
Investigating a Model for the Impact of Human Resource Management Factors on the Cleaner Production

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ABSTRACT

The cleaner production is defined as an "integrated preventative environmental strategy" for improved resource efficiency, minimization of risks and environmental impact, and reduced waste and costs in an organizational operation. It has been promoted since the 1980s as a strategy to enable the businesses to minimize the waste and improve their environmental performance while reaping financial benefits from those activities. In general, the micro, small and medium enterprises (MSMEs) especially face significant hurdles to adopting CP as those are constrained by limited professional management skills and systems including: concentrated decision-making by owners, limited skilled human capital, non-involvement of workers, poor record keeping and lack of in-house monitoring and maintenance systems, and unstable finances and sources of funding. The aim of this study is to investigate the impact of human resource management factors on the cleaner production. Results show that helical milling is capable of greatly improving productivity and reducing costs, approaching the benefit of mass production.

JEL Classification: O13; O15; O44; Q56.

Keywords: Cleaner Production (CP); Human Resource; Environmental Management; Cost.

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1. INTRODUCTION

Defining the cleaner production as a conceptual relationship between the production and sustainability sectors, it can be emphasized that the cleaner production can help the industrial sector to achieve the sustainable development objectives through the definition of method and development of tools for implementing the procedures. The application of cleaner production can also help the leaders to evaluate the alternatives for significant reduction of negative industrial effects on the human health and environment as well as the evolution of societies towards the fair and sustainable communities. The changes need to be done in order to implement the cleaner production in a certain company. These changes are not only associated to the technological aspects (new machine and tools), but also pay attention to the deeper changes in the field of administrative aspects of firm operations and decision-making based on the market, change in the entrepreneurs and employees' mentality and corporate policies because the staff and owners determine the executive success of CP and their commitment and participation should be approved and encouraged.

Environmental quality concerns and cleaner environment & cleaner production/consumption methods have been also at the agenda of scholars in the last two decades and environment quality has been linked to cleaner production/consumption patterns with this respect (Gokmenoglu & Taspinar, 2015; Heidari et al., 2015; 2013; Katircioglu, 2014a; 2014b; Katircioglu, 2017; 2015). On the other hand, in 1989, the United Nations Environmental Program-Division of Technology, Industry and Environment (UNEP) defined the CP as an ongoing program of integrated preventive environmental strategy for production, service and processes to increase the

productivity of environment in order to reduce the human and environmental risks (Silva et al., 2013). Baas (1995) has defined the cleaner production as a conceptual approach and procedure to production which needs considering all life cycle stages of a product or a process with the aim at reducing or preventing the short-term or long-term risks to humans or environment. However, despite the numerous interpretations of cleaner production concept, Baas has offered an expanded definition of cleaner production:

- The cleaner production is the continuous application of integrated and preventive environmental strategy of processes and products to reduce the risk to humans and environment.
- The cleaner production techniques include the preservation of raw materials and energy, eliminating the toxic raw materials, and reduction of amount and toxicity of all greenhouse gases and waste.
- The cleaner production strategy for products focuses on the reduction of environmental impact throughout the product life cycle from the extraction of raw materials to consumption of end product.
- The cleaner production is available through the experience and improvement of technology and changing the attitude (Silvestre et al., 2014).

The elimination or reduction of greenhouse gas production and waste in resources is prior to their modification at the end of process in cleaner production, and this resource reduction can be achieved through two general methods: The changes in the product and also in the methodology and process. The CP seeks to improve the production efficiency, environmental management and human development, and it is often utilized instead of the Pollution Prevention (P2). According to the UNEP DTIE (1996), the P2 is considered as the reduction of resource, and prevention or reduction of waste sources and preserve the natural resources through the reduction or removal of pollutants with high efficiency in the use of raw materials, energy, water and land. Despite the fact that both issues focus on the environmental management by reducing the source for pollution control, there are some differences in this regard:

- The CP focuses on the changes in a wide range of elements in the environmental management, while the term of Pollution Prevention is generally used to describe the environmental improvement as a result of changes in the technology.
- Geographical usage: P2 is a common term in the North America while the cleaner production is utilized in Europe, Asia and Australia.
- Through the process of comprehensive production and management methods, the CP takes steps beyond the P2 and includes the whole product life cycle like the human and organizational dimensions of environmental management.
- Not only the CP is applicable for manufacturing processes, but also for products and services.

Therefore, it can be concluded that the CP is a very comprehensive, coherent and systematic approach as it includes the changes in all organizational associated with the production and processes; and its definition solely reflects a search for continuous improvement which is also the goal of quality management. In short, the CP programs provide a win-win strategy which leads to the reduction in costs of company and increased profitability through optimization through optimization of resource use and reduces its own environmental impact. Despite the potential benefits of CP programs, the recent articles such as the paper by Dewey et al have paid attention to the slow expansion of cleaner production and clean technologies and it is originated from the numerous problems which are reported or felt during the implementation of a CP program. These barriers are classified into 4 groups:

- 1- Market and policy: The macro level policies focus on the correction after operation instead of CP as well as the stringent environmental laws or the lack of consistent and clear policies to support the CP and minimize the waste;
- 2- Financial and economic: The lack of financial incentives due to the long return on investment especially for small and medium-sized enterprises and projects with high investment;
- 3- Technical and Information: the lack of enough CP awareness and knowledge like most of the existing international cleaner technologies and the lack of skills;

4- Managerial and organizational barriers (Khalili et al., 2014).

2. HUMAN RESOURCE MANAGEMENT

The Human Resource Management is founded in the early twentieth century and influenced by Frederick Winslow Taylor (1856-1915). Taylor described the meaning of scientific management term (later expressed with "Taylorism" term) and took efforts to increase the economic efficiency in generating jobs. He eventually entered one of the main inputs into the production process (work) and tried to discover the labor productivity. The movement of human relations originated from the research by Elton Mayo et al; and the research by Hawthorne (1924-1932) was so motivating and thus it led to the more useful employees without regard to the financial compensation and working conditions. The contemporary efforts by Abraham Maslow, Kurt Lewin, and Max Weber (1864-1920), David McClelland and Frederick Herzberg (1917-1998) established the foundations of industrial and organizational psychology, the organizational behavior and organizational theory and created a new space for new scientific discussions.

The Human Resource Management (or simply the human resources) or briefly the HRM is a process of working with people so that these individuals and organizations achieve their full capabilities even when that change requires the need to acquire the new skills, take the new responsibilities and a new form of relationships. In fact, the human resource management refers to the use of human resources in line with the organizational goals and includes the activities such as staffing and recruitment, training, salary and organizational relationships. In other words, the human resource management is an organizational function which promotes the employees' performance in serving the employer's strategic objectives. The HRM seeks to find how to manage people in the organizations with focus on the policies and systems. The units and parts of human resource management are specifically responsible for a number of activities including the recruitment, training and development, performance evaluation and reward and punishment (e.g. the management of salary and benefits). Furthermore, the Human Resource Management pays attention to industrial relations which refer to balance in organizational operations with rules resulting from discussions between employees and managers and governmental laws.

The human resource management was the outcome of human relation movement in the early twentieth century when the researchers began to document the methods for creation of business value through the strategic management of their workforce. This function was initially influenced by trading works such as the payroll and benefits, but with regard to the globalization, strengthening the companies, the technology development, and further research, the human resource management is now associated with the strategic initiatives such as the integration and acquisition, the talent management, planning the replacement of industrial relations and labor relations, diversity of culture and the capacity. The tasks associated with the human resource management may be implemented by trained professionals in new companies. In larger companies, a group of all efficient individuals is dedicated to implementation of rules by expert employees who play the roles in various tasks of human resources as well as the responsible leadership who is responsible for strategic decision-making in business.

To train the staff, the higher education institutions, and professional associations, the companies have created research programs which are allocated to these tasks. According to the evidence, the academic and human organizations are seeking to employ and promote the human resource management course. Furthermore, according to the published research articles in most of the academic journals including those mentioned in this article, the human resource management is a series of research studies which are popular in the field of management and industrial and organizational psychology. In fact, the human resource management is closely correlated to the sciences such as the behavior management, industrial psychology (job psychology), labor economics, statistics and computer. The human resource management should create value for organizations. This value creation is for both internal and external stakeholders. The internal stakeholders are the employees and organization, while the external stakeholders are the organization customers, investors and the community (Zilahy, 2004).

2.1 The Role of Human Resource Management Factors in Cleaner Production

As Zilahy (2004) points out, the recent attention is taken on the organizational factors. These factors include the behavioral barriers such as the resistance to change which indicates the lack of willingness to technology and methods as well as the lack of high-level support to cleaner production, and the environmental capacities and long-term strategy of clean technology (Calia ET AL., 2009; Thomas, 1995; Moors et al., 2005). Furthermore, Murillo-Luna et al., (2011) point out to insufficient supply of equipment and information, and weak development of clean

technologies and procedures, and the lack of information about the available methods and technologies, and the lack of organizational capabilities such as the limited environmental incentives and limited staff preparation, poor leadership of senior management and the lack of staff involvement, poor communication system and poor operational inertia.

Ensuring the staff commitment in the process of strengthening the CP programs is one of the major challenges which imply the human management activities (Khalil et al., 2014). In staff employment, which aims at motivating the candidates' potential to apply for current or future jobs, the employment pays attention to increased quantity and variety for particular jobs. The employment measures are the company's preferences for candidates who are committed to the environment. In selection and when employment leads to an increase in the number of candidates, the selection leads to the reduced numbers by selecting the best candidate who has the best criterion for available job opportunity. In other words, it refers to the selection of those who are committed to environment. When the selection and recruitment is combined with the environmental dimension, the environmental performance of a company is utilized as an element to attract the talented people (Jabbour & Santos, 2008). Obviously, it is so important to employ and select the employees, who pay attention to the environment, for green organizations, but studies indicate that this method is not always associated with the aspects of environment (Jabbour & Jabbour, 2015). As Rathi (2003) considers the managers' tendencies to employ the unskilled or semi-skilled human resources for doing the common tasks of production without understanding the basic operation, which is considered as a secret, as one of the barriers to CP implementation in SME companies.

The environmental education is the subject of first studies on the correlation between the human resource management and environmental management introduced in the 1990s. Sarkis et al have recently suggested that the environmental education allows the employees to adopt more advanced environmental management practices (Jabbour & Jabbour, 2015). The educational program should include some special topics and senior managers' participation. The main topics include the CP concept, the success and benefits, the environmental policies of organization, and legal requirements, and statements of senior management commitment (goals). Furthermore, it is suggested paying attention to some informing measures such as the posters, business meetings, notes, speeches or lectures with invited speakers in the field of successful cases and staff remuneration plans (Khalil et al., 2014).

Training, evaluation, and reward to help the companies for increasing the employee motivation in order to confirm the environmental concerns of companies enable the company to compete and achieve the environmental standards (Govindarajulu & Daily, 2004). Renwick et al., (2013) summarizes three main components of human resource aspects of environment as follows: The first main component is associated with the development of green skills and refers to the activities such as the recruitment, selection, training and development of environmental knowledge and encouragement of environmental management. The second major component refers to the green employees' motivation and points out to the assessment and rewards and the third main component refers to the stimulation of staff participation and empowerment and creation of a green organizational culture. Rathi (2003) also considers the indifference to the job and the lack of commitment and thus the lack of appreciation of staff work by rewards as one of the barriers to implementation of CP.

2.2 The Role of Human Resource Management Factors in Cleaner Production

The industrial development and sustainability are two important elements in industrial development strategies of developing countries. The industrial development should be based on the concept of environmental sustainability in order to ensure the sustainable development. In fact, the real growth of economy is important in addition to its growth process at the national level. The experience has indicated that the economy can develop rapidly by protection of environmental resources. However, the poverty reduction programs are steadily declined when the development projects cannot be implemented within the framework of sustainability. This is more important for the third world countries as the unfair income distribution and poverty have had big impact on the environment and led to the extensive destruction of natural resources. Furthermore, the low levels of knowledge and industrial standards, the inadequate environmental regulations and lack of public awareness about the importance of environmental problems lead to the use of inappropriate production processes with low efficiency in consumption of raw materials and energy (Ghazinoory, 2005). Daily and Hong have emphasized that each stage of environmental management system requires the special support of human resources activities with an emphasis on the employee employment and selection, training, performance evaluation and reward. These activities not only support the environmental management systems, but also support the development of products and innovation with minimal environmental impact. The concepts and methods of cleaner production can help to increase the

efficiency and profitability through savings of energy and raw materials and thus lead to the development of economy and environment and dimensions of human health (Ghazinoory, 2005).

Since the lack of awareness and knowledge of cleaner production as much as most of the international available clean technologies, the lack of skills and some of the organizational barriers such as the limited environmental incentives, limited staff readiness, lack of adequate leadership by senior management, and the lack of staff participation are some of the obstacles and difficulties in implementation of CP, and on the other hand, the CP programs are usually done exclusively by department of environment, while this department has inadequate skills and authorities to apply the CP in the whole company and according to the literature review of some aspects of human resources such as the employment, environmental education, performance evaluation and reward, it is found that they may affect the working practices of environmental management systems (Silva et al., 2013). It is expected that these dimensions can have a positive impact on the cleaner production; and since there are a few studies which provide the integrated models of interaction between human resources and management of environment in companies and also understanding the cleaner production strategies in developing countries is associated with obstacles, on the one hand, the educational problems such as the illiteracy and lack of public economic awareness prevent from the environment culture among a significant sector of population, and on the other hand there are too few number of trained personnel and laboratorial equipment to deal with the environmental problems as a challenge towards the sustainability.

There is a need for trained personnel to deal with these obstacles in order to provide the necessary expertise (Ashton et al., 2002). The systematic method for training program not only enables the employees to identify the problematic issues of environment, but also enables them to identify the best solution to deal with these problems. If the environmental education is defective or inadequate, the staff will be unready to deal with such these complex problematic issues. On the other hand, the studies have indicated how the companies (Xerox and a large chemical plant in America) can encourage their staff for innovation and attention to environment by reward and performance evaluation systems in order to reduce and recycle the waste (Jabbour & Santos, 2008). and finally, the evaluation and staff adequate rewards are very important for companies based on the environmental results (pollution reduction) in order to activate them in the field of environment (Jabbour & Jabbour, 2015). Despite the fact that entering into the field of human resources is considered as a crucial factor in active environmental management, there are too few bibliographers who cover the human resource and environmental management in companies. In fact, there are too few articles which provide the integrated models of interaction between the human resources and environmental management in companies (Jabbour & Santos, 2008). Considering the above-mentioned issues, it is expected that the human resources factors will play the effective roles in successful implementation of cleaner production.

3. DISCUSSION

Milliman and Clair (1996) were the first authors who studied the impact of human resource management on the environmental management. They provided a model of environmental performance for human resource management including four main stages:

- The company needs an environmental perspective as a guide to shape its strategy.
- Employees need to be educated to understand the philosophy of environmental vision of organization through its goals and strategies.
- The performance of environmental staff should be evaluated by a suitable evaluation system in line with the goals.
- The compensation programs should be defined in order to implement the supportive activities of environment in the workplace.

They have pointed out the importance of human resource role in active implementation of specific strategy in the company towards environment (Milliman and Clair, 1996). Training, evaluation and reward for increased employee motivation to confirm the corporate environmental focus enable the company to have more competitiveness and meet the environmental standards. Renwick et al (2013) propose three main components of human resource management environmental aspects: The first core component is associated with the development of green abilities and implies the types of performance such as the selection, employment, training, development of environmental knowledge and encouraging the leadership of environmental management.

The second core component is associated with the green staff motivation and implies the evaluation and reward, and the third core component is associated with the stimulated employee participation and indicates the valorization of tacit knowledge, staff empowerment, and creation of a green organizational culture (Paille et al., 2013). Due to the absence of study on the correlation between the human resources and cleaner production (author) and promotion of cleaner production as a strategy for empowering the businesses to reduce the waste and improve the environmental performance since the 1980s [4], the research literature for correlation between the human resource management and environment is only presented in this section. Providing a theoretical model as Figure 1 and research hypotheses by researcher, it is hoped that this study will provide the effective information about the role of human resources in cleaner production. The following hypotheses will be investigated by defining the human resource management factors as the independent variables and definition of cleaner production as the dependent variable:

- The employment and selection based on the attention to the cleaner production process affects the reduction in waste and increased energy savings and attention to cleaner production.
- The staff reward during the production process reduces the waste and increases the energy savings and attention to cleaner production.
- The staff performance evaluation during the production process reduces the waste and increases the energy savings and attention to cleaner production.
- The staff training during the production process reduces the waste and increases the energy savings and attention to cleaner production.

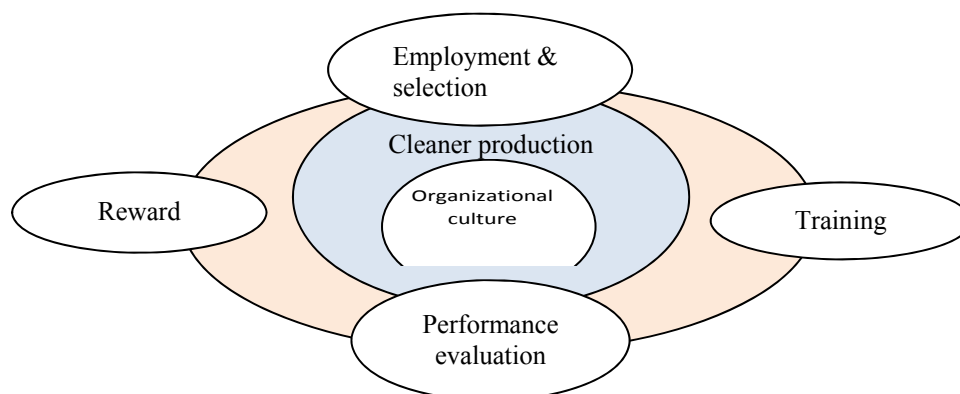


Figure 1.
Theoretical Model

Figure 1 presents the impact of human resource factors on the cleaner production which shows that employment selection, rewarding, organizational culture, performance evaluation, and especially training are effective factors on cleaner production stages of firms. Thus, these factors need to be investigated also empirically by the authors.

4. CONCLUSION

The cleaner production is widely adapted from different methods of environmental management, and there are numerous studies and document for proving the positive correlation between the cleaner production and implementation of improved business. Adopting the cleaner production methods is based on conserving the raw materials and energy based on the systematic reduction of waste, the production of greenhouse gases and inputs as a way to improve the adaption of products. According to this scenario, the cleaner production program refers to the measures which allow the company to be qualified in efficient use of raw materials and energy in a production process (Severo et al., 2014). Meanwhile, according to a definition of cleaner production as a conceptual relationship between the production and sustainability, we can emphasize that the cleaner production can help the industrial sector to achieve the objectives of sustainable development through defining the methodology and development of tools for implementing the procedures. The cleaner production application can help the leaders to evaluate the alternative methods for significant reduction of negative industrial effects on the human health and

environment as well as the evolution of societies towards the fair and sustainable communities (Agostinho et al., 2015).

Furthermore, the cleaner production is able to create the environmental sustainability in addition to the impact on the measurable social, economic, and welfare indices at the macroeconomic level through developing a traditional model. Despite the fact that the cleaner production concept is offered as a win-win concept which is not often universal, there are various activities under the CP and some of them require the higher levels of investment and long-term periods of return and may have no certain winner (King & Lenox, 2002). This issue indicates that this concept is not accepted and operated as it is expected. Therefore, it should be noted how these potential barriers limit the adoption of this method and how we can overcome these barriers through improving the education and knowledge among the technical skills and business community. The changes should be made in order to implement the cleaner production in a certain company. These changes are not only dependent on the technological aspects (new machine and tools), but they also pay attention to deeper changes in the field of managerial aspects of corporate operation and market-based decision making, the change in the entrepreneurs and employees' thought, and the policies of company because the staff and owners determine the success in CP implementation and their commitment and participation should be encouraged and approved (Khuriyati et al., 2015). However, the development of products with less environmental impact needs support by human resources. The successful design, development, and integration of cleaner production strategies for sustainable development are based on the establishment of human capital which refers to the experts with sufficient education and knowledge in certain fields of cleaner production and sustainable development.

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