



Time compression diseconomies in environmental management: The effect of assimilation on environmental performance



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ABSTRACT

This research addresses the relationship between an organisation's assimilation of its environmental management system (EMS), the experience it gains through it, and its environmental performance. Assimilation here refers to the degree to which the requirements of the management standard are integrated within a plant's daily operations. Basing ourselves on the heterogeneity of organisations, we argue that assimilation and experience will inform environmental performance. Furthermore, we posit that the relationship between assimilation and environmental performance depends on experience. The attempt to obtain greater assimilation in a shorter time leads an organisation to record a poorer environmental outcome, which we shall refer to as time compression diseconomies in environmental management. We provide empirical evidence based on 154 plants pertaining to firms in Spain subject to the European Union's CO₂ Emissions Trading System.

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1. Introduction

The adverse environmental impact caused by the pursuit of business operations in general, and the production of goods and services in particular, has been the focus of considerable attention on the part of scholars in recent years. A firm's environmental performance is the individual measurement of that impact. An environmental impact has been defined by the International Organization for Standardization (ISO) as “any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspect” (ISO 14001:2004, p. 2).

Consumers may choose from among a greater number of “ecological products” whose environmental impact, in theory, should be lower than that of other products, but regarding which they do not always have the necessary information for making a rational decision. According to Eurobarometer (2012), 48% of consumers are “confused” by the flow of environmental information they receive. Organisations also require quality environmental data in order to make the best decisions on their environmental management. The implementation of an environmental management system (EMS) as per the ISO 14001 standard helps to systemise the data and create environmental indicators that assist decision-

making in these matters. According to the ISO standard, the assessment of environmental performance is a “process to facilitate management decisions regarding an organization's environmental performance by selecting indicators, collecting and analysing data, assessing information against environmental performance criteria, reporting and communicating, and periodically reviewing and improving this process” (ISO 14031:1999, p. 2).

A branch of the literature has focused on studying the measurement of this environmental impact (in what is referred to as the environmental outcome), distinguishing between those firms that do not have an EMS and those that do, and above all those that have had their EMS certified (Montabon et al., 2000; Dasgupta et al., 2000; Melnyk et al., 2003; Russo, 2002; Potoski and Prakash, 2005a,b; King et al., 2005). One of the problems these studies face is the implicit assumption that all organisations with an EMS introduce similar practices and may be treated as a uniform group (Christmann and Taylor, 2006; Heras-Saizarbitoria and Boiral, 2013). This problem is even more apparent in broader quantitative studies, in which there is no information on each organisation's individual management (Nawrocka and Parker, 2009). This means that scholars have used the presence of an EMS and its certification as a determinant of the environmental outcome (King et al., 2005; Gonzalez-Benito et al., 2011), without considering the wide diversity of organisations and, above all, the environmental management practices they deploy.

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Nevertheless, there is robust evidence of the diversity of EMS implementations, with scholars specifically focusing their attention on those organisations that despite having an EMS (and even having had it certified) have not changed their environmental behaviour. These cases tend to be referred to as symbolic implementations (Christmann and Taylor, 2006) or “rational myths” (Boiral, 2007). In order to resolve the problem of the differences between the levels of implementation of a specific standard, scholars have used the concept of *assimilation of the EMS* (Naveh and Marcus, 2004). This term allows differentiating between organisations according to the extent to which the standard's requirements are integrated within the organization's daily operations. In a similar way, other scholars highlight the level or quality of adoption (Aravind and Christmann, 2011), the heterogeneous adoption or integration of the EMS (e.g. Yin and Schmeidler, 2009; Curkovi and Sroufe, 2011; Heras-Saizarbitoria et al., 2011) or the degree of internalization of ISO 14001 (e.g. Castka and Prajogo, 2013; Prajogo et al., 2012; Qi et al., 2012; Heras-Saizarbitoria, I., 2011).

According to Naveh and Marcus (2004), the assimilation is a complex process based on (1) laying down rules enabling the organisation to effectively adhere to the management system's standards; (2) coordination with key suppliers and customers; and (3) an internal integration process between the old way of operating and the new approach to work. Although the literature on environmental management is very extensive, little attention has been paid to the concept of assimilation and, at the time of writing, there is hardly any empirical evidence on the effect such assimilation has on firms' environmental performance.

Assimilation is a process whereby “the links between the organization's old policies, procedures, and rules and its new ones have to be considered” (Naveh and Marcus, 2004). This means that assimilation is a process of change, passing from an old stock of assets to a new one (Dierickx and Cool, 1989). We should not therefore ignore temporal aspects, as all change occurs at a pace that may determine its success (Armenakis and Bedeian, 1999). Accordingly, time is another key factor for studying these organisational changes, due both to the need for the proper assimilation of new management fundamentals and to the effect of the experience to which the organisation is subject.

This paper is going to focus on the organisational changes involved in the proper assimilation of an EMS and which condition its explanatory role in an organisation's environmental performance. To do so, we shall analyse the moderating role experience plays in environmental management. We argue that the positive effect assimilation has on environmental performance is not only complemented by an experience effect, but that the passage of time is a necessary requirement for proper assimilation. We return to the concept of time compression diseconomies (Dierickx and Cool, 1989) applied to environmental management, according to which firms recording a high degree of assimilation over a short period of time will manifest a poorer environmental performance. We therefore contend that a firm's assimilation and experience have a direct effect on its environmental performance, and what's more, time has a moderating effect on the impact assimilation has on the environmental outcome.

The next section presents a review of the state-of-the-art regarding environmental outcomes in which we shall set out the arguments upon which we base the causality between EMS-based environmental management and the environmental outcome. We shall then present our predictions on the impact that assimilation, experience and the accumulation of assets will have on an organisation's environmental performance. The third section will outline the methodology used in the empirical study, describing the sample and the metrics applied. The fourth section will address

the results obtained. The fifth section will discuss these results and the papers' contributions, and provides a summary of the main conclusions.

2. Theory and hypothesis

2.1. Environmental practices and the environmental outcome

For some years now, the scientific community has been providing evidence on the relationship that exists between the systemisation of environmental practices and the environmental outcome in firms. In addition to the ongoing debate on the usefulness of environmental certificates, and assuming there is a generally positive relationship between environmental practices and environmental performance, scholars are becoming increasingly more interested in the further exploration of those contingencies that determine the nature and strength of that relationship.

Dasgupta et al. (2000) report that a firm only improves its environmental outcome when it has financial incentives to do so, which means it will not spend more on that improvement than the fine it may incur for any breach of the law in matters of environmental legislation. In their analysis, and like other scholars, these authors acknowledge that they have not assessed which factors specifically lead to a better environmental performance. Potoski and Prakash (2005b) explain this relationship in terms of the coercive power of the standard upon which the firm's environmental management is based. They differentiate between programmes without reprisals and those that do indeed involve them. According to prior studies, the voluntary environmental programmes that certain firms may embrace, such as the chemical industry's Responsible Care Program (King and Lenox, 2000) or the U.S. Department of Energy's Climate Wise Program (Welch et al., 2000), do not appear to improve environmental outcomes due to a lack of disciplinary power. Accordingly, the threat that audits pose to an EMS certified according to ISO 14001 should suffice to encourage an organisation to improve its performance (Earnhart and Leonard, 2013). If this argument were true, those firms with an EMS certified to ISO 14001 should record a better environmental performance than those with an uncertified EMS, but several studies report the opposite (see Table 1). Some scholars provide evidence on the lack of independence and rigour of the audit process (Heras-Saizarbitoria et al., 2013).

According to Russo (2002) and King et al. (2005), firms with an EMS certified to ISO 14001 record similar environmental outcomes to other firms with an uncertified EMS, albeit superior to those without an EMS. This may be due to the systemisation of their environmental actions, thanks to a series of standards that regulate and programme those activities, processes and procedures, upon which certification has no effect whatsoever. By contrast, an internal transformation is achieved that leads to a series of organisational results that the firm achieves with a view to improving its environmental performance. This process involves modifying the incentives of the organisation's agents (King et al., 2005) in order to align their behaviour with the management's objective. Accordingly, the stricter the standard that regulates the EMS, the better the environmental performance to be expected, in line with the conclusions reached by Dahlström et al. (2003). These scholars evidence that firms with a certified eco-management and audit system (EMAS) record a better environmental performance than those with an EMS certified to ISO 14001.

Although scholars have based themselves on these organisational changes that imply the systemisation of environmental management according to a management standard, there is scant evidence on how they occur and on the extent to which each one of these changes affects the environmental outcome. Scholars initially

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