The Macro and Micro Levels of Ecological Modernisation

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Introduction

Ecological Modernization (EM) theory was initially developed in Western Europe in the early 1980s. In spite of the last 20 years of research, "[t]here is no one canonical statement of the ideology of ecological modernisation […]" (Weale, 1992, p. 75) and definitions of EM are still fuzzy. We understand that this concept comprises structural and behavioural changes and, from a generic perspective, proposes technological innovation as a strategy to simultaneously promote environmental protection and economic development.

Although EM authors have different assumptions and perspectives, there is a group of elements that is usually associated with EM and gives some degree of unity to the theory. Some aspects typically mentioned are: combination of environmental and economic objectives, use of preventive technology, market instruments and voluntary agreements (Hajer, 1995, Jokinem, 2000, Mol, 1995). However, studies insufficiently recognise important differences in conditions and underlying assumptions for EM.

Our objective, in this paper, is to discuss the potential usefulness of an analytical framework based on the distinction of two different levels of EM: the micro (firm) level and macro (society) level. We defend that the analysis of EM at these two different levels not only makes clear the differences in requirements necessary to introduce EM, but also helps identifying barriers to implementation. The micro-macro scheme, then, is presented as a framework for assessing the likelihood of success of actions taken towards the adoption and application of EM strategies, in particular in other than countries those in which EM has so far been developed.

Two levels of analysis

Dividing EM into micro and macro levels is a consequence of understanding this process as two interrelated phenomena. Although modernisation must occur at the micro level and firms must develop new clean technologies to reduce pressure on the environment, such changes may only occur if motivated by forces external to the firms. In this section, then, we present the two levels and discuss the necessity of initiatives at the macro level to promote EM at the micro level.

The micro level of EM deals with the behaviour of firms. At this level, agents have only one and clear purpose: to maximise private benefits, i.e. increase the firm's value. Actions towards this consensual aim are implemented within an environment of stable power relations, rigid hierarchical structure and, consequently, little conflict. The economic reasoning, thus, leads to decisions targeting (financial) return in the short term.

In contrast, the macro level presents more fluid and dynamic elements. There are diverse agents (government, industry and public) attempting to improve the "collective quality of life" (not an easy task, assuming the existence of different definitions of quality of life). This competition is mediated by government, in a political context, where roles and responsibilities might change periodically. The situation results in an environment of uncertainty, high level of conflict and political reasoning. Decisions are oriented towards voters' preferences, and the election cycle constrains the timeframe.

Because of these differences, distinct driving forces propel the micro and macro levels.

Profit motivates firms; they only develop "green" technologies, create environmental management systems or voluntarily reduce pollution, if changes result in higher returns. Willingness to innovation exists only if it increases revenue (either through acquisition of new markets, or payment of premium prices) or reduces costs (due to more efficient use of resources or tax reduction). Firms see EM as economic development with positive environmental externalities.

Study of EM at the micro level has been undertaken by Huber (Spaargaren, 1997a)and Spaargaren (1997b), among others. They argue that market forces drive industry towards green production and "[p]roducers and consumers undertake it [EM] of their own volition in acknowledgment of its advantages to both of them and society as a whole" (Andersen, 2002, p. 1395). Huber, for example, considers environment-oriented policies unnecessary and "regards state-intervention as an obstacle to effective environmental reform" (Spaargaren, 1997a, p. 14).

However, the role of "the market" towards green production should not be overestimated. Consumer preference is shaped to a large extent by marketing and advertising; therefore, consumers often buy green products that firms tell them to buy. The market-driven rationale, then, seems truncated, because it concludes that firms are the actual generators of their own modernisation.

Besides that, empirical studies also suggest that the "EM from within" approach may not necessarily occur by itself. After studying changes in Central and Eastern European Countries Andersen (2002, p. 1406) argues that neither domestic nor Western European markets have been able to start the ecological modernisation process, and concluded that "an ecological modernization process has not developed as a natural component of the transition process across the region". At the same time, Pellow et al. (2000) find that the modernisation of the recycling programme in Chicago resulted in a deterioration of local environment (work facilities) and quality of recyclable material. They also comment that "[a]s new technologies have brought firms and financers into the market, […] the ecological sphere has been recaptured and subsumed under the economic sphere" (ibid, p. 111).

Although "the market" is necessary for the development of EM, it does not seem to be sufficient to bring about an environment-oriented restructuring of the industrial process. This limitation leads us to consider that "[i]t is no good relying on any supposed 'invisible hand'

operating in market systems to promote good environmental outcomes" (Dryzek, 1997, p. 141) and that macro conditions induce the modernisation process.

A second group of authors (Andersen, 2002, Ashford, 2002, Christoff, 1996) study the role of government and social movements in promoting EM. Considering the European context in the 1980s, it can be said that EM resulted from conflicting demands. On the one hand, environmental organisations and green parties expressed concern about deteriorating environmental conditions and risks – such as polluted rivers, dying forests and risk of nuclear/chemical accidents. On the other hand, policy makers were required to promote economic growth, in order to avoid rising unemployment and a reduction of the quality of public services.

This scenario, in addition to the "political necessity" to take action, resulted in a discourse that promoted environmental protection with positive economic externalities. From the micro level point of view, "modernised" companies are more efficient with improved competitive advantage. In addition, from a macro perspective, modernisation results in a reduction of pollution and public expenses in health services and environmental restoration. Finally, because EM proposes that "some tasks and responsibilities in environmental management shift from the state to the market" (Frijns et al., 2000, p. 269), activities like data collection and control over free-riders are transferred to firms, and also reduce public expenses. Such processes can be identified in some Dutch voluntary agreements (de Jong and Wolsink, 1997) and German atmospheric emission policies (Weale, 1992).

In summary, although it can be said that the micro and macro levels of EM have different structures and dynamics, they are strongly connected. But it needs to be emphasised that EM actually happens at the micro level; if companies do not modernise, there are no environmental gains. However, changes do not occur spontaneously and, as explained in the next section, require special conditions at the macro level.

Requirements for EM

The literature describes EM as a set of transformations at both micro and macro levels. At the micro level, the main issues are efficiency and innovation, while at the macro level, authors are more concerned with the use of new environmental policy instruments. However, these changes require the fulfilment of a set of conditions.

Although efficiency is a traditional capitalist aim, EM authors propose a particular kind of efficiency – output efficiency (Mol, 1995), eco-efficiency (Cohen, 1997) and environmental efficiency (Gouldson and Murphy, 1997). These concepts are concerned with the amount of natural resources used (either raw material or energy). Making the production processes more efficient diminishes the pressure on resources and pollution emissions, reducing the need for filters or waste treatment. At least to some extent, preventive technologies substitute end-of-pipe solutions.

However efficiency depends on innovation and technological restructuring (Hajer, 1995). Innovation can be related with opportunity, willingness, and capacity (Ashford, 2002). Although opportunity is not clearly defined, willingness for innovation might be created either at the micro level (by economic reasoning, as discussed before) or at the macro level (by government regulation). Similarly, capacity for innovation depends on the firm itself (investment and knowledge) and on the societal conditions (funding and research/educational institutes).

Jänicke (1990, p. 106), however, broadens the concept of technology in EM theory and includes (from a techno-centric view) some social issues: "Social technology, or social engineering, shapes social behaviour (also in the form of self-organization)". Firms, then, should also use participatory approaches and discuss alternatives with the public. Such practices demand a restructuring of firms' decision-making processes and a reorientation of social movements' strategies towards directly negotiating with firms (Mol, 1995, p. 58). Thus, in this paper, technological innovation is understood not only as new equipment, but also as new organisational/institutional arrangements.

At the macro level, EM mainly proposes changes in the policy-making approaches. It denies the strategies used during the 1970s, when government specialists believed they could fully understand environmental problems and use normative regulation to discretely control the environmental impacts (Weale, 1992, p. 76). By contrast, EM defends precautionary policies that focus on the causes of the problems, and rely on agreements with stakeholders and economic instruments.

An EM conducive policy approach requires policy advisors and scientists capable of identifying cause-effect relations concerning environmental, economic and social issues, as well as co-operation with stakeholders to address these causes. Social movements and firms must also organise representative associations to take part in the negotiations and agreements with government. The three groups of agents must become more accessible and flexible to implement together the proposed solutions.

So, implementing EM norms requires a series of conditions, both at the micro and macro levels. Some of the changes at the micro level depend on requirements at the macro level, and vice-versa. If conditions at both levels do not line up with each other, obstacles emerge that may constrain the implementation of EM strategies.

Obstacles and constraints to EM

Structural barriers exist to the implementation of EM. Foremost, these are associated with the short-term timeframe of companies and government, and the tension between a participatory approach and scientific rationality.

In spite of EM's advocacy for the use of preventive technologies, "[r]eactive approaches are relatively easy to accommodate as they do not challenge existing strategies and systems" (Gouldson and Murphy, 1997, p. 79). Many new technologies are economically feasible in the long term, but they may present increasing costs in the short term (for example, because of research or production restructure). Decisions at the micro level, then, may not pursue these solutions, because of the risk of losing market share in the short term (the dominant time frame for decision making). Such innovations could make sense if adopted by the whole sector; however, there is no strong motivation for moving collectively, because, for individual firms, this does not necessarily increase their market share. So, although environmentally friendly innovation occurs, it is more likely to be incremental than structural. Some authors (Murphy and Gouldson, 2000, p. 43) suggest that government is capable of facilitating structural innovation, but this alternative also presents difficulties.

Assuming that politicians are motivated by votes, it can be argued that, in most situations, they will prefer decisions that have outcomes within the election cycle. As a result, industrialised countries "[…] have been implementing concerted environmental policy for a quarter of a century. But it has evolved in a process based not on strategic thinking but on

short-term reaction to crisis or failure" (Gouldson and Murphy, 1997, pp. 79-80). A strategy to escape this "lock-in" is the use of participatory processes in policymaking and implementation. These have been used, in particular, in strategies directed at sustainable development. Social involvement is also proposed by EM literature, for instance in the form of reflexive EM – "a democratic process of deliberate social choice out of alternative scenarios of development (or indeed non-development)" (Hajer, 1995, p. 281) – but this solution meets obstacles within EM theory.

EM theory has a clear basis in economic rationality: it assumes that science will find effective solutions to environmental problems, and relies on economic motivation to increase efficiency. However, most scientific solutions are developed in research institutes and universities, and are not necessarily accessible or understandable by the public or social organisations. Besides that, the emphasis on efficiency might conflict with some values of social movements, like well-being, solidarity and self-esteem. Therefore, if it is necessary that stakeholders agree with increasing efficiency and economic rationality as being the main goal of EM strategies, this also can be problematic.

These obstacles may slow down the diffusion of EM, confining it to a few activities or industrial sectors. For instance, despite the efforts of the German government towards EM, end-of-pipe technologies still correspond to 75% of the solutions used in the country, which is close to the average in Europe (Neale, 1997, pp. 9-10). Leroy and Tatenhove (2000, p. 176) propose that the opportunities for EM are restricted mainly to sectors with a high potential for innovation and positive investment capacity, and do not extend to more traditional industries like housing or furniture. If such obstacles diminish the adoption of EM in European countries, they may pose even bigger difficulties in other regions.

From the perspective of non-European countries, not only domestic issues should be studied when evaluating the feasibility of EM. Pressures from the international context should also be considered – although it is not clear if these help to overcome domestic barriers or are additional obstacles. Some authors have identified in "[…] most 'peripheral' states the construction of institutions for environmental reform that are clearly inspired by the OECD ones" (Mol, 2000, p. 139). Policy diffusion may inspire (or even instigate) non-industrialised countries to adopt EM and other paradigms designed by European countries. But modernised firms in industrialised countries may oppose such diffusion in order to maintain their competitive advantage (White, 2002). This issue, however, is beyond the scope of this paper.

Conclusion: how can EM be promoted?

In this article, we used a framework based on the micro and macro levels of EM to identify requirements for the implementation of EM, as well as assess obstacles and constraints. In particular, the aim of using the framework is to identify conditions that may need to be developed by non-European countries that desire adopting EM as a paradigm.

Based on this framework, we considered that market demand, the main motivation for innovation, does not create necessarily the "green twist" and is not sufficient to promote EM at the micro level. We concluded that conditions at the macro level are also important.

Among these conditions, the construction of a knowledge society, with effective research and educational institutions, seems to be a crucial step towards EM. Improving knowledge appears to be a requirement for both "ecological" and "modernisation" aspects of EM. On the one hand, scientific research is necessary to identify environmental problems and propose

alternative solutions. Additionally, the public must understand the issues in order to participate effectively in discussions and negotiations. On the other hand, firms need skilled managers and labour to design and operate modern equipment; and government must have creative staff to collaborate with the public and firms, to develop preventive policies, and to implement flexible instruments.

Besides building knowledge (cognitive) capacity, it is also necessary to develop a culture of long-term thinking. A first analysis indicates that, in general, governments and firms tend to focus decisions on the short-term. Reflexive EM, translated into public participation in policy making and implementing, may be a desirable, or even necessary, strategy to create a basis for long-term policy. However, public acceptance of EM assumptions (i.e. belief in economic rationality and efficiency) cannot be taken for granted, and new approaches or mechanisms to link the views and interests of the public, governments and firms in a longer-term framework, still have to be developed.

In conclusion, our findings suggest two main areas for further research on conditions for EM in non-European countries. First, it is necessary to improve our understanding of (the conditions for) cognitive capacity building, technically, socially and environmentally. Second, we need to enhance our understanding of the conditions for the development and implementation of participatory strategies for long-term policy involving the public, governments and firms.

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