

The relation between ISO 14001 certification and environmental performance of SMEs

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Abstract

The objective of this research is to assess the impact of certification according to ISO 14001 on environmental performance. We adopted a qualitative approach by studying multiple cases. The four SMEs studied agree that ISO 14001 ensures the optimization of resource consumption and the improvement of waste management. Faced with this convergence, there was a divergence in the explanations of the actors.

Keywords: Certification; ISO 14001; Management; Performance.

Introduction:

With the emergence of the notions of sustainable development and corporate social responsibility, business thinking is increasingly oriented towards environmental performance.. Consequently, companies are increasingly resorting to ISO 14001 certification, which concerns environmental management system. Studies investigating the relationship between ISO 14001 certification and social performance show similarities and differences in results.

This research aims to analyze the impact of ISO 14001 certification on environmental performance in the Tunisian context.

This research is divided into four parts. The first focuses on the presentation of the standard and its contributions identified in the literature. It presents also the components of environmental performance. The second part is dedicated to the presentation of the research methodology. The analysis of the results is carried out in the third part while the discussion of the results appears in the fourth part.

1. Literature review :

1.1. ISO 14001 and its contributions :

In 1996, the international organization for standards published ISO 14001: The most important standard in the series of standards devoted to environmental issues. The aim of ISO 14001 is to reduce the impact of organizational operations on the environment, but also to facilitate development and international trade by introducing a globally recognized standardization system. Certification of environmental management systems based on this standard is voluntary. And the number of ISO 14001 certifications issued worldwide at the end of 2015 stands at 319,329 (Ionascu et al. 2017). Previous research on organizations and the environment has only emphasized institutional forces such as regulatory, market, and social pressures that are the drivers of corporate evolution toward the most environmentally friendly operations (Jiang and Bansal, 2003). Businesses seek to comply with legislation to avoid legal liabilities, penalties and fines. Businesses are also proactively or strategically adopting environmentally friendly activities to anticipate regulatory changes and remain competitive (Clark, 1999; Bansal and Roth, 2000; Molina-Azorin et al., 2015). Pressures from customers and suppliers and social pressures from the local community, environmental activists and the general public further contribute to inducing ecological responsiveness from the business world (Berry and Rondinelli, 1998). Researchers have also explored the economic reasons for corporate ecological responsiveness. Bansal and Roth (2000), referred to this as competitiveness motivation. This perspective considers the ecological responses of organizations such as eco-labeling, green marketing and EMS implementation as sources of competitive advantages. Early adoption of these responses is believed to have helped build corporate reputation, prevent competition, and create value for businesses (Henk et al. 2012)). By projecting an image associated with respect for environment, entities also hope to improve their financial performance by increasing productivity and reducing costs (Ullah et al., 2014). The literature dedicated to ISO 14001 certification in the context of SMEs has revealed several conclusions which relate to the study of the relationship that may exist between this certification and the performance of firms. ISO 14001 standard plays an important role in developed countries of the world. However. Due to the difficulties of collecting primary data from companies in developing countries, researchers have had limited understanding of the benefits to be gained from implementing this standard (Hengky et al, 2018). However, the impacts of ISO 14001 on performance are controversial. While some authors (Alemagi et al., 2006; Ferron et al. 2012; Lo et al. 2012) highlight a positive effect on financial results, others (De-Francia and Ayerbe, 2009; Paulraj and De Jong, 2011; Manurung and Rachmat, 2019; Muda and Wahyuni, 2019) show that ISO 14001 has a limited, or even negative in some cases, financial impact. In addition, the analysis of the economic motivations for the adoption of ISO 14001 shows that few companies highlight the improvement of financial results as a motivation for the implementation of the environmental management system. ISO 14001 certification is not a condition for achieving environmental performance, but it can contribute, according to Echehelh et al (2018), to a better organization of firms' managerial activities. Henk et al. (2012) point out that most organizations that implement ISO 14001 achieve environmental objectives and mark improvements. The authors add that positive impacts are influenced by the age of the environmental management system, the commitment of senior and middle managers, the size of the organization, employee awareness and stakeholder involvement. According to Lo et al. (2012), the eco fashion market is growing rapidly. Retail sales of products using organic cotton increased 4 times from 2006 to 2009 reaching USD 4.3 trillion worldwide in 2009. With the rise of environmental concerns among consumers and stakeholders, environmental

management has become an important responsibility for fashion and textile manufacturers. Indeed, production related to fashion and textiles often requires high levels of energy and water consumption and emits large quantities of pollutants. In this context Lo et al. (2012), highlighted a positive effect of the adoption of ISO 14001 on financial performance measured by ROA and ROS as part of their research on fashion and textile companies. Some studies reveal that ISO 14001 certification requires a high cost depending on the characteristics of each company which includes investment costs and routine audit fees (Testa and D'Amato, 2017; Qian et al. 2017 and Wiengarten et al. 2018). Other research puts into perspective the impact of ISO 14001 on competitiveness based on improving access to international markets, improving competitive advantage and increasing market share as research variables. Some researchers highlight a positive impact (Brammer et al., 2012; Tan, 2005), others note the weakness or even the absence of this positive effect on competitiveness (Morrow and Rondinelli, 2002). There are a few studies that focus on the relationship between ISO 14001 and customer focus. In this regard, Zeng et al. (2005) and Sambasivan and Fei (2008) emphasize that the standard helps to strengthen customer trust in the company. For their part, Darnall et al. (2001) and Psomass et al. (2011) say that ISO 14001 significantly increases customer satisfaction. In contrast, Holt (1998) shows that the majority of customers do not understand the merits and thus attach little value to the environmental standard. Speaking of impacts on production, some authors such as Darnall et al. (2001) and Zeng et al. (2005) show that the standard can improve the production process in terms of minimizing resource consumption. This improvement is due, according to Darnall et al. (2001) to the involvement of staff in the process of continuous improvement of company operations. Alemagi et al. (2006) and Brammer et al. (2012), in their research, emphasize that certification improves product quality. However, research by Montabon et al. (2000) reached a result affirming the absence of effects on product quality, within the framework of a vast study in the United States with more than 1500 companies. The literature has focused on the contributions of ISO 14001 to improving technology. Indeed, the adoption of this standard promotes the reduction of environmental impacts through the adoption of new technologies (Radonjic and Tominc, 2006; Wagner, 2008). The implementation of this standard has a positive impact on compliance with environmental laws and regulations (Boiral, 2007). Research also addresses the impact on human resources. The implementation of ISO 14001 increases employee commitment and strengthens their responsibilities (Darnall et al. 2008; Boiral, 2007). The standard helps improve internal communication by communicating environmental actions, thereby changing the work culture (Tan, 2005; Brammer, 2012). Regarding improving company image and reputation, Poksinska et al. (2003), Zeng et al. (2005) and Tan (2005) mention positive impacts while Morrow and Rondinelli (2002) believe that these impacts are uncertain and cannot be generalized. In this sense, ISO 14001 helps companies establish good relations with public authorities and local communities (Poksinska et al., 2003; Jiang and Bansal, 2003; Alemagi et al., 2006). ISO 14001 contributes to the improvement of environmental management practices, in particular the regular conduct of audits, the documentation relating to environmental requirements and the mastery of internal procedures (Darnall et al. 2001; Morrow and Rondinelli, 2002; Zeng et al., 2005; Brammer et al., 2012; Mungai et al. 2020). In their study conducted in 2012, Boiral and Henri highlighted a positive effect of certification on environmental performance measured by four variables: Mandatory managerial actions, integration of environmental issues into strategy, operational environmental actions and performance indices environmental. Waste reduction is one of the significant results of ISO 14001 certification thanks to the improvement of the production process (Holt, 1998; Montabon

et al., 2000; Psomas et al., 2011; Brammer et al., 2012) . Among the advantages cited in the literature, there is the improvement of the recycling process (Babakri et al., 2004), the reduction of accidents (Tan, 2005; Zeng et al., 2005) and the reduction of emissions (Nishitani et al. al., 2012). The positive aspects presented above are attenuated by the results of studies which deny the positive relationship between ISO 14001 and environmental performance. In this dynamic, Barla (2007) notes that certification does not have a significant effect on environmental performance which is measured by the level of reduction in emission costs. The researcher goes further by noting that certain companies not certified ISO 14001 show better environmental performance compared to those certified. Boiral (2007) says that the standard does not significantly affect environmental performance measured in his research by environmental indicators such as mineral residues, water consumption, cyanide release and soil contamination. The author concludes that the impacts of certification and the improvements observed on the environmental level will only be visible in the long term. Other researchers agree with the opinions of Barla (2007) and Boiral (2007).

concerning the absence of significant effects on the reduction of emissions as Poksinska et al. (2003), Russo (2009) and Gomez and Rodriguez (2011). In his study dealing with the relationship between ISO 14001 and environmental performance), Turki (2014), notes the existence of a positive impact. To conduct his research Turki (2014) based himself on his measurement model of the PE proposed in 2009. A model which defines the strategic, the operational and the relational as components of the PE. Note that the positive impact generated is more visible on a strategic and relational level.

The divergence in results does not only concern the contributions, but it also affects the motivations for implementing ISO 14001 certification. According to Tayo Tene (2015), the managerial literature highlights economic, social and environmental motivations. The economic motivations are the satisfaction of customer requirements, access to international markets, reduction of operational costs, improvement of internal operations and maintenance of competitive position. The main social motivations covered by the literature are the manifestation of organizational responsibility, the improvement of relations with stakeholders and the improvement of the brand image and reputation of the firm. The author adds that, paradoxically, the motivations demonstrated in the literature are few in number compared to economic and social ones and the control of environmental impacts is done in a systematic way. The table below summarizes the impacts of ISO 14001 certification explained by certain authors in the literature.

1.2. Environnemental performance :

Environmental Performance (EP) is a contingent, complex, indeterminate notion and a source of subjective interpretation (Janicot, 2007).

Few works offer definitions of EP, which has often been assimilated to environmental impacts caused by companies (Turki, 2014). This performance was defined by Janicot in 2007 as “the ability of the company to manage physical flow transformation operations in an efficient and sustainable manner”. Following Reynaud's diagram (2003), the reduction of pollution, the safety of installations, the safety of products and the depletion of resources are the four dimensions which define environmental performance. For his part, Turki (2014) defined PE as “the result of the environmental efforts made by the company as well as the variation in ecological pressures taking into account this result”. Boubaker (2015) highlighted that PE represents the component of organizational performance that addresses raw material consumption, product life cycle and financial investments intended to correct the waste of raw

materials during production. In 1996, in its ISO 14001 standard, the International Organization for Standardization (OIN) defined EP as “the measurable results of the environmental management system in relation to the organization's control of its environmental aspects, on the basis of its environmental policy, its environmental objectives and targets”. In 1999, in its ISO14031 standard, the ISO developed another definition, broader than the previous one, which was closely linked to the Environmental Management System (EMS) proposed by the ISO 14001 standard. A definition according to which PE is considered as “the results obtained by the management of an organization regarding its environmental aspects”. In the literature, PE remains poorly defined and this has led to difficulties in determining its components due to the lack of consensus on both their nature and their numbers (Turki, 2009). In this sense, the Literature marked components of PE such as environmental managerial practices, environmental organizational practices, negative externalities and the relationship of companies with their stakeholders (Wood, 1991; Burgos and Cespedes, 2001; Henri and Journeault, 2008). For his part, Turki (2009) proposed three components for his PE measurement model: strategic, operational and relational. In 2001, the European project called Measuring Environmental Performance of Industry (MEPI) identified five components of the EP, namely energy consumption, water consumption, atmospheric discharges, liquid discharges and solid discharges (Berkhout and al., 2006). For its part, the GRI in 2006 listed seven components of the EP in particular: Compliance, products and services, discharges, biodiversity, water, energy and materials (Turki, 2009). To measure EP, companies with an Environmental Management System (EMS) according to the ISO 14001 standard use environmental indicators and audits (Renaud, 2009). Environmental Indicators (EI) are numerical measures of the aspect of EP (Turki, 2009). To assess environmental performance in a company, ISO14031 V 2013 has defined three categories of indicators; Managerial Performance Indicators (MPI), Operational Performance Indicators (OPI) and Environmental Status Indicators (EEI). MPI provide information on management activities aimed at influencing the EP of an organization. IPOs provide information on the EP of an organization's operational process. IEEs provide information on the local, regional, national or global environmental context.

2. Research methodology:

We adopted a qualitative approach by studying multiple cases which allowed us to analyze the impact of ISO 14001 certification on environmental performance.

Qualitative analysis can be defined as an approach discursive analysis of social experiences, individual life stories or collectives, bodies of materials, with the intention of constructing the meaning that the actors attribute to their representations and their practices. It's about an intellectual work procedure focused on transcription, interpretation, which is part of a logic of discovery of dimensions so far invisible to the social realities analyzed. This way of proceeding does not imply automatically resort to statistical methods to be valid and complete, but it essentially targets the conceptual, qualitative, and extensive dimensions objects of study constructed from reality (Dumez,2016).

Data collection was carried out with four Tunisian ISO 14001-certified SMEs. To conduct this collection, we used semi-structured interviews and documentation. These data were then processed by a thematic analysis of intra- and inter-case content. This analysis was facilitated by the use of NVIVO software in its 12th version. The following table presents the four cases studied.

Table1 : The Cases studied

Case	Sector	Total staff
Case A	Chemical industry	36
Case B	Furniture industry	104
Case C	Chemical industry	232
Case D	Chemical industry (pharmaceutical)	180

3. Results analysis:

The analysis of the results is generally carried out in two stages. The first is an intra-case analysis which seeks to present the results by case studied. The second step, called the inter-case analysis, will identify the similarities and differences between the cases studied (Hlady-Rispal, 2002).

3.1. Intra-cases analysis:

Case A:

Environmental performance is defined in our research by two components: Resource consumption (water and energy) and waste management. In company A, reading the energy consumption and water consumption monitoring tables for the production process showed that there was an increase in water consumption rate of 0.36 m³/ton in 2013 at 0.43 m³/tonne in 2017 and a slight increase in the rate of electricity consumption from 33.01 KW/tonne in 2013 to 34.06 KW/tonne in 2017. At the same time, we noted a decrease in the monthly rate of truck fuel consumption and monthly boiler fuel consumption rate respectively from 2.06 liters/hour in 2013 to 1.02. liters/hour in 2017 and from 7.23 liters/hour in 2013 to 6.25 liters/hour in 2017. Documentary research in the QSE dashboard also showed a decrease in the OIW rate (Ordinary Industrial Waste) from 0.81 in 2013 to 0.22 in 201 and a reduction in HIW (Hazardous Industrial Waste) rate from 0.007 in 2013 to 0.005 in 2017. According to the QSE manager, the reduction in truck and boiler fuel consumption rate and that of OIW and HIW return to ISO 14001 certification which requires the determination of Significant Environmental Aspects (SEA) and the planning of actions addressing these aspects: “ISO 14001 requires the definition of AES (Significant Environmental Aspects) and the control of these aspects. Our company has identified fuel consumption as an AES which impacts the environment through the depletion of non-renewable natural resources and has set a consumption reduction objective accompanied by an adequate action plan: Reduction fuel consumption rates is due to renewal of some machines coupled with better maintenance. The OIW and HIW rates are also identified as SEA which have called for a vigorous action plan. (Verbatim QSE manager). The consumption of water and electricity are also considered as AES for company A. The QSE manager describes the slight increase as “negligible” and adds to explain the non-reduction in consumption rates

as follows: “The consumption of water and electricity are SEA for our company, and the increase in their rates always remains optimal as long as it does not exceed the set thresholds. » (Verbatim QSE manager). After having presented the verbatim statements of the interviewees from case A, we will state those of the actors from case B.

Case B :

The QSE dashboard marks a decrease in annual water consumption from 1090 m³ in 2014 to 540 m³ in 2018. On the other hand, there was an increase in annual electricity consumption from 480 toe in 2014 to 568 toe in 2018. For electricity consumption, the QSE manager mentions that the objective was not to exceed 800 toe, which proves that the company has successfully achieved its set objective. “For electricity consumption, it must be said that we have achieved our set objective. In fact, the value of annual electricity consumption should not exceed 800 toe. » (Verbatim QSE manager). Concerning the management of discharges, the QSE manager emphasizes that the objective set in this regard was compliance with the appropriate regulations. “For the management of discharges, our set objective was to ensure corresponding regulatory compliance. » (Verbatim QSE manager). The QSE manager attributes these environmental contributions to the logic of continuous improvement established by the ISO 14001 standard. “These environmental contributions obviously come back to the ISO 14001 standard which is designed according to the Deming wheel which makes it possible to continually improve the environmental process . » (Verbatim QSE manager).

Case C :

According to the QSE manager, QSE certification, in particular ISO 14001, constitutes a means of reducing resource consumption and achieving better results in terms of waste management. Our actor attributes these results to the definition of environmental objectives followed by appropriate actions, for continuous improvement. “In developing the QSE certification project and to anchor the logic of continuous improvement supported by the ISO 14001 standard, we have set environmental objectives, including those in relation to the consumption of resources and waste management. Each objective must be subject to an indicator. The application of actions corresponding to these objectives resulted in positive results on both axes. » (Verbatim QSE manager). For the consumption of resources, company C has three objectives in the year of our study, namely the reduction in the rate of electricity consumption per person, the reduction in water consumption per person per day and compliance with the regulations corresponding to waste management. According to the QSE dashboard, the rate of electricity consumption per person decreased from 0.39 toe in 2016 to 0.3 toe in 2018. Water consumption per person per day also decreased from 67 liters to 52 liters . For compliance with regulations relating to waste management, the table mentions a percentage of 100%. To explain these environmental results, the QSE manager deploys the actions taken to achieve the objectives: “To achieve the objective relating to electricity consumption per person, we implemented a timer system and we replaced the halogen lamps by LED lamps. To reduce water consumption per person per day, we have replaced the existing faucets with economical ones. In addition, we have equipped the toilets with an economical two-button flush mechanism and we have raised staff awareness of the importance of good governance of energy resources. » (Verbatim QSE manager). Company C was always vigorous in respecting regulations relating to the environment. But, ISO 14001 presents a way to maintain this valor. “I could say that our company is well structured and compliance with the environmental regulatory texts applicable to our organization has always been a priority and before the transition to ISO 14001. But such

certification could maintain this valor at its high levels. » (Verbatim QSE manager). After having presented the verbatim statements of the interviewees in case C, we will state those of the actors in case D.

Case D :

The transition to QSE certification, in particular to certification according to the ISO 14001 standard, has had a positive impact on the consumption of water, electricity and the management of waste. The QSE manager notes that the effects on these points come down to compliance with all of the normative requirements. And he emphasizes that the QSE policy of company D, which we have read, includes the environmental orientations of the company which revolves around compliance with environmental regulations, protection of the environment against pollution and optimization of resource consumption. It is from this policy that the appropriate objectives are set. In this regard, our actor mentions that they managed to reduce the quantity of non-recycled waste dumped into nature per year between 2015 and 2018. And he adds that in this period, the annual consumption of water in the administration has decreased and increased in the production process. This increase is, according to the QSE manager, due to the increase in production, but the objective relating to the threshold not to be exceeded has been achieved. Company D also succeeded in achieving its set objective which concerns annual electricity consumption which decreased between 2015 and 2018.

“A QSE certified company has its QSE policy. As you can see, compliance with environmental regulations, protection of the environment against pollution and optimization of resource consumption are the guidelines defined in this policy. These strategic directions are deployed into appropriate objectives. For waste management, we managed to reduce the quantity of non-recycled waste dumped into nature per year between 2015 and 2018. Still in the same period, the annual consumption of water in the administration decreased significantly. But the increase in production has led to an increase in this quantity in the production process, but it still remains an optimal consumption which does not exceed the fixed threshold value. And that is exactly our goal. We aimed to reduce annual electricity consumption and we succeeded in achieving this objective. » (Verbatim QSE manager). The QSE manager attributes these contributions to compliance with the normative requirements of ISO 14001 and he says to express his opinion: “These contributions relating to the consumption of water and electricity and the management of discharges amount to compliance with the totality of the requirements of the ISO 14001 standard: Indeed, this standard requires the explanation of strategic orientations in an environmental policy or in the QSE policy. These orientations must subsequently be deployed into objectives. The standard requires compliance with legal and regulatory requirements and all environmental requirements. ISO 14001 also requires training and raising staff awareness of environmental issues. Among the key requirements, there is the identification, evaluation of environmental aspects and treatment of the most significant ones. This standard also requires periodic internal audit. Documentary management through the use of documented information is a requirement which contributes greatly to organizing work, above all facilitating the monitoring and control of any action. These are the main normative requirements whose compliance is capable of leading to environmental performance. Like the other two standards, ISO 14001 is based on continuous improvement. Engaging in the logic of continuous improvement defined by respecting a benchmark will, in my opinion, guarantee performance. It should be noted that achieving an objective is the result of a relevant action plan including the best managerial and technological best practices. ”

3.2. Inter-cases analysis :

In terms of this dimension, the four case studies agree on the fact that ISO 14001 certification, ensures the optimization of resource consumption and the improvement of waste management. Faced with this convergence, there was a divergence in the explanations of the actors. At company A, there was an increase in water consumption rate, a slight increase in electricity consumption rate and a decrease in monthly truck fuel consumption rate, monthly boiler fuel consumption rate, OIW (Ordinary Industrial Waste) rate and HIW (Hazardous Industrial Waste) rate. According to our interviewee, the reduction in fuel consumption rates for trolley and boiler and those of OIW and HIW comes down to ISO 14001 certification which requires the determination of Significant Environmental Aspects (SEA) and the planning of actions addressing these aspects. Water and electricity consumption are also considered SEA for company A which has managed to maintain their rate within the optimal values which do not exceed the set thresholds. At company B, there was a decrease in annual water consumption and an increase in annual electricity consumption. For electricity consumption, our actor mentioned that the company was successful in achieving its set objective, which was not to exceed the defined threshold value. Concerning the management of discharges, our interviewee emphasized that they succeeded in achieving the appropriate set objective which was compliance with the corresponding regulations. The actor attributes the environmental impacts cited to the logic of continuous improvement established by the ISO 14001 standard. At the level of case C, there was a reduction in the rate of electricity consumption per person, a reduction in the consumption of water per person per day and maintaining 100% compliance with waste management regulations. Our actor attributes these impacts to the development of environmental objectives accompanied by appropriate actions in order to anchor the logic of continuous improvement supported by ISO 14001. Concerning case D, there was a reduction in the quantity of non-waste. recycled dumped into nature per year, a reduction in annual electricity consumption, a reduction in annual water consumption in administration and an increase in this quantity at the production process level. According to our actor, this increase which aligns with the increase in production respects the objective relating to the threshold not to be exceeded. The interviewee attributes these contributions mainly to compliance with all the normative requirements of ISO 14001 which is based on the principle of continuous improvement. Indeed, the actor deploys the main requirements such as the explanation of strategic orientations in an environmental policy or in the QSE policy, the deployment of these orientations in objectives, compliance with legal and regulatory requirements and all environmental requirements, identification, evaluation of environmental aspects and treatment of the most significant, training and awareness of staff in environmental issues, internal audit periodic and document management. In addition to compliance with the normative requirements of ISO 14001, the QSE manager mentioned that achieving the objectives required a relevant action plan encompassing the most informed managerial and technological practices.

4. Discussion of results :

By conducting our empirical study, we noted a positive impact between QSE certification and environmental performance. The positive impacts on resource consumption and waste management come from the ISO 14001 standard. Our field study allowed us to identify the contributions leading to these effects. Indeed, the standard requires the determination of significant environmental aspects (SEA) and the planning of actions addressing these aspects. In addition, the standard establishes the logic of continuous improvement. The latter encourages the development of environmental objectives accompanied by appropriate actions. We also

noted that compliance with all of the normative requirements of ISO 14001 such as the explanation of strategic orientations in an environmental policy or in the QSE policy, the deployment of these orientations into objectives, compliance with legal and regulatory requirements and all environmental requirements, identification, evaluation of environmental aspects and treatment of the most significant ones, training and awareness of staff in environmental issues, periodic internal audit and document management. We also understood that achieving environmental objectives required a relevant action plan encompassing the best managerial and technological practices. Our results agree with those of Darnall et al. (2001), Zen et al. (2005) and Turki (2014) who emphasize that ISO 14001 led to the minimization of resource consumption. The positive effects on waste management is one of the significant results of ISO 14001 identified by certain authors such as Holt (1998), Montabon et al. (2000), Babakri et al. (2004), Boiral et al. (2007), Psomas et al. (2011), Brammer et al. (2012), Nishitani et al. (2012) and Turki (2014). On the other hand, our results are opposed to those of Poksinska et al. (2003) Barla (2007), Boiral (2007), Russo (2009) and Gomez and Rodriguez (2011) who deny the positive relationship between ISO 14001 and environmental performance measured by environmental indicators in relation to resource consumption and management of discharges. As for the contributions identified during our study which resulted in environmental performance, we have marked certain crossings with certain results from the literature. Boiral (2007) highlighted that the implementation of ISO 14001 had a positive impact on compliance with environmental laws and regulations. Furthermore, Tan (2005), Boiral (2007), Darnall et al. (2007) and Brammer (2012) mentioned that the standard increased the integration of employees and reinforced their responsibilities. According to Darnall et al. (2001), Morrow and Rondinelli (2002), Zeng et al. (2005) and Brammer et al. (2012), ISO 14001 contributed to the improvement of environmental management practices, in particular the regular conduct of audits, documentation relating to environmental requirements and the mastery of internal procedures. Finally, the point of continuous improvement was mentioned by Darnall et al. (2001) who emphasized that involving staff in the process of continuous improvement led to a minimization of resource consumption.

Conclusion:

As a conclusion, we have noted a positive impact of ISO 14001 certification on environmental performance, particularly on resource consumption and waste management.

To arrive at this conclusion, we adopted a qualitative study. The strength of the latter lies in the attempt to reconcile complexity, detail and context. However, this approach has a problem of generalization of the results given the small size of the sample. For this reason, it is recommended to crown this research with confirmatory quantitative research.

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