



## IMPACT OF ECO-BASED INNOVATIONS ON THE EFFICIENCY OF CORPORATE ENVIRONMENTAL RESPONSIBILITY

*Impacto das inovações baseadas na eco sobre a eficiência da responsabilidade ambiental das empresas*

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**ABSTRACT:** The ultimate purpose of Corporate Environmental Responsibility (CER) is to prevent harmful influence of business activities on the environment. Each company should be obligated to adhere to it since environmental pollution is a serious threat for the future of mankind. Based on this urgent need, ecological innovation appeared. It purports to make a transition from a harmful business to a more accountable one. Hence, the contribution aims at studying how different, most developing countries, have been approaching and practicing CER to propose a more practical and general framework strategy with a qualitative methodology encompassing common accepted steps to drive improvements in the efficiency of CER and Eco-Innovation. Such a framework focuses on innovation as a key to business success aligned with CER and it is based on previous eco-based innovations in such a context. Necessary data will be collected by a survey questionnaire about several case studies.

**KEY WORDS:** Corporate environmental responsibility; Innovations; Environment

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## IMPACTO DAS INOVAÇÕES BASEADAS NA ECO SOBRE A EFICIÊNCIA DA RESPONSABILIDADE AMBIENTAL DAS EMPRESAS

*Impact of eco-based innovations on the efficiency of corporate environmental responsibility*

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**RESUMO:** O objetivo final da Responsabilidade Socioambiental (RCE) é evitar a influência prejudicial das atividades empresariais no meio ambiente. Cada empresa deve ser obrigada a aderir a ela, uma vez que a poluição ambiental é uma séria ameaça para o futuro da humanidade. Com base nessa necessidade urgente, surgiu a inovação ecológica. Ele pretende fazer uma transição de um negócio prejudicial para um mais responsável. Assim, a contribuição visa estudar quão diferentes, a maioria dos países em desenvolvimento, vem se aproximando e praticando RCEs para propor uma estratégia mais prática e geral com uma metodologia qualitativa que englobe etapas comumente aceitas para impulsionar melhorias na eficiência de RCEs e Eco-Inovações. Essa estrutura se concentra na inovação como uma chave para o sucesso do negócio alinhado com o CER e é baseado em inovações baseadas em eco anteriores em tal contexto. Os dados necessários serão coletados por um questionário de pesquisa sobre vários estudos de caso.

**PALAVRAS-CHAVE:** Responsabilidade ambiental corporativa; Inovações; Meio Ambiente

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### INTRODUCTION

Innovation is regarded as a core driver of the development and success of any business. It has multiple definitions, and several of the most succinct and relevant ones posit it as the implementation of a novice or significantly enhanced product, service, process, or method, whereas others underline that innovation can have continuous connotation, and mean a course of improvement (Reinlie, 2017). In Rexhepi, Kurtishi and Bexheti (Kurtishi and Bexheti, 2013) they stated, —innovation in implicit way tends to be one of the main drivers of competitiveness (p. 540).

Innovative technologies must be safe, justified and constructive in order to become a valuable strategic tool for the company. Along with this, the value for society and accountability for the corporate performance has become a key issue in the modern business world. Diverse novice types of innovation have emerged nowadays, reflecting the aforementioned stance of harm to the environment. Eco-innovation and social innovation are among them. According to the report by the Organization for Economic Co-operation and Development (OECD), eco-innovation is defined as —innovation that reflects the concept’s explicit emphasis on a reduction of environmental impact, no matter whether or not that effect is intended (OECD,2009b). Furthermore, eco-innovation, or green innovation in other words, is targeted at decrease of resources and energy consumption —while promoting sustainable economic activity (OECD,2012). Nevertheless, many companies focus on receiving a higher profit and neglect the harm their performance imposes on the environment. The concept of corporate environmental responsibility (hereinafter, CER) implies the accountability of each company for the society concerning its actions. To be more precise, organizations claim the duty to abstain from such types of business activity that can damage the natural environment either in direct or indirect way. As a result, the notion of eco-innovation appears implying performance that contributes to a sustainable development that creates new products and services targeted to both provide significant business value and at the same time decrease environmental damage. So, what is the actual impact of eco-based innovation on the enhancement of efficiency of CER? The present paper proposes to study relevant, credible and up-to-date literature focused on eco-based innovations outlook in the context of CER and its current approaches and practices in developing countries and provide a general methodology based on major issues identified during the secondary research and the model of efficiency criteria from the framework. A qualitative research is chosen in order to collect essential data on the issue in question. The study relies on the literature review, a number of case studies and a survey questionnaire.

## EXAMPLES

There are several cases that illustrate how ecological innovation can presently be employed as a constructive tool of CER. For example, research on the issue of CER actualization and its potential efficiency in one of the low income countries, Bangladesh, was conducted by Belal, Cooper, and Khan in 2015. This country is in the process of transition to middle income countries, but huge amount of costs spent on dealing with urgent environmental issues is a serious obstacle for this process (Belal, Cooper, Khan, 2015). Therefore, the initiative of CER actualization is regarded as a potential solution in the situation of Bangladesh (Belal, Cooper, Khan, 2015). It is recommended to involve NGOs to this process as an approach to the introduction of ‘surrogate accountability’ performed via third parties in order to contribute to the vulnerable stakeholders. As the scholars underline, such an alternative approach to the issue of corporate responsibility is expected to have more significant —potential in developing countries where NGOs might act as surrogates for victims of corporate activities and sanction the power wielders on behalf of the vulnerable with a view to redress the balance of power and hold the corporations to account (Belal, Cooper, Khan, 2015).

Another example that is relevant to the given discussion concerns process of eco-innovation in industrial water-service systems (Levidow et al., 2016). Levidow, Lindgaard-Jorgensen, Nilsson, Skenhall, and Assimacopoulos conclude that there are many challenges in the implementation of eco-innovations in the given sphere, but the overall potential of their use is significant, and further studies of the issue in question are recommended (Levidow et al., 2016). Finally, Asfaw, Botes and Mengesha present a case of Ethiopia as a relevant sample of developing countries implementing CER (Asfaw, Botes and Mengesha, 2017). The experts also conclude that influence of NGOs in the given context will be an optimal solution (Asfaw, Botes and Mengesha, 2017). Their clearly set and constructively developed strategies are expected to contribute to formation and effective functioning of green economy in the country (Asfaw, Botes and Mengesha, 2017). The policies should be actualized via cooperation with government, media, educational institutions, and primary stakeholders (Asfaw, Botes and Mengesha, 2017).

There are five major gaps in the presented research, namely, 1) strategies of NGOs in developing countries aimed to prevent improper use of power and impact. NGOs should cooperate with governmental organizations and at the same time focus on the ultimate purpose of CER. The urgency of the given gap is confirmed by Asfaw, Botes and Mengesha (Asfaw, Botes and Mengesha, 2017); 2) there is a gap in the vision of strategy that can be adhered to and developed by NGOs in addressing the issue of CER. Actually, each developing country has similar issues in general, but peculiarities of their implementation as well as proximity to higher level of development differ. Hence, more alternatives and examples of CER implementation with all the challenges and potential outcomes should be investigated more as supported by Asfaw, Botes and Mengesha (Asfaw, Botes and Mengesha, 2017); 3) there is also a gap in addressing CER issues under circumstances of industrial efficiency. As a rule, the changes implied by CER require time, costs and efforts. Hence, it is crucial to explore more on the most optimal solutions for such transitions. It is especially relevant in developing countries where the potential is rather limited and the current environmental problems are serious. This issue was approached by Levidow, Lindgaard-Jorgensen, Nilsson, Skenhall, and Assimacopoulos superficially (Levidow et al., 2016); 4) the study of Bangladesh conducted by Belal, Cooper, and Khan reveals that there is a gap in effective and affordable strategies on financial issue for the developing countries. To be more precise, the options for acquisition of the costs for changes that are usually a deficit in developing countries should be studied as underlined by Belal, Cooper and Khan (Belal, Cooper Khan, 2015); 5) finally, the major premises of effective development of green economy in developing countries is considered to be another gap in the area of concern. Belal, Cooper, and Khan dwell on the issue of ‘\_surrogate accountability’ (Belal, Cooper, Khan, 2015).

Figure 1 presents a framework that illustrates the major aspects for ensuring efficiency of eco-based innovation in terms of CER provision. These aspects include *scalability, capacity, security, speed of installation, error handling and validation of the data*. These constituent elements of the efficiency paradigm are expected to gauge the actual positive influence of ecological innovation of CER-related organizations in developing countries. Scalability is needed to provide maximal utility of the discussed strategies. Capacity of each country is a crucial factor as far as it predetermines perspectives of use of ecological innovations and transition to CER in business sector. Security is a crucial element that prevents business from failure in financial terms and environment from actual damage. Speed of installation is also a serious issue in the given context since many businesses refuse to shift to CER since it requires not only money, but also time. Error handling is a crucial issue of the future. The stakeholders should be ready to face the errors and deal with them constructively. The potential solutions should be developed beforehand so as to respond timely. Finally, validation of the data is a step to the next level of eco-based innovation and effective CER since it presents background for further improvements and better outcomes.

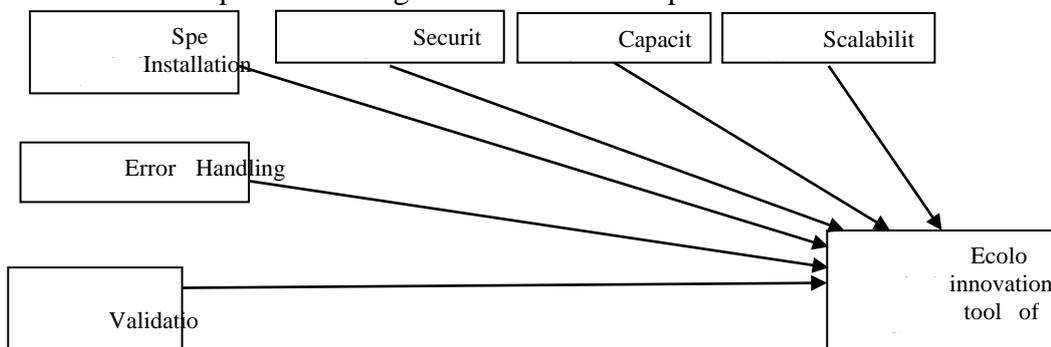


Figure 1 Framework Ensuring Efficiency of Eco-innovation in Terms of CER Provision

**DATA AND METHODOLOGY**

The given methodology will include, as secondary research, a literature review of credible, reliable and up-to-date sources that feature the core concepts of the research and relevant case studies in the area of

interest. Primary research encompasses conducting survey and consequent analysis of the acquired responses. The results lead to the ability to identify several ideas of innovation eligible for further practical use or future, more specific exploration.

### **Method One**

The present study adheres to the qualitative approach. The reason is that this approach aligns with the major aims of the given research, namely, to provide in-depth insight into the issue in question, analyze it from different angles and acquire as much details on the topic as possible. According to

Hancock, Ockleford and Windridge, qualitative research —focuses on reports of experience or on data which cannot be adequately expressed numerically|| as well as —focuses on description and interpretation and might lead to development of new concepts or theory, or to an evaluation of an organizational process|| (Hancock, Ockleford, Windridge, 2009). Along with such, this type of research uses flexible, emergent and at the same time systematic research process (Hancock, Ockleford, Windridge, 2009). Hence, the given methodology for the research requirements fits impeccably.

The research question of the present study is: What is the actual impact of eco-based innovation on the enhancement of CER efficiency?

#### Discussing about Method One

The focus of the study will be narrowed by means of several case studies representing the essential data needed for conclusions and further application of research results. The study will also identify directions for further research and potential implications for practice with CER in developing countries.

### **Method Two**

The overall quantity of the respondents necessary for the study was 100. A back-up group of 20 more people was formed in case some of the respondents declined to partake, failed to complete the survey or provided incomplete responses. Each individual received a welcome e-mail letter with basic terms, guarantees and form of informed consent. Along with this, each person was assigned to a group. The date the survey was to be distributed and time for its completion (1 week) were also mentioned in the letter. As soon as 100 of the respondents from the main group provided their consent and confirmed participation, the survey questions were approved, and the surveys were returned by the due date. Only two respondents failed to provide their feedback, so it took 10 additional days to contact the representative of the back-up group and receive their responses.

#### 3.1.1 Discussing about Method two

Once 100 responses were collected, each aspect was analyzed and arranged into a set of inferences. Consequently, the outcomes of the primary and secondary research were compared and aligned or contrasted accordingly. Finally, a concise and comprehensive report was developed, revealing core findings, discrepancies and challenges of the issue in question. The most valuable empirical contribution of the study was a set of innovative ideas designed based on the given research course.

## **RESULTS**

The results acquired via online survey were structured in accordance with the core efficiency criteria presented in the model. All the participants of the study confirmed that proper implementation of eco-innovative technologies impacted efficiency of CER positively. 78% of the respondents agreed that eco-innovation always requires making crucial changes, but at the same time leads to better performance outcomes and higher quality of the final product or service level. Some respondents noted in their additional comments to the survey, that CER was impossible without eco-innovation and that awareness of urgent necessity to implement CER in all countries by all companies is a key to the future with resources available and natural conditions favorable for all living things on Earth. Seven respondents claimed that CER is being implemented too slowly and such a pace does not suffice for timely changes needed to save the natural capital. One of the participants posited that the course of implementation of eco-innovative technologies endangered the survival of many companies as far as it required much time, efforts, alterations and

expenses, and, as a result, the company could face potential bankrupt since revenues could decrease or investors could pull out. This is an important aspect that should be studied further in the future studies.

### **Scalability**

The results on the criteria of scalability were as follows: 76% of the respondents stated that eco-innovation contributed to scalability, but only in the long run. Some respondents highlighted that their business needed around two to three years to cross the line of proper scalability after the introduction of eco-innovation technologies (34%), whereas others stated that qualitative implementation of eco-innovation led to positive results in terms of scalability of the business within a year (28%). The rest of the respondents stated they had no experience with eco-innovation aligned with scalability issues.

### **Capacity**

Capacity criterion acquired the following research outcomes: the prevailing majority of respondents (58%) stated that the primary threat to capacity of the business was eco-innovations; some respondents claimed it was of utmost importance to start eco-innovative practices only when the program aimed at CER provided transparent vision of adjusted performance that did not affect capacity, whereas others claimed it was crucial to start eco-innovative practices as soon as possible since it was hard to construct an impeccable scheme for every type of business without affecting any of the currently studied criteria of efficiency. One of the respondents expressed in the section for additional comments that capacity should be a main concern in the long run, i.e., the capacity decreased in the course of CER actualization is a logical consequence of serious transformations, and should be endured for the sake of the ultimate purpose – better capacity in the future.

### **Security**

Security issue received most of the attention of respondents in the section of additional comments. The following aspects were addressed: according to 98% of the respondents, security was considered to be the major concern in eco-innovative practices; 44% of the participants believed that security was a key measure in constructive eco-innovation; 28% of the respondents claimed they improved security in their businesses via introduction of eco-innovation, and 3% of them stated innovative technologies were hazardous to their businesses on the initial stage of implementation. 14% of the participants also highlighted that initial plan of implementation of eco-innovative technologies should include the predictions for potential threats to security and solutions or preventive measures. Furthermore, 7% of the respondents believed that eco-innovation could become a hazard to overall security measures only in cases in which it was implemented or conducted improperly. Finally, 78% of the participants also mentioned that security was a consequence of constructive and qualitative eco-innovation and adequately functioning business.

### **Speed of installation**

Speed of installation was the next aspect studied in the given research. 77% of the respondents stated that implementation of eco-innovation was proceeding too slowly. Some respondents commented that they had the following problems because of the low speed of installation: loss of investors because of incremental rates of decreased revenues (11%); loss of partners because of failed deadlines and terms of their partnership (18%); reduced sales (12%); and lower rates in performance in the annual report (6%). On the other hand, three respondents mentioned that the slow speed of installation could be improved through higher expenses. One of the participants also added that speed of installation in his experience directly depended on the competence of the team. Finally, 28 respondents mentioned the need for constructive, maximally detailed plan of installation as a core basis of timely implementation.

### **Error handling**

Error handling was the most controversially perceived aspect in the context of the given research.

To be more precise, 52% of the respondents believed that it would be impossible to predict and prevent all the crucial errors in the process of implementation of eco-innovative technologies. Furthermore, the main factors contributing to effective error handling were identified as: timely detection of error, highly

competent personnel, plan for prompt solution of the errors and their consequent prevention, strong security system, and maximal alignment of business capacity with requirements of eco-innovative technologies. Finally, proper error handling was considered as a significant stage of development of the company in the process of eco-innovation implementation.

### Data validation

Data validation is a final criterion of efficiency used for evaluating positive contribution of eco-innovation to CER in the modern business world. According to the survey completed by those 100 participants, 79% claimed that data validation was not a problem provided all the previous stages of eco-innovation implementation were conducted properly and timely. Still, the respondents were asked to list the main challenges and drawbacks they faced in the context of data validation, and the most common responses were the following: omission or confusion of data that led to data corruption and security vulnerability; insufficient amount of data necessary for valid outcomes; and improper choice of validation method. A plurality (46%) highlighted omission or confusion of data as a major reason of unjustified validation results. 23% of the respondents claimed that such unjustified and corrupted results led to serious problems in overall business performance consequently.

## CONCLUSION

Thus ecological innovation can contribute to the efficiency of CER in developing countries assumed the financial support, time and effort are provided. Furthermore, clear strategies are also needed to provide maximal efficiency. Based on the research, it is recommended to actualize eco-based innovation in business domain of developing countries with active engagement of NGOs as third parties. Moreover, a framework that encompasses main efficiency criteria was constructed. The framework includes scalability, capacity, security, speed of installation, error handling and validation of the data.

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