generation and development in Denmark. The financial resources at the disposal of this organization exceed those available to many other organizations engaged in urban development in Denmark. They are, for this reason, better able to make the long-term investments needed for developing eco-districts as these projects involve long reimbursement time or returns on investment. The involvement of key construction actors in the development of eco-district reference tools conferred legitimacy upon these tools and inspired other major actors in the Danish construction industry to get involved.

Networks were also important for mobilizing actors to get involved. Some of the individuals working in the consultancies have also served as consultants for the private developer. These individuals transfer knowledge and legitimacy, and thus point to how particular knowledge networks are at play in developing voluntary standards for sustainable construction of an urban area (district/community) and ultimately in potential field formation.

*Proposition 3. The adoption and diffusion of voluntary standards are closely linked to the legitimacy that is conferred upon them by the status of the organization(s) developing the standard and the network of actors involved in their development or application.*

DISCUSSION

**Theoretical Contributions**

Previous literature has proposed, and empirically documented in a variety of sectors, that new organizational fields undergo structuration as they mature (DiMaggio & Powell 1983, DiMaggio, 1982; Tolbert & Zucker, 1983). Organizations come to increasingly resemble one another as they contribute to shape the norms, values, beliefs, practices and taken-for-granted assumptions that structure an organizational field. Institutionalist literature has identified a number of mechanisms associated with structuration, ranging from isomorphic pressures at the field level (DiMaggio & Powell, 1983; Tolbert & Zucker, 1983) to institutional entrepreneurs (Maguire et al., 2004) and network of actors (Lounsbury & Crumley 2007) that generate novel practices and structures that, once theorized, diffuse within organizational fields (Strang & Meyer, 1993; Greenwood et al. 2002). The very early stages during which a new field is formed, i.e., prior to the on-set of structuration processes, have received only scant scholarly attention.

DiMaggio (1982) and DiMaggio and Powell (1983) proposed that structuration occurs when organizations in an emergent field increase the extent of their interaction, inter-organizational structures of domination and patterns of coalition become clearly defined, the information load in a field increases, and organizational actors in an emergent field begin to recognize that they are involved in a common enterprise. However, they remain silent on the dynamics that give rise to these patterns. For instance, does a new field form when an existing field resists institutional change, or do these two processes unfold simultaneously? What does it take for a subset of actors in a field to experience that they are part of a common enterprise? And how do new patterns of domination and coalitions arise at the early stages of field formation? The demarcation of the early stages of a field raises a host of new questions about the process through which a new field emerges. We have taken a few steps in the direction of clarifying this topic.

Our study contributes to this literature with propositions about the role of mandatory and particularly voluntary standards in field formation. The four empirical studies that we conducted within the emergent field of sustainable construction in Denmark suggest that standards contribute in three ways to the formation of new fields. Firstly, standards—or more precisely the discrepancy between mandatory and voluntary standards—incite actors to innovate. One way in which they do so is to set ambitious and high performance goals that challenge actors to innovate in order to meet them. Another way is to set ambiguous and collaborative goals that inspire actors to experiment collectively in order to find solutions to complex problems. Secondly, the discrepancy between mandatory and voluntary standards helps to create identifiable boundaries around actors who adhere to voluntarily standards and set them apart from other actors in the field. The creation of a group identity for this latter group can provoke a split within an existing field, provoking the formation of a new field within the ‘parental’ field. As the new field gains increased legitimacy and membership, it may break out to form a separate field. Thirdly, standards can, if they are associated with legitimate actors in the ‘parental’ field and embedded in networks of actors, help mobilize actors to join the emergent field. These three propositions constitute the key theoretical contributions of our study.

Our findings are not exhaustive; additional ways in which standards contribute to field formation may certainly exist. Moreover, our propositions should be interpreted as indicative of potential patterns of field formation. Although they are based on the integration of four empirical cases, the findings have been derived from a single field, namely sustainable construction in Denmark. They are only indicative of processes that may also shape the formation of sustainable construction in other countries and the emergence of new fields in other industries.

To the extent that they apply more widely, our propositions point to ways in which standards may, either deliberately or inadvertently, enable new fields to form. For instance, mandatory and voluntary standards may be formulated deliberately in such a way as to encourage certain actor groups to break out into a new field. Standards may, alternatively, be designed to encourage the evolution or adaptation of an existing field. The outcome of such deliberate efforts may of course differ from the original intention.

In this light, standards constitute an interesting prism for institutional analysis. They provide an analytical angle through which we can observe the dynamic relationship between new and existing fields, which has been neglected in previous literature. As an analytical object, standards also escape the dichotomy between field level dynamics (DiMaggio & Powell; 1983) and deliberate actors (Maguire et al., 2004; Battilana et al., 2009) as the main source of institutional change. Standards offer an identifiable object of analysis for studying the dynamics of field formation without privileging either field level dynamics or actors in accounting for the outcome.

**Implications for Future Research**

Inquiry into the emergence of new fields by means of standards opens up many interesting perspectives for future research. First of all, it calls for insight into the motivations and potential projects of early adopters of standards. Are they seeking to gain first mover advantages, such as financial gain and reputation, and to carve out a niche for themselves? Or do they perceive themselves as engaging proactively in a social movement that aims for institutional change or new field formation? Such studies may illuminate the intentionality involved in field formation.

Another avenue for future research would be to investigate how the vague formulations of voluntary standards impact practice. Their interpretive ambiguity facilitates the mobilization of actors, who can ‘relate to’ the standard in different ways. Actors have much room to adjust their interpretations to the situation at hand and to their specific context at a given moment in time. An interesting question is whether (or when) actors seek to implement standards in order to improve their performance as opposed to not implementing them for the purpose of ceremonial adoption (i.e., decoupling)? More specifically, how do actors perceive the benefit associated with adopting voluntary standards, and how does that perception affects the formation of a new field?

A final topic for future research consists in adopting an institutional work perspective to investigate how central actors in the parental field react to the emergence of a new field. Central actors tend to have superior financial and symbolic resources relative to actors at the periphery of a field; they may therefore be instrumental in either facilitating or blocking the formation of a new field. The institutional work of actors with different subject positions make for an interesting topic of study related to the emergence of new fields.

**Implications for Practice**

Sustainability has become a salient feature of the policy discourse in Denmark and the European Union. The details of what this topic entails more precisely for the construction industry are beginning to crystallize in the form of new design templates, technologies and assessment methodologies. These features of sustainable construction seek to improve not only energy and resource efficiency but also the social and economic dimensions of construction, including livability, affordability and increased productivity. The emergent field of sustainable construction is, however, still contentious; adding to the uncertainty as to the ways in which the field will develop. Companies seek to develop a sustainability profile and, perhaps, to distinguish themselves from others in their respective domain will need the ability to make sense of what is going on in field, and notably around it, and they must have the time and resources to deal with uncertainty as to what constitutes good practice within the field. In addition, firms need the capacity to (1) identify changes in the discourse and development opportunities associated with adherence to both mandatory and voluntary standards and (2) orient or re-orient themselves in ways that allow them to capitalize on these opportunities. The latter capacity is likely to depend on (3) their abilities to enroll other actors, ensure their collaboration in developing new designs and technologies, and gain their support for the firms’ new products/services and (4) their capacity to reconsider their products, stakeholder relations and the credibility of their image. Our findings suggest also that the emergence of sustainable construction as a new field may enable construction actors to better assess the risks involved in introducing ambitious voluntary standards for sustainable construction.

Other companies within the parental field of construction may regard the call for sustainability as a threat to their activities and/or as a waste of time and resources. These actors do not wittingly seek to build in ways that are unsustainable. They may simply be encountering some of the numerous barriers in the institutional structure of the construction industry, e.g., short-termism and costing strategies, contractual relations, lack of inter-firm collaboration, and lack of awareness, which can preclude firms from pursuing more sustainable development paths. These firms are likely to be the incumbents of the field and the practical implications they face differ significantly from those of firms seeking to establish a new field. Incumbents will, presumably, need to use time and resources to maintain the status quo through discursive and professional means such as pricing policies and economies of scale associated with the continued use of well-known materials and technologies.

This dynamic may split the construction field into two segments: the ‘traditionalists’ who comply minimally with mandatory standards and the ‘futurists’ who keenly embrace higher and higher voluntary standards for sustainable construction. This split may reinforce the current formation of a new field of sustainable construction at the fringes of the construction field. While such a bifurcation may be an asset for sustainability in the short term, it may also deter traditionalists from progressing, ever so slowly, in the direction of sustainability.

CONCLUSION

Our study examined to the role of standards in the emergence of new fields through an analysis of the emergent field of sustainable construction. Sustainability serves as a frame of reference for developing common understandings, new technologies and assessment metrics and is emerging as a separate field within the parental field of construction (Markard et al. 2012.). Our empirical studies suggest that that standards contribute in three ways to the formation of this new field and perhaps to other field formations as well. Firstly, the discrepancy between mandatory and voluntary standards incites actors to innovate. Standards stimulate innovation by setting ambitious goals that challenge actors to innovate in order to meet them; alternatively they encourage innovation by setting ambiguous and collaborative goals that inspire actors to experiment collectively in order to find solutions to complex problems. Secondly, the difference between mandatory and voluntary standards helps create identifiable boundaries around actors who adhere to voluntarily standards. These boundaries stimulate the creation of a group identity, which can provoke a split within an existing field and lead to the formation of a new field within the ‘parental’ field. Increased legitimacy and membership may result in the new field breaking away from the parental field. Thirdly, standards that are associated with legitimate actors in the ‘parental’ field and embedded in networks of actors help mobilize actors to join the emergent field. Through these three mechanisms, new fields acquire a purpose, boundaries, legitimacy and membership, all of which are required to initiate a new field.

To the extent that they apply more widely, our propositions point to ways in which standards may, deliberately or inadvertently, provoke the formation of a new field. Much more work is needed on the role of standards, notably on the interaction between voluntary and mandatory standards in processes of field formation. Many other elements and processes besides standards may be involved in field formation; they also require investigation. More generally, the topic of how fields emerge is deserving of much more attention than it has received so far. New fields, aside from sustainable construction, emerge on a regular basis; we need to understand how and why they emerge and take shape. Attention to the dynamics of new field formation may also enrich our insight into institutional entrepreneurship and institutional work, including their intentional and unintentional effects. This topic may shed light on some of the intricate relationships that exist among institutional processes that have previously been identified. Most importantly perhaps, such insight might help actors who are struggling to improve construction practices achieve some very worthy ambitions in a highly complex world.

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1. There are other ways of distinguishing/defining standards, e.g. as technical/non-technical, process/outcome and de jure/de facto standards (Brunsson et al. 2012) [↑](#footnote-ref-1)
2. Available <http://energycodesocean.org/code-information/danish-building-regulations-br-08-section-7>. The issue of energy efficiency has a long history in Denmark, dating back to the repercussions of the oil crisis in the 1970s. At this point in time, the Danish government began to prioritize energy efficiency as a means to ensure (energy) self-sufficiency (Energy Plan 1976). [↑](#footnote-ref-2)
3. Realdania was founded in 2000 and is astrategic philanthropic association seeking to promote cities for people and innovation in construction and built heritage. In 2011 Realdania made grants of approximately EUR 160 million (Realdania, 2013). [↑](#footnote-ref-3)