Advantages and Limits of Using Pollution Control Tools as Strategic Options in the Management of Organizations

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Abstract

The paper aims to outline some of the pollution control tools and the advantages and limits of using them as strategic options within the management of the organizations. We provide a short literature review on the pollution control tools evolution and we emphasize the fact that there were three important stages that marked this evolution. Also, we propose a short classification of the pollution control tools identifying the most important criteria of sorting them. Afterwards, we provide an non-exhaustive analysis of both the advantages and limits of these elements, which is fundamental in the process of capitalization of the pollution control tools within the management of the organizations, through amplifying their strategic dimension. Therefore, the knowledge of the strengths and of the weaknesses of each pollution control tool represents a mandatory decisional input for the top management of the organizations, in their strategy foundation within the environmental protection.

Keywords: *pollution control tools, strategic, environmental protection, tradable certificates, renewable energy, management, sustainable*

JEL classification: M29, F18, Q52.

Introduction

The evolution of the pollution control tools is marked by three fundamental stages, which influenced also the managerial visions regarding the role and the importance of environmental protection in the context of strategic endeavors undertaken at organizational level. First stage in the evolution of pollution control tools is represented by their emergence, along with the intensification of the concerns with regard to environmental protection and sustainable development.

First preoccupations with pollution control field date back to 1968, as long with the establishment of Club of Rome, that afterwards, in the year 1972 published the book *Limits to growth (*Meadows, et al, 2004) that has been sold in over 12.000.000 of copies, translated into 30 international languages and became hence the best sold book on environmental issues of all times.

Within the paper are presented the threats faced by society as a result of accelerated economic growth, as well as the damage caused by economic activity on the environment.

The second stage in the evolution of pollution control tools is represented by **the emergence of economic tools for pollution control**, which occurred in the

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early 1990s as an alternative to classical instruments, mainly qualitative and seemingly ineffective, of pollution control. Thus, economic tools for pollution control have gradually replaced traditional prevention and control tools (Hepburn, 2006), while providing to national economies (or, where applicable, to companies), with a high level of autonomy regarding the taking-up of decisions aimed at ensuring compliance with restrictions imposed by environmental regulations.

If until about 15 years ago, the environmental protection was a constant source of expense for economic agents who were obliged to constantly adapt their strategies according to environmental regulations, and to immobilize their financial resources to ensure compliance with required standards along with the emergence of economic tools for pollution control, came up the opportunity to generate added value due to the fact that under the new approach, the pollution is economically a negative externality, which makes it susceptible to either generate a profit (through transfer of pollution right) or a cost reduction (through internalization).

The emergence of economic tools for pollution control has been approached as a recurring topic of research by many experts, among them standing out Austin's approach (1999), which summarized adequately the impact of new tools on national economies, respectively on the organizational strategies, arguing that these tools not only clear the relationship between regulation authorities and economic agents, but also provide with potential sources of revenue for state and government, while helping to increase their flexibility in managing the sources of emissions.

The third and most recent stage in the evolution of pollution control tools is based on the separation from the economic instruments of a class of tools which are highly complex and attractive for economic agents, namely **market mechanisms based tools** (in this case, demand, supply and price). The tools included in this category are generically called tradable permits and include green certificates, white certificates and emission certificates (black). The attractiveness of these tools results from their trade on special markets with national and international coverage, which operate similarly to the mechanisms of stock exchanges (MacKenzie, 2011). Economic agents are designed to carry the demand, respectively the supply and the sale can be done either immediately or forward through options contracts or futures contracts.

The similarity of tradable permits markets with capital market turns green certificates, white certificates and emission certificates into speculative instruments, which can generate profit for the economic agents. Thus, the third stage in the evolution of pollution control tools confirms definitively the conversion of pollution control tools from cost generating elements in potentially profit generating elements, both for state (where there are tradable opportunities for pollution rights) and mainly for the economic agents.

Assuming that market mechanisms based tools are designed to strike a balance between resource scarcity and price (Staudte & Karcher, 2001), as a consequence of markets failure (Convery & Redmond, 2007), it appears that the decision to adopt and the way to integrate these tools into the current activity of the

organization is a strategic management prerogative, being the prerogative of proactive environmental strategies.

1. Classification of pollution control tools

Analyzing the existing approaches in the literature on pollution control tools, we can conclude that these are classified according to the features that they possess, in several categories, according to the following criteria:

- **After the impact on the national economy, there are:**
  - ✓ **macroeconomic tools** – tools legislated at national or international level, through national regulatory authorities (fees for pollution, maximum allowable concentrations for emissions, principles and international regulations on environmental protection, pollution control subsidies, restrictive measures on pollution limits, incentives for the utilization of renewable resources), the application of which affects the national economy as a whole;
  - ✓ **microeconomic tools** – tools legislated by national regulatory authorities applicable to all economic agents within a state or only to the specific categories of economic agents (environmental monitoring, environmental management systems, emission certificates, green certificates, white certificates), whose application involves strategic decisions at organizational level, affecting their financial performance and conditioning development directions on medium and long term.
- **After the degree of compulsoriness, there can be distinguished**:
  - ✓ **mandatory pollution control tools** – settlements established by laws, regulations, international conventions on environmental protection (maximum allowable concentrations of emissions, principles and international regulations on environmental protection, restrictive measures on pollution limits);
  - ✓ **optional pollution control tools** - facilities offered by national or international authorities to adopt pollution control measures that require significant investment, and that for their accesing the economic agents are required to indicate their choice (grants to combat pollution, measures to stimulate the use of renewable resources, grants for reengineering, tax deductions for clean investments etc.);
  - ✓ **facultative pollution control tools –** strategical decisions of participatory management bodies, which presume voluntary option for implementing and using within current activity some pollution control tools, without them being compulsory when taking the decision (environmental monitoring, environmental management systems, policies for capitalization of tradable permits etc.).
- **After the complexity level, there are distinguished:**
  - ✓ **simple pollution control tools –** tools which involve a simple

operating mechanism, undifferentiated, regardless of the entity to which is applied (the polluter pays principle, environmental taxes);

- ✓ **complex pollution control tools –** tools that require a different treatment, depending on the specific of the entity to which is applied (for example, number of green certificates offered to a producer of energy from renewable sources differs depending on the source of produced energy);
- ✓ **integrated control tools –** tools that combine elements that are specific to several pollution control tools in order to achieve a high level of efficiency (green certificates market integration, that stimulates energy production from renewable sources with white certificates market, that stimulates the rationalization of energy consumption, regardless of the source from which it is generated).

- **After the operating mechanism, there are distinguished:**
  - ✓ **pollution taxes –** tools that include several direct payments of economic agents, in the form of contributions, taxes or emission rates, dimensioned either by estimates of the amount of pollutants released into the environment, either by actual measurements taken by the competent authorities (OECD, 1997), in which case the fees for poolution can take the form of administrative sanctions;
  - ✓ **maximum allowable concentrations for emissions –** tools that involve the establishment of maximum concentrations for several pollutants that economic agents can release within the environment, without them having to pay fees/rates/penalties for doing so;
  - ✓ **international principles of environmental protection –** tools that govern the legal framework regarding environmental protection and that are universally applied by most countries; the most famous principles are the polluter pays principle, the subsidiarity principle, the sustainable development principle and the caution principle;
  - ✓ **performance guarantees –** tools used in order to guarantee the environmental standards compliance of economic agents, through which economic agents are required to pay a guarantee, that is returned when is ascertained the conformation to these standards;
  - ✓ **subsidies –** tools that take form of financial aids offered by a certain public authority of the economic agents, in order to support their attempts to diminish the impact of the economic activities on the environment;
  - ✓ **restrictive measures concerning pollution limits** – tools that require mandatory capitulation of some activities and practices with negative impact on the environment, for all the economic agents that operate within a state territory, and that, generally, involve additional costs for the producer, in order to adapt the technologies to the requirements imposed by these restrictive measures;
  - ✓ **incentives measures for renewable resources capitalization** – tools through which investments in developing capacities for

generating electricity from renewable sources are supported and that aims on long term at the green certificates market development;

- ✓ **licenses, rights and pollution levels (tradable, transferable)** – tools based on the principle of market balance, according to which a growth of emissions associated with an entity that operates in an economic system must be offset by a decrease of an equivalent amount of emissions, otherwise the price mechanism will stabilize the market;
- ✓ **environmental monitoring** – tool used for supervision, evaluation, forecasting and warning regarding the evolution of the impact of economic activities on the environment, in order to timely intervention for maintaining the environmental balance (Wursthorn, et al., 2011);
- ✓ **environmental management systems** – tools that certify the compliance of an activity operated by an economic agent with national or international standards elaborated by standardization organizations in the field of environmental protection;
- ✓ **tradable securities** – economic tools for pollution control, given to economic agents, as a result of their efforts for environmental protection, ant that can be used by them as securities that can be traded on specific markets that operate similarly to capital markets.

The evolution and the typological classification of pollution control tools reflect the fact that the organizations are highly preoccupied with the capitalization of new opportunities brought by modern mechanisms for ensuring the compliance with the environmental requirements, abandoning the re-active attitude and opting for a pro-active attitude, that integrates within strategic approaches elements regarding the environmental protection under the form of strategic options.

Taking into consideration the fact that daily there are adopted regulations on environmental protection that become imperative for the economic agents, not taking into account the strategic impact of these regulations on their economic activity can prove a dangerous choice for managers, that can put them into difficulty in relation to competition and state institutions.

2. Advantages and limits of main pollution control tools typologies, that reflect the strategic impact within the management of the organizations

Given the advantages and the limits that characterize each of existing pollution control tools is likely to provide decision makers (depending on the area where they operate, but also on other relevant criteria) with a general perspective on the risks to which they expose when including a certain pollution control tool in the framework of the strategic vision of the organization.

Moreover, the fact that some pollution control tools are currently available for all typologies of organizations (environmental management systems), others are limited to certain typologies of economic agents (green certificates), and

others are uncertain (subsidies) is likely to significantly complicate the decision making process and to impose the increase of the volume of information that is required for taking accurate and substantiated decisions. In these circumstances, we assess that is necessary a synthetic and integrative presentation of the main individual advantages and disadvantages associated with existing pollution control tools, according to the approach outlined in Table 1.

Table 1 Advantages and limits of the main pollution control tools

Fees for pollution	
Advantages	1. **predictability** (allow the anticipation of the financial effort that has to be made by the economic agents who are subject to them); 2. **universality** (they are applicable to all economic agents typologies, that through their activity pollute the environment); 3. **reclaim** (they can be reclaimed by their inclusion in the sale price of goods, the financial effort to support the fees being uncertain and predictable).
Limits	4. **compulsoriness** (there are perceived by the economic agents as financial obligations); 5. **non-equitability** (there are not equitably established for all the economic agents, being a macroeconomic tool that takes into account medium values at economy level); 6. **non-optionality** (their subject to them is independent of the economic agents will); 7. **inefficiency** (increase of pollution fees level will lead to increase of pollution level, contrarily to the goal for which there have been outlined and also will lead to increase of optimal pollution abatement costs in the context of informational asymmetry).
Maximum allowable concentrations for emissions	
Advantages	8. **standardization** (they ensure a certain degree of equity, at least at national level); 9. **optionality** (the subject to them is considerably influenced by the economic agents' behaviour); **10. compatibility** (there are compatible with the pollutant pays principle and with the caution principle, reason why their efficiency is significantly upgraded in relation to pollution fees).
Limits	11. **risk** (they depend on the probability and on the impact of the emergence of some circumstances that are unconformable to environmental protection principles); 12. **subjectivity** (establishment of some accurate maximum allowable concentrations is a highly difficult process, fact that

	brings forward the emergence of subjective interpretations of the different states, or even within the same state at different moments of time); **13. limited action** (they do not allow quantification of the side effects of overtaking the maximum allowable concentrations).
International principles regarding the environmental protection	
Advantages	14. **universality** (they are applicable to all economic agents typologies and to all states, without any waiver); **15. morality** (they represent moral behaviour standards of economic agents regarding the environment; for example, according to pollutant pays principle, any entity that produces damage to the environment, or subjects to some risks the environment through the economic activity that undertakes, has the obligation to encounter the effects of these actions and to pay the costs of bringing the environment in the same stage that it was before the negative impact manifested).
Limits	16. **inefficiency** (they are frequently evaded by the economic agents, who take advantage of the very high level of generality and of the ethical rather that compulsory connotation of these principles); 17. **generality** (they are applicable to certain very general cases and that are affected by pollution, reason why they lack methodological details); 18. **restriction** (caution principle, for example, represents a boundary to technical progress and sustainable economic growth); 19. **subjectivity** (caution principle, for example, achieves differently, depending on the decision makers' disposition to risk, on their beliefs, on their psychological and moral profile).
Subsidies for combating the pollution	
Advantages	**20. incentive role** (they enable the dissemination of harmless technologies and eco-technologies);
Limits	21. **uncertainty** (they are used aleatory and unpredictably by states, in order to encourage pollution reduction); 22. **non-rationality** (they contradict the *pollutant pays* principle and stimulate the irrational behaviour of the economic agents with regard to the environmental protection); **23. differentiated access** (they are destined to some specific economic sectors, or to certain categories that are preferential to the economic agents); **24. distortion of competition** (they represent incentives for certain typologies of economic agents, to whom they enable the creation of some preferential conditions on the market).

The capitalization of renewable energy sources	
Advantages	25. **emergency** (it represents an emergent attempt at national economies level); 26. **financial support** (there are many advantageous financial sources, inclusive irredeemable, that support investments in the development of capacities for generating energy from renewable sources); **27. institutional support** (there were settled support mechanisms for the investors in the development of capacities for generating energy from renewable sources, such as green certificates).
Limits	28. **high costs** (there are necessary significant investments, thus limiting the SME's access to this opportunity); 29. **dependence on the climatic factor** (the capacity production is significantly and irreversibly limited by the climatic factor); **30. lack of infrastructure** (there are detected legislative and controlling gaps at market level, inclusive lack of the infrastructure needed for trading the produced energy).
Environmental monitoring	
Advantages	31. **complexity** (it ensures the monitoring of the environmental aspects with high accuracy, analyzing the available information from a multidimensional perspective); 32. **compliance** (it offers a guarantee on the compliance of organization's activity with environmental regulations); 33. **computerization** (it allows the collection, storage and processing of data in electronic format, thus providing with a quantitative dimension on the impact on the environment of an activity) ; 34. **organizational memory** (it contributes to the development of organizations' capacities for developing an organizational memory, in what concerns their impact on the environment).
Limits	35. **time consumption** (it involves the existence of a high volume of data, regularly collected, which presumes a considerable volume of necessary time for applying the tool); 36. **resources consumption** (presumes the existence of some people, having as a main task collection and statistical analysis of the information).
Environmental Management Systems	
Advantages	37. **environmental risk division** (they ensure an analysis and a proper evaluation of the environmental risks, allocating responsibilities for their control); 38. **costs optimization** (they contribute to provisions' reduction and to the reduction of research and development costs within environmental field);

	39. **accountability** (they contribute to the accountability of employees and of the management regarding the issues on the environmental aspects); 40. **image** (they contribute to the procurement and consolidation on short-term of a competitive advantage based on image); **41. access** (they can be easily implemented, there being many experts in the implementation and management of these systems).
Limits	42. **non-dynamism** (pollution control is static realized and is recorded within documents after the damage produces); 43. **the ability to mimic** (the low implementation costs of the environmental management systems make them easily imitable by any competitor, regardless of its dimension and its specific of the activity); **44. rigidity** (they are based on standards that are not universally accepted, thus giving them a certain degree of rigidity).
Tradable permits (green, white and emission certificates)	
Advantages	45. **optionality** (their use as pollution control tools represents a quasi-volunteering option of the economic agents); 46. **volatility** (the price and the traded quantities are volatile, thus inducing a speculative aspect to the tools, and generating win opportunities for the economic agents who operate on the market); 47. **incentive condition** (they are incentives that stimulate economic agents' motivation to operate in a certain way that involves responsibility to the environment); 48. **diversity** (they allow the achievement of diverse trades, aiming at tradable patterns used at capital market level); **49. efficiency** (they contribute to the increase of the efficiency of the investments oriented to environmental protection, through the increase of investors' economic benefits).
Limits	50. **non-governing** (the mechanisms of the trading markets have not got yet to maturity, thus generating a certain instability of the market); 51. **non-predictability** (the atypical features of the market generate an unpredictable behaviour of the market factors); **52. non-liberality** (the existence of a regulation authority capable of influencing the trading rules, affects the market operation in free terms).

The analysis of these elements is fundamental in the process of capitalization of the pollution control tools within the management of the organizations, through amplifying their strategic dimension. Without the previous enumeration being exhaustive, this synoptic of the advantages and limits of each tool represents a starting point in developing a future research oriented to the conversion of the opportunities generated by knowledge and use of the pollution control tools into sources of competitive advantage.

Conclusions

Analyzing globally the pollution control tools that exist and that are used currently within the organizations the specialty literature tries to identify credible answers to a set of dilemmas that slightly justify the legitimacy of the process of integration of ecological aspects within the current strategies of the organizations. These dilemmas, that have been partially elucidated with the help of the empirical researches undertaken by experts, can be in their turn used in understanding the reasons that determine economic agents' behaviour in relation to the environment. Knowledge of the strong points (advantages) and of the weak points (limits) of each pollution control tool represents, in these circumstances, a mandatory decisional input for the top management of the organizations, in their strategy foundation within the environmental protection.

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