Ontological Modeling of Certification and Inspection Process to Support Smart Disclosure of Product Information

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ABSTRACT

The increasing number of certification schemes diminishes the utility of certifications as private regulation and creates several policy challenges. The undergoing efforts to help consumers verify the accuracy of information created by private regulation mechanisms such as certification are currently confronted with the complexities of certification and labeling systems and the difficulties in linking data points across various certification schemes. This paper presents the development of certification and inspection ontology to support smart disclosure of product information. This study proposes that the resulting ontology enables information integration and standardization thus supporting knowledge discovery and sharing by synthesizing information across disparate data sources that is valuable for informing data-driven policy formulation. The ontology also supports standardization of an agreed set of terms and semantics for currently fragmented certification and inspection schemes to support comparability across different certification schemes. The accuracy and consistency of the proposed ontology are verified by using current reasoning tools to run queries based on a set of predefined competency questions.

KEYWORDS

Certification Schemes, Fairtrade, Ontology, Ontology for Product Certification, Private Regulation, Product Packaging Information, Smart Disclosure, Sustainable Labelling Schemes

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1. INTRODUCTION

Governments worldwide have endorsed the use of private regulations to manage the complexity of transnational trading relationships. These regulations rely on a coalition of non-governmental actors to add additional layers of rules and fill a gap in regulatory capability at the global level (Bartley, 2007, 2011; Mayer & Gereffi, 2010). This gap is a result of the reluctance of many governments to agree to binding transnational trade standards (Bartley, 2007). Private regulations offer a way to codify and monitor compliance of organizations with given safety, quality, social and environmental standards. Voluntary certifications, such as organic or Fairtrade, represent one particular type of private regulation that certifies the social and environmental conduct of companies. These certifications are based on voluntary mechanisms and rely on market dynamics - the interaction of companies, consumers and other stakeholders - for enforcing compliance (Mayer & Gereffi, 2010). Companies in turn use the certification to preserve their reputation, solicit trust from consumers, and achieve product differentiation advantage in the marketplace.

The number of certification schemes has expanded rapidly since 1990s (Bartley, 2011; Taylor, Murray, & Raynolds, 2005). For example, the eco-label index is currently tracking 463 eco labels worldwide in 25 industry sectors. On one hand, development of eco-labels provides consumers with more purchasing options. On the other hand, the rapid proliferation of certification schemes hinders the ability of consumers to comprehend the meaning behind each certification. The lack of understanding could influence market dynamics by complicating consumers’ purchasing decisions and providing opportunity for irresponsible companies to take advantage of consumer confusion. Survey by TerraChoice in 2010 conducted in 24 stores in the U.S. and Canada claimed that more than 95% of the 5,300 products being observed committed at least one sin of green-washing1 (Makower, 2010; Swain, 2011). The problem with green-washing is that it could lead to information asymmetry between consumers and companies by diluting the meaning of private regulation.

The situation outlined above has created policy challenges since governments can no longer solely rely on the market dynamics to enforce sound practices of private regulation. The effectiveness of private regulation to represent company’s true commitment toward social and environmental policy becomes questionable (Ramus & Montiel, 2005). As a result, several efforts are being undertaken to help consumers verify the accuracy of product information provided by private regulatory frameworks, including information about voluntary sustainable certifications. In the private sector, consumer advocates such as GoodGuide, Barcoo or NuVal, created web and mobile tools and applications to help consumers better understand the consequences of their purchases in the context of healthy and ethical consumption (Luna-Reyes et al., 2014). Watts & Weyner (2011) coined this type of applications and tools mobile technology-mediated ethical consumption (MTEC) tools (Watts & Weyner, 2011). In public domain, government entities, particularly in the U.S., have recently started promoting an information policy called smart disclosure to give consumers more control over their own data to make informed choices about their purchases (Sunstein, 2011).

However, the complexities of certification and labeling systems and the difficulties in linking data points across various certifications complicate the efforts to help consumers make informed choices. For example, majority of existing MTECs assign high environmental scores to any product that is certified by a voluntary sustainable certification scheme. However, certifications differ in the vigor of their standards, which does not get represented in the evaluation. The inability of the current MTECs to uncover further information behind each label diminishes the value of their product evaluation. Currently, the smart disclosure efforts by the U.S. government focus only on the disclosure of product usage and consumption history of products that have continuous buying properties such as banking, electricity, or mobile usage. Smart disclosure policies do not yet address disclosure of
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