UNIVERSITY OF SARAJEVO
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SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

THE ASSESSMENT OF THE ISO 14001 IMPLEMENTATION PROCESS IN SELECTED MANUFACTURING ENTERPRISES IN BOSNIA AND HERZEGOVINA

Ljubljana, October 2019 IRFAN DIZDAREVIĆ

AUTHORSHIP STATEMENT

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Ljubljana, 03rd October 2019. Author's signature: *Irfan Dizdarević*

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LIST OF ABBREVIATIONS

APO Asian Productivity Organization
BCG Boston Consulting Group
B&H Bosnia and Herzegovina
BSI British Standards Institution
EMS Environmental Management System
EMAS EU Eco Management and Audit Scheme
EPA Environmental Protection Agency
EPD Environmental Protection Department
EU European Union
GETF Global Environmental and Technology Foundation
IIED International Institute for Environment and Development
ISO International Organization for Standardization
MIT Massachusetts Institute of Technology
PEPSE Poverty Eradication and Planning of Sustainable Energy
PDCA Plan, Do, Check, Act
WCED World Commission on Environment and Development

INTRODUCTION

Since the early 1970s, the outlook on environmental protection was through a command-and-control approach which has had substantial, yet critically limited, success in reducing negative environmental impacts of industrial production. Improvements have been made, where identifiable and rather forked environmental issues such as land-based waste disposal, end-of-the-pipe air emissions and discharges into water systems were reduced. Critics of this approach have argued it is inflexible and economically inefficient (Case, 2006). Causes for this are rather recognized. Environmental regulatory agencies are understaffed and underfunded, laws on environmental protection are confusing and contain too many loopholes and there is a lack of political will for strict enforcement. Consequently, regulatory compliance lingered at lower levels than anticipated (Blackman, 2011). This is why plenty of other environmental problems remain and continue to thrive, such as water pollution, greenhouse gas emissions, wasteful consumption of natural resources, and the use of toxic chemicals just to name a few (Case, 2006).

On the other hand, Bosnia and Herzegovina (hereafter: B&H) has a slightly different problem leading to the same negative results of creating loopholes in-laws on environmental protection. B&H has an exceedingly complex and fragmented institutional structure of environmental administration (four levels - state, entities levels of Federation of Bosnia and Herzegovina and Republika Srpska, cantons and municipalities). While responsibilities of these environmental institutions are adequately defined there is still an absence of strong vertical (entity/cantonal/municipal) and horizontal (inter-entity/inter-ministry inter-municipal) coordination. As a consequence, B&H now has very poor, inefficient and costly environmental management due to poor identification of responsibilities and doubling tasks. Furthermore B&H lacks substantive information to engage in evidence-based policymaking. In order for any country to tackle environmental issues with a correct environmental policy, it has to have adequate environmental data from which to derive certain conclusions and adapt accordingly. Unfortunately, B&H lacks systematic measuring, legal obligations to collect data and has dispersed data through complex environmental administration. Obviously, this is leaving loopholes in environmental policies tackling real environmental issues (Hadžiabdić et al., 2012). It comes as no surprise that B&H existing environmental regulation is inadequate and non-compliant with EU environmental standards.

In such conditions, it is reasonable to assume that enterprises in B&H are less inclined to behave eco-friendly, due to lack of substantial penalties and criminal charges for the endangering environment and might be seeking their competitive advantage through hazardous behaviour toward the environment. For e.g. enterprises due to specific demand placed on them may find that its own customers are preventing the adoption of cleaner technologies (Hertin, Berkhout, Wagner & Tyteca, 2003). According to Brady (2005) and multiple other kinds of research more stringent environmental regulations lead to more eco-

friendly behaviour, meaning if organizations don't comply, they will face substantial financial penalties and spoiled reputation. Unfortunately, in B&H "There are no comprehensive policies. Therefore, the planning, development, and monitoring of resource use, energy production, environmental protection, and social politics is slow, unreliable, and inefficient." (Hasović & Ganić, 2014, p. 207).

However, enterprises around the world now understand that the environment is no longer just a problem of compliance, but a management issue. A survey conducted by MIT and BCG in 2015 of more than 3,000 managers and investors from enterprises worldwide has shown investors consider sustainability performance as tangible value and are willing to part ways with enterprises that have a poor footprint track record (Furlong, 2016). In such conditions, enterprises are more easily persuaded to see this situation as a blessing rather than a burden. This, at the same time, allows them to reduce their production costs and enter new expanding markets of green goods and services (Kesidou and Demirel, 2012). For these reasons, among others mentioned later in this paper, a growing number of enterprises are committing to the establishment of Environmental Management Systems (hereinafter: EMS) to attain an advantage. In most cases they are doing so through nongovernmental environmental certification programs such are ISO 14001 and the EU Eco Management and Audit Scheme (hereinafter: EMAS).

Although the main premise of ISO 14001 is the improvement of its environmental performance, there have been critics of it; Sekaran (1992) and Nawrocka and Parker (2009) for not delivering expected results and rather concentrating on other motivation factors. The purpose of this paper is to understand the main reasons for adopting an EMS certificate ISO 14001 by selected Bosnia and Herzegovina manufacturing enterprises. To identify the main motives, costs, benefits and barriers that have been experienced within these manufacturing enterprises through the implementation of ISO 14001. Moreover, to present these results and show specifically what kind of pressures and problems enterprises encountered. Furthermore, the aim is to evaluate their performance from the environmental protection perspective and analyse the entire cycle of ISO implementation processes for selected manufacturing enterprise in B&H.

According to literature implementation of EMS does not necessarily lead to the environmental benefits that were envisioned when EMS was first developed. Enterprises could seek their competitive advantage through the implementation of EMS rather than concentrating on their environmental performance. So, the general goal of this thesis is to assess main problems (costs and barriers) and motives (costs and benefits) in implementation processes of ISO 14001 Environmental Management System for selected B&H manufacturing enterprises and, to assess its environmental impact and connection with environmental policy.

According to these statements following objectives were derived:

- to understand the goals and purposes of ISO 14001;
- to represent the main environmental issues related to manufacturing enterprises in ISO 14001 implementation process and their connection with environmental laws and policy implemented;
- to analyse a case study which will provide practical example for the complete implementation process;
- to evaluate the main problems, motives, costs, benefits, and barriers to implementing ISO 14001 by questionnaires to selected certified manufacturing enterprises;
- to assess whether enterprises introduction of ISO 14001 (environmental policy) enhanced its environmental performance;
- to provide recommendations for prevention of problems in the implementation process;

This thesis is based on a systematic literature review principally reflecting on the importance of environmental policy and in particular it presents earlier research findings related to the application of EMS standard. Evaluation and the analysis of costs and benefits relating to the application of EMS standards among B&H enterprises is based on a case study methodology. Integrated questionnaires are used to get deeper understanding of the process, barriers and challenges enterprises face in the process of applying the standard and in particular the new business opportunities they seek upon successful completion of the process. A literature review provides a reader with adequate insight into the topic. Moreover, it provided an adequate base for a conception of questionnaires and an appropriate examination of the case study. Through the case study reader will be able to see and understand in more detail the whole process of implementation. The same process of implementation is based upon ISO 14001:2004 version User Manual (EPD, 2005). The first questionnaire allows this project to compare different experiences of the enterprise's implementation process of ISO 14001 and the problems they faced. The second questionnaire was formulated by derivation from the first. It was intended for enterprises who still did not implement ISO 14001 with a goal to show better insight into barriers and motivation forces enterprises face before considering the implementation of ISO 14001 environmental system. The sample size of questioned enterprises was determined through an internet survey of printing and packaging enterprises in B&H and the number of responses collected through telephone and e-mail correspondence.

Conceptually the thesis is structured into three main sections. The systematic literature review of EMS and everything involved with known literature so far about main problems, motives, costs, benefits, and barriers to implementation of ISO 14001 represents the first section. The second section of the thesis is based on qualitative analysis of the implementation of ISO 14001 in the printing and packaging industry in B&H. Finally, the third section represents a case study of Unioninvestplastika d.d. which provided a practical example for the complete implementation process.

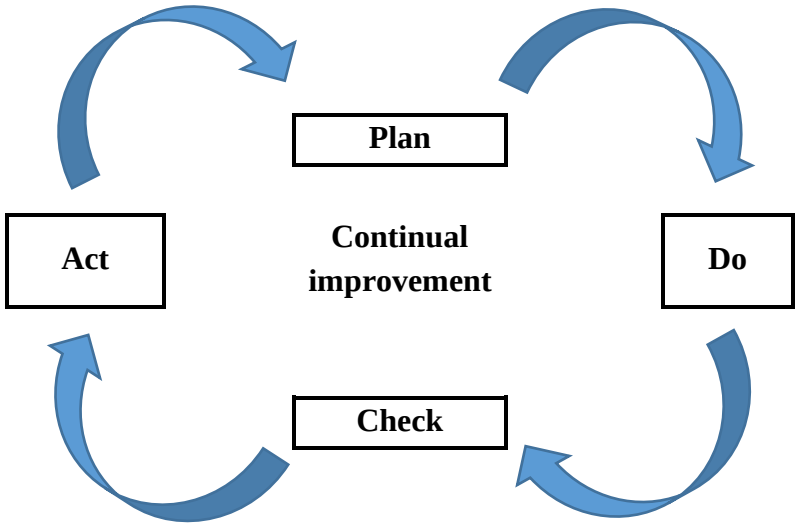
1 ENVIRONMENTAL MANAGEMENT SYSTEMS

Nearly any particular activity of an organization does have a certain effect on the environment. This could result from direct impact such as: accidental leakage of hazardous materials, emissions caused by production, water and energy consumption or indirect impact such is waste produced after the end of the product's life.

EMS is a tool used to solve these kinds of problems. Specifically, according to EPA (2017) an EMS: "Is a framework that helps an organization achieve its environmental goals through consistent review, evaluation, and improvement of its environmental performance. The assumption is that this consistent review and evaluation will identify opportunities for improving and implementing the environmental performance of the organization. The EMS itself does not dictate a level of environmental performance that must be achieved; each organization's EMS is tailored to its own individual objectives and targets."

It is generally accepted that an effective EMS is developed on the principle of Deming, "Plan, Do, Check, Act" (PDCA) model with the concept of continual improvement. More specifically, plan in regard to what you are going to do, do what you planned to do, check to confirm you did what you planned initially and act to make improvements (IIED, n.d.). According to APO (2003) the process of continual improvement plays an especially important role. As environmental aspects become more integrated into business operations it can benefit a company in a way that it could turn out to be an essential component of their business strategy.

Figure 1: *"Plan, Do, Check, Act" model*



Source: Environmental Protection Department (2015).

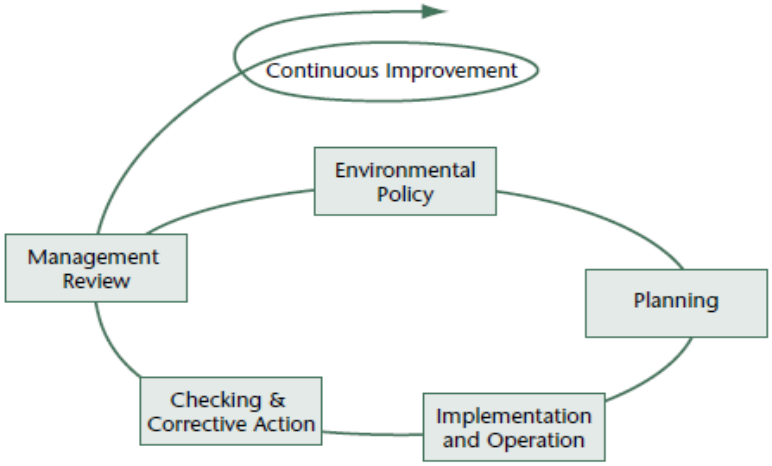
Each organization for itself decides its own approach to implementation of EMS. An organization can decide to in-house implement EMS to meet its own environmental goals, follow the guidelines of the international standard ISO 14001, the EU Eco Management and Audit Scheme (EMAS) or the British Standard BS 8555 (intended specifically for small and medium-sized organizations), or could choose to implement formal ISO 14001 certification developed by the International Organization for Standardization (ISO) or EMAS registration developed by the European Commission for enterprises and other organizations (Wrap, 2015).

1.1 ISO 14001

ISO 14001 is the EMS standard developed by the International Organization for Standardization (ISO, n.d.). ISO 14001 definition of EMS (in Weiß and Bentlage, 2006, p. 19) states: "The part of the overall management system, that includes organizational structures, planning activities, responsibilities, practices, procedures, processes, and resources for developing, implementing achieving, reviewing and maintaining the environmental policy."

It was first launched in 1996 to support a self-regulatory approach rather than using public regulation measures to reduce the damage of organizations toward an environment. (Weiß and Bentlage, 2006). It was later updated in 2004 and 2015, both times released alongside ISO 9000 standard for quality management. In 2004 standard was released to provide better clarity and guidelines for organizations implementing ISO 14001. It also allowed organizations to integrate ISO 14001 alongside general quality management system ISO 9000. ISO 14001:2015, with main principles remaining the same, introduced a new requirement for risks and opportunities. In this new ISO, there was, no longer a need for mandatory procedures, which allowed organizations to set up their own limits on their own management system (ISO 14001 History, n.d.). ISO 14001 based on the Deming "Plan, Do, Check, Act" consists of five main elements: setting the environmental policy, planning elements, implementation elements, checking elements and act elements. Each of these elements is subdivided into one or more parts making a whole for organizations to carry out successful EMS.

Figure 2: *ISO 14001 Environmental Management System*



Source: Weiß & Bentlage (2006, p. 29.).

Table 1: *Comparing the PDCA cycle to the ISO 14001: 2004 Standard*

PDCA Cycle	ISO 14001: 2004 Standard
	4.2. Environmental Policy
Plan	4.3. Planning 4.3.1. Environmental Aspects 4.3.2. Legal and Other Requirements 4.3.3. Objectives, Targets and Programme(s)
Do	4.4. Implementation and Operation 4.4.1. Resources, Roles, Responsibility and Authority 4.4.2. Competence, Training and Awareness 4.4.3. Communication 4.4.4. Documentation 4.4.5. Control of Documents 4.4.6. Operational Control 4.4.7. Emergency Preparedness and Response
Check	4.5. Checking 4.5.1. Monitoring and Measurement 4.5.2. Evaluation of Compliance 4.5.3. Nonconformity, Corrective Action and Preventive Action 4.5.4. Control of Records 4.5.5. Internal Audit
Act	4.6. Management Review

Source: Environmental Protection Department (2005, p. 6).

According to Wrap (2015, p. 13): “An environmental policy is a written statement outlining your organization’s mission in relation to managing the environmental impacts of its operations. “It represents the first step for the establishment of EMS and it is a single principle that doesn't consist of further parts. Each policy should consist of clear objectives, should be validated from senior management and recognized by employees, allow clear communication between every party including shareholders, customers, and suppliers and be a part of business strategy.

“Planning” helps organizations to form the objectives and processes that are necessary for gaining results which are in a line with the environmental policy set out in the first place. Each organization possesses its own environmental aspects upon to look on, such are: air emissions, water discharges, solid and hazardous wastes, noise and vibration, energy use, contamination of land, etc. Each organization has to identify those aspects and evaluate them in order to design its EMS. This will allow the organization to craft its EMS for control and reduction of negative environmental impacts caused by its activities, products, and services. Besides environmental impacts, the organization has to identify and comply with legal requirements imposed by different levels of authorities either local, national, or international. The organization also must impose its own objectives and targets, and at the same time, observe and estimate progress in accomplishing those targets. Finally, it has to establish management and operational control by establishing programs for monitoring and measuring the organization’s environmental impacts (EPD, 2005).

“Do” process refers to the implementation phase of an already identified plan. In this phase, upper management secures resources, either human or physical, necessary for formation, maintenance, and improvements of EMS. Every employee has to know their role, have appropriate skills and know their place and influence in the organizational structure. Those who do not possess the necessary skills should be provided with training about the importance and their role in EMS. Adequate means of communication need to be present between upper and lower management, shareholders, customers, and suppliers. Moreover, adequate documentation and control of the same documentation need to be present. Operational control also plays an important role in managing the supervision of significant environmental aspects such are: green office practices, green purchasing, waste handling, storage and disposal, air, noise, water pollution control, chemical handling and storage, material conservation and good housekeeping, energy-saving program, etc. Finally, emergency preparedness response procedures need to be established for cases of unplanned situations in order to eliminate as many negative effects as possible of such events on health and safety (EPD, 2005).

The “Check” process represents a measure of monitoring. In this phase organizations check the overall effectiveness of activates performed including the acceptability of environmental policy, objectives, targets, legal, and other requirements. The process entails the results to be presented to interested parties. The first step of this process is monitoring and measuring

whereby it confirms that all objectives and targets, set initially, are accomplished and that all significant environmental aspects are being managed. The next step is to evaluate the enterprise's commitment to compliance and both legal and other requirements to which it subscribes. The results of the first two steps should be recorded and lead to corrective actions for further improvement of EMS functioning. In this process, environmental management records are required to verify that all requirements of EMS have been met and to demonstrate that everything is functioning properly. Lastly, an internal audit of EMS should define the organization's compliance with ISO 14001 and resolve any EMS deficiencies (EPD, 2005).

"Act" represents actions conducted by management to ensure continuous improvement of the organization's EMS. Upper and lower management have to review the whole process, at least once a year, and depending on their analysis, they should act towards newly established objectives (EPD, 2005).

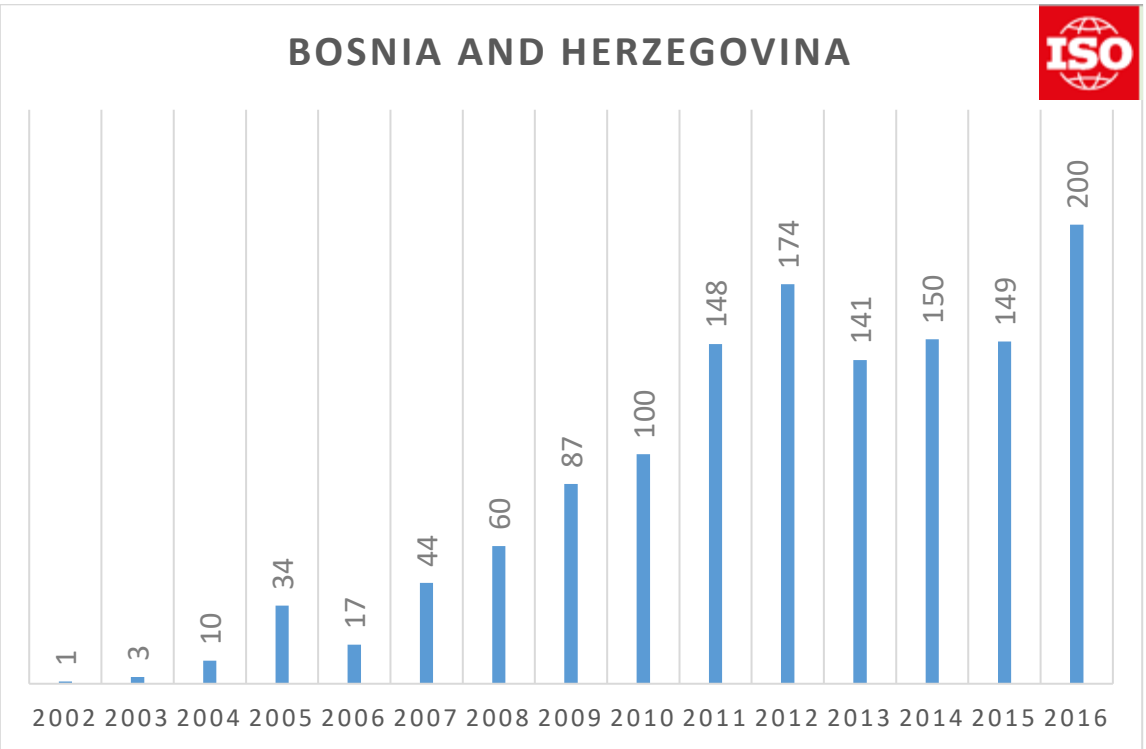
1.2 ISO 14001 in Bosnia and Herzegovina

B&H has an exceedingly complex and fragmented institutional structure of environmental administration (four levels - state, entity levels of the Federation of Bosnia and Herzegovina and Republika Srpska, cantons, and municipalities). While responsibilities of these environmental institutions are adequately defined there is still an absence of strong vertical (entity/cantonal/municipal) and horizontal (inter-entity/inter-ministry/inter-municipal) coordination. Therefore, at present B&H has very poor, inefficient, and costly environmental management due to poor identification of responsibilities and doubling tasks. Furthermore, B&H lacks substantive information to engage in evidence-based policymaking. In order for any country to tackle environmental issues with a correct environmental policy, it has to have adequate environmental data from which to derive certain conclusions and adapt accordingly. Unfortunately, B&H lacks systematic measuring, legal obligations to collect data, and has dispersed data through complex environmental administration. Obviously, this allows loopholes in environmental policies tackling real environmental issues (Hadžiabdić et al., 2012). In B&H: "There are no comprehensive policies. Therefore, the planning, development, and monitoring of resource use, energy production, environmental protection, and social politics is slow, unreliable, and inefficient (Hasović & Ganić, 2014, p. 207)." It comes as no surprise that B&H existing environmental regulation is inadequate and non-compliant with EU environmental standards. In such conditions, where it is reasonable to assume that compliance is lower than in more developed countries, ISO 14001 in B&H probably plays an even bigger role in protecting an environment, although the very motives of implementation may not be that pure.

Since 2002 the number of certified organizations in B&H has increased. Currently, in B&H there are 200 enterprises (ISO 14001 – data per country and sector – 1999 to 2016, 2016) with ISO 14001 Certificates from which 178 are certificated with ISO 14001:2004 and 22

with ISO 14001:2015., and none are a part of EMAS – Eco-Management and Audit Scheme, since the EMAS regulation applies to 27 EU member states, three member countries of the European Economic Area, and EU accession countries (Hadžiabdić et al., 2012).

Figure 3: *Number of enterprises certified in B&H 2002–2016*



Source: ISO 14001 – data per country and sector – 1999 to 2016 (2016).

1.3 Problems that influence ISO 14001 implementation

In recent times, a variety of studies have been conducted to examine the barriers influencing the implementation of EMS. These studies present great value in identifying obstacles enterprises face, which allows them to gain a better understanding and provides encouragement in their implementation processes.

In research conducted by Hillary (1999) information was collected from 33 different European studies on the drivers and barriers for EMS implementation and maintenance. According to the study, two types of barriers exist: internal and external. Internal barriers are considered to be: lack of resources, implementation, perception of environmental issues, and company culture, whereas external barriers are considered to be: certification systems, uncertain market benefits, institutional weaknesses, and a lack of adequate external guidance.

Similarly, to Hillary (1999), Zutshi and Sohal (2004) made their own division of EMS implementation barriers. They note companies experienced two types of barriers: industrial and organizational. Under industrial barriers they placed technical information, capital costs, the configuration of current operations, competitive pressures, and industry regulation, while under organizational barriers they consider employee attitude, poor communication, past practice, and inadequate top management leadership.

According to Weiß and Bentlage (2006) EMS in debts different internal and external costs for companies. These costs depend on different factors such as scale and nature of an organization's environmental impacts, existence, and stage of development of environmental management and on the speed of the process of implementation. Internal costs are attributed to labor costs, while external costs toward activities such as outside staff training, consultant fees, in-house training, and specialized training costs, certification costs, internal manpower costs, investment costs for improving environmental performance.

Dahlström,K., Howes,C., Leinster,P. and Skea, J. (2003) in the statistical analysis of the connection between EMS and the regulator's assessment of performance for 800 sites, advocates that sites with integrated EMS do not necessary convey better compliance with environmental regulations, do not have an impact on the likelihood of incidents or provide superior environmental performance from those who did not implement EMS.

1.3.1 Internal barriers

Almost anything an organization does has a certain impact on the environment, so certainly achieving good environmental quality will unavoidably involve costs. The difference is according to Blair and Hitchcock (2001) some firms see environment as an asset and others view it as a cost or externality. Anglada (2000) in his survey of Spain's SMEs found that managers see the environment as an additional cost, rather than an advantage due to financial considerations. However, this might not be just a case for SMEs, but for large enterprises too. Costs of switching from existing infrastructure and expertise to new might be too high for everyone involved. Brady (2005) highlights barriers resulted from the need for enterprises to change old materials to new ones in order to certify. As a result, enterprises have high material costs, capital requirements, and operational costs. Rao, P., Castillo, O. L., Intal, P.S. and Sajid, A. (2006) notes lack of financial resources is often considered to be the main obstacle in adopting an EMS due to the fact that firms operate in a vastly competitive market with small profit margins. Two different pieces of research conducted by Williams et al. (2000) and Palmer (2000) found that the vast majority of firms could not allocate resources for environmental improvements in their companies. The ones who could have been highly profitable and operated in narrow markets.

When looking at certification with EMS according to Poole, Coombs, and Van Gool (1999) firms need to look upon two different types of costs: implementation and maintenance costs. On one hand, the costs of implementation are incurred from different types of activities organizations undertake regarding the certification process such as planning, identifying environmental problems, developing management plans, training, communication, documentation and document control, environmental functional reviews, etc. On the other hand, maintenance costs are incurred from monitoring the EMS. Activities involved include auditing and reviewing. The process of monitoring is very important as it stimulates a cycle of continuous improvements. According to Mostek (1998), firms who decide to implement EMS and document environmental issues which are not related to compliance with any regulatory schemes, may in the future, through the audit process, be incriminated and held accountable if actions to solve these issues were not taken.

Hillary (1999) states internal barriers represent difficulties that come up within an organization. In her study, she displayed human resources as the main obstacle relative to financial resources. Likewise, Rivera-Camino (2001) asserts a deficiency of skilled human resources as a sizeable barrier. Stratchan, Sinclair and Lal (2003) point out the problem of excessive paperwork and bureaucracy connected to EMS. Moreover, Hillary (1999) concluded many enterprises do not understand the entire concept of EMS and do not see a clear connection between EMS implementation and costs savings. Similarly, it was stated by Constantinos et al. (2010) where, according to them, many organizations are hesitant to involve themselves in the process of EMS due to a lack of perceived benefits. That is why, according to Hillary (1999), it is necessary to have a good enterprise attitude toward EMS implementation as it keeps consistency in achieving desired results. However, this is not an easy task for enterprises as Wagner (2002) for e.g. has not discovered a connection between profitability and EMS in a large sample of German manufacturing companies. Finally, Poole, Coombs and Van Gool (1999) note in their research the additional problem of ISO 14001 not being suitable for every individual industry and firm sizes as guidance material for every firm cannot be the same.

Table 2 shows a list of internal barriers according to the study of Hillary (in Inno, 2005).

Table 2: *Internal barriers to EMS implementation Hillary (1999)*

Resources	**Understanding and perception**	**Implementation**	**Attitudes and company culture**
Lack of management and/or staff time for implementation and maintenance;	Lack of awareness of benefits;	Implementation is an Interrupted and interruptible process;	Inconsistent top management support for EMS implementation;

Table 2: Internal barriers to EMS implementation Hillary (1999) (continued)

Resources	**Understanding and perception**	**Implementation**	**Attitudes and company culture**
Inadequate technical knowledge and skills; Lack of training; Multifunctional staff easily distracted by other work; Lack of environmental manager and professional staff; Requirement for capital Expenditure;	Lack of knowledge of formalized systems; Perception of bureaucracy; Perception of high cost for implementation and maintenance.	Inability to see relevance of all stages; Internal auditor independence difficult to achieve in a small firm; Doubts about ongoing effectiveness of EMSs to deliver objectives; Difficulties with envir. aspects/effects evaluation and the determination of significance; Uncertainty about how to maintain continual improvement.	Management instability; Low management status of person spear heading EMS implementation; Resistance to change; Lack of internal marketing of EMS; Negative view or experience with ISO 9000 standards rubs off on ISO 14001's acceptance.

Source: M. Inno. *Assessment of the ISO 14001 Implementation Process in Estonian Certified Construction Companies*, 2005, p. 18.

1.3.2 External barriers

It is fairly obvious that the costs of certification go along with organizational improvements. Activities like employee training, extensive documentation or leasing of consulting assistance and auditors all require resources (de Joussineau, 2012). Hillary (2004) identifies not only that the auditors and certifiers are costly, but often lack relevant experiences to execute a comprehensive audit. GETF (in Jiang and Bansal, 2003) in their research appraised the initial cost of implementation with ISO 14001 for a company to be between $24,000 and $128,000 and maintenance of the system between $5,000 to $10,000 annually contingent on the size of the facilities and operations of the company. This means that any potential short-term benefits for firms are way lower than the cost of certification.

Hillary (2004) also points out the importance of economic climate, as SMEs are especially highly influenced by it, and their priorities may shift to more instant activities. Something

similar was stated by Hutchinson and Hutchinson (1995), whereby many managers simply do not have enough time and staff to think about long term benefits as they are more occupied by immediate critical day-to-day activities. Moreover, Hillary (2004) represents institutional weaknesses as a major obstacle to the implementation of EMS as a lack of financial support and legislative framework can discourage firms on their path. According to Williamson (1996) institutional arrangements and policies are the ones affecting the number of organizations implementing EMS as an institutional environment creates rules for the game. Furthermore Reinhardt and Vietor (in Famiyeh, Kuttu and Anarfo, 2014) state institutional framework puts constraints on industrial organizations, influences markets in which they operate and lastly influences the way firms will respond to it. This means the institutional environment not only creates rules of the game but also the market for environmentally friendly products and services. Finally, Hillary (2004) points out the lack of support and guidance in the implementation process of EMS.

According to Hillary (1999) both internal and external barriers are closely related. However internal barriers play more important roles as negative attitudes toward environmental problems may stop EMS implementation from the very beginning. Jenkins (2004) notes that survival for SMEs is the most important thing, so joining environmental activities could be high risk resulting in high costs.

Table 3 shows a list of external barriers according to the study of Hillary (in Inno, 2005):

Table 3: *External barriers to EMS implementation Hillary (1999)*

Certifiers/verifiers	**Economics**	**Institutional weaknesses**	**Support and guidance**
High cost of certification/ verification which disproportionally penalizes small firms;	High cost of certification/ verification;	Lack of promotion of EMSs and accessible financial support;	Inadequate institutional quality to assist SMEs;

Table 3: *External barriers to EMS implementation Hillary (1999) (continued)*

Certifiers/verifiers	Economics	Institutional weaknesses	Support and guidance
Lack of experienced verifiers; Duplication of effort between verifiers/ certifiers and internal auditors; Verifiers exceeding their role e.g. influencing audit cycle length; Distortion in the verifier market.	Changing economic climate alters the priority given to an EMS; Insufficient drivers and benefits; Uncertainty about the value of an EMS in the market place.	Lack of clear or strict Legislative framework; Absence of a central source of information on environmental legislation;	Inconsistent approach of consultants to EMS implementation; External assistance, e.g. consultants needed to interpret ISO 14001 and required for environmental review and EMS implementation; Lack of sector specific Implementation tools, examples; Lack of explanation of concepts and more guidance needed on environmental aspects and significance evaluation; Poor quality information and conflicting guidance given.

Source: M. Inno. *Assessment of the ISO 14001 Implementation Process in Estonian Certified Construction Companies*, 2005, p. 19.

1.4 Motives that influence ISO 14001 implementation

Motives that influence ISO 14001 implementation are quite interesting keeping in mind that regulators do not require enterprises to certify. Alberti, Caini, Calabrese and Rossi (2000) in their report divide the benefits of EMS implementation into economically quantifiable benefits and non-economically quantifiable benefits. Economically quantifiable benefits represent activities such as a reduction in the amount of raw materials used by streamlining production, optimization of resource use leading to increased productivity and a more

efficient production system, reduction in energy consumption and finally reduction in transportation and waste treatment costs. Alberti, Caini, Calabrese and Rossi (2000) regard these benefits as significant but acknowledges a problem of no definitive way of measurement. Under the list of the non-economically quantifiable benefits Alberti, Caini, Calabrese and Rossi (2000) list enhancements in employees' knowledge and environmental awareness, improved firms' image, improved risk assessment, better management, opening to new markets and customers and an improved overall attitude toward the environment. As per Bellesi, Lehrer and Tal (2005) markets in Europe are significantly more environmentally conscious than other parts of the industrial world. Moreover, EMS integration could provide a favorable position for enterprise undertakings toward exports aiming to reach European markets.

Cotoc, Traistaru and Stoica (2013) argue implementation of EMS enhances the relationship with authorities as in future government will allow easier access to financial resources to those organizations that are environmentally responsible. Moreover, it allows the modernization of management with extra efficient control of data. Furthermore, EMS goes beyond profit as it preserves and improves quality of life for future generations through the more responsible use of natural resources. According to Vlăduţescu (in Cotoc, Traistaru and Stoica, 2013) enterprises that incorporated EMS will more easily gain financial services from banks and insurance companies. Those enterprises which can prove that they had a corresponding policy in case of an environmental accident will be compensated adequately. Kotler (2011) states the motivation of employees rises with the implementation of EMS as employees identify themselves with an employer who openly supports environmentally friendly methods. According to Dima and Vlăduțescu (in Cotoc, Traistaru and Stoica, 2013) EMS implementation also drives levels of innovations as actions are required to comply with EMS and resources are often scarce.

Stookes (2009) highlights the importance of economic benefits such as a reduction in operating costs for enterprises in certifying with ISO 14001. Other authors WCED (1987), Brady (2005) and Smith and Green (2005) mark the existence of notable cost reduction generated from more efficient use of energy, cuts in waste through more effective disposal and more efficient use of resources such as water and raw materials. However, most cost savings are directly linked to purchasing new eco-friendly goods and equipment. Bansal and Hunter (2003) state organizations that certify with ISO 14001 improve the environmental image and fetch external legitimacy. Coglianese and Nash (2001) advocate, that companies through rises in internal efficiencies are gaining a competitive advantage over the competition and boosting their environmental performance. Yin and Schmeidler (2007) in a survey of more than 400 U.S. ISO 14001 certificate holders found that enterprises that incorporated ISO standards in their facilities on daily operations were more likely to report higher improvements on their environmental performance and more likely to report that ISO certification contributed to those improvements.

Steger (in Ison, Peake and Wall, 2002) in his review of empirical evidence concluded that the biggest impact of standardized systems seems to be in the area of legal compliance, whereby compliance increased with the introduction of standardized EMS. Moreover, in his cost-benefit analysis, he noted that the costs are much easier to measure as they are immediate, while the benefits are partly long term and harder to measure.

According to Hortensius and Barthel (1997) ISO 9001 can also be a major driver in the implementation of certified EMS as ISO 14001 is created to be compatible with it. Meaning enterprises that already implemented ISO 9001 are more easily persuaded to implement it, because they already passed a similar path through the ISO 9001 implementation process and possess the necessary know-how now to improve their environmental performance and reduce their costs through ISO 14001 implementation.

Moreover, enterprises could decide to combine both ISO 9001 and ISO 14001 and integrate them simultaneously to the core business system in order to attain intended objectives. Primarily, such an approach allows processes of both systems to be aligned with the business strategy of an enterprise leading to improved business performance and continuous improvement of management systems. What is more, it promotes a holistic approach to business processes. This leads to an increase in efficiency, coordination, and optimization deriving real value for the whole enterprise. Thirdly, it reduces and minimizes duplication of overlapping documentation and responsibilities making it easier to manage and maintain business processes. Furthermore, it allows time and resource-saving as audit processes become more effective. Finally, it improves risk and opportunity management. Coordination makes identification of potential risks and opportunities easier. Therefore, it does not allow one system to impact the other in a negative way (BSI, 2015).

According to Gleckman and Krut (1997) once enterprises identify potential benefits of implementing ISO 14001, naturally their expectation rises and motivates enterprises toward execution, the formation of environmental objectives and operations, and influences the core environmental policy of an enterprise in regard to its environmental performance. However, Hamschmidt (2000) has documented from a business survey executed among Swiss enterprises, that environmental performance is not a priority in an enterprise's decision for adopting an EMS. The survey generated moderated levels of environmental effectiveness through the adoption of EMS. In a survey 60% of enterprises generated small improvements, 10% large improvements, and 30% reported weakening or could not estimate their environmental performance. As noted by 158 respondents, the most important benefits included: strengthening innovation, customer loyalty, prevention of new environmental legislation, and enhancement of corporate public image ranked among the highest. Only three from the reported fourteen benefits had a direct relationship with environmental performance and they include risk minimization, the certainty of legal compliance, and support of the ecological transformation of the line of business.

Although enterprises are not mandated by any law to implement EMS, they are required by the law to adhere to certain pollution thresholds, implement certain technology for pollution control and report their emissions. In such conditions, certain enterprises act in advance from fear of legal sanctions of not being able to comply, such as losing their operating permits and incurring fines and penalties. As laws and thresholds could potentially change, enterprises implement different proactive environmental measures. At the same time, this kind of situation creates a competitive advantage for enterprises that anticipated stricter regulatory requirements. The impact of new regulations on proactive enterprises would be marginal as it would lessen reporting requirements and eliminate the need for the instant purchase of costly pollution control technologies. Moreover, it opens the door to the institutional inflow of capital through the pioneer stand of a particular enterprise on the environment. This allows for a collaborative relationship with the government to promote environmental learning, capacity-building according to Darnall and Edwards (2006), and trust between facilities and regulators according to Hoffman (2000). Finally, it allows the enterprise, through established trust and access, to impact future environmental policy.

Market forces are increasingly influencing enterprises' decisions to adopt an EMS. Customers are becoming more and more aware of their natural environment as available environmental information about enterprises' practices has increased. On one hand, according to Konar and Cohen (1997) and Marshall and Mayer (1992) if customers possess information about hazardous behavior of enterprises toward the environment it will greatly impact an enterprise's reputation and its ability to market its products. On the other hand, according to Darnall, Rigling Gallagherand and Andrews (2001) the market may reward those enterprises which incorporated EMS by being attractive to those buyers who target eco-friendly products. Supply chain pressure is also a major influence on EMS adoption. For e.g. General Motors, Toyota, and Ford Motor Company all require their suppliers to adopt certified EMS. According to survey of Arimura, Darnall and Katayama (2009, p. 2.) of Japanese manufacturing companies: „ISO 14001 promotes green supply chain management practices, in that facilities with environmental management systems (EMS) certified to ISO 14001 are 40 percent more likely to check their suppliers' environmental performance and 50 percent more likely to require that their suppliers undertake specific environmental practices." According to Cotoc, Traistaru and Stoica (2013) the value of an enterprise in case of a merger, purchase, or sale rises with incorporated functional EMS.

According to Suchman (1995) in order for enterprises to remain competitive and realize long term survival they have to attain social legitimacy. Hoffman (2000) states environmental organizations, community groups, labor unions, and trade associations all play their role in pressuring organizations to implement EMS. Similarly, to consumers, so-called social "constituents" increased their involvement and awareness on the environmental problems from the availability of environmental information at their disposal. Public awareness has been increased through media coverage of environmental disasters, resulting in social demand rise for enterprises to improve their environmental performance. Environmental

organizations and community groups are often the main drivers of the rise in this demand through organized protests and boycotts. Labor unions also play a major role as they are protecting employees from environmental accidents and potential injuries. Moreover, trade associations are becoming more involved in managing their member's environmental actions and some of them even conditioning EMS implementation as a requirement.

Ownership pressures can also influence enterprise's decision to implement EMS. Shareholders are aware of financial liabilities associated with poor environmental reputation and financial penalties, so their overall interest is rising to become an environmentally responsible enterprise. Studies of Konar and Cohen (1997) on enterprises with higher toxic chemical emissions and Klassen and McLaughlin (1996) on enterprises that experienced chemical spills have shown that enterprises with poor environmental performance are penalized by lower stock prices. Contrary to these, those enterprises with good environmental performance, which adapt EMS, are more likely to draw interest from socially concerned investors.

1.5 Environmental problems in printing and packaging enterprises

Printing and packaging enterprises can cause a variety of different environmental problems. Air emission, wastewater discharge, pollution and degradation of land, waste disposal (solid and liquid), unreasonable use of natural resources and energy, and other environmental issues like the smell, noise, vibration can be considered as the main environmental problems.

Environmental issues associated with printing have mostly been involved in regards to technological improvements. Today's modern and complex printing machines generate hazardous chemicals and wastes. Solvents are substances, usually liquid, used in processes of printing. Petrol, kerosene, mentholated spirit and turpentine, to name a few, all generate waste at different levels. Some of them are highly flammable with a single contact with a naked light. Besides being flammable, cleaning solvents and thinner used to mix ink can produce poisonous vapors. According to Kuhn (1986) these organic solvents can be highly dangerous and affect human life dependent on levels of toxicity. Another major problem affecting printing enterprises is the disposal of used ink and liquid. Once printing is finished, dregs on machines from ink and solvents need to be washed. However, any chemical waste disposed of in an incorrect way could potentially lead to catastrophic results. Most importantly, it can endanger employees through breathing or body contact. Fuelled printing machines cause another major problem through the emission of gases, fumes, and dust. Similar to factory plants, printing enterprises emit carbon monoxide and ozone affecting human health and the environment. Printing enterprises can have a major impact on pollution and degradation of land through paper offcuts, trimmings, refuse dumps, and junked materials. Once these chemical wastes are drained on land some of it will evaporate and the remainder will impact the soil's fertility. This will greatly impact the flora and fauna of the

area. As a repercussion, land would be depleted of vegetables and trees with no possibility of agriculture, there could be a possibility of disease-carrying animals breeding (rats and mosquitoes) and killing of wildlife. It is being noted that ink, paint, and colors from printers can cause skin and nerve diseases when inhaled or brought into contact with the skin. According to the study conducted in Australia in 1993 on two distinct paint manufacturing industries fabricating industrial coatings and powder paints, employees that come in contact with ink need to be regularly monitored for the possibility of damaging the nervous system. The study also showed that those employees working directly with materials involved had considerably worse lung function than laboratory and administrative workers at the same firms. Most of the employees experienced symptoms of shortness of breath, chest tightness, and coughing (Kayode and Ogunlade, 2012).

Packaging represents a crucial connection between production and consumption. Its utility is indispensable as it facilitates the distribution of goods to the end consumer, therefore, making it possible to attain goods otherwise not accessible. Moreover, it is essential for the protection, preservation, and marketing of goods among other uses. In the future, its role will be even bigger as urbanization continues to rise alongside the necessity for goods. Since the 1970s packaging has regularly been linked to wasteful behavior due to an element of visibility. This is a fairly simple fact as most people do not notice packaging until it is consumed or once it becomes trash and an environmental burden. Enterprises in the business are using a wide range of materials for packaging goods such as metal, glass, wood, paper or pulp-based materials, plastics, ceramics, or a combination of one or more materials. Each of these materials has its own impact on the environment. Environmental issues associated with packaging are garbage, water pollution, air pollution, and solid wastes. Garbage has often been associated with packaging as the materials once used for protection, preservation, and distribution became a main component of the same garbage.

Water pollution is mostly generated from the release of harmful packaging chemicals and materials used in the manufacturing process. Some of the chemicals polluting the water in the process are biological oxygen demand (BOD), chemical oxygen demand (COD), volatile suspended solids (VSS) and total suspended solids (TSS). Moreover, materials like adhesives, coatings, and inks used in the packaging process can cause hydrocarbon pollution, while releases of cooling water from electricity generation can cause thermal pollution. Lastly, water pollution can also be generated from landfill sites.

When it comes to air pollution it is generated from emissions of harmful chemicals either from accidents or direct activities. In case of accidental fire or waste incineration chemicals such are vinyl chloride, CFC, and hexane could be emitted. Emission caused by directly related activities from packaging arises from the decomposition of materials used in the process such are paper and wood. Those materials release chemicals such are CO2 and methane. Furthermore, another source of air pollution originates from the release of other

harmful chemical related to electricity generation (CO2, SO2, Nox) and transportation (CO2, SO2, NOx, dust, hydrocarbons).

Solid wastes occur as soon as the extraction and processing of raw materials happen. The majority of this waste ends up on junkyard. Today, most people are convinced that solid waste occurs only after the goods have been consumed. However, that is far from the truth as a lot of waste occurs before consumers have ever seen a product. It is well known that many packaging materials are reused through recycling. Unfortunately, recycling does not inhibit future generations of waste. The problem is that a sizeable number of collected material cannot be recycled and products made from recycled material sooner or later will become waste (Pongracz, 2006).

2 THE IMPLEMENTATION OF ISO 14001 IN PRINTING AND PACKAGING INDUSTRY IN B&H: QUALITATIVE ANALYSIS

To assess the implementation process for selected manufacturing enterprises in B&H more specifically, reasons for adoption and whether or not they provided the desired environmental performance, a questionnaire survey was conducted. The questions were based on a literature review conducted and a case study examined through informal interviews and accessed a collection of internal publications. The questionnaire consisted of 15 questions. Some of them were multiple choice questions with the possibility to choose more than one answer and others were “yes” and “no” questions. Besides basic information about an enterprise, questions are divided into three major categories:

- Motivation forces for the implementation of ISO 14001;
- Problems in the implementation process of ISO 14001;
- Environmental performance and ISO 14001.

In addition, a second questionnaire was formulated by derivation from the first. The second questionnaire was intended for enterprises that still did not implement ISO 14001. The second questionnaire allows better insight into barriers and motivation forces enterprises face before considering the implementation of the ISO 14001 environmental management system.

2.1 The questionnaire: methodological conceptions

The success of this research was based upon the questions being formulated toward three main aspects of motivation, problems and environmental performance in an implementation process of ISO 14001. Through the literature review, it was already noted that enterprises can have different perceptions of the motives, problems and environmental performance in

the implementation process of ISO 14001. For these reasons formulated questions have objectives to identify those motives, problems and environmental performance for selected enterprises in the printing and packaging industry in B&H. Two questionnaires were formulated to show the difference in the enterprises' perceptions of the mentioned aspects that have or have not implemented the ISO 14001 environmental management system.

2.1.1 Motivation forces for the implementation of ISO 14001

Within this aspect, the participants who implemented ISO 14001 in the questionnaire no. 1 (Appendix 2) were asked what were the main motivating forces for the implementation of ISO 14001. The question served the purpose of finding out the main reasons for the adoption of ISO 14001 in the printing and packaging industry in B&H. The given answers were collected from a literature review conducted in the research. A similar question was asked to enterprises that still have not implemented ISO 14001 in questionnaire no. 2 (Appendix 3). The question served the purpose of showing the difference in perception of motivational forces and expected benefits prior to and after implementation of ISO 14001. Within this aspect, the participants who have implemented ISO 14001 were asked what were the benefits gained after implementation. Through a literature review, it was noted that certain enterprises could not perceive potential benefits, lacked awareness, and knowledge about the potential benefits of ISO 14001. The question served the purpose of showing that although motives can be positive, actual results of implementation may or may not result in desired outcomes. Moreover, within this aspect, the participants were asked whether the potential environmental benefits of solving environmental problems with ISO 14001 were bigger motive for implementation rather than the economic and other potential benefits gained by implementation. Through literal review, it was noted that environmental performance is not the main motive for the adoption of EMS and that other reasons are a bigger influence for adoption. The question served the purpose of examining whether that is the case for printing and packaging enterprises in B&H. Finally, the question about the integration of both ISO 14001 and quality management system ISO 9001 was formulated to determine which enterprises implemented both systems and what kind of benefits did they attain with the integration.

2.1.2 Problems in the implementation process of ISO 14001

Within this aspect, participants who implemented ISO 14001 were asked how long did their certification process last. The question served the purpose of showing the longevity of process. Moreover, if the process lasted longer it could have potentially incurred additional costs. Secondly, within this aspect, participants who implemented ISO 14001 were asked whether they used outside help during implementation process. Through literature review and case study it was noted that outside help is often used for the certification process and

that it insures additional costs. In this section enterprises were also asked to approximately determine how much were the initial costs of implementation and annual maintenance costs of ISO 14001. The literature review and case study showed that enterprises face both of these and that can deter new enterprises to certify. The purpose of the question is to gain feel for expenses enterprises in B&H experience prior and after implementation of ISO 14001 implementation. Within this aspect the participants who implemented ISO 14001 in questionary no. 1 (Appendix 2) were asked what were the main barriers they faced in the implementation process of ISO 14001. The question served the purpose of finding out the main obstacles to adoption of ISO 14001 in printing and packaging industry in B&H. The given answers were collected from literature review conducted in the research. A similar question was asked to enterprises who still have not implemented ISO 14001 in questionnaire no. 2 (Appendix 3). The question served the purpose of showing main reasons why enterprises who still did not implement ISO 14001 are not eager to do so. Finally, the participants who implemented ISO 14001 in questionnaire no. 1 (Appendix 2) were asked to give an opinion of whether the costs of implementation with ISO 14001 were bigger than benefits gained after implementation. The literature review showed that the costs are often easier to measure than the benefits. The question served the purpose of examining whether or not the enterprises are actually satisfied with their implementation of ISO 14001. A similar question was asked to enterprises who still have not implemented ISO 14001 in questionnaire no. 2 (Appendix 3). As the costs are easier to measure than the benefits it can lead to misperception to enterprises that still have not implemented the standard as being just additional burden to their operations and finances.

2.1.3 Environmental performance and ISO 14001

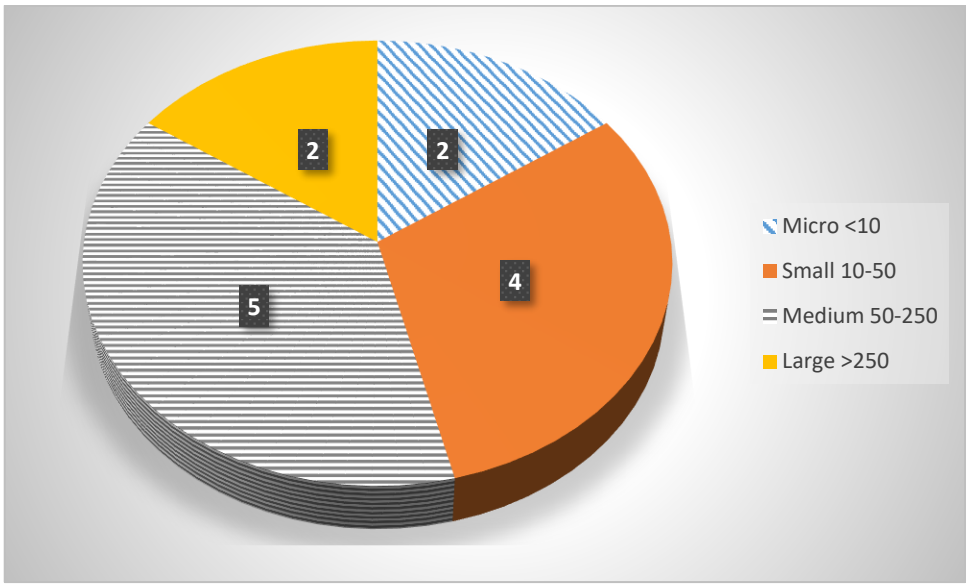
Within this aspect, all the participants were asked about the main environmental problems they face. The question served the purpose of showing the main environmental problems in the printing and packaging industry in B&H. The literature review and case study showed printing and packaging enterprises can cause different environmental problems. Moreover, the participants who have implemented ISO 14001 were asked whether any environmental objectives were set and attained beyond regulatory compliance before and after integration of ISO 14001. The questions served the purpose of showing whether a questioned enterprise was solely involved in environmental protection before the implementation of ISO 14001 due to requirements by law and whether or not ISO 14001 helped enterprises after implementation to achieve better environmental outcomes beyond the ones imposed by law. Finally, the participants who implemented ISO 14001 in questionnaire no. 1 (Appendix 2) were asked to give an opinion on whether the impact of their enterprise on the environment has improved with the implementation of the ISO 14001 standard. The question served the purpose of showing that regardless of the motivation for implementation better environmental outcomes are achieved with ISO 14001. A similar question was asked to enterprises who still have not implemented ISO 14001 to give an opinion on whether the

impact of their enterprise on the environment would improve with the implementation of the ISO 14001 standard. The question served the purpose of examining enterprise willingness to certify and determining whether they need financial and educational help in order to implement the standard. The question also creates a ground for policy recommendations.

2.2 Questionnaire survey

The survey was conducted on enterprises in the printing and packaging industry in B&H. As there is no record or a list of enterprises which have already implemented ISO 14001 system in B&H two questionnaires, one for enterprises which implemented ISO 14001 and the other for the ones that did not, were forwarded to enterprises in the industry in line with information obtained through internet survey which provided us with the list of 23 active enterprises operating within the industry. The record does not exist due to two reasons. Firstly, the Institute for Standardization of B&H does not keep such records under their jurisdiction. Secondly, private, domestic and foreign enterprises are the ones certifying enterprises in B&H and every one of those enterprises keeps their own records of such. The questionnaire was taken from Inno (2005) and adapted to the goals of the thesis. Questionnaires were forwarded to 23 enterprises in the selected industry from which 13 replies were gathered allowing for a 56.5% response rate. Data collection for this thesis was carried out in September of 2018. Enterprises vary in size of their facilities, number of employees, and operations.

Figure 4: *Number of employees in printing and packaging enterprises*



Source: own work.

Telephone interviews were carried out with quality managers, directors, and employees from selected enterprises with an aim to increase the response rate and to obtain qualitative information. The questionnaires were forwarded through e-mail. Initially, only two enterprises were not interested in completing the questionnaire for the simple reason of unwillingness to do so. The other enterprises that did not complete the questionnaire initially made a promise that they would, but the reply never came back even after multiple notices.

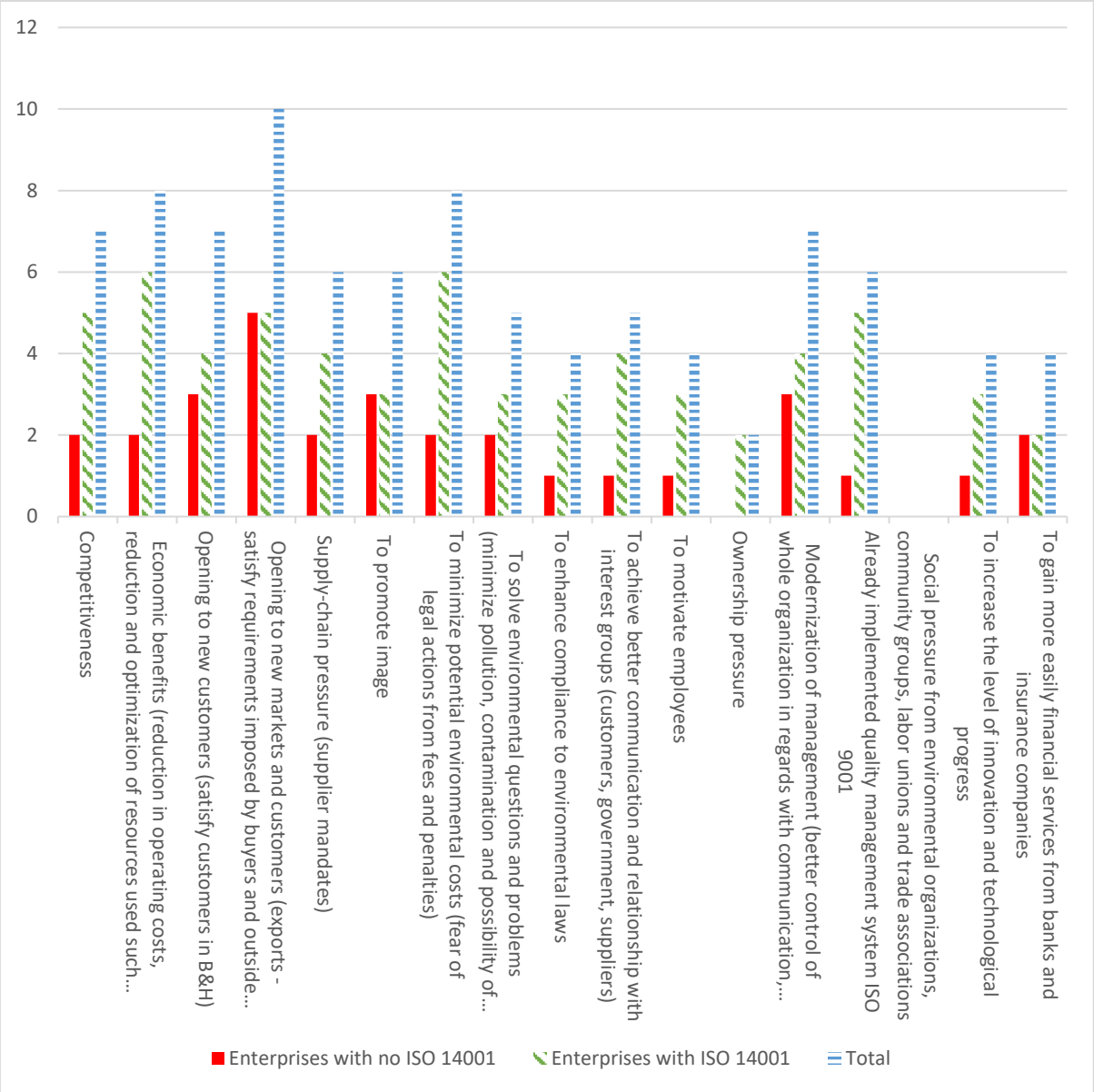
3 RESULTS OF QUESTIONNAIRES

3.1 Motivation forces for the implementation of ISO 14001

From 13 replies collected from enterprises operating in the printing and packaging industry in B&H, six enterprises have implemented ISO 14001 system and seven have not. When it comes to motivation forces for implementation of ISO 14001 among all 13 respondents the main singled out the motive was opening to new markets and customers in regard to exports and satisfying requirements imposed by buyers and outside contractors with 10 out of 13 votes. Other well-marked answers were economic benefits (reduction in operating costs, reduction, and optimization of resources used such are raw materials and energy, increased productivity, reduction in transportation, and waste treatment costs etc.) and minimization of potential environmental costs (fear of legal actions from fees and penalties) both with 8 out of 13 votes. None of the 13 enterprises admitted the existence of any kind of social pressure from environmental organizations, community groups, labor unions, and/or trade associations to implement ISO 14001 system and only two enterprises experienced ownership pressure to implement ISO 14001, out of which both have already implemented the system. Only 5 out of 13 enterprises noted that they implemented or would implement ISO 14001 to solve environmental questions and problems (minimize pollution, contamination, and possibility of environmental accidents) and just 4 out of 13 to enhance compliance with environmental laws. However, most noted benefits for six enterprises after integration of ISO 14001 were increased competitiveness and reduction in operating costs due to possessing necessary know-how from already implemented quality management system ISO 9001.

Five out of six enterprises implemented both ISO 14001 and quality management system ISO 9001. The most noted benefits of such integration were improved business performance, a holistic approach to business processes and saving time and resources. Before ISO 14001 integration, in regard to setting and attaining environmental objectives beyond regulatory compliance, four out of six enterprises stated they did so even prior to ISO 14001. However, after implementation, all of the enterprises recognized that environmental objectives are set and attained beyond regulatory compliance.

Figure 5: *Motivation forces for the implementation of ISO 14001*



Source: own work.

The identification of the motive 'opening of new markets and customers in regard to exports and satisfying requirements imposed by buyers and outside contractors' is consistent with Alberti, Caini, Calabrese and Rossi (2000), Bansal and Hunter (2003) and Bellesi, Lehrer and Tal (2005) as it is reasonable to assume enterprises in B&H would seek to export their products to EU countries to reach new customers and a larger market. At the same time, it is a fact that the EU seeks that the enterprises from B&H respect certain environmental thresholds in order to import into the EU. This allows enterprises in the EU to save time and effort associated with clarification prior to purchasing products from B&H.

The results from the questionnaire are also consistent with Darnall and Edwards (2006) and Hoffman (2000) when it comes to the motive of 'minimization of potential environmental costs (fear of legal actions from fees and penalties)' where enterprises act in advance to fence themselves from sudden changes in environmental laws and regulations. The results are also consistent with WCED (1987), Brady (2005), Smith and Green (2005) and Stookes (2009) when it comes to the motive of economic benefits (reduction in operating costs, reduction and optimization of resources used such are raw materials and energy, increased productivity, reduction in transportation, and waste treatment costs, etc.). Lower results on the motive 'implementation of ISO 14001 to solve environmental questions and problems (minimize pollution, contamination, and possibility of environmental accidents)' is consistent with Hamschmidt (2000) business survey conducted among Swiss enterprises where environmental performance is not a priority in an enterprise's decision for adopting an EMS.

Most noted benefits after implementation with ISO 14001 were increased competitiveness influenced mostly by better internationalization opportunities, better utilization of resources and minimization of potential environmental costs, and reduction in operating costs due to possessing the necessary know-how from already implemented quality management system ISO 9001. Obviously, the implementation of ISO 14001 gives an advantage to an enterprise over the competition that did not implement the standard or at least puts them at the same level as the ones that did as the standard is widely known and internationally recognized. For this and multiple other factors mentioned through this paper, it is reasonable to assume competitiveness increases with implementation of ISO 14001. Reduction in costs due to possessing necessary know-how from already implemented quality management system ISO 9001 is consistent with Hortensius and Barthel (1997).

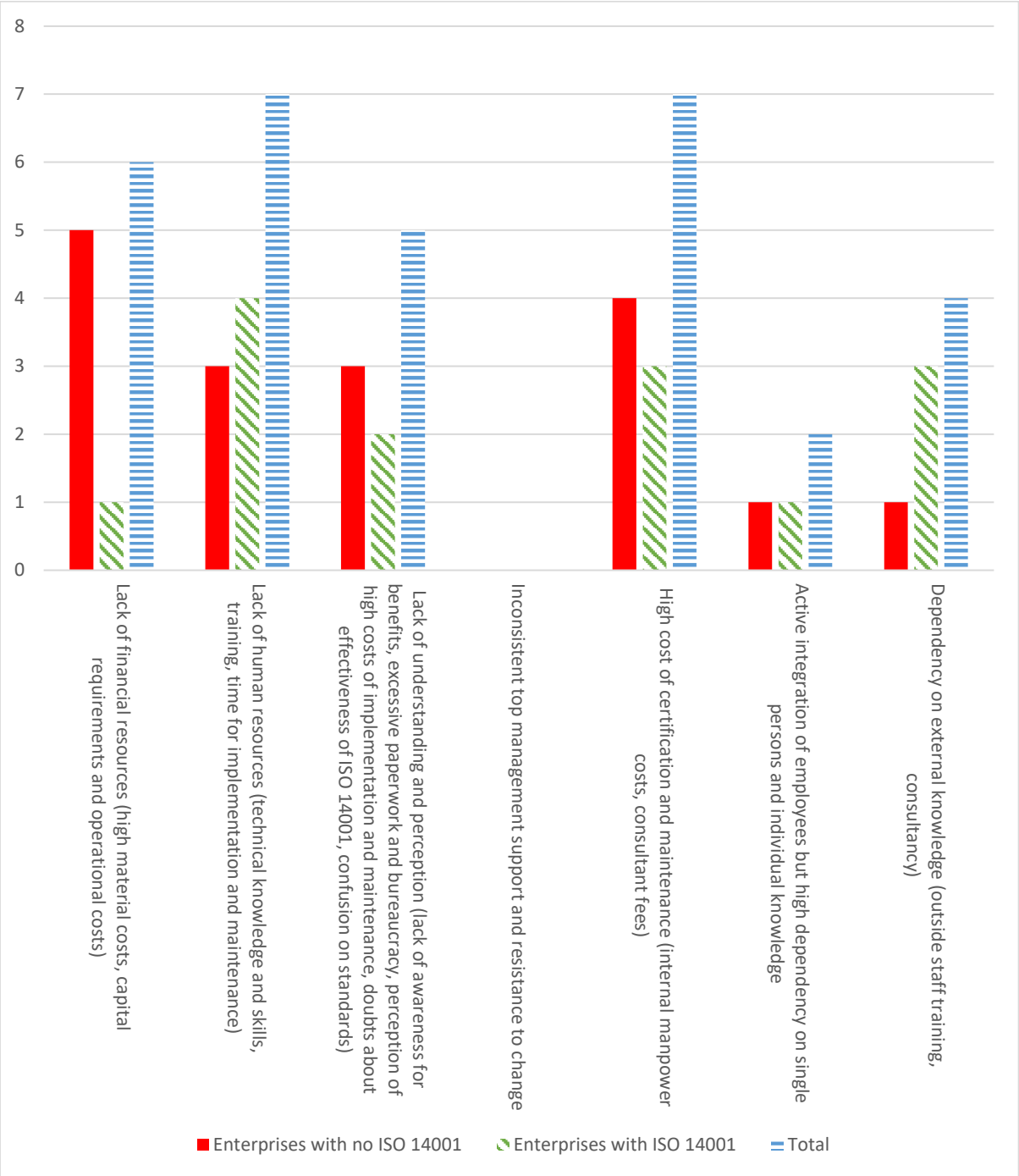
3.2 Problems in the implementation process of ISO 14001

The most noted barriers to implementation were lack of human resources (technical knowledge and skills, training, time for implementation and maintenance) and the high cost of certification and maintenance (internal manpower costs, consultant fees) both of which had 7 out of 13 votes. It was noted from those enterprises that implemented ISO 14001, that certification costs can be up to KM 25,000 and annual maintenance costs up to KM 5,000. All the enterprises used outside help by hiring consultants during their implementation process, while the implementation process for all enterprises lasted up to a year.

Lack of human resources is consistent with Hillary (1999) and Rivera-Camino (2001) as the most noted internal barrier where enterprises in B&H simply lacks skilled human resources in this field. High costs of certification is consistent with Hillary (1999) and GETF (1999) as an external barrier. The numbers are obviously not the same as in research conducted by GETF as the costs of implementation could vary among a wide range of factors such as the

country of implementation, the size of the enterprise in terms of the number of employees and skills or knowledge they possess, amount of outside help used, consulting services, sizes of facilities, etc.

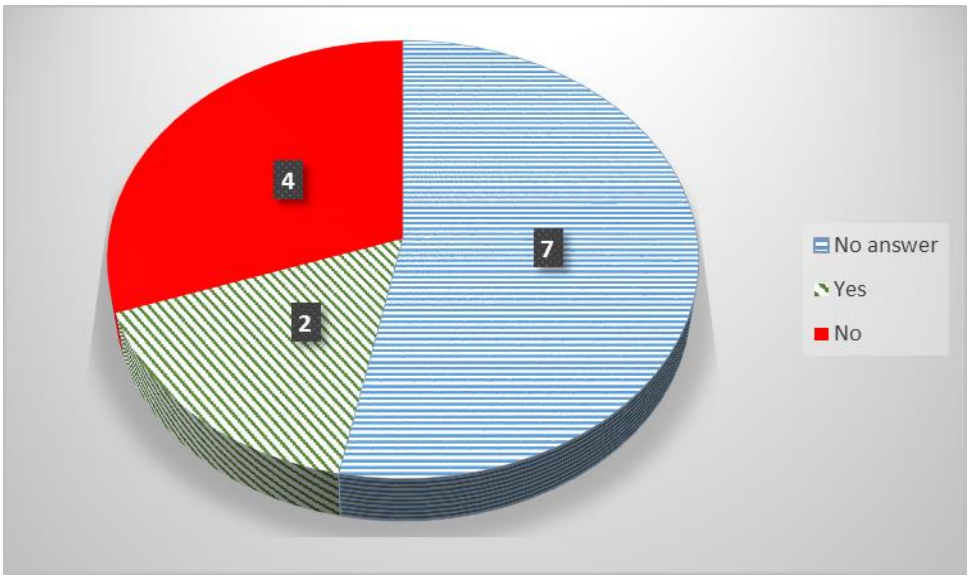
Figure 6: *Barriers to acquring ISO 14001*



Source: own work.

When it comes to the question of whether the costs of implementation with ISO 14001 was higher than benefits gained after implementation the results were mixed among respondents. What is even more interesting is that 7 out of 13 respondents did not give an answer, yet, at the same time, four out of the six enterprises that did implement the system were among them. These results are consistent with Steger (in Ison, Peake and Wall, 2002) wherein his cost-benefit analysis he noted that the costs are much easier to measure as they are immediate, while the benefits are partly long term and harder to measure.

Figure 7: *Perception of costs being higher than benefits*

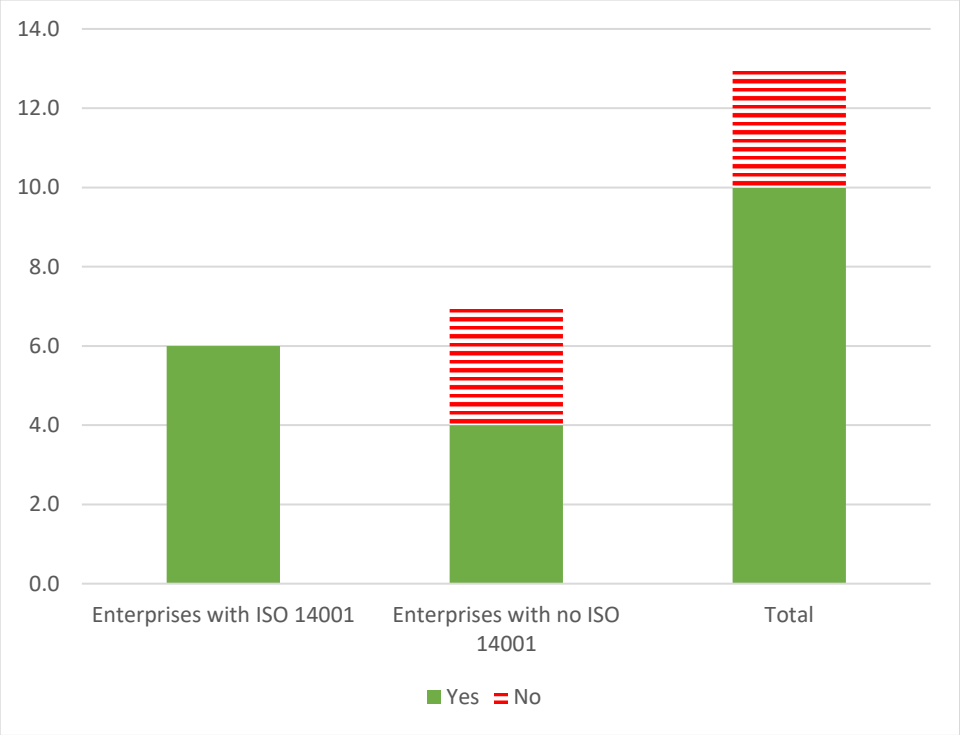


Source: own work.

3.3 Environmental performance and ISO 14001

When it comes to the question of improved environmental performance with implementation of ISO 14001 those enterprises that still did not implement ISO 14001 had mixed answers, while the enterprises that did implement universally acknowledged they yielded better environmental outcomes after implementation. Five out of the six enterprises that implemented ISO 14001 noted environmental benefits to be the biggest motive for implementation of ISO 14001 in question number three. However, two of those five enterprises did not check motive 'solving environmental questions and problems (minimize pollution, contamination and possibility of environmental accidents'. Making the environmental performance as motivation for implementation for ISO 14001 dismissive and as already mentioned, consistent with Hamschmidt (2000).

Figure 8: *Outlook on the improved environmental performance with the implementation of the ISO 14001*



Source: own work.

Gaining better environmental outcomes with implementation of ISO 14001 through better utilization of resources and management is consistent partially with Coglianese and Nash (2001) which advocate that firms through a rise in internal efficiencies are gaining competitive advantage over competition and boosting their environmental performance. All six respondents that implemented ISO included, motive of 'economic benefits (reduction in operating costs, reduction and optimization of resources used such are raw materials and energy, increased productivity, reduction in transportation and waste treatment costs etc.)' before implementation of ISO 14001. However, only four out of the six enterprises acknowledge that actual economic benefits were gained after implementation.

Improved environmental performance with ISO 14001 implementation is consistent with Yin and Schmeidler (2007) where in their survey on more than 400 U.S. ISO 14001 certificate holders found that enterprises that incorporated ISO standards in their facilities on daily operations were more likely to report higher improvements on their environmental performance and more likely to report that ISO certification contributed to those improvements.

4 CASE STUDY: IMPLEMENTATION OF ISO 14001 AT UNIONINVESTPLASTIKA DD

Unioninvestplastika d.d. (2017a) was established in 1970 as part of the social enterprise Unioninvest Sarajevo. Back then the basic activity was the processing of plastics and production of kettles and parts of two-component plastic and production of polyethylene foil. During the war, the enterprise was completely devastated. Through the privatization program, the enterprise was taken over by the MIMS group. In the late 2000s, the expansion of the production program and the modernization of the plant started to accelerate, and from the completely disintegrated enterprise, it became a leader in its branch in B&H. Today, it is a contemporary printing press, which also has printing facilities, production of modern packaging and polyethylene products.

At the beginning of 2001 Unioninvestplastika's d.d. first activity, as a part of the MIMS group, was polyethylene processing into foil up to 200 microns of thickness. Polyethylene production implies the production of heat-shrinkable foil, building foil, retail sacs, as well as sacks for omnibus packaging and garbage bags. The next activity was Offset Press, which started work in mid-2004. Offset printing includes newsprint, magazine editions, catalogs, labels, books, brochures, posters, etc. The third activity introduced in early 2005 was flexographic printing, which includes the production of flexible packaging with high quality, multi-color printing,

Flexographic printing implies the production of flexible packaging used for modern packaging in the food, pharmaceutical, and detergent industries. It is used for making polypropylene wrapping labels in rolls or already cut into the desired format as well as in the so-called "shrink sleeve" label. By the end of 2012, the additional activity of manufacturing commercial carton board boxes was added to offset printing. This was enabled by adding new machines and equipment from Polet d.d. Sarajevo. The company employs approximately 100 workers of appropriate professions, including graphic designers, offset and flexographic repairers, bookmakers, and other professionals (Unioninvestplastika, 2017a).

4.1 Purpose and scope

By means of the grant from the International Finance Corporation (IFC) of the World Bank, through the PEPSE project in 2008, ISO quality management and environmental management standards were implemented at Unioninvestplastika d.d.. Integrated management systems were implemented according to ISO 9001: 2008 and ISO 14001: 2004 certified by the DET NORSKE VERITAS (DNV) certification company from Zagreb.

In Unioninvestplastika d,d. the quality and environmental manager is responsible for creating, establishing, implementing and maintaining the quality and environmental management standards. The quality and environmental management standards are applied and implemented by all enterprise's employees in the domain of their responsibilities and authorizations. Rules of procedures are approved and declared mandatory by the director of the enterprise. Revisions to quality and environmental management standards can be initiated by all employees. Amendments to quality and environmental management standards are granted by the same function that approved the original release.

The general guidance for the development and implementation of Environmental Management System (EMS) was taken from the International Organization for Standardization (ISO) 14001:2004 Standard (Unioninvestplastika, 2017a). According to the study conducted by Adhikari (2010, p. 57-65) the following elements are essentially the same in ISO 9001: 2008 and ISO 14001: 2004:

- Training, awareness and competence;
- Document control;
- Nonconformity, corrective and preventive action;
- Control of records;
- Internal audits;

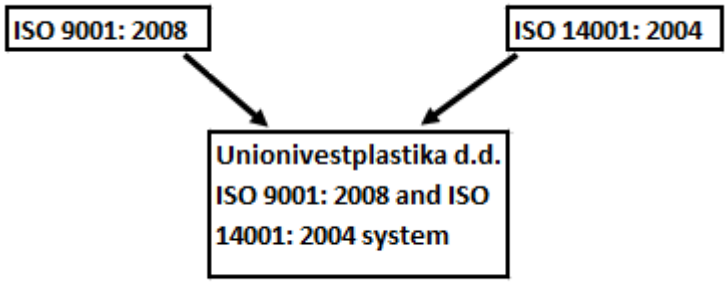
According to the same study the following elements are also very similar:

- Policy;
- Structure and responsibility;
- Documentation;
- Operational control;
- Monitoring and measurement;
- Evaluation of compliance;
- Management review;

According to the same study the following elements are unique to ISO 14001:

- Environmental aspects;
- Legal and other requirements;
- Objectives and targets;
- Communication;
- Emergency preparedness and response.

Figure 9: *ISO system integration at Unioninvestplastika d.d.*



Source: Unioninvestplastika d.d. (2017a).

Obviously, integration of the ISO 9001 quality management system and ISO 14001 environmental management system at Unioninvestplastika d.d. allowed cost savings due to the optimization of resources. It is safe to say that their single system allowed this through establishment of common procedures and effective utilization of time.

4.2 Initial review

Management of Unioninvestplastika d.d. (2017c) through an initial review of EMS strived to respond to legal requirements and requirements of the ISO 14001: 2004 standard all in accordance with the financial, technological, and personnel capabilities. This allowed them to consider all environmental aspects in the process and serve as a base for the implementation of EMS. The following determinants were used for the preliminary assessment of environmental impacts:

- Laws and standards in force
- Analysis of processes from the aspect of environmental management elements
- Validation of environmental incidents that have already occurred

In addition, the following elements and potential negative environmental problems were taken into consideration:

- Air emission;
- Wastewater discharge
- Pollution and degradation of land
- Waste disposal (solid and liquid)
- Use of natural resources

- Other environmental issues (smell, noise, vibration)

4.3 Environmental policy

In an effort to express its commitment to the development, application and improvement of the efficiency of the management system, the management board of Unioninvestplastika d.d. (2017a) established its environmental policy. The following measures along with objective indicators and evidence for its realization were noted:

- Educating and developing awareness about the importance of respecting customer requirements as well as legal and normative requirements will be implemented through training of employees;
- The quality and environmental management policy should be clearly defined and attainable;
- The policy management system will be the starting point for determining quality objectives and environmental goals;
- All employees will have the ability and obligation to participate in their suggestion, development, and effective implementation;
- Verification of the efficiency and effectiveness of the management system and related processes will be carried out through regular annual audits at the sessions of the management;
- The resources needed to implement, maintain, and develop the management system and related processes will be timely provided;
- Management will seek continuous improvement of the efficiency and effectiveness of the processes applied in the enterprise. In addition to internal audits and reviews conducted by the management board, processes have been established that allow greater frequency of monitoring, data collection and information, as well as actions aimed at steady improvement.

These measures allowed Unioninvestplastika d.d. to possess clear objectives validated in a timely manner from senior management and allowed information to be distributed to all employees with the important notion of continuous improvement.

4.4 Planning

According to User Manual (Generic ISO 14001 EMS Templates, 2005) for ISO 2004 the planning process has three stages of implementation, which were also followed by Unioninvestplastika d.d.:

- Environmental aspects;
- Legal and other requirements;
- Objectives, targets and programme(s).

4.4.1 Environmental aspects

Classifying and assessing environmental aspects is vital to the planning of any EMS to govern and reduce the environmental effects arising from an enterprise's activities, products, and services. During this process of evaluating environmental aspects Unioninvestplastika d.d. (2017c) took the following elements into consideration based on their initial review:

- Legal requirements (LR) - Used to determine if the identified environmental aspect is regulated by law and the possibility of violation of a particular law.
- Interested parties (IP) - Used to determine if the identified aspect is significant for one of the interested parties such as buyers, partners, owners, employees, or community.
- Duration of impact (DI) - Used to determine the duration of the impact of the identified aspect.
- Practice code (PC) - Used to determine if a certain aspect is regulated by the standard, code of conduct or by the rules of the profession.

In addition to this, the environmental management team of Unioninvestplastika d.d. evaluates the risk associated with the effects of these environmental aspects. The following elements are taken into consideration:

- TRF - total risk factor,
- PO - probability of an occurrence,
- SI - severity of an impact,
- PDI - probability of detecting an influence.

Unioninvestplastika's d.d. environmental management team assigns points to the mentioned element to determine the effect on the environment.

The following equations (1) and (2) are used for determination of total risk and total value:

$$TRF = SI \times (PO + PDI) \quad (1)$$

$$TV = LR + IP + DI + PC + SI \times (PO + PDI) \ (max\ 40) \quad (2)$$

An environmental aspect that has a total value score (2) of greater than or equal to 20 is considered to be significant.

Table 4: *Criteria for Determining Significant Environmental Aspects at Unioninvestplastika d.d.*

Legal requirements (LR)	**Interested parties (IP)**	**Duration of impact (DI)**	**Practice code (PC)**	**Probability of an occurrence (PO)**	**Severity of an impact (SI)**	**Probability of detecting an influence (PDI)**
Low importance **Value 0**	Low importance **Value 0**	Short-term (mild) influence **Value 0**	Low importance **Value 0**	Unlikely event **Value 1**	Barely noticeable effect of influence **Value 1**	High probability **Value 1**
Medium importance **Value 4**	Medium importance **Value 2**	Medium duration of influence **Value 2**		Likely event **Value 2**	Limited environmental impact **Value 2**	Possible Detection **Value 2**
High importance **Value 9**	High importance **Value 6**	Long lasting influence **Value 4**	High importance **Value 3**	Unavoidable event **Value 3**	Significant impact on the environment **Value 3**	Impossible detection **Value 3**

Source: Unioninvestplastika d.d. (2017c).

This process allowed Unioninvestplastika d.d. (2017e) to determine significant environmental aspects outlined in the table below:

Table 5: *Significant environmental aspects at Unioninvestplastika d.d.*

Environmental problems	**Significant environmental aspects at Unioninvestplastika d.d.**
Soil and water pollution	Accidental spillage of solvent chemicals, petroleum products (oil, petroleum, gasoline), paint and diluents, use of cleaning agents (alcohol and gasoline), discharge of waste paper soaked in colour and glue, dirtied rags with chemicals, oily parts of machines, sanitary waste water in public sewage
Air pollution	Emission of glue and chemical fumes, gas from evaporation during roto printing drying, waste gases - flue gas boilers
Exhaustion of natural resources	Use of paint, adhesive chemicals, paper and print colours in production

Table 5: *Significant environmental aspects at Unioninvestplastika d.d.)(continued).*

Environmental problems	**Significant environmental aspects at Unioninvestplastika d.d.**
Landfills, soil and water pollution	Used toners, electronic equipment, accumulator, battery, lighters and fluvial tubes, packaging contaminated with hazardous chemicals, waste parts of machinery contaminated with oil and hazardous chemicals
Water pollution	Waste oil, grease and emulsions from the machine
Soil and air pollution	Use of electricity

Source: Unioninvestplastika d.d. (2017c).

4.4.2 Legal and other requirements

The following laws and procedures were identified and complied by Unioninvestplastika d.d. (2017e) related to its environmental impacts (see Table 6).

Table 6: *Legal and other requirements complied by Unioninvestplastika d.d.*

No.	**Legal and other requirements complied by Unioninvestplastika d.d.**
1.	Law on environmental protection
2.	Law on nature protection
3.	Law on air protection
4.	Water law
5.	Law on waste management
6.	Rulebook on air quality monitoring
7.	Rulebook on the monitoring of emissions of polluting substances into the air
8.	Rulebook on air quality limit values
9.	Rulebook on categories of waste with the lists
10.	Rulebook on the waste treatment of the hazardous wastes which are on the list with unknown content
11.	Regulation on the obligation to submit an annual report on the fulfilment of the conditions of the waste management license.

Source: Unioninvestplastika d.d. (2017c).

At same time Unioninvestplastika d.d. placed an important role on the identification of customer needs and determination of the requirements relating to the product.

The environmental manager is responsible for each factory process, to ensure and review the legal requirements for all the environmental aspects identified within their area of responsibility. An environmental manager can do this by accessing information on the internet, by subscribing to the official newspaper, trainings, by reading commercial or

technical journals, by environmental news, consulting with other environmental specialists (other similar factories or similar areas), hiring consultants, seeking legal advice from federal or cantonal ministries on regulatory information related to environmental aspects (Unioninvestplastika, 2017a).

4.4.3 Objectives, targets and programme(s)

Unioninvestplastika d.d. (2017d) set its objectives, targets, and programmes based on already identified significant environmental aspects. Consequently, this allowed much more control of their environmental impacts. When defining the objectives, the management considers product requirements, performance, processes, customer satisfaction, availability of resources needed to achieve quality, and environmental goals.

Table 7: *Section from Unioninvestplastika d.d. environmental program*

Environmental management program						
Environmental aspect	Influence	Framework	Operative objective	Activities	Deadline	Responsibility
Emission of flue gases from boilers	Air pollution	Concentration of the emission maintain within the permitted limits	Concentration of the emission maintain at levels below requirements by law	Perform emission measurements through an authorized company	31.12.2017.	Quality and Environmental Manager

Table 7: *Section from Unioninvestplastika d.d. environmental program (continued).*

Environmental management program						
Environmental aspect	Influence	Framework	Operative objective	Activities	Deadline	Responsibility
Oil waste	Soil and groundwater contamination	Improve manipulation of hazardous waste	Improve manipulation of empty oil packages, oiled objects and oil barrels	Construction of hazardous waste warehouse	30.06.2017.	Quality and Environmental Manager
				Remove packaging and empty oil drums from the circuit through an authorized company	Periodically	Quality and Environmental Manager
				Transport used oil through an authorized company	Periodically	Quality and Environmental Manager

Source: Unioninvestplastika d.d. (2017d).

4.5 Implementation and operation

Implementation and operation represent process of doing the processes recognized during "Plan" stage. According to User Manual (Generic ISO 14001 EMS Templates, 2005) for ISO 2004 implementation and operation process has seven stages of implementation also followed by Unioninvestplastika d.d., and they include:

- Resources, roles, responsibility and authority;
- Competence, training and awareness;
- Communication;
- Documentation;
- Control of documents;
- Operational control;

- Emergency preparedness and response.

4.5.1 Resources, roles, responsibility and authority

Senior management of Unioninvestplastika d.d. (2017a) defines the responsibilities and authorizations of the enterprises' employees and realizes ongoing communication with them in order to meet the policy and objectives of the quality management system and the environment. Most of the responsibilities are already defined in purpose and scope, and environmental policy sections. The quality and environmental manager is at the same time a representative of the management board and has responsibilities which include:

- Ensuring that the processes required for the quality and environment management system are established, applied and maintained.
- Reporting to the senior management about quality management and EMS, and possibilities for further improvements.
- Raising awareness about customer requirements.

4.5.2 Competence, training and awareness

Competence, training, and awareness represent a major part of successful implementation of EMS as it explains the importance of EMS to all personnel. The enterprise ensures that all staff possesses the required knowledge and are committed to EMS implementation. The aim of Unioninvestplastika d.d. (2017b) is to have all personnel trained and educated at appropriate levels contingent on their role at the enterprise. Senior management is responsible for training and making additional resources available if necessary. Trainings are performed periodically.

Table 8: *Training process at Unioninvestplastika d.d.*

FLOW DIAGRAM	DESCRIPTION OF ACTIVITIES	MATRIX OF RESPONSIBILITY	
		EXECUTION	SUPERVISION
START			
Creating a training plan proposal	Proposed training plan for organizational units		Manager

Table 8: *Training process at Unioninvestplastika d.d. (continued).*

FLOW DIAGRAM	DESCRIPTION OF ACTIVITIES	MATRIX OF RESPONSIBILITY	
		EXECUTION	SUPERVISION
Creating training requests	Creating requests and delivering to legal and staff services	Specialists / technologists	Manager
Organizing training	- Realization of education is led by the secretary - External and internal education	Secretary	Director
Realization of education	External education	Secretary	Director
Realization of education	Realization of internal training in organizational units	Experts from the organizational unit or the field	Heads of organizational units or field
Preparation for knowledge verification	Preparation for knowledge verification	Employee	
Knowledge check OK? (NO / YES)	Checking employee knowledge		Experts from the field
Certificate	Obtaining or Issuing Credentials		Experts from the field
END			

Source: Unioninvestplastika d.d. (2017b).

4.5.3 Communication

For effective implementation of EMS an enterprise has to have successful internal and external communication. Unioninvestplastika d.d. (2017a) possesses both. The purpose of internal communication is to achieve such a flow of information that will provide timely and complete information to the responsible persons in charge of undertaking information-based activities. It provides all employees with a better understanding of the objectives and enables each employee to influence further developments. Unioninvestplastika d.d. assesses the flow of internal communication through board review, internal audits, intranet, informal-formal discussions, and meetings.

External communication ensures that the enterprise notifies its customers of the type and quality of their products receives inquiries and submits bids and receives information on the satisfaction of their customers. With regard to environmental aspects, Unioninvestplastika d.d. regularly provides information to all interested parties (ownership, buyers, government, partners, financial institutions, media, professional associations, non-governmental organizations and citizen movements, trade unions, etc.) about its environmental impact and significant environmental aspects (Unioninvestplastika, 2017a).

4.5.4 Documentation

The documentation of the quality management system and the EMS applied in the Unioninvestplastika d.d. (2017a) contains policy, objectives, procedures, and other documents required for planning, implementation, and supervision of recognized processes (e.g. plans, rule books). Also, there are records proving the results of processes and systems. In the Unioninvestplastika the management system documentation is divided into four hierarchical levels.

Table 9: *Hierarchy of document management systems*

Rules Policy and objectives	Level I
Procedures	Level II
Instructions	Level III
Records	Level IV

Source: Unioninvestplastika d.d. (2017a).

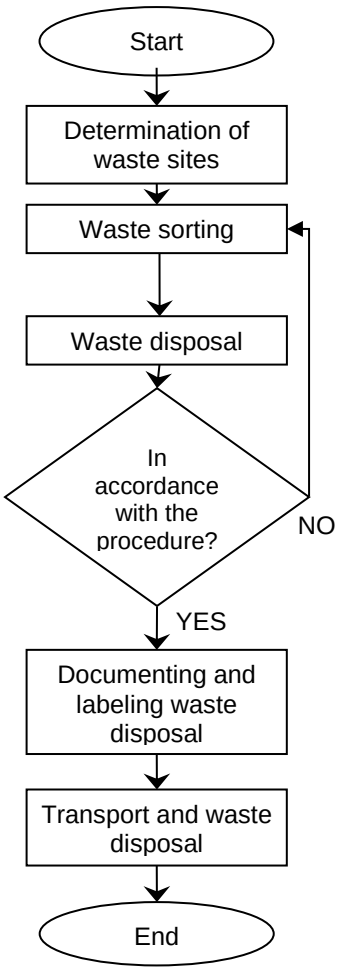
4.5.5 Control of documents

Control of documents in Unioninvestplastika d.d. includes processes of confirming the suitability of documents before issuance, reviewing and updating documents, ensuring that changes and current status of the audited documents are identified, ensuring that the relevant versions of the applicable documents are in place and ensuring that the documents are legible and recognizable. Documentation about EMS is available to every employee of Unioninvestplastika d.d. through intranet (Unioninvestplastika, 2017a).

4.5.6 Operational control

Activities that are associated with identified significant environmental aspects in accordance with environmental policy, framework, and operational objectives are identified and planned to ensure that they are implemented under specified conditions. At Unioninvestplastika d.d. (2017a, 2017f) operational control is conducted for processes of procurement, whereby the established flow of activities ensures that the product obtained will be in compliance with the established requirements regarding the characteristics, cost, and delivery dates defined. Moreover, the enterprise conducts operational control of its machines and equipment as any malfunction can potentially lead to disastrous results. Activities that are associated with identified significant environmental aspects in accordance with environmental policy, framework, and operational objectives are identified and planned to ensure that they are implemented under specified conditions by establishing and maintaining circuits, facilities, equipment, installations, rational energy consumption, and waste management. The environmental manager is responsible for oversight of operational activities from the start to the end regarding environmental aspects, while owners of the processes and other employees are responsible to act according to instructions and given orders by the environmental manager. All processes are documented to ensure procedures do not diverge from environmental policy, procedures, and targets.

Figure 10: *Flow diagram waste disposal at Unioninvestplastika d.d.*



Source: Unioninvestplastika d.d. (2017f).

4.5.7 Emergency preparedness and response

Unioninvestplastika d.d. (2017e) established procedures for managing possible environmental accidents and developed its own emergency preparedness and response processes to prevent and minimize possible effects. Unioninvestplastika d.d. classified possible crisis situations that may cause disaster and major accidents according to causes of occurrence.

The three main causes are:

1. Natural,
2. Technical-technological,

3. Production, storage, processing, handling, transport, collection and other activities with dangerous substances from the Seveso II Annex of the EU Directives, which represent the real or potential dangers that may cause a sudden event with negative environmental consequences.

Moreover, the existence of a company can be endangered by either danger to an employee or danger to the environment. Both could substantially impact not just the reputation of the company, but also create a substantial financial burden on an enterprise if not managed properly. Accidents associated with negative environmental impacts that are most likely to occur are spillage of chemicals, fires and explosions, and natural disasters (earthquakes, floods, storms). The enterprise has developed an internal intervention plan with specific tasks for such cases (Unioninvestplastika, 2017).

4.6 Checking

Checking represents processes that are practiced for measurement and monitoring of the use of previous EMS processes. According to User Manual (Generic ISO 14001 EMS Templates, 2005) for ISO 2004 the checking process has five stages of implementation also followed by Unioninvestplastika d.d., and they include:

- Monitoring and measurement,
- Evaluation of compliance,
- Nonconformity, corrective action and preventive action,
- Control of records,
- Internal audit.

4.6.1 Monitoring and measuring

Unioninvestplastika d.d. (2017a) has determined and documented the monitoring and measurement methods as well as devices for testing those results. Its equipment is calibrated and verified at specific intervals. Depending on the existence and requirements by international or national standards those calibrations can be changed. For instance, if such standards do not exist the base used for calibration and verification is written down for future comparison. Such equipment is protected from the possibility of changing settings and potential damage imposed during handling, maintenance, and storage. The enterprise evaluates and records the validity of the results of previous measurements when it detects that the monitoring and measurement equipment was not compliant with the requirements. At the final process stage calibration and verification, records are entered in the measuring device card. These kinds of processes allow effective control of significant environmental aspects. When it is rational to assume something is wrong, the data collected is intended to

assess the ability of the process to achieve the planned results or desired environmental outcomes.

The work order and specification determine the characteristics of the products to be monitored and measured in order to verify product and phase requirements in the process of product realization. Typical procedures for monitoring and measuring products within project implementation include but are not limited to a review of product realization in the enterprise and review of product realization with the customer. Evidence of compliance and eligibility criteria are documented and then the order managers are authorized to continue product realization to a further planned phase. Finally, Unioninvestplastika d.d. organizes and collects data on product compliance, process execution, customer satisfaction, and suppliers. Based on this information it conducts analysis for the evaluation of its position.

4.6.2 Evaluation of compliance

Through this stage Unioninvestplastika d.d. (2017a) checks its commitment to compliance. Checks are done through internal audits and management reviews. As part of the checking phase of the monitoring, measurement, analysis and improvement processes, the requirements for measuring the conformity of the EMS, conformity of the processes and the parameters of environmental impacts are highlighted. Measurement data is the basis for analyzing, making conclusions and getting the reports needed to make effective management decisions aimed at improving the process, increasing customer satisfaction and improving environmental impact.

Evaluation is done by comparing the legal and other requirements with monitoring and measurement data, nonconformity actions, internal audits, and inspection findings. The environmental managers make records on compliance assessment which is discussed at management sessions where the management board makes decisions about changing policies or other system elements, establishing or revising environmental framework and operational goals.

4.6.3 Nonconformity, corrective action and preventive action

Nonconformity, corrective action, and preventive action are established to ensure that a product that is not compliant with the requirements is identified and will not be used or delivered until the appropriate decision is taken to proceed with it. At Unioninvestplastika d.d. (2017a; 2017e; 2017f) owners of the process make decisions on further proceedings regarding a product. The options are to complete the product, conditional acceptance, alternative use, or refusal. In the case of a conditional contract when the proposed use of a product does not meet the established requirements the owner of the process reports and

implements a settlement with the buyer or representative. Corrective actions are taken to eliminate the causes of noncompliance and prevent their repetition, while preventive actions reflect a proactive approach to prevent noncompliance making it an important part of the process of continuous improvement. The environmental and quality manager is responsible for recording and monitoring the realization of corrective and preventive actions.

4.6.4 Control of records

Unioninvestplastika d.d. (2017a) holds records that include documents containing indirect and direct evidence that products or processes have met the requirements of EMS. These documents are created either by Unioninvestplastika d.d. or have been issued by their suppliers. Most importantly these records prove that the enterprise apply management system is in accordance with the requirements of ISO 9001 and ISO 14001.

4.6.5 Internal audit

Unioninvestplastika d.d. (2017a) conducts internal audits periodically, at least once a year, for the purpose of assessing the efficiency of the quality management system and the EMS. Moreover, to determine whether the results are in accordance with the plan and actions set capable of achieving the established objectives. Finally, for proposing and implementing the necessary corrective actions. Internal audits are planned, considering the importance of certain processes for the functioning of the EMS and the results of the previously conducted audits. For any inconsistency noted and recorded during the audit the team leader is obliged to: determine the causes, propose and implement the correction or corrective action, and set the deadline for implementation. The auditor checks the effectiveness of actions taken and verifies the elimination of negligence. As a next step, the report is made by auditor team leaders and delivered to the quality and environmental manager. Upon the expiry of the established deadline for eliminating any non-compliance or a cause, the auditor's team leader checks the effectiveness of corrective actions. The results are recorded in the Corrective Action Report and submitted to the quality and environmental manager. If disagreement has not been eliminated, the quality and environmental manager initiates actions that he considers appropriate.

4.7 Management review

The management review of the system at Unioninvestplastika d.d. (2017a) is done annually. This allows the timely collection of the necessary data and information in order to objectively assess the appropriateness, consistency, and efficiency of the system. Among other activities reviewed is the evaluation of compliance with EMS, legal, customer requirements, and product quality is performed.

4.8 Discussion and recommendations

Recommendations for ISO 14001 implementation are based on an interview conducted with Mr. Mirvić, the environmental and quality manager at Unioninvestplastika d.d., literature review and survey conducted on 13 enterprises in the printing and packaging industry in B&H. According to Mr. Mirvić the most important and pretty straight forward answer was to follow all the steps in the implementation process. Moreover, he notes the importance of setting reasonable goals for the enterprise regarding capabilities the particular enterprise possesses. According to him, it is important to foster a balance between operations and attaining desired environmental outcomes by taking one step at a time at the micro-level of the enterprise. Taking one step at a time on particular operations, training of employees, and gathering everyone to buy into the system with top management support will allow seamless transitions to the system. In an interview, he acknowledges the initial reason for the implementation of ISO 14001 was satisfying the need for outside contractors and exporting Unioninvestplastika d.d. products to the EU. However, after becoming more familiar with the system the enterprise recognized multiple advantages of such integration. Mr. Mirvić sees the high cost of certification and a lack of skilled human resources as the biggest flaw of the system. According to him B&H or even maybe the EU should allow grants to subsidize SMEs on their implementation process. This would allow easier management of daily operations in the enterprise, where environmental outcomes would not be pushed to the side at all moments.

Through literature review and conducted a survey on 13 enterprises in printing and packaging industry in B&H it was noted that the biggest barriers to implementation of ISO 14001 are lack of human resources and high costs of certification and maintenance. In order to solve these issues and achieve better environmental outcomes universally acknowledged as being achieved by enterprises which already integrated the ISO 14001 system in the conducted survey and backed by a literature review of Yin and Schmeidler (2007), policy recommendations could play key role in the process. Such policy would mostly be related to government support in access to capital, training, and skills, and rising awareness about multiple advantages of ISO 14001 environmental management system. This would laid foundations towards new greener industries for both new enterprises entering different sectors and already established enterprises lacking help. The exploitation of such support would be limited to some degree as through research, we have concluded that although motivation forces for the implementation of ISO 14001 may differ better environmental performance is achieved regardless.

CONCLUSION

ISO 14001, when managed and implemented adequately, allows enterprises to improve their environmental performance. With regards to that, ISO 14001 in B&H plays a very important role as institutional forces are very weak and inclusive. It has been shown in a small survey sample of B&H enterprises in the printing and packaging industry that those enterprises who have implemented ISO 14001 yields better overall environmental performance, although motivation forces for integration may differ. They were able to do so through a rise in economic efficiency and improvement in the inventory resource management that affects the costs of production. Moreover, the system allowed them better management, communication, and attention to detail in the processes they conduct. The latter was shown through the case study whereby Uninoninvestplastika d.d. had to follow each step on its certification process.

Initially, most of the respondents in a survey acknowledged they implemented ISO 14001 for other reasons, most noted opening to new markets and customers through exports and satisfying requirements imposed by buyers and outside contractors. This was reasonable to assume to be true as for importers it decreases the time and effort needed to clarify enterprises from which they are purchasing a product. However, in my opinion, and the opinion of respondents in the survey those results do not in any way impact the environmental outcomes of integration. The most noted barriers in the implementation process were the high cost of certification and maintenance and lack of human resources. Those barriers could be managed by educating enterprises about the system, teaching them to take baby steps in the implementation process of setting reasonable goals and providing them with financial support.

This is why it is extremely important to establish a governmental policy which would allow access to capital, rise in training to acquire skills and knowledge and raise awareness on multiple advantages of the system. In my opinion, only then, enterprises, and especially small to medium size, could be expected to provide desired outcomes for the environment and their business. Once more this would lay foundations towards new greener industries for both new enterprises entering different sectors and already established enterprises lacking the help.

Most noted benefits for enterprises who already implemented the ISO 14001 were increased competitiveness influenced mostly by better internationalization opportunities, better utilization of resources and minimization of potential environmental costs, and reduction in operating costs due to possessing the necessary know-how from already implemented quality management system ISO 9001. As the ISO 14001 is widely known and internationally recognized the implementation would put B&H enterprises in the level playing field with international ones. This is why the help of government through policy making is essential as it not only creates a better Eco system, but boosts the national economy.

Although B&H has exceedingly complex and fragmented institutional structure of environmental administration (four levels - state, entities levels of Federation of Bosnia and Herzegovina and Republika Srpska, cantons and municipalities) it must not be allowed this to be another excuse for ignoring the help needed by enterprises lacking in capital and skills required for implementation of ISO 14001. To combat their internal obstacles enterprises in B&H need guidance and support from the government to improve their training capabilities and knowledge about ISO 14001. This could be done through government subsidies. Those could be given to enterprises willing to implement ISO 14001 and also to those who already have implemented ISO 14001 and exemplified the process of continuous improvement in the protection of the environment. This kind of help could lead to a rise in awareness and attitudes in employees' behavior toward the environment. If the enterprise is incentivized by the government to implement ISO 14001 at the same time it becomes a job for each employee to acquire the knowledge, communicate and operate in the best interest of the enterprises and at the same time in the best interest of the environment. Giving such grants should obviously have to be closely monitored and handled by the highly educated and experienced environmental specialist and not given in decision making hands of politicians.

Besides the need for government to increase its role, environmental organizations, community groups, labor unions, and/or trade associations should do the same and become more active in this regard. The survey showed the non-existence of any kind of social pressure from environmental organizations, community groups, labor unions, and/or trade associations to implement ISO 14001 among all 13 respondents. This is a problem as it disincentives certification in a huge way, allowing certain enterprises bigger freedom of choice to behave in a hazardous way toward the environment in boundaries of the law. The environmental organizations, community groups, labor unions, and/or trade associations should also have a vote in decision making on which enterprises should get subsidies from the government. This would allow greater parity for all enterprises that would apply and minimize the possibility of conflicts of interest. Also, this would incentivize all the enterprises who have already implement ISO 14001 on their process of continuous improvements as they could potentially be additionally rewarded by doing something which is already helping them in many other aspects of their operations besides protection of the environment. At the same time by giving a certain amount of decision making power to the environmental organizations, community groups, labor unions, and/or trade associations rise their own awareness about the topic which in all honesty should be present at least to a certain point in the first place. This would be the way all parties involved including enterprises, government, environmental organizations, community groups, labor unions, and/or trade associations could hold each other accountable. This could influence even the consumers to behave in an eco-friendly way as the number of certified enterprises would increase and the way they operate would change.

All the objectives set initially in the master thesis have been fulfilled. The master thesis provided the reader with the following:

- A better understanding of the goals and purposes of ISO 14001;
- The main environmental issues related to printing and packaging enterprises in B&H with regards to ISO 14001 implementation process and their connection with environmental laws and policy implemented;
- An analysed case study which provided a practical example for the complete implementation process;
- Evaluated the main problems, motives, costs, benefits. and barriers of implementing ISO 14001 by questionnaires to selected printing and packaging enterprises in B&H;
- Assessed whether enterprises introduction of ISO 14001 enhanced its environmental performance;

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APPENDIXES

APPENDIX 1: Povzetek v slovenskem jeziku

Podjetja po vsem svetu zdaj razumejo, da okolje ni več samo problem skladnosti, ampak vprašanje upravljanja. Vlagatelji menijo, da je trajnostna uspešnost zelo oprijemljiva vrednota in so pripravljeni prekiniti sodelovanja s podjetji, ki imajo slab okoljski zapis. Namen tega dela je bil razumeti glavne razloge za sprejetje Certifikata sistema ravnanja z okoljem (EMS) ISO 14001, ki so ga izbrala podjetja v proizvodnem sektorju v Bosni in Hercegovini in opredeliti glavne motive, stroške, koristi ter ovire, ki so bile izkušene znotraj teh podjetij skozi implmentacijo certifikata ISO 14001. Hkrati je bil namen tega dela predstaviti te rezultate in pokazati, na kakšne težave so podjetja naletela. Cilj je bil tudi oceniti, ali so podjetja z uvedeno okoljsko politiko ISO 14001 izboljšala svojo okoljsko učinkovitost. Nenazadnje je bilo treba podati priporočila za preprečevanje težav v procesu izvajanja. To je bilo storjeno s sistematičnim pregledom literature, izvedbo raziskave na 13 podjetjih v tiskarski in embalažni industriji v Ljubljani in B&H ter z analizo celotnega cikla implementacije ISO (študija primera implementacije v Unioninvestplastika dd). Raziskava je pokazala, da ISO 14001, ko se upravlja in izvaja ustrezno, omogoča podjetjem, da izboljšajo svoje okolje, čeprav se lahko motivacije za implementacijo razlikujejo. Tukaj je tudi predstavljeno, da je vloga ISO 14001 v B in H institucionalne sile zelo šibka in vključujoča. Diplomska naloga tudi pokaže, da lahko pri uvedbi ISO 14001 pride do ne le izboljšanja okoljske uspešnosti, temveč tudi izboljšave na drugih področjih, kot recimo na področjih gospodarske učinkovitosti in izboljšanja upravljanja z zalogami, kar vpliva na stroške proizvodnje in povečano konkurenčnost. Ti vplivi so predvem omogočili boljše priložnosti za internacionalizacijo. Po drugi strani pa so najbolj opazne ovire v procesu implementacije visoki stroški certifikacije in vzdrževanja ter pomanjkanje človeških virov. Ravno iz tega razloga je bilo izredno pomembno priporočiti vzpostavitev vladne politike, ki bi omogočila dostop do kapitala, povečala usposabljanje za pridobitev znanj in spretnosti ter ozaveščanje o številnih prednostih sistema.

APPENDIX 2: Questionnaire no. 1

1. *What were the main motivation forces for implementation of ISO 14001 at your enterprise?*

☐ Competitiveness

☐ Economic benefits (reduction in operating costs, reduction and optimization of resources used such are raw materials and energy, increased productivity, reduction in transportation and waste treatment costs etc.)

☐ Opening to new customers (satisfy customers in B&H)

☐ Opening to new markets and customers (exports - satisfy requirements imposed by buyers and outside contractors)

☐ Supply-chain pressure (supplier mandates)

☐ To promote image

☐ To minimize potential environmental costs (fear of legal actions from fees and penalties)

☐ To solve environmental questions and problems (minimize pollution, contamination and possibility of environmental accidents)

☐ To enhance compliance to environmental laws

☐ To achieve better communication and relationship with interest groups (customers, government, suppliers)

☐ To motivate employees

☐ Ownership pressure

☐ Modernization of management (better control of the whole organization in regards to communication, training, efficiency in controlling data and documentation, distribution chain)

☐ Already implemented quality management system ISO 9001

☐ Social pressure from environmental organizations, community groups, labor unions and trade associations

☐ To increase the level of innovation and technological progress

☐ To gain more easily financial services from banks and insurance companies

☐ Other:

_____

2. *What benefits did your enterprise actually gain after ISO 14001 implementation?*

- ☐ Increased competitiveness
- ☐ Gained economic benefits (reduction in operating costs, reduction and optimization of resources used such are raw materials and energy, increased productivity, reduction in transportation and waste treatment costs etc.)
- ☐ Raised the number of customers in B&H
- ☐ Expanded to new markets and customers (increased exports)
- ☐ Enhanced image of the enterprise
- ☐ Content suppliers
- ☐ Minimized potential environmental costs (fear of legal actions from fees and penalties)
- ☐ Solved environmental questions and problems
- ☐ Enhanced legal compliance
- ☐ Achieved better communication and relationship with interest groups (customers, government, suppliers)
- ☐ Increased working motivation of employees
- ☐ Content ownership
- ☐ Increased modernization of management (better control of the whole organization in regards to communication, training, efficiency in controlling data and documentation, distribution chain)
- ☐ Reduced costs due to possessing necessary know-how from already implemented quality management system ISO 9001
- ☐ Enhanced relationship with environmental organizations, community groups, labor unions and trade associations
- ☐ Increased level of innovation and technological progress
- ☐ Easier access to financial services from banks and insurance companies
- ☐ Other:

_____

3. *Were the potential environmental benefits of solving environmental problems with ISO 14001 bigger motive for implementation rather than the once checked in the first question?*

- ○ Yes
- ○ No

4. *Did you integrate both ISO 14001 and quality management system ISO 9001?*

- ○ Yes
- ○ No

5. *If your answer was yes to a previous question, what were the main benefits of such integration?*

- ☐ Improved business performance
- ☐ Allowed holistic approach to business processes (increase in the efficiency, coordination and optimization deriving real value for the whole enterprise)
- ☐ Reduced documentation and duplication
- ☐ Saving time and resources
- ☐ Improved risk and opportunity management
- ☐ Other:

_____

6. *How long did the certification process last?*

- ○ < 0.5 year
- ○ 0.5 - 1 year
- ○ 1 - 2 years
- ○ > 2 years

7. *Did your enterprise use outside help during the implementation process?*

- Yes
- No

8. *Approximately how much were the initial costs of implementation of ISO 14001?*

- < 10.000 KM
- 10.000 - 25.000 KM
- 25.000 - 50.000 KM
- 50.000 - 75.000 KM
- 75.000 - 100.000 KM
- > 100.000 KM

9. *Approximately how much are annual maintenance costs of ISO 14001?*

- < 2.500 KM
- 2.500 KM - 5.000 KM
- 5.000 KM - 7.500 KM
- 10.000 KM - 15.000 KM
- > 15.000 KM

10. *What were the main barriers your enterprise faced in implementation process of ISO 14001?*

- Lack of financial resources (high material costs, capital requirements and operational costs)
- Lack of human resources (technical knowledge and skills, training, time for implementation and maintenance)
- Lack of understanding and perception (lack of awareness for benefits, excessive paperwork and bureaucracy, perception of high costs of implementation and maintenance, doubts about the effectiveness of ISO 14001, confusion on standards)
- Inconsistent top management support and resistance to change

☐ High cost of certification and maintenance (internal manpower costs, consultant fees)

☐ Active integration of employees but high dependency on single persons and individual knowledge

☐ Dependency on external knowledge (outside staff training, consultancy)

☐ Other:

_____

11. *In your opinion were the costs of implementation with ISO 14001 bigger than benefits gained for the enterprise?*

○ Yes

○ *No*

12. *What are the main environmental problems your enterprise faces?*

☐ Soil pollution

☐ Water pollution

☐ Exhaustion of natural resources

☐ Air pollution

☐ Landfills

☐ Other environmental issues (smell, noise, vibration etc.)

13. *Before ISO 14001 implementation were any environmental objectives set and attained besides the ones to comply with environmental laws and regulations?*

○ Yes

○ No

14. *After integration of ISO 14001 were any environmental objectives set and attained beyond regulatory compliance?*

- Yes
- No

15. *Do you think the impact of your enterprise on the environment has improved with the implementation of the ISO 14001 standard?*

- Yes
- No

APPENDIX 3: Questionnaire no. 2

1. *What would be the main motivation forces for implementing ISO 14001 at your enterprise?*

☐ Competitiveness

☐ Economic benefits (reduction in operating costs, reduction and optimization of resources used such are raw materials and energy, increased productivity, reduction in transportation and waste treatment costs etc.)

☐ Opening to new customers (satisfy customers in B&H)

☐ Opening to new markets and customers (exports - satisfy requirements imposed by buyers and outside contractors)

☐ Supply-chain pressure (supplier mandates)

☐ To promote image

☐ To minimize potential environmental costs (fear of legal actions from fees and penalties)

☐ To solve environmental questions and problems (minimize pollution, contamination and possibility of environmental accidents)

☐ To enhance compliance to environmental laws

☐ To achieve better communication and relationship with interest groups (customers, government, suppliers)

☐ To motivate employees

☐ Ownership pressure

☐ Modernization of management (better control of the whole organization in regards to communication, training, efficiency in controlling data and documentation, distribution chain)

☐ Already implemented quality management system ISO 9001

☐ Social pressure from environmental organizations, community groups, labor unions and trade associations

☐ To increase the level of innovation and technological progress

☐ To gain more easily financial services from banks and insurance companies

☐ Other:

_____

2. *What would be the main barriers that your enterprise would face if it were decided to implement the ISO 14001?*

- ☐ Lack of financial resources (high material costs, capital requirements and operational costs)
- ☐ Lack of human resources (technical knowledge and skills, training, time for implementation and maintenance)
- ☐ Lack of understanding and perception (lack of awareness for benefits, excessive paperwork and bureaucracy, perception of high costs of implementation and maintenance, doubts about the effectiveness of ISO 14001, confusion on standards)
- ☐ Inconsistent top management support and resistance to change
- ☐ High cost of certification and maintenance (internal manpower costs, consultant fees)
- ☐ Active integration of employees but high dependency on single persons and individual knowledge
- ☐ Dependency on external knowledge (outside staff training, consultancy)
- ☐ Other:

_____

3. *In your opinion would the costs of implementation with ISO 14001 be bigger than benefits gained for the enterprise?*

- ○ Yes
- ○ *No*

4. *What are the main environmental problems your enterprise faces?*

- ☐ Soil pollution
- ☐ Water pollution
- ☐ Exhaustion of natural resources
- ☐ Air pollution
- ☐ Landfills
- ☐ Other environmental issues (smell, noise, vibration etc.)

5. *Do you think that the environmental impact of your company would be improved with the implementation of the ISO 14001?*

- ○ Yes
- ○ *No*