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Abstract

The building sector is simultaneously characterized by regulation pervasiveness, by the superposition and overlapping of technical standards, and by a profusion of labels. This paper analyzes the rationale for such a multiplicity of mandatory and voluntary standards. The main consequences are the risk of confusion in the minds of buyers and the rise in prices due to the additional costs imposed by the continuous progression of requirements and the need to comply with many different standards. Both effects seriously hamper the penetration of the market by the products with the most demanding labels. The simplification of this regulatory and normative package would likely improve the economic efficiency of the sector.

Keywords: NGOs, Energy efficiency, CSR, Labels, Voluntary self-regulation, Building industry
JEL Codes: L31, L74, L15, M14, Q48

1 Introduction

The coexistence of various standardization instruments, such as voluntary, technical and non-technical standards, certifications and labels, to which the regulation itself is superimposed, testifies to the needs of information of the consumers, of harmonization of the procedures and of guarantees of quality, but it also raises the natural question of the necessity and effectiveness of competition between norms of any kind. This is especially true in the building industry to which an impressive normative apparatus applies.

Technical standards are reference documents developed collectively and voluntarily in a long process by different players, including companies potentially competing in the same market segments. These standards include solutions to technical and commercial problems relating to products, goods and services that arise repeatedly in relations between economic, scientific, technical and social partners. A very small number (less than 1% according to AFNOR[1]) of standards are mandatory in France, imposed by regulations or legislation.

Certification is a procedure whereby a third party, the certifying body, gives written assurance that an organization system, process, person, product or service complies with requirements specified in reference document, that may or may not contain standards. It acts as a form of communication between the supplier and the buyer. Certification depends on rules and regulations that are specific to the certifying body, which performs the audits and assigns the certificate. It is regulated by public rules and certifiers must be accredited (in France, the only national accreditation body is COFRAC[2]).

Labeling is not equivalent to certification. Labels are not regulated by legal or regulatory provisions but they can be promoted by private organizations, such as NGOs or corporations groups. They are based on internal specifications, which can be controlled by an internal or third-party body. The attribution of the label depends on rules defined internally by the owner organization.

Often poorly distinguished from each other by the public, these instruments are all voluntary instruments, unlike mandatory standards that are a regulatory tool. From now on, mandatory standards are designated as 'norms', whereas the term 'standards' is reserved to voluntary standards certified by accredited third-party bodies and 'labels' is used for private voluntary standards assessed without accreditation.

Playing an important role in the functioning and structuring of markets, as they contribute to provide the necessary information to the market (Stigler, 1961), all these instruments are alternately

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[1] AFNOR (Association Française de NORmalisation) is vested with a general-interest mission to coordinate leadership of the French standardization system.

[2] COmité FRançais d'ACcréditation (French Accreditation Body)

regarded either as obstacles to free competition or as instruments for its improvement. The question of the interactions between standardization/labelling and competition is complex, requiring to take into account three dimensions: the effects of standards or labels on competition between firms, the effects of competition between firms on standardization, and the causes and effects of competition between and among standards or labels. Because the two first dimensions have been extensively studied in the economic literature (Farrell and Saloner, 1985; Katz and Shapiro, 1985; Ronnen, 1991; Denicolo, 2000; Schmalensee, 2009), we focus in this paper on the third dimension.

The available literature on the causes of the multiplicity of norms is mainly derived from the economics of organizations and the institutional economy. On the other hand, the analysis of the competition between labels is rooted in industrial organization that studies labels, innovations and competition and in environmental economics, which considers environmental labels or standards of social and environmental responsibility as instruments or substitutes for public regulation (regional, national or international).

By relying on all these literature streams, this article aims to study the causes and consequences of competition between standards and/or labels, the role of different actors and to provide an analytical framework that can be applied to the building industry. As a first step, our Section 2 presents the specificities of the regulatory and standards system in the French building industry (with a focus on residential buidlding). In Section 3, we review the various complementary explanations for the existence of multiple standards and labels. Section 4 is devoted to analyzing the dynamics of what can be designated as a "market" of the standard or label. In Section 5, we study the effects of this competition on the markets. Finally, the reading grid thus defined will make it possible to highlight, in Section 6, the particular dynamics and the consequences of the normative corpus in the French building industry.

2 Norms, standards and labels in the French building industry

The industry of spatial planning, housing, construction, architectural and urban design, has the characteristic of placing on the market complex products rendering an essential service (housing). The complexity makes it necessary the intervention of different companies and different trades and qualifications. Construction processes and intermediate products such as finished products have potentially significant impacts on the use of natural resources, including energy, and waste generation. The residential and tertiary industrys account for 42.5% of final energy consumption and for 23.5% of national greenhouse gas emissions directly or through electricity consumption and district heating (DGEC calculations Based on Citepa and Base Carbon data), which makes the control and reduction of these emissions a major objective of environmental policy. The national French

ambition is to reduce carbon dioxide emissions by more than 75% by 2050 (and 38% by 2030). Standards and labels can play an important role to achieve this goal (Villot et al., 2011). These particularities explain the important need for standardization and even regulation, both to ensure the interoperability and coordination of the various service providers and to guarantee minimum levels of quality, safety of persons, accessibility and minimization of environmental impacts. Especially in terms of safety, the rise in expectations has been particularly pronounced for several decades, which corresponds to a strong social demand to reduce uncertainty. Standardization is used by public authorities for the purposes of public policy, referring to standards when safety, environment and protection of workers and consumers are at stake.

These specificities of the industry thus give rise to a double development: a certain normative inflation accompanied by a growing share of regulation in relation to standards of voluntary application. The other industries in the same case are rare - food, chemical industry (REACH Directive) - and in most cases safety aspects also impose the obligation of the standard.

Furthermore, the distinction between technical standards and good practice is often unclear, with certain standards being made mandatory by regulatory validation. On the other hand, certain voluntary standards may be de facto imposed insofar as the fact that a manufacturer does not use materials or processes recommended in the unified technical guidelines (DTU) would entail liability in the event of a failure. The government is obliged by the Public Procurement Code to make reference to standards in all its markets. Finally, the courts refer to standards for resolving disputes.

The number of standards approved by AFNOR for the building industry is relatively stable at around 3,800 documents. 280 documents were published in 2012, of which nearly 80% were updates. 230 were also removed as they no longer met user expectations.[3]

Without pretending to be exhaustive, a reasoned inventory of existing standards, labels and certifications in the field of building leads us to distinguish, going from the design of buildings and products along the value chain, including urbanization and land use planning:

- product specification standards (NF P and NF EN), voluntary, except where they are made mandatory by regulation;

- the NF DTU (or Unified Technical Documents) standards, which deal with the design and execution of building structures, referring to product standards to define the materials, products or equipment to be used to construct a structure;

- thermal regulation (RT) and associated regulatory labels (HP, THPE, etc);

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[3]www.afnor.org

- other technical standards for the quality of equipment and premises, such as phonic standards, accessibility for the disabled, electrical, seismic, etc.

- the NF Logement and NF Logement HQE certifications, which cover the entire production of a promoter, not an individualized operation;

- Qualitel and Habitat & Environnement certifications awarded to new housing programs for multi-family dwellings or grouped single-family dwellings, to which energy labels (HPE, THPE) may be added;

- private labels, such as HQE, LEED, BREEAM, Effinergie, PassivHaus, etc. ;

- an ISO "Sustainable Development" standard which is still in draft form;

- the national "Eco-Quartiers" label, related to Eco-districts, instituted by the Ministry of Housing, Equality of Territories and Rurality, or the European label Qualicities of Sustainable Development Policies for Historic Towns.

3   The causes of the multiplicity of standards and labels

The word 'norm' induces in French the idea of normality, and of the abnormality of what is deviating from it, just as the English term of 'standard' to designate the norm also carries the sense of reduction of diversity.[4] The increase in standardization activity should thus lead to the homogeneity of products and practices and, a fortiori, to the convergence and reduction of the diversity of standards. On the contrary, the multiplicity of standards remains astonishing, especially in the area of Corporate Social and Environmental Responsibility (CSR) standards. Companies or groups of companies invest considerable resources in the development of new standards, despite the existence of recognized international standards.

The different forms of standardization depend not only on its mandatory or voluntary nature, but also on the aims pursued.

3.1   Multiplicity of standards

The first explanation for the multiplicity of standards and labels lies in the plurality of modes of organization that govern their elaboration. Standards include de facto standards and de jure standards derived from decision-making processes led by standardization committees (as in the case of

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[4]The word 'standard', more rarely used in French, is often used in a more restrictive sense of interoperability standard.

ISO standards). According to Farrell and Saloner (1985), standardization resulting from committee work is more likely to provide gains in coordination than standardization at the initiative of markets, especially because it avoids incompatibility between products and between co-contractors. Cargill and Bolin (2007) or Simcoe (2007) show that the internal policy of these committees, often linked to particular interests, can undermine the legitimacy of these standards and hinder their development. The term de facto standards mainly refers to processes leading to uniformity, where all (or almost all) potential adopters adopt the same solution. These processes are fundamentally different from the decision-making processes that produce de jure standards. However, the boundary between the two concepts is not sealed, as a de jure standard may become de facto standard, especially in the perception of new entrants to the market. Among the labels, the distinction is made between those which result from the action of non-profit non-governmental organizations (NGOs or associations) and whose stated objective is the search for the public good (internalisation of externalities) and those that are established by corporations or groupings of corporations.

Other distinctions are often made between standards according to their nature, depending on whether they are technical or non-technical on the one hand, and whether they are result-oriented or process-oriented. Technical standards generally aim to facilitate compatibility and interoperability between different components of a given system.

Among these, product standards set specifications and criteria relating to product characteristics. Thus, when standardization relates to quality characteristics, it leads to the definition of minimum quality and/or safety standards or to the establishment of labels aimed at strengthening buyers' information. The minimum standards are essentially based on the avoidance of damage (negative externalities). Standards and labels can fulfill the same role of reducing information asymmetries in cases where the buyer cannot assess the quality of the good. In the absence of standards or labels, the imperfection of information would lead to so-called adverse selection situations where no producer has an interest in producing high quality goods since no consumer would agree to pay the price, in case of uncertainty about the true level of quality. Standards and labels appear in this case as tools to promote the quality of goods. *"Voluntary standards create trust. They make it possible for firms to improve working methods, to differentiate themselves and to define responsibilities."* (AFNOR)

Process standards set criteria for the production patterns of products. They apply within and between organizations (such as safety standards) without predetermining specific outcomes. For example, ISO 9001 does not directly measure the quality of products or services but specifies management processes that are supposed to ensure higher quality. Outcome standards can only be applied in areas where results are clearly identifiable and measurable. Nevertheless, the adoption of standardized processes does not guarantee the desired consequences, which are often uncertain.

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For this reason, the process standards themselves are increasingly linked to the results.

Social and environmental standards are often opposed to technical standards. However, they can be produced in the same way as technical standards (ISO 26000, ISO14000, GRI), even if they are much more often promoted by private agents, such as NGOs, companies or clusters. These are essentially process standards. They cover many aspects of economic activity, such as quality control, social and environmental management, financial and non-financial reporting, human and labor rights, fair trade, protection of the environment or corporate governance. They can be very general and consist of broadly defined guidelines (Global Compact[5]) or more formalized frameworks, even if they are still likely to evolve (Global Reporting Initiative for non-financial reporting[6]). Committees that produce CSR standards generally involve more stakeholders than technical standards, which is explained by the policy and normative dimension of CSR standards. International and cross-sectoral standards in the various sectors of the economy are often accompanied by specific (and often multiple) labels in certain sectors, such as coffee, forestry, the textile industry, flowers or, more importantly here, the building industry.

In the tradition of the studies of organizations, standardization can be analyzed according to its nature, according to its mode of elaboration or according to its impacts. These are the three axes proposed by Brunsson et al. (2012), which we reiterate here: standardization as a form of organization, standardization by organizations and standardization of organizations themselves.

3.2   Standardization as a form of organization

Standardization is by itself a form of organization of society and of the economy: it reduces uncertainty, transaction costs and information asymmetries between sellers and buyers. It is often a vehicle for modernizing and reforming the internal functioning of organizations. It offers more flexible and generalizable means of regulation than directives, often of national application: standards are the only type of rules that can be applied at the international level. Standards and labels have emerged particularly in areas where intergovernmental regulation is weak or non-existent, while the stakes are considerable: carbon emissions, human and labor rights, telecommunications, corporate governance, non-financial reporting, fishing rights, etc. Brunsson et al. (2012) note that the high demand for international standards is a solution to the often-claimed counterproductive effects of the divergence between national standards that constitute an obstacle to overall economic integration, acting as non-tariff trade barriers. According to the international standardization organization ISO, "*ISO International Standards represent a global consensus on the most advanced state of technology or good practice studied*" or "*ISO standards make a positive contribution to the*

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[5]www.unglobalcompact.org

[6]www.globalreporting.org

world in which we live. They facilitate trade, promote the sharing of knowledge, and contribute to the dissemination of technological progress and good management and conformity assessment practices".[7]

3.3 Standardization of organizations

According to the institutionalist approach, standards are seen as rules created in the environment of organizations that are likely to adopt them, with standards thus spreading among organizations. Standardization of organizations refers to how standards are adopted, disseminated, implemented, avoided or altered in their implementation. The first question is the reason why organizations adopt standards, in the absence of legal penalties for non-adoption. Institutionalists highlight the role of coercive, normative and mimetic pressures in the adoption and dissemination of norms. Coercive pressures can come from States (as in the case of European standards, which are adapted and translated into more detailed standards by Member States), civil society (NGOs lobbying for companies to comply with social responsibility standards), employees of the company assuming that a standard developed by experts is necessarily superior to the own rules of operation decided internally by the company, or by other companies (preferential treatment of adopters of the standard). Guler et al. (2002) highlight the influence of the presence of multinational firms in a country on the number of ISO 9001 certified companies (multinational firms preferring certified suppliers), while Delmas and Montiel (2008). demonstrate that a higher level of activism in a particular country has a positive impact on the adoption rate of ISO 14001 by chemical industry firms.

Legitimacy and effectiveness are the two most frequently cited reasons for the adoption of labels. Jamali (2010) finds that entrepreneurs consider that CSR labels and standards can significantly increase the legitimacy of their organization, but fear that this is to the detriment of their economic efficiency. These two motivations can also explain the multiplicity of standards and labels.

The effect of corporate pressures may nonetheless be counterproductive. When organizations are reluctant to adopt a standard or when its application is complicated, the tension between theoretically voluntary but in practice almost mandatory adoption often explains the decoupling between action and communication. This can be expressed as "*[the firm adopting the norm] normalizes its practice but does not practice the norm*" (Brunsson and Jacobsson, 2000). This is the phenomenon called *greenwashing* in the field of environmental standards.

Beyond the institutionalist point of view, economists believe that the adoption of standards meets economic criteria for increasing profit or improving efficiency. Empirical studies show a positive correlation between the adoption of higher standards and levels of economic performance.

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[7]www.iso.org

Standards reduce information asymmetries between vendors and buyers by enabling producers to somehow calibrate their products or services and report that certain basic requirements have been met. This reduces consumer uncertainty and transaction costs, motivates repeat purchasing behavior and increases the size of markets. Standards (but even more labels) create credible market signals and allow the expansion of niche markets. The combination of the institutionalist vision with the economic view also suggests that early adopters are motivated by efficiencies, while later adopters conform to an institutionalized practice in order to increase or restore their legitimacy.

In this perspective, the plurality of standards observed in the field of corporate social and environmental responsibility is considered to be responsible for weak coordination, unnecessary duplication of procedures, inflation of certification costs, and for the confusion induced for consumers and firms adopting the standards in question. The convergence between norms has often been presented as a solution to the problems arising from competition between standardizers (Bernstein and Cashore, 2007), whereas the latter is seen by Reinecke et al. (2012) as a means to stimulate the development of standards through the promotion of innovation and adaptation to "best practices" through mutual observation.

3.4   Standardization by organizations

Most standards are products of organizations. Traditionally, these organizations are non-profit associations or non-governmental organizations, whose members represent companies, sectoral associations, representatives of civil society and the state. The first standardization organizations, such as the British Standards Institution (BSI) and the American National Standards Institute (ANSI), were founded in the early 20th century. Their real objective was standardization, in the classic sense of the word. The French Association for Standardization (AFNOR) was founded in 1926, while the second half of the 20th century saw the creation of the International Organization for Standardization (ISO). In addition to these institutions there are many organizations created by the civil society, such as Fairtrade or the Forest Stewardship Council.

These institutions respect the TBT principles of transparency, openness, impartiality and consensus, etc.[8] Members of standardization organizations may include organizations or individuals who have an economic or ideological interest or expertise. For example, ISO standards are developed and revised by technical committees composed of different working groups. The members of such a committee have the same rights to influence the development of the standard, the decisions being most often taken by voting procedure. One way to increase the legitimacy of the standard

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[8]The purpose of the Agreement on Technical Barriers to Trade (TBT) is to ensure that product requirements and procedures used to assess compliance with these requirements do not create unnecessary barriers to trade.

is to integrate several stakeholders and seek consensus among them during the standardization process. Experts are often solicited mainly for this purpose, the need to legitimize the norm being perceived as more important than to bring its contents into line with the expert opinions (Brunsson et al., 2012). But the choice of experts can also have other consequences: when the field is wide, the selection of experts can influence the content of the standard insofar as it delimits the mass of information that can be mobilized. For example, Boström and Tamm Hollström (2010) demonstrate the influence of differences in the financial means of NGOs on their participation in international standardization processes and hence on the content of standards.

The format of the standards is itself standardized and the space of standards is hierarchized (European standards homologated at national level, national standards, international standards, etc.). Finally, certain standards, such as management systems, constitute meta-standards (Heras-Saizarbitoria and Boiral, 2013): quality management (ISO 9001), risk management (ISO 31000) 14001), and recently RSE (ISO 26000). Unlike performance standards, they do not refer to compliance with a particular objective or outcome, but they provide recommendations on a set of procedures, or requirements for operational systems, which must be used.

When different companies in the same industry have adapted to different product standards, the plurality of standards is a source of rivalry and competition. Essential arguments against the plurality of norms are the existence of norm switching costs (Greenstein, 1997) -or the presence of network externalities (Katz and Shapiro, 1986) when the utility obtained from the use of a product meeting a given standard increases with the number of users. This network effect may lead to widespread adoption of a standard that is not necessarily the best (for example, the DVORAK keyboard based on the respective frequency of the letters would be more efficient than the QWERTY keyboard that has been locked of the market due to the powerful network externalities). Technical standards can hinder technological development by reducing the variety of products put on the market and thus limiting the choice of consumers. But the standardization process itself can allow the diffusion of new technologies, for example the disclosure of the existence of patents has become mandatory to avoid the phenomena of hold-up by companies holding a technology that could influence the standardization committee in favor of the latter. It is nevertheless also a factor of potential collusion between companies.

Reinecke et al. (2012) argue that the various label producers, including NGOs, behave as suppliers in a market, invest in the development and marketing of different labels or standards and position themselves in relation to their competitors in order to gain market share in terms of members or adopters. Another reason for the plurality of labels and standards is that they serve different purposes, which may be superimposed but never perfectly. The labels supported by NGOs correspond to ideological orientations which may be dissimilar. The labels of companies or groups

of companies differ from the labels created by the social movements (NGOs, consumer associations, etc.) because the organizations themselves will adopt these labels.

4   The market dynamics of standards and labels

4.1   Factors that are favorable or unfavorable to the multiplicity of standards / labels

Jutterström (2013) describes very precisely the tensions between factors favorable to the plurality of norms and factors of reduction of this plurality in the field of social and environmental responsibility.

On the basis of two case studies (ICTI, a grouping in the toy industry) and EICC (grouping in the electronics industry), Jutterström (2013) highlights the role of three factors in the emergence and permanence of multiple CSR standards and labels (identity, autonomy of decision-making and organizational variation) as well as three factors that act in the opposite direction (adaptation of subcontractors, economics and social conformity).

The concern for identity appears to be crucial for companies who wish not to abandon theirs by conforming to standards or labels that are more general because they are transversal; They prefer to create in-house labels or at least labels specific to their industry. Similarly, companies place a high value on their autonomy in terms of decision-making, which leads them to prefer to develop their own standards. Organizational variation refers to the strategy of some industries or companies to create their own standard by adapting other standards by translation or combination.

Conversely, the first factor in reducing the number of standards and labels is the need for subcontractors to adapt their activities to different standards, which can be complex and costly even when standards or labels have convergent objectives. However, they may also conflict in varying degrees. The concern for economics also leads to a reduction in the number of standards and labels because their development, or at least their adoption, requires the organization of certification and control, which is time-consuming, knowledge-demanding and costly. The fact that companies participate in standardization through groups or associations enables them to reduce their costs and to pool their skills in a cooperative way. Finally, the concern for social conformity leads to a reduction in the number of labels, many actors such as NGOs or associations exerting strong pressure on companies to adopt a (yet voluntary) standard before a given date. Even though displaying a label can give a competitive advantage to a first mover firm in its market, for the followers, it is important to comply with the social norm thus established, which counteracts the multiplication of labels.

The dynamics of the number of norms and labels thus results from these two sets of opposing

forces. Some of these forces affect the search for legitimacy component (identity and social conformity) and others the economic efficiency component (autonomy in decision-making, organizational variation, adaptation of subcontractors and economics).

Most empirical studies tend to predict a decrease in the number of CSR standards and labels in the near future, the main reason being the complexity of the situation of subcontractors who have to comply with different, if not contradictory, standards. Jutterström (2013), however, believes that this is not certain insofar as the dynamics depend on the tensions between the different forces described above and have already led many companies to adopt several different standards or labels.

While the terms "norms" and "normalization" bear a priori the sense of stability and uniformity, Brunsson et al. (2012) argue that standardization is fundamentally a dynamic phenomenon that can be illuminated according to the three perspectives envisaged.

The dynamics of organizational standardization are inherent in the adoption of standards, which give rise to a process whereby general rules are applied to specific organizations or "translated" into more local rules.

Standards are formally voluntarily adopted insofar as such adoption is not imposed by the hierarchical authority of States or other organizations. The capacity to regulate standards therefore rests solely on their perceived legitimacy and relevance, but also, in some cases, on the pressures exerted by certain parties. Indeed, even if failure to comply with a standard does not imply legal penalties, some standards are so widespread that non-compliance can lead to other sanctions, such as the impossibility of entering a market (public procurement). It should be noted, however, that although voluntary standards are derived from organizations that are independent of States, they are most often encouraged and promoted by them (Turcotte et al., 2012 note that this is more the case in Europe than in North America).

Vigneau et al. (2014) emphasize the potential role of the norm's dynamics (focusing more specifically on GRI) and of potential interactions, or their nonexistence, between different standards to better understand the influence of the norm on the internal organization of the CSR of the company.

Regarding the dynamics of standardization by organizations (by SSOs), it results from the existence of two tensions. The first one is due to the conflict between efficiency of the standardization process and participation in the process. The proliferation of competing standardization bodies encourages potential adopters to consider their participation in the process as a means of establishing their legitimacy. Nevertheless, increasing participation reduces the effectiveness of the process by making it more difficult to reach consensus. On the other hand, broad stakeholder participation is often necessary because it facilitates the development of the content of the standard so that it can be acceptable to all, but also because participation often means commitment to

adopt the norm and lastly because the legitimacy of the norm vis-à-vis parties outside the process is all the stronger because the participation is wide. The second tension is the potential conflict between the two possible roles of the participants in the process, the role of expert and the role of representative of interest groups. Acute conflicts can arise out of the competition between very strong divergent interests and then result in a standard being only a fragile and failing compromise with the objectives aimed rather than a solution based on expert opinions. Such conflicts may give rise to competing standards developed by organizations or meta-organizations trained for this purpose that do not wish to conform to the original standard. Rasche (2010) shows that the barriers to the entry of the standardization market have been significantly reduced by the use of new information and communication technologies, which explains the emergence of competing standardizing institutions. A final aspect relates to the internal dynamics of standards, which are reviewed systematically and at least every five years in the case of AFNOR, and can be updated or canceled when they have become obsolete or, for example, in The French case, when a European standard has been published. 1,229 out of the 2,005 new documents published by AFNOR in 2014, 1,224 were revisions. 1,790 standards were removed from the collections. In total, as of October 1, 2015, AFNOR had 33,614 voluntary standards in force in France, including 3,449 international (ISO), 21,626 European (CEN) and 8,539 French-French standards.[9]

The dynamics of the organization of society and economy through standardization firstly stems from the tension between the voluntary adoption of norms and their regulatory function. The voluntary component of the standard makes it a relatively weak instrument insofar as the risk is great that it is not applied. To compensate for this weakness, the norm is often accompanied by control, sanctions and hierarchical authority. Different types of penalties may appear: for example, adopters who fail to comply with the standard may be denounced as such and thus withdrawn from the list of conformities or be subject to boycotts (eg for social norms). On the contrary, certification, or the right to affix a label, is an example of a positive sanction. Another way to strengthen this contribution to the organization of the economy is to sensitize large formal organizations to the application of standards so that they become internalized: environmental NGOs try to persuade multinational corporations to integrate certain standards into their strategy, or States to make these standards mandatory or to make them references.

4.2 Different trajectories depending on the markets

Turcotte et al. (2014) explain the multiplicity of norms (labels) by combining a bundle of reasons, economic, ideological and institutionalist. They apply this analysis to three markets - logging,

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[9]www.afnor.org

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coffee and textiles - which illustrate the possible diversity of trajectories leading to persistent fragmentation in the textile industry, the emergence of cooperations for coffee and a concentration of labels in the forest sector. The differences are as much due to the specificities of the markets themselves as to the interactions between producers and promoters of standards.

For example, in the coffee sector, which is the first agricultural commodity exported in the world, produced mainly by small family businesses but priced on international commodity markets, the first labels were created by coalitions of NGOs, consumers and producers with very different interests. The Organic label (1972) aimed to eliminate the use of pesticides because of their adverse effects on the health of farmers and the environment, while the Fairtrade label had set itself the objective of guaranteeing the purchase price of coffee to improve the living conditions of small producers. Another label was launched in 1995 by the Rainforest Alliance in order to preserve the primary forests, favoring the cultivation of coffee under cover of forest. Others followed. The big roasters, most of them multinationals, responded to the attacks of NGOs and the increasing penetration of these labels by the launch of competing initiatives, carried out by companies in the industry. The coexistence of different labels obliging producers to adopt several to enlarge their market, the need has quickly become felt to unify the current private standardization, while giving it greater credibility. A meta-organization of promoters of labels, the alliance ISEAL, was created for this purpose. In 2004, it launched a Guide of Good Practice for Setting Social and Environmental Standards (ISEAL, 2006). Its activity has spread to many other industries (fisheries, forests, agriculture, mining, textiles, tourism, etc.). In spite of the collaboration thus initiated, the differences of points of view and of objectives between the promoters of labels remain too important to allow the fusion of the different labels. Rather than abandoning their own label, many companies have preferred to add an NGO label, or even a fair trade label and an organic label.

As a complex industry, the forest industry provides a very different example of dynamic labels. First of all, unlike coffee, 80% of the primary resources are owned by the states and more than half of the exploited forests are located in 5 countries (Russia, Brazil, Canada, USA and China). The production chain includes multiple actors, from planting and slaughter to distribution, of all organizational types, public and private. Finally, the products of this industry are multiple: building materials, furniture, paper or firewood. These characteristics make the regulation of external effects difficult. After an unsuccessful attempt at certification by a group of industrialists under pressure from NGOs concerned with deforestation, the countries participating in the 1992 Rio Summit were unable to agree on the content of a global convention on forests. In 1994, WWF and other environmental NGOs from over 25 countries formed an alliance with forestry companies, governments and the World Bank to launch the Forest Stewardhip Council (FSC), an accreditation body for certifiers of sustainable use of tropical forests. Whereas some NGOs considered the FSC to

be insufficiently reliable and unable to protect effectively forests and biodiversity, industry leaders quickly criticized the FSC requirements as too expensive and impractical. It was the source of various national initiatives (USA, Canada, Europe, Brazil, Switzerland, Chile, Malaysia, Finland, etc.) launching new certifications. Very quickly, however, due to the mutual recognition of the different systems, the market for forest certification has been reconciled, resulting in the formation of a duopoly where the PEFC (Program for the Endorsement of Forest Certification), promoted by industrialists, is now facing the FSC promoted by NGOs.

Finally, in the textile industry, the normative impulse came in the 1980s from NGOs concerned with improving the working conditions of subcontractor employees in the developing countries of American textile companies. Following the establishment of codes of conduct specific to each multinational concerned for its own subcontractors, deemed as ineffective by NGOs, combined initiatives of industry associations and stakeholders motivated the development of standards. Nevertheless, disagreements between NGOs and companies on governance and the implementation of these processes led to the creation of different standards. The persistence of these disagreements explains the lack of convergence to this day and the fragmented state of the normative landscape in this industry.

5   The impact on markets of competition between labels

Many elements on the consequences of competition between these different tools are brought by the existing literature around the competition between eco-labels and the credibility of the certification body. These consequences include competition among firms, innovation and consumer welfare.

Since standards and labels are supposed to reduce asymmetries of information, the literature on competition between different labels is organized in two complementary streams. The first studies the consequences of this competition when the labels bring in perfect and well understood information of the buyers as to the qualities of the products labeled. Ben Youssef and Lahmandi-Ayed (2008) show that the presence of a credible certification body is enough to push companies to provide levels of quality perfectly identified by consumers. In this case, the effects depend essentially on the nature, perceived by the objective function, of the certifying organization. The second trend is concerned with the effects of imperfect signals due to failures of the certifier or the confusion created in the mind of the consumer by the co-existence of different labels.

5.1   Competition between perfectly informative labels

The first part of the literature focuses on the consequences of competition between perfectly informative labels. According to Heyes and Maxwell (2004), a label created by an NGO can affect

well-being by reducing the need for a mandatory standard, while the simultaneous use of both instruments ensures an improvement in economic well-being. Fischer and Lyon (2014) formalize the competition between eco-labels issued by different third parties, specifically an NGO and a firm label. They show that even when labels provide consumers with perfectly reliable information, environmental damage may be more serious in the presence of both labels than in the presence of the NGO's only label. They also highlight cases where competition among labels reduces overall economic welfare.

Noe and Rebello (1995) study competition between groups of firms when consumers prefer more expensive "ethical" technologies without being able to identify them or to control them. Producers could thus act as free-riders in relation to the reputation of their group and practice greenwashing. They show, however, that social pressures within the producer group can ensure the long-term dominance of "ethical" technology.

Mueller et al. (2009) are interested in the application by companies of CSR standards in their supply chain. The wide variety of existing standards allows companies to choose to apply the least demanding, using the legitimacy argument that it provides. But this strategy undermines the reputation of CSR standards among stakeholders, making it useless for companies to actually spend money in CSR actions. They then show that the only way to counteract this new adverse selection is to match the standards with additional requirements in terms of certification transparency and control.

In a market where competition is imperfect (monopoly or oligopoly), a minimum quality standard is preferable to a label that would give buyers perfect information about product quality (Baltzer, 2012). Indeed, the minimum quality standard maintains a certain symmetry of information and leads consumers to consider the products sold by the different producers as homogeneous which intensifies the competition between them. On the other hand, if the label makes the information perfect, consumers can differentiate the products according to their level of quality which reduces the competitive pressure.

On the other hand, considering the juxtaposition of a minimum (regulatory) quality standard and a label promoted by an NGO, in a monopoly case, Bottega and De Freitas (2009) show that the presence of the label pushes optimum level of regulation downwards, but that the NGO would like this level to fall further: it is simply due to the fact that the regulation raises the lowest level of quality placed on the market, prompting some consumers to turn away from the highest quality (labeled) and thus to increase the market share of the lowest quality.

Bonroy and Constantatos (2015) point to a gap in the literature regarding the optimal number and optimal levels of labels in a market. Indeed, in the case where n quality levels coexist, the perfect information can only be obtained by a set of n-1 labels. Nevertheless, it is necessary to

consider the trade-off between the profit obtained by the gain of information due to an additional label and the cost of this new certification. When companies can choose their level of quality, the number and level of labels is crucial.

Ben Youssef and Abderrazak (2009) show that in the case of perfect information, the introduction of a second eco-label in a market improves the environmental qualities of the labeled goods, whereas in the case of imperfect information, It raises prices but leads to a deterioration in the environmental quality of the products offered.

5.2   Effects of the confusion induced by the profusion of labels

After a first article (Mason, 2006), that emphasized the detrimental effects of the imperfect signal emitted by inaccurate eco-labels, Mason (2011) shows that a low-separation eco-labeling procedure can increase or reduce welfare according to the cost and accuracy of the certification process. Mahenc (2009) shows that if consumers lack confidence in the certification body, labeling can be detrimental to society, i.e. the certifier may charge excessive prices in order to signal its credibility. Harbaugh et al. (2011) find that the value of an eco-label may be affected by the confusion of consumers caused by their lack of confidence in the precision of the eco-label. They suggest that information campaigns would be a good way to reduce the level of uncertainty affecting the signal given by eco-labels. This is the direction followed by Bottega and De Freitas (2009) who assume that the NGO defines a quality threshold secured by the label and decides to invest in an advertising campaign in order to persuade consumers to buy labeled products.

Brécard (2014) uses a theoretical model of double differentiation to analyze the consequences of the coexistence of two labels on different dimensions, environment or health, and unlabelled products. It implies that consumers believe that both labels report the same environmental quality but differ horizontally, their preference for an eco-label instead of a health label being linked to their degree of altruism. This hypothesis is inferred from the results of a previous applied study on seafood (Brécard et al., 2012). It is shown that the consumer confusion between the two types of labels weakens the firm that produces the eco-responsible good, and especially since the label is strict. Labeling benefits all the more the two products labeled that the label on health is strict, and this at the expense of the non-labeled product. Whatever the certification body (NGO, firm or regulator), the introduction of labels improves the overall environmental quality of the labeled products, which can lead to the disappearance of non-labeled products. Finally the differentiation of labels is beneficial to the environment even if the two labels correspond to the same level of eco-responsibility. This is an important result as it contradicts the standard results of negative consequences of consumer confusion among different labels. On the other hand, it is consistent

with those of Dekhili and Achabou (2013) who show, in an empirical study on agri-food products, that consumers are sensitive to the superposition of labels on different biological and ecological components.

6 Causes and impacts of the normative tome in the French building industry

As exposed in section 2, the French building industry is governed by an impressive juxtaposition, and overlapping, of norms, standards and labels, for which the primary momentum is often, but not always, due to national and local political power (Paris and Henry, 2009). It results from a very specific dynamics, that will be analyzed here in the restricted field of energy performance. The effects of such a normative tome are analyzed in the second sub-section. Interestingly enough, even though they are mainly negative, they may be, in some aspects, not as detrimental as the economic theory predicts them to be.

6.1 The energy performance of buildings: from regulation to labels and labeling to regulation

The field of energy performance of buildings is of particular interest because of the superimposition of numerous regulations, standards and labels on the one hand, and the singular dynamics of this normative portfolio.

It appears as constitued by a base, extended by thermal regulation (RT), regulatory labels (HPE, HTPE) or private (Effinergie, Minergie, etc.), and certifications more or less encompassing.

Thermal regulations, which aim to set a maximum energy consumption limit for new and existing buildings at different points of consumption, such as heating, air conditioning, lighting, etc., are themselves evolutionary. The RT 2012, required since 1 January 2013 for all permanent and temporary buildings whose installation lasts more than 2 years, succeeded to the RT 2005 (itself following the RT 2000) and should be replaced by the RT 2020.

This evolution goes hand in hand with the increasingly ambitious objectives of environmental policy, but it should be noted that this does not happen independently of the evolution of labels, regulatory or private, which have more stringent performance requirements or add requirements of means, or that take several dimensions into account.

RT 2005 was accompanied by regulatory labels, the High Energy Performance labels, with 5 different levels of government-defined labels for new buildings (HPE, HPE Enr, THPE, THPE Enr, BBC). All these levels were characterized by energy consumption for heating, cooling and

domestic hot water, lower than the reference consumption defined by the thermal regulations in force: HPE (-10%) and THPE (-20%). The EnR suffix added to the previous headings defined labels with additional obligations to install renewable energy equipment: HPE EnR 2005 (heating, and possibly DHW heating, by a boiler using biomass, and in particular wood) and THPE EnR 2005 (-30% compared to the RT, with obligations to install solar thermal collectors, photovoltaic sensors, wind turbines or high-performance heat pumps). Finally, the BBC label, "low-energy building" was applicable if energy consumption was very much lower than the regulatory energy consumption: 50 kwh / m^2 in primary energy for the overall consumption of a dwelling (heating, cooling, production of hot water, ventilation and lighting), adaptable according to climatic zones of the RT and the height of the building project. Of these different labels, only "EnR" labels (for Renewable Energy) imposed demands on means, while others limited themselves to reinforcing the results criteria of the 2005 RT.

However, Article 4 of the Grenelle 1 law stipulates that "all new buildings which are the subject of an application for a building permit submitted from the end of 2020 shall, except in exceptional cases, have a primary energy consumption lower than the quantity of renewable energy produced in these buildings, and in particular wood energy ". To meet this objective, and in line with the requirements of the Climate Plan, which sets a threshold for primary buildings of 50 kWh / m^2.an for new buildings, the RT 2012 has been put in place. It generalizes the BBC label and imposes three additional performance requirements compared to the previous regulations: the energy efficiency requirement defined by the Bbiomax coefficient (Bioclimatic requirements), which imposes a limitation in terms of energy requirements (heating, air conditioning, lighting) related to the design of the home; the maximum conventional consumption requirement of primary energy measured by the cepmax coefficient = 50 kWh / (m^2.an) on average but modulated according to the geographical region; the requirement of summer comfort assured, calculated with the coefficient Ticref which represents the internal temperature not to be exceeded. Means obligations are also in place to achieve the objective of low energy consumption: high-performance insulation, excellent air tightness, efficient treatment of thermal bridges, use of renewable energy, measurement of energy consumption, and natural lighting.

But the objective remains the future RT 2020 which should go so far as to impose that any new building produces energy beyond that necessary for its operation. The phase of change from one RT to another should be similar to the previous evolution and in particular it should involve the creation of new regulatory labels HPE and HTPE associated with the RT 2012. Pending this creation, the collective Effinergie which had developed the BBC label in close collaboration with the government, already offers private labels RT 2012 -10% and -20%. It has also introduced more demanding labels such as the RT 2012 Bbio -30%, the Effinergie + label which reinforces on 3

points the requirements of the RT 2012, and especially the BEPOS-Effinergie pilot label which is the precursor of new regulations for a positive energy building. The general principle of the latter is simple: the difference between the building's primary non-renewable energy consumption and its production of renewable energy must be less than or equal to an allowable gap.

The "positive energy building" is based on the concept of a passive house developed in Germany in the 1970s and on local production of renewable energy. Other private labels are based on this concept, such as the German label PassivHaus or Minergie, of Swiss origin. Each of these labels does not take exactly the same frame of reference into account, even if the concepts remain close. The German label Passivhaus is deemed as more demanding than the Swiss Minergie, of which Effinergie is a French version (Carassus, 2008).

On these labels are superimposed more or less exacting certifications, which differ in terms of their references and how they are awarded. The certification marks NF Maison Individuelle or NF Tertiaire guarantee a building carried out in strict compliance with regulations and the rules of the art at agreed prices and deadlines. They are issued by AFNOR Certification. In the field of office buildings, three certifications compete. The NF HQE commercial building certification makes it possible to distinguish buildings whose environmental and energy performance correspond to current best practices. It is issued following audits of the Operation Management System (SMO) and the Environmental Quality of the Building (QEB). This certification can be accompanied by a High Performance Energy label. The British method for assessing the environmental performance of buildings called BREEAM is the most widely used building certification standard in the world. The US LEED certification is also used all over the world. It has the particularity to take into account the whole life cycle of the building (origin of the materials, the choice of their elimination, the overall energy consumption, etc.). The latter two are also competing with the German label DGNB, which is considered one of the most comprehensive because it takes account of ecological, economic and socio-cultural aspects. All of these certifications have different approaches but differ more in form than in substance. These different labels illustrate clearly how national contexts matter, as underlined for the coffee industry by Manning et al. (2012): different standards or labels were developed in particular national contexts by stakeholders operating in these contexts, which explains the differences between them but also their co-variation. Practionners often advocate for the use of at least one of them, without exressing any explicit preference ((Vazquez et al., 2014).

The HQE, BREEAM and LEED standards have a wider environmental objective than energy performance, with an advantage for HQE that extend also the environmental quality to the urban development (Gazzeh et al., 2010). They include the preservation of biodiversity . But there are also at least two private labels for taking biodiversity into account in real estate projects: the Biodivercity label, an international label created by the International Council on Biodiversity and

Real Estate (CIBI), a non-profit association composed of Colleges representing different industries (including developers and builders); and the European label Effinature co-designed with the professionals of biodiversity, real estate and landscape.

On another level, the new regulatory label "Bâtiment Biosourcé", created in 2012, is intended for new, non-residential, public or private buildings, incorporating a significant part of biosourced materials of plant or animal origin such as wood, hemp, straw, sheep's wool, etc. Obtaining the label is subject to the justification of the quality of the building. It is therefore only available in association with a certification: either an NF HQE^{TM} certification, the multi-criteria certification of High Environmental Quality, or an NF HPE certification, certification to obtain a HPE (High Energy Performance).

Finally, the Sustainable Building Passport developed by CertiVéa (a subsidiary of the Center Scientifique et Technique du Bâtiment or CSTFB), is a simple environmental display system that applies to commercial buildings and more specifically to the NF Bâtiments Tertiaire-HQE certificate. It aims to improve the readability and comparability of HQE certification on 4 themes: energy, environment, health, comfort.

Among the 4 French eco-district standards and labels, developed repectively by a norm-developer (Eco-district Norm P99N), an association (HQE Development), the ministery (Eco-Quartiers), and a public construction agency (HQE2R), HQE2R and HQE Development are more oriented toward a certification of the work process like an ISO certification, whereas Eco-Quartiers label pursue an assessment of eco-districs as a sustainability product (Acquier et al., 2011). Boxenbaum et al. (2011) argue that, in contrast with Danish equivalent tools, the French initiatives essentially took inspiration from national initiatives, such as HQE, making efforts to appear as unique, and avoiding international imitations. However, they explicitly refer to normative guidelines, such as French norms and European legislation, and to international standards, such as ISO.

Faced with this maquis of labels and certifications, what are the attitudes of companies in the industry? Contrary to those of the industries mentioned above, companies do not create their own labels, but they generally adopt several, complementary or competing ones. They make extensive use of the display effect of labels by complying with the maximum number of labels so that they can enter all markets (eg international markets). Some building groups also strive to differentiate themselves by appearing particularly virtuous and innovative: they develop concepts, implement procedures, make commitments, without for the moment inducing to weaken standards, as predicted by Lutz, Lyon and Maxwell (2000). This is the case of the Green Office concept backed by Bouyghes to a triple certification HQE Commercial Building, BBC and BREEAM. Eiffage develops the H2CO (Habitat at Cost and Consumption Optimized) housing concept, which exceeds the BBC-Effinergie standard, and highlights the award of the CQFD (Quality Cost Reliability

Deadline) by a PUCA / ANRU / USH jury. Similarly, Vinci highlights Oxygen, its eco-commitment, as well as its vision Blue Fabric, claiming in February 2014, 600 certified or certified projects (BBC, NF housing, BREEAM, HQE ...). The Jutterström (2013) analysis grid applies here according to two different components: concern for identity, autonomy of decision-making and organizational variation determine the definition of concepts or approaches specific to large groups; on the other hand, the need to adapt subcontractors, the search for economics and social conformity lead them to back their approaches to existing labels.

This review of the normative landscape for energy performance in the building industry clearly demonstrates the existence of a regulatory continuum involving private labels, regulatory labels and certifications. As in the case of finance, where IFRS (International Financial Reporting Standards) standards are derived directly from private standards, the regulation of the building industry is firmly supported by labels, often private ones, some of them being developed in close collaboration with the State.

As in the industries of logging, coffee or seafood, NGOs (associations, collectives) are the initiators of demanding labels, systematically beyond the regulation. But in this building industry, the dynamics are not limited to a concentration or fragmentation of the label market. Following a very specific approach, progress is being made through advances - from precursor labels to the existing regulations - and then successive catching up - of regulations in relation to pilot labels. However, the only elements imposed by the regulator were already well accepted by the different actors (Debizet, 2012).This is an original case of standardization by organizations highlighting close cooperation between different types of organizations (state, associations, standardization committees). Nevertheless, this mechanism apparently runs counter to the results of Bottega and De Freitas (2009) for whom (see above) the promoter of the private label would find it preferable (for the improvement of the quality of the environment) that regulation becomes less demanding. Bottega and De Freitas are in the case of a monopoly, and the results can therefore be extended to the case of the oligopoly, which is closer to the situation on the building market. This apparent contradiction actually emphasizes the fact that here the timing is the reverse of that described by Bottega and De Freitas (2009): indeed, the future level of regulation is decided before a frontrunner label is set up, in collaboration between the regulator and the association, to promote the transition of companies that have the potential to do so.

6.2 The effects of the normative tome in the building industry

Due to the importance of the regulatory base and the nature of the regulatory and standardization dynamics in this industry, the consequences of the proliferation of norms, standards and labels are

not always those suggested by economic theory until now.

As regards the risk of downgrading caused by competition between labels (as in the Fairtrade / Max Havelaar fair trade dispute), it is very limited in the case of energy performance by the fact that the labels themselves are necessarily higher than the existing regulations, the level of the standards is higher over time, and the requirements are requirements for results. The case is very similar to the complementarity of a public minimum quality standard and private labels in the agrifood industry analysed by Condron et al. (2005). According to the prediction of Ben Youssef and Lahmandi-Ayed (2008) the credibility of certification bodies leads companies to provide identifiable levels of performance. On the other hand, there is a risk of this kind in other environmental dimensions: for example, the coexistence of the two labels on biodiversity Biodivercity and Effinature (supported by different types of actors) presents a priori some analogy with the duopoly formed by the FSC and the FEPC in the forest industry. To be sure, however, it would be necessary to be able to evaluate precisely their degree of requirement and the profiles of the real estate projects having chosen one or the other.

A certain risk of greenwashing remains, due to the profusion of labels and certifications, not really because it would be possible for a company, as in other markets, to display virtuous without any real foundation, but rather because the lack of information of the buyers allows confusion between labels with different levels of demand but with titles all connoted positively. It is therefore rather a risk of confusion. For example, the distinction may be difficult to operate between the private label RT 2012 -10% (Effinergie), which requires a 10% increase in both Bbiomax and Cepmax compared to RT 2012, and the label HPE à Come if it is only related to the Cepmax. Unless one of the two aligns with the other ... In the absence of theoretical results on the optimal number of level labels (Bonroy and Constantatos, 2015), it is difficult to assess the economic efficiency of the existing system.

As for the effects of the juxtaposition of labels on different components, such as energy performance labels and labels on biodiversity or the label Biosourced Building, they can be analyzed according to the prediction of Brécard (2014): the labeling would benefit all the more the two products labeled that the label of energy performance is strict (it is the component that generates private effects of savings in heating costs for example, whereas the interest of the labels biodiversity is based more on the altruism of buyers), at the expense of non-labeled products. It remains to verify empirically this prediction.

The particular dynamics of the normative apparatus, which is based on gradual shifts in regulations and labels, presents specific disadvantages. First of all, the confusion is accentuated by this permanent evolution. The information is all the more difficult to find in a clear way that many websites keep mention of the old labels, which are no longer deliverable. Secondly, the upgrading

of requirements has so far been accompanied by a system of financial incentives to adopt the most demanding labels. However, the change in the reference system naturally requires changes to the criteria for granting aid: for example, the aid previously granted to BBC-certified houses such as the zero-interest loan (PTZ) and the Sustainable Development Tax Credit to the owners who build in RT 2012 under certain conditions, which will probably no longer be the case when the new regulatory labels are released, with the aid then referring to the new pilot label. This evolution, which is necessary to push for the adoption of the most demanding standards, can have perverse effects by encouraging some market players to lobby to delay the introduction of new pilot labels. Finally, the argument that labeling adds value to a building (single-family home or office building) on resale is obviously jeopardized by the sliding increase in regulation. If building a BBC house before 2013 provided on average a resale price higher than that of other houses, this advantage is now shared by all new buildings.

Few applied studies exist on the effects of different standards and regulations in the building industry, unlike some industries such as the agro-food industry (Tootelian and Ross, 2000). In the case of the Netherlands, Vermeulen and Hovens (2006) show that the introduction of energy standards similar to the French labels HPE explains in large part the adoption of innovations reducing energy consumption in construction of office buildings. Corbett and Muthulingam (2007) highlight the joint effect of a search for differentiation and the existence of intrinsic benefits in the adoption by developers of LEED standards in the construction of "green" buildings. Based on four case studies carried out in Italy, Albino and Berardi (2012) demonstrate that building green buildings involves a stronger integration of the network made up by the manufacturer and its subcontractors, engaged in a real co-realization but that the environmental certifications of the different participants do not play a significant role. Focusing on a detailed analysis of French eco-district standards and labels, compared to the Danish equivalent tools, Acquier et al. (2011) argue that the process of standard-setting has been dominated by efforts on actors enrolment but they find only little evidence that these standards and labels have promoted breakthrough innovation.

Because the objectives of the standards and regulations are very diverse, the normative requirements can be contradictory: between the standards of accessibility to the handicapped, the thermal regulation and the phonic standards for example. In 2009, the Conseil d'Etat highlighted the harmful absence of ex ante impact studies before imposing sometimes very heavy rules. It is often criticized for the over-abundance of standards to contribute to their misapplication by over-demanding the monitoring, training and qualification capacities of the players in the industry. Franzitta et al. (2010) advocate thus for an harmonization through the creation of a European Eco-label for residential buildings, with an holistic approach instead of a by component approach.

Standards and regulations are accused of raising the cost of construction (cost of information,

learning, investment, purchase of new materials, maintenance, etc.), a mechanism accentuated by compliance cost inflation to multiple standards. Technical standards are expensive in themselves because they need to be purchased in order to be adopted. An AFNOR survey conducted in 2008 showed that in the building industry, voluntary standards are mainly perceived as sources of incremental costs (by 51.7% of entrepreneurs compared to 34% for all industries) rather than profits (48.3% against 66%). By transposing the observed extra cost of the BBC label, the extra cost generated by the RT 2012 was estimated, for example, in a study by PREBAT (Energy Research and Experimentation Program in the Building) at 10 to 15% of the cost of the construction. However, it is likely that such estimates increase the real effects of standards because they overlook the potential learning effects, the diffusion of innovations, or the productivity gains induced by a greater integration of teams necessary to meet the requirements of the RT 2012.

From the economist's point of view, the major weakness of the normative / regulatory system of the building industry is that it has developed without any consideration of cost minimization. However, as far as housing is concerned, the consequences of higher costs are more important than in other markets. By raising the household solvency threshold, the increase in prices increases the crowding out of the most modest households in the new housing market.

7   Conclusion

The building sector is simultaneously characterized by regulation pervasiveness, by the superposition and overlapping of technical standards, and by a profusion of labels. This paper has analyzed the rationale for such a multiplicity of mandatory and voluntary standards. Its main consequences are the risk of confusion in the minds of buyers and the rise in prices due to the additional costs imposed by the continuous progression of requirements and the need to comply with many different standards. Both effects seriously hamper the penetration of the market by the products with the most demanding labels. The simplification of this regulatory and normative package would likely improve the economic efficiency of the sector.

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