

Opening the Indonesian Bio-Fuel Box: How Scientists Modulate the Social

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ABSTRACT

This article employs the notion of translation introduced in ANT literature to study the current bio-fuel development in Indonesia. Despite the presence of some activities by scientists, businessmen, policy makers, and farmers, diffusion of bio-fuel innovation seems to remain very limited. The article aims at understanding the bio-fuel development trajectory by seeking to disclose a variety of elements that shape the trajectory. We also make use of the notion of 'qualculation', to further diagnose the trajectory. Bio-fuel translations generated by three different scientists are described in the article. We show that the translations follow specific patterns of qualculation, namely 'proliferation' and 'rarefaction'. We use this to make sense of the current diffusion of bio-fuel innovation in Indonesia. Beside this contextual result, the article also seeks to contribute to ANT literature by exploring the concept of qualculation in the analysis of technological innovation.

Keywords: ANT; bio-fuel development; diffusion of innovation; qualculation; translation

INTRODUCTION

Bio-fuel development activities in Indonesia have been intensified and wide spreading since early 2005. Scientists from major Indonesian universities have been involved in an 'invention race' by offering calculations and efficient solutions, and thousands of rural farmers have taken voluntary steps to cultivate and harvest energy plants. Top level bureaucrats and elite politicians have been in prolonged debates to defend what they see as Indonesia's energy crisis problem and its solution. However, until

today, despite the variety of laboratory research involving numerous scientists, and billions of rupiah invested in the research, no technical solutions take place on the road. Despite the intensive and extensive research to supply technology to solve the energy crisis problem, its diffusion to the benefit of society seems to be very limited, if not totally absent.

The article aims at understanding the bio-fuel development trajectory by seeking to disclose a variety of elements that shape the trajectory. We use some analytical concepts developed in the actor-network theory literature

to achieve that aim. In particular, we deploy the notion of translation to trace the relations of heterogeneous actors that compose the bio-fuel development trajectory. To gain deeper insight into the translations, we equip the analysis by the notion of *qualculation*, developed by Callon and Law (2003). The field work supporting the article began in early 2006, taking place in several laboratories in the Institute of Technology Bandung (ITB) and in the agency for technology assessment and application (BPPT), and in two villages in West Java. We also conducted interviews with informants from a variety of government institutions, political parties and mass organizations, and of course, with rural farmers and rural housewives. The ‘following the actors’ technique advocated by Latour (1987) is employed to trace the relations connecting heterogeneous elements.

THE TECHNICAL AND THE SOCIAL

In the ANT literature, technical and social entities are seen as ‘two sides of a single coin’ (Latour, 1987; Callon, 1986; Law, 2003). The social is conceived as a patterned network of relations connecting heterogeneous materials (Law, 2003). In the very similar way, scientific facts and the functioning of efficient engines draw resources from heterogeneous elements to support their durability (Latour, 1987). The heterogeneous elements include not only human actors, but also non-human actors. ANT proposes the so-called general symmetry principle that says, basically, in the analysis, human and non-human actors need to be accounted equally (Latour, 2005).

Callon (1986) and Latour (1987) propose the notion of translation to trace how an actor-network comes to existence. Thus actors are involved in a chain of translations to define the role of other actors, to set performance on trials. Network durability may result from translations, as well as network collapse. Callon (1986) goes further by analyzing translations

into four moments: problematization, inter-essement, enrolment and mobilization. The conception of moments of translation serves as an analytical tool. Nevertheless, ANT is not a stability-seeking or equilibrium-seeking theory. As emphasized by its proponents, ANT is a descriptive theory. It seeks to describe the process of entity construction, as well as deconstruction.

The use of ANT in addressing technology assessment problems is conceptualized in the Constructive Technology Assessment (CTA) theory (Rip et al., 1995). CTA seeks to integrate social objectives and criteria by looking closely to the co-evolutionary process that connects technology and society. CTA conceptualization stems from the possibility of modulating technology in the course of its development¹, though it is not an easy task to accomplish (Schot, 1992, p. 37). In their elaboration of the notion of technology modulation and steering, Fisher et al (2006) call for the “reflexive awareness” of actors to become attentive to nested processes, structures, interactions, and interdependencies, both immediate and more removed, within which they operate. They assert that “reflexive awareness” implies equality and open process in a network.

While the notion of reflexive awareness refers to a mental entity, there is another related concept in the ANT literature that refers to a network of heterogeneous entities. That is, the concept of *qualculation*. This concept is employed by Callon and Law (2003) to discuss rationality and, its opponent, non-rationality. The term ‘*qualculation*’ is invented to avoid unnecessary distinction between calculation and, its qualitative counterpart, qualification or judgement. Callon and Law (2003) show that calculation, or qualification, may be conceived as an action of drawing heterogeneous resources, putting them in a single space, ordering, and totalizing. According to them, as long as we are interested in studying agency and action, “if there is a boundary at all, then it is not between the rational and the non-rational but rather between ... the *qualculable*, and the non-*qualculable*” (Callon and Law, 2003, p.

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