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Valuation of Environmental Management Standard ISO 14001: Evidence from an Emerging Market

Hammad Riaz ^{1,*}, Abubakr Saeed ¹, Muhammad Saad Baloch ¹, Nasrullah ¹
and Zeeshan Ahmad Khan ²

¹ Department of Management Sciences, COMSATS University, Islamabad, Park Road, Islamabad 44000, Pakistan; abubakr.saeed@comsats.edu.pk (A.S.); msaad.baloch@gmail.com (M.S.B.); nasrullah_shah@yahoo.com (N.)

² Department of Planning and Development, Pir Mehr Ali Shah, Arid Agriculture University, Rawalpindi 44000, Pakistan; zakhan_ze@yahoo.com

* Correspondence: hammad.uae89@hotmail.com; Tel.: +92-51-924-7000

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Abstract: ISO 14001 (Environmental Management Standard) helps corporations to build legitimacy and goodwill, and can be also viewed as an organizational response to institutional pressure to act proactively towards the environment. The purpose of this paper is to investigate how investors in the emerging country value voluntary environmental management standard ISO 14001 certification. The impact of voluntary environmental management standard ISO 14001 on market performance is still not clear. By using event study methodology, this study matched ISO-certified firms with non-certified ones based on three different matching principles that include return on assets, size, and industry. The findings indicated that investors negatively valued ISO 14001 in both the short and long run. The study recommended policy implications for managers, policy makers, and non-government organizations.

Keywords: ISO 14001; legitimacy; institutional forces; environmental system; event study approach; emerging markets

1. Introduction

Firms around the globe are increasingly concerned about the different sustainable environmental strategies to legitimize their operations among various stakeholders (Dbouk et al. 2018; Gavronski et al. 2008). ISO 14001 is considered to be one of those sustainable firms' strategies (De Jong et al. 2014). ISO 14001 is the most widely adopted environmental strategy, which not only fosters firms' environmental performances (Russo 2009; Potoski and Prakash 2005) but also increases firms' financial performances (De Jong et al. 2014; Darnall and Edwards 2006), promotes an environmentally friendly supply chain (Curkovic and Sroufe 2011), and indicates current environmental management objectives. ISO 14001 ensures that firms implement environmental policies with the objective to eliminate environmental pollution. It is a plan–do–check–act approach that regulates business entities to develop an environmental policy that aims for better environmental performance by minimizing the hazardous wastes, and monitors the outcome of implemented environmental policies (von Zharen 2001).

India is the world's fastest growing economy, with a fast growth output. However, India has been in trouble by increasing environmental degradation, which has raised the attention of the globe. Indian firms are actively adopting ISO 14001 to attain legitimacy among various stakeholders, to show that they are employing environmentally proactive techniques in their operations. The number of

ISO 14001-certifications India rocketed in the past years. India recorded a 99% increase in ISO 14001 certifications from 2010 to 2016 (ISO 2015).

The increasing trend of certifying environmental management systems (EMSs) with ISO 14001 encouraged different scholars to investigate the financial benefits of its adoption (De Jong et al. 2014; He et al. 2015). A number of existing studies explore the impact of ISO 14001 on financial and market performances of the organizations (Paulraj and De Jong 2011; Wahba 2010; Cañón-de-Francia and Garcés-Ayerbe 2009; Aarts and Vos 2001; Dowell et al. 2000). These empirical investigations provide helpful insights in the related literature. However, these studies are mainly focused on the organizations of the developed market, and paid no or little attention to the firms of developing markets like India. The findings of these studies are vague and inconclusive, as some scholars found positive market responses to ISO 14001 (Martín-de Castro et al. 2016; Lee et al. 2017; Jacobs et al. 2010; Paulraj and De Jong 2011) while others reported negative relationships (Lee et al. 2008; Zhao 2008; Cañón-de-Francia and Garcés-Ayerbe 2009; Aarts and Vos 2001). The regulatory and institutional settings of developing economies sharply differ from those of emerged ones, owing to poor judicial systems and corporate governance, greater information asymmetry, and weak regulatory monitoring (Lee et al. 2008). The weak institutional and regulatory environment encourages organizations to symbolically adopt ISO 14001, which yields negative or no effects on the environmental initiative's efficacy. In the arena of competitions, to get legitimacy, organizations might adopt ISO 14001 in response to the isomorphic pressure prevailing in the market (Boiral and Henri 2012).

When organizations implement any environmental policy with the intention to gain institutional legitimacy instead of adoption in reality, discrepancies may arise in the application of that environmental policy (Delmas and Toffel 2008; Delmas and Montes-Sancho 2010). We state that the adoption of ISO 14001 symbolically can be a double-edged sword which can damage the initiative's trustworthiness, which in result harms the firm's legitimacy among various stakeholders and is negatively valued by them (Aravind and Christmann 2011). Additionally, in any institutional setting with no proper checks and balances, and where public rules and regulations are vague, the voluntary environmental strategies such as ISO 14001 certifications are not taken authentically by the stakeholders. Moreover, environmental responsiveness and protection is not the foremost concern in developing markets, since the utmost priority of investors is material security (Globerman and Shapiro 2009). Such cultural values, prevalent beliefs, and societal norms, in fact, influence the cognition of the investors towards environmental protection (Majeed et al. 2015). Keeping in view the above arguments, India, being an emerging economy, might demonstrate different market valuations by certifying with ISO 14001.

This study investigates the impact of ISO 14001 certification on the market performance of Indian domestic firms. For the larger extent, we are convinced that the domestic firms get certified with ISO 14001 as a result of mimetic pressure from international ones (Christmann and Taylor 2006). As compared to international firms, domestic firms lack strict observation by international stakeholders to fortify certifications and attain effective, sustainable strategies (MacLean and Behnam 2010). In response, investors make their investment choices on past efficacious outcomes attained from implementing environmental strategies and negatively evaluate it. With the purpose to empirically test our hypothesis, 62 domestic Indian companies were used over the time period of 2010–2017.

This study contributes to existing body of knowledge in the following important ways. Firstly, most of the existing literature on the financial impacts of ISO 14001 focused on emerged economies, and much less attention has been given to emerging economies. Secondly, the association between market performance and ISO 14001 is inconclusive and slightly mixed. Some researchers reported a positive association (Chen et al. 2018; Flammer 2013; Jacobs et al. 2010; Wahba 2010; Dowell et al. 2000; Melnyk et al. 2003; Klassen and McLaughlin 1996) while others found negative or weak associations (Lee et al. 2008; Cañón-de-Francia and Garcés-Ayerbe 2009; King and Lenox 2001; Aarts and Vos 2001). Therefore, it is still unclear whether ISO 14001 enhances the market evaluation of the firms or not. The results of this empirical investigation increase the understanding of the financial outcomes of ISO 14001 in India by throwing light on institutional and social factors that shape this

phenomenon. Drawing on institutional theory and market learning perspectives, this study establishes the importance of social traits in the performance of the financial markets. Lastly, this study focuses only on domestic firms, whereas the prior studies were largely concerned on multinational companies. To investigate the market evaluation of ISO 14001 of domestic firms is empirically and theoretically vital, because domestic organizations face low institutional pressure to certify with ISO 14001 as compared to multinational firms (Husted et al. 2016).

2. Prior Literature

Globally, around 600,000 firms have attained certifications consisting of numerous management standards such as ISO 9000, ISO 14001, etc. (Boiral and Roy 2007). Various studies explain the importance of implementing these ISO certifications in regard to the firms' objectives to attain legitimacy and acceptability in the working environment. Delmas and Montes-Sancho (2010) highlights this importance, and states that firms adopt ISO 14001 standards as a management tool to gain legitimacy and improve their reputation among their key stakeholders, for instance societies, governments, regulators, environmental groups, customers, suppliers, etc. Boiral and Henri (2012) identify its importance for internal efficiency in terms that ISO 14001 presents an opportunity for the firms to improve their daily environmental performances by promoting it as a precautionary approach. Furthermore, these standards require their implementation inside whole organizational systems to achieve the continuous environmental performance. Delmas and Montes-Sancho (2010) state that firms meet societal expectations to fulfill the environmental obligations by implementing these standards, which in return help firms to attain legitimacy and external appreciation. Heras-Saizarbitoria and Boiral (2013) call for comprehensive research on the adoption of EMAS and its impact on firms' outcomes. Existing literature discusses institutional theory while explaining the use of ISO 14001 standards by the firms.

Suchman (1995) explains that as per the institutional theory, firms adopt ISO 14001 to reinforce the precision of their operations in a certain defined set of rules, guidelines, principles, customs, values, or norms. Firms take different initiatives to build their reputations among different key stakeholders and achieve legitimacy that helps firms to survive in domestic and international environments and increases their business values (Parida and Wang 2018; Mellahi et al. 2016). These strategies help firms in their survival and avoid regulatory burdens. He and Shen (2017) demonstrate that firms achieve the latest technologies and resources by implementing ISO 14001, which can be used to gain efficacy, and improve environmental performance and effectiveness that ultimately enhances firms' profitability, performance, and reputation (Russo 2009; King and Lenox 2001; Klassen and McLaughlin 1996).

According to the institutional theory, a corporate strategy attains a symbolic value when it spreads across the population and gains popularity in terms of providing legitimacy. Hence, firms adopt these strategies, such as the ISO 14001 standard, by realizing their positive effects and by being influenced by mimetic pressure from competitors (Christmann and Taylor 2006). Alternatively, as more and more firms around the globe start adopting a specific corporate strategy, it becomes a taken-for-granted strategy. Based on this argument, Zajac and Westphal (2004) suggest that, as usual, acceptance toward a specific corporate strategy such as ISO 14001 certification varies globally, and such corporate strategies turn out to be dominant among dominant multinational firms. Domestic firms probably adopt these strategies because of mimetic pressure from competitors. ISO 14001 certification is considered to be a strategic response to those initiative pressures that do not cover the trade-offs among the real environmental reactions and the symbolic environmental obligations between the organizations (Delmas and Burbano 2011). Stakeholders are usually unable to monitor the firms' environmental performances and underlying policies, and thus firms' environmental managing systems purposefully present firms' environmental commitments in front of stakeholders (Bowen and Aragon-Correa 2014). Delmas and Montes-Sancho (2010) state that, being influenced by competitive pressure, firms may adopt ISO 14001 symbolically. But in reality, they have poor environmental performance (Boiral 2007).

Adoption of corporate strategies mainly influences the perceptions of key stakeholders, specifically the investors, regarding the performance of the firms, and ultimately controls the corporate strategies' market values. Zajac and Westphal (2004) discuss this market learning perception and state that perceptions of the investors regarding a corporate strategy mainly depend on the historical records related to gaining the effective advantages by adopting that particular corporate strategy. Empirical evidences help market participants and key stakeholders to know about any corporate strategy and take decisions based on the empirical findings. Market learning perspective assumes that if empirical evidences indicate less favorable outcomes from a specific organizational strategy, investors consider it less fruitful and make decisions based on prior efficacy outcomes. Based on the perspectives of market learning and efficiency of corporate strategies, empirical evidences related to the use of corporate strategies and their effective outcomes keep updating over time (Zajac and Westphal 2004). Basically, this stored, publicly available empirical information helps investors to make better decisions related to current and future investments, as investors mainly prefer efficient and effective outcomes (in some cases they also consider the prior efficient outcomes of corporate strategies). Hence, markets partners make decisions regarding the adoption by considering the market value of a specific strategy based on past experiences.

Boiral and Henri (2012) indicate that companies are gradually adopting the ISO 14001 certification without in fact executing the standards. As the environmental managing standards are not properly executed, these do not improve the efficiency related to economic and environmental outcomes (Boiral 2007). In return, as firms fail to execute these standards over time, their projected efficient advantages based on the implementation reduce, and the response of the investors consequently deteriorates. All these efficient outcomes and failed executions are available globally based on the empirical findings for the domestic firms. ISO 14001 certification offers a gateway for firms to gain legitimacy among numerous stakeholders, and provides an inside-managing tool. However, this aspect of outward appreciation is frequently considered to be the purpose of adopting the ISO 14001 standard, but it is still not inevitably linked to the aim of achieving efficacy and enhanced environmentally friendly practices, or compatible with these objectives (Heras-Saizarbitoria and Boiral 2013; Delmas and Montes-Sancho 2010). Therefore, firms dissociate their ongoing compliance practices from their former environment-related managing practices by positioning and organizing the prevailing recognized structures, while evading the incorporation of these standards into day-to-day operations of the firms.

Implementation of ISO standards by the firms to confirm the dominant institutional reasons, and then by overlooking the actual execution of the standards, makes the efforts unproductive (Boiral 2003). Existing findings on organizational dissociation reveals that these kinds of reputational managing strategies may bring a loss to the internal and external legitimacy that ultimately affects the outcomes of the firms. MacLean and Behnam (2010) claim that firms' efforts to achieve legitimacy through dissociation produces a legitimacy deception. This legitimacy deception allows non-compliance or institutional misconduct, and eventually creates a loss in terms of reductions in external legitimacy. Observing the comprehensive influence of symbolic implementation of ISO 14001 certifications, Aravind and Christmann (2011) also explain that dissociation of execution from the certification jeopardizes the market trust, as the certification cannot exactly indicate the better environment-related performance and impress the external stakeholders such as government, investors, communities, etc. MacLean et al. (2015) state that dissociation of recognized certifications generates inauspicious impacts on perceptions of the initiatives' related to the legitimacy for numerous stakeholders and firms' results.

The empirical findings related to investigating the influence of implementation of ISO 14001 certification by the firms on their performances vary across the firms and regions, and the findings still appear to be indecisive. The advocates of adoption of ISO 14001 certifications claim that organizations adopt voluntary systems to overcome environmental issues and build their social image (Pacana and Ulewicz 2017), and adoption of ISO 14001 certification can be considered favorable among the firms in the financial market as it shows financial and environmental assurances, and enhances operational competences and helps firms to attain legitimacy (Delmas and Montiel 2007).

Dowell et al. (2000) analyze the impacts of adoption of ISO 14001 on the market-based valuation of USA's transnational companies, as represented by Tobin's Q ratio, and find a substantial positive effect. Similarly, Wahba (2010) also used Tobin's Q ratio to measure the market performance, and the findings suggest that firms' performances are positively influenced by the adoption of ISO 14001 certification. Lo et al. (2012) investigate the financial impact of ISO 14001 on textile and fashion firms. They show that ISO 14001 helps firms to get short-term financial gains. They report that financial gains started in the implementation period and remained for one year after the certification. Announcement of the adoption of the ISO 14001 standards helps to gain a substantial positive effect on the stock values (Jacobs et al. 2010). Chen et al. (2018) also indicate a positive financial impact of green performances. Klassen and McLaughlin (1996) also show a positive effect of ISO 14001 certification on the valuation of the stocks. Nevertheless, the extent of its impact differs across countries. Flammer (2013) argues that investors' reactions are positive towards pro-environment corporate actions and negative towards the environmentally destructive corporate actions.

However, there exist some studies indicating no or negative effects on market performance of the adoption of ISO standards. For example, Aarts and Vos (2001) find no significant association among firms' certification announcements and corporate performance in cases of New Zealand firms. Lee et al. (2008) investigate the behavior of Taiwanese firms and reveal that certification announcements cause a negative impact on corporate performance. Likewise, Cañón-de-Francia and Garcés-Ayerbe (2009) show that in case of Spanish firms, the adoption of ISO 14001 standards is linked with lower share prices and reduced shareholders' wealth. These varying results about the influence of adopting ISO 14001 certification on the corporate performances are mainly because of different research settings and likely endogeneity problems (King and Lenox 2001). Heras-Saizarbitoria et al. (2011) investigate selection versus treatment effects of ISO 14001, and whether better financial performance is due to ISO 14001 or ISO 14001 precedes financial performance. They find that the firms with better financial performance have a higher propensity to certify their EMSs with ISO 14001. They also find that there is no significant increase in financial performance after certification. Positive significant impacts due to pro-environmental initiatives are more likely to arise in well-developed countries, while such financial advantages might not exist in developing countries, such as India (Docking and Downen 1999).

Based on the above detailed discussion over existing studies and considering the diverse evidences, this study can argue that the association among market performance and adoption of ISO 14001 certification is indecisive, i.e., it can be positive, neutral, or negative. But importantly, it can be considered as the first step towards the more enhanced EMAS system. Yadav et al. (2016) identify the key factors, such as socio-cultural setting, regulatory framework, economic conditions, stakeholders trust, and institutional complexities, while determining the effect of environmental management systems on corporate outcomes. Along with these factors, different laws and rules related to environmental management and different economic systems of various countries create the scarcity of resources for the firms, which in return generates different effects of firms' environmental policies on their performances (MacLean et al. 2015). These factors can vary, specifically due to the inefficient institutional settings of emerging countries in terms of business ambiguity and risk evasion, political instability, poor implementation of standards, and inefficient markets as compared to developed countries (Dixon-Fowler et al. 2013). According to the perspective of corporate finance, financial responses (in terms of investors and stock market) to the implementation of corporate strategies indicate the evaluation of the market to assess the efficiency gains achieved through adopting the environment-managing tools by the firms. That evaluation is mainly affected by the existing empirical evidences. These efficiency advantages are strictly related to the successful implementation of corporate strategies.

So, to bridge the literature gap and address the empirical limitations, employing event study methodology by Barber and Lyon (1996) this study aims to determine whether investors in India appreciate the adoption of ISO 14001 by domestic firms, in terms of their market performance.

3. Data Sources and Methodology

3.1. Sources of Data

The focus of this study is on listed domestic firms of India. There is no database in India containing the ISO 14001 statuses of the firms, so we manually collected the ISO 14001 information of the firms from their websites, and quarterly and CSR reports. As there are thousands of firms listed on Mumbai Stock Exchange, it was difficult to manually search all the firms, and so we randomly selected 1000 listed Indian domestic firms. This study defines 2012 as its event year in order to capture the long-term effects of ISO 14001 adoption. In the initial search, we found 749 ISO 14001-certified firms from India. We selected only domestic firms, and this filter drastically decreased our sample to 196 firms. We only included firms that were certified in the year 2012. After removing the firms with missing ISO 14001 certification year and those which were certified in years other than 2012, our number of firms reduced to 69. Next, we removed financial firms from our sample, leaving the sample with 64 firms. Finally, we searched the financial information of the remaining firms from the OSIRIS database. After removing the financial firms and the firms with missing or incomplete financial information, we were left with 62 ISO 14001-certified firms.

3.2. Methodology

This study employs the event study and control methodology to examine the impact of ISO 14001 on market performances of the certified firms, as proposed in a seminal work of [Barber and Lyon \(1996\)](#). This methodology has been extensively used by prior studies to investigate the financial performances of ISO standards ([Corbett et al. 2005](#); [De Jong et al. 2014](#); [Candido et al. 2016](#)). This methodology can be used to compare the performances of the firms certified with the ISO 14001 standard with the firms without certification. There are three critical choices while employing an event study and control methodology ([Barber and Lyon 1997](#)), which are discussed below:

- **Well-Defined Event:** On the top, the initial task of employing event methodology is to define the well-defined specific event of interest and to isolate the time period for which the financial outcome proxies (Retrun on sales, Return on assets, Tobin's Q, etc.) in the particular well-defined event will be investigated, known as the "event window". This study defined ISO 14001 certification as the event of interest and defined the event period as the year in which firms got certified with ISO 14001. The abnormal performance in the Tobin's Q is investigated over a long post-event window of four years.
- **Selection of Control Firms:** The primary objective of the event study is to isolate the short-term impact of a specified event as the underpinning theory, efficient market hypothesis theory ([Fama 1991](#)), emphasizes on short-term performance. Therefore, the use of event study to measure long-term performances might be biased. Particularly, there are two issues associated with event study methodology while evaluating long-term performance ([Hendricks and Singhal 2005](#)). The first problem is to find the factors that are required to be controlled while evaluating the long-term analysis. Prior researches identified previous performance and size of the firm as important factors that affect a company's performance ([Carhart 1997](#); [Fama and French 1996](#)). Following prior literature ([De Jong et al. 2014](#); [Candido et al. 2016](#); [Corbett et al. 2005](#)), we used ROA and total assets as control variables. The second problem associated with event study methodology is the cross-sectional dependency caused by overlapping time periods among the sample firms while evaluating long-term performance variables. Prior studies suggested one-to-one matching to overcome this issue ([Lyon et al. 1999](#); [Barber and Lyon 1997](#); [De Jong et al. 2014](#)). Therefore, this study also used one-to-one matching criteria, where each certified firm is matched with a non-certified one that has a close pre-event ROA, size, and industry (using two-digit SIC codes).

For each certified (sample) firm, this study selected three types of non-certified (control) firms on the basis of three different matching criteria: ROA and size, ROA and industry, and size and industry.

In the first matching criteria, we selected the control firm that had a pre-event ROA between 90% and 110% of the sample firm’s ROA, and the total assets of the control firm had pre-event total assets of between 50% and 200% of the sample firms’ total assets. We restricted the control firms’ pre-event ROA to be between 90% and 110% of sample firm’s ROA, because the results would be more meaningful when the control firm’s ROA was closest to sample firm’s ROA before the event. In the second matching criteria, we selected control firms using one-to-one matching criteria. Those firms which had a pre-event ROA between 90% and 110% of the sample firm’s ROA were selected as control firms, and the control firm must belong to same industry. Lastly, in the third matching criteria, we selected control firms again using one-to-one matching criteria. Those firms which had pre-event total assets between 70% to 130% of the sample firms were selected as control firms. Here, we used much stricter criteria for total assets to ensure reliability of our results. Our ambition was to select the ISO 14001 non-certified firms that were closest to the ISO 14001-certified firms in term of assets. In doing so, we further restricted the non-certified firms’ assets to lie between 70% to 130% of the certified firms.

Expected and abnormal performance: The expected performance is defined as the performance that would be expected if no specific event were to take place, and the abnormal performance is the difference between expected and actual performances of the sample firms. The mathematical formula is as follows:

$$AP_{i,t-1,d} = P_{i,t-1+d} - [P_{i,t-1} + (PI_{i,t-1+d} - PI_{i,t-1})] \tag{1}$$

where $AP_{i,t-1,d}$ is the abnormal performance of firm i from year $t - 1$ to $t - 1 + d$, using $t - 1$ as the base year; $P_{i,t-1+d}$ is the actual post-event performance of firm i (sample firm) during the period $i, t - 1 + d$; $P_{i,t-1}$ is the actual performance of firm i (sample firm) during the base year $t - 1$; $PI_{i,t-1+d}$ is the actual post-event performance of firm i (control firm) during the period $i, t - 1 + d$; $PI_{i,t-1}$ is the actual performance of firm i (control firm) during the base year $t - 1$; $[P_{i,t-1} + (PI_{i,t-1+d} - PI_{i,t-1})]$ is the expected performance of firm i without the event in the period $i, t - 1 + d$, and it is the summation of the sample firm’s performance before the event during the period $t - 1$.

This study used paired sample t -tests (parametric), Wilcoxon signed-rank (WSR) tests (parametric), and Binomial sign tests (non-parametric). The WSR test is more powerful and appropriate than its counterparts (Barber and Lyon 1996). Therefore, we interpreted the significance of our results with the WSR test. Additionally, findings employing the t -test and Binomial sign test are also reported.

4. Analysis and Results

Table 1 shows descriptive statistics for the sample and control firms matching for ROA and size in the year 2011 (one year before the event). The mean values of the sample firms reported total assets of \$6637.753 millions of dollars, sales of \$6845.763 millions of dollars, return on assets of 9.425%, return on sales of 12.528%, and a Tobin’s Q ratio of 1.578.

Table 1. Descriptive statistics for sample and control firms matched by ROA and size (year 2011).

	Mean	Median	Standard Deviation	Maximum	Minimum
Sample firms					
Total Assets	6637.753	4012.324	7684.287	31,452.125	637.427
Sales	6845.763	3995.985	7985.958	44,348.223	898.64
Return on Assets	9.428	7.24	9.421	30.19	−7.3
Return on Sales	12.528	9.989	14.62	62.78	−9.217
Tobin’s Q	1.578	1.352	1.304	5.317	0.041
Sales	1792.634	1385.156	18,925.846	12,856.245	387.519
Control firms					
Total Assets	2784.646	1372.073	4394.864	29,876.567	359.526
Return on Assets	8.412	8.135	10.254	34.39	−16.87

Table 1. Cont.

	Mean	Median	Standard Deviation	Maximum	Minimum
Return on Sales	8.658	7.556086	10.745	44.251	−22.0945
Tobin’s Q	1.552	1.352	1.474	5.985	0.03

Total assets and sales are in millions of dollars, return on assets and return on sales are in percentages, and Tobin’s Q is a dimensionless measure.

Meanwhile, the mean values of the control firms reported total assets of \$2784.646 millions of dollars, sales of \$1792.634 millions of dollars, return on assets of 8.412%, return on sales of 8.658%, and a Tobin’s Q ratio of 1.552. For the purpose of comparing the sample firms with the control firms, we mainly focused on return on assets and size of the firms, and it can be seen from the descriptive statistics that the ISO 14001-certified firms were close to non-certified firm in the pre-event year (2011).

4.1. Main Results

The abnormal performances in the market performance of the firms, which we measured through Tobin’s Q, are reported in Table 2. The mean and median columns show the abnormal performances in the Tobin’s Q of the sample firms along with Wilcoxon Signed rank test (WSR), *t*-test, and sign test. We can see from the table that there were no significant differences between ISO 14001-certified and non-certified firms before the event, which prove that we best selected the control firms with sample ones. Table 2 shows the short-term and long-term abnormal performances in market performance over the four-year time period (from 2013 to 2016).

The first row (2010–2011) shows the abnormal performances for the year before the year of certification, i.e., when firms decided to take ISO 14001 and start working on it. The second row (2011–2012) reports the abnormal performances (in Tobin’s Q) in the event year. The third row (2012–2013) shows the abnormal performances after the event year, and so on. The rows 2011–2013, 2011–2014, 2011–2015, and 2011–2016 show the accumulated or long-term abnormal performances of certified firms for four years.

It can be noted from the results that abnormal performances in market performance, proxied by Tobin’s Q, were negatively significant in both the short and long run. The investors negatively valued ISO 14001 certification following the certification year. However, it can be seen from the results that the magnitude of abnormal performances in Tobin’s Q was less in the long term as compared to the short term. The mean abnormal performance in Tobin’s Q in the period 2013–2014 was −0.073. In 2014–2015, it was −0.635 and for 2015–2016 it was −0.524. One notable difference in the abnormal performances in the long run is that the negative outcomes were gradually increasing, from −0.044 to −0.313, though the magnitude was less than that of short term. Keeping in view the findings of our analysis, we state that the market negatively valued the ISO 14001 certifications in the short term, as well as in the long run.

Table 2. Abnormal performance in market valuation, matched by ROA and size.

Base Year	Final Year	Abnormal Performance (Mean)	Abnormal Performance (Median)	<i>p</i> -Value (WSR Test)	<i>p</i> -Value (<i>t</i> -Test)	<i>p</i> -Value (Sign Test)
2010	2011	0.147	0.082	0.171	0.534	0.164
2011	2012	0.313	0.204	0.115	0.399	0.164
2012	2013	−0.366	−0.189	0.002 ***	0.004 ***	0.000 ***
2013	2014	−0.355	−0.073	0.000 ***	0.000 ***	0.000 ***
2014	2015	−0.619	−0.635	0.000 ***	0.000 ***	0.000 ***
2015	2016	−0.628	−0.524	0.000 ***	0.000 ***	0.000 ***
2011	2013	−0.048	−0.044	0.021 ***	0.000 ***	0.000 ***
2011	2014	−0.203	−0.067	0.000 ***	0.000 ***	0.000 ***
2011	2015	−0.305	−0.228	0.000 ***	0.000 ***	0.000 ***
2011	2016	−0.377	−0.313	0.000 ***	0.000 ***	0.000 ***

*** denotes *p* < 0.01.

4.2. Alternative Tests

With the purpose of ensuring the reliability and robustness of our findings, and to ensure that our findings were not specific to the selection criteria of control firms, we re-estimated our results with two more different one-to-one matching criteria of selecting control firms. In the first robustness test, we selected control firms on the bases of pre-event returns on assets and industry, and we selected those firms which must have had ROA that lie between 90% and 110% of sample firms’ ROA and also belonged to same industry as the sample firms, identified by two-digit SIC codes. In the second robustness test, we selected control firms on the bases of pre-event total assets and industry. We selected those firms which had total assets that lie between 70% and 130% of the sample firms’ total assets and belonged to same industry as the sample firms, identified by two-digit SIC codes. In the second robustness test, we employed much stricter criteria for the total assets, to ensure the robustness of our findings. The abnormal performances in the Tobin’s Q with these two matching criteria are reported in Tables 3 and 4. It can be observed from the results of the alternative tests that our findings here are similar to the main findings reported above. Specifically, after the event period, there were clear statistically significant negative abnormal performances observed in the Tobin’s Q values. Like the main results, the magnitude of the abnormal performances in Tobin’s Q were more in the short run than in the long run. The patterns of abnormal performance in Tobin’s Q were very similar to the main results. So, we conclude that using a different matching criterion for control firms does not change the nature of the main findings.

Table 3. Alternative test: Abnormal performance in market valuation, one-to-one matched by ROA and industry.

Base Year	Final Year	Abnormal Performance (Mean)	Abnormal Performance (Median)	p-Value (WSR Test)	p-Value (t-Test)	p-Value (Sign Test)
2010	2011	0.035	−0.102	0.002 ***	0.001 ***	0.001 ***
2011	2012	0.431	0.084	0.488	0.571	0.771
2012	2013	−1.113	−0.89	0.00 **	0.024 ***	0.02 ***
2013	2014	−0.533	−0.817	0.5006	0.6767	0.3621
2014	2015	−0.521	−0.558	0.08 **	0.192	0.301
2015	2016	−0.464	−0.39	0.07 **	0.312	0.01 ***
2011	2013	−0.448	−0.423	0.02 ***	0.04 ***	0.02 ***
2011	2014	−0.478	−0.536	0.00 ***	0.00 ***	0.00 ***
2011	2015	−0.489	−0.574	0.00 ***	0.00 ***	0.00 ***
2011	2016	−0.484	−0.542	0.00 ***	0.00 ***	0.00 ***

** denotes $p < 0.05$ and *** denotes $p < 0.01$.

Table 4. Alternative test: Abnormal performance in market valuation, one-to-one matched by size and industry.

Base Year	Final Year	Abnormal Performance (Mean)	Abnormal Performance (Median)	p-Value (WSR Test)	p-Value (t-Test)	p-Value (Sign Test)
2010	2011	0.03	0.02	0.807	0.728	0.754
2011	2012	1.64	1.01	0.1587	0.112	0.2145
2012	2013	−2.59	−2.56	0.076 **	0.042 ***	0.435
2013	2014	−2.34	−2.24	0.00 ***	0.00 ***	0.00 ***
2014	2015	−2.24	−2.16	0.00 ***	0.00 ***	0.00 ***
2015	2016	−2.33	−2.35	0.00 ***	0.00 ***	0.00 ***
2011	2013	−0.035	0.04	0.712	0.812	0.952
2011	2014	−0.501	−0.646	0.004 ***	0.002 ***	0.000 ***
2011	2015	−0.667	−0.852	0.000 ***	0.000 ***	0.000 ***
2011	2016	−0.714	−0.104	0.000 ***	0.000 ***	0.000 ***

** denotes $p < 0.05$ and *** denotes $p < 0.01$.

5. Conclusions and Discussion

This study analyzed the empirical effects of ISO 14001 on stock market performance in cases from India. Prior studies on ISO 14001 revealed that, commonly, ISO 14001 and market equity relate positively, with a consistent performance in the long run. These privileges are backed by the conception that image building and organizational legitimacy can be achieved through environmental management systems (EMS) (Zajac and Westphal 2004; Castka and Prajogo 2013). In contrast, the current study does not support the positive relationship between ISO 14001 and stock market performance in the case of emerging economies, i.e., India. Our results are consistent with the studies which find that ISO 14001 negatively related with market performance (Fisher-Vanden and Thorburn 2011; Aarts and Vos 2001; Cañón-de-Francia and Garcés-Ayerbe 2009). This conflicting result is because of the different cultural contexts of emerging countries, consisting of different norms, culture, economic conditions, beliefs, and institutional environment (Zhong 2015). The current study contributes to the existing literature by providing a relationship between environmental and financial performances in the following manners.

Firstly, there is sufficient discussion about ISO 14001 and firms' performances, but most of the studies are focused on developed countries (Aarts and Vos 2001; Cañón-de-Francia and Garcés-Ayerbe 2009; Wahba 2010; Dowell et al. 2000; Paulraj and De Jong 2011) with very little focus on emerging countries. Social, regulatory, and market forces are different between emerging and developed countries, and these forces are the key determinants of the organizational environmental tactics, which would result in adverse effects on financial outcomes in developing economies. By considering India, the current study contributes to the existing body of literature by empirical validation of the relationship between financial outcomes and ISO 14001 in an emerging economy.

Secondly, the prior studies focused on international/multinational firms and neglected domestic firms. The current study is a first study of its kind to examine the relationship among ISO 14001 and market performance in cases of domestic firms. Derivative and isomorphic forces are the key forces from multinational firms to domestic firms regarding environmental policy implementation to be sustained in the marketplace. Thirdly, the current study additionally explores the probable justification regarding the revealed negative relationship between market performance and ISO 14001 in cases of emerging countries.

In an emerging economy like India, customer priorities and environmental guidelines are different from those of developed economies (Marquis et al. 2011). The results of the current study are consistent with the prior studies' results which quoted a negative relationship between market performance and ISO 14001 (Aarts and Vos 2001; Zhao 2008; Cañón-de-Francia and Garcés-Ayerbe 2009). In emerging economies, the greatest investor concern is material security, and they considered ISO 14001 to be an additional cost on the firm (Globerman and Shapiro 2009). The investors' decision behaviors can be described by investor-specific norms and customs (Hong and Kacperczyk 2009). In the same vein, investors act according to their mental biases, based on their norms and customs, instead of acting rationally. Thus, specified norms and socio-ethnic factors may affect investors' perceptions and actions regarding corporate environmental creativity. Environmental consideration is the manifestation of good-life afar the money-oriented concerns, which results in increasing security and prosperity under the developed world. In cases of emerging economies, i.e., India, the situation is quite the opposite. The organizational concern regarding environmental protection is not significantly important to investors in India, as they are more concerned about monetary profits. Furthermore, investors are important players of the society, where societal customs and norms have significant implications on their decision-making processes. They assess adoption of environmental strategies like ISO 14001 negatively.

In light of this perception, environmental management systems are supposed to be a responsive initiative to the mimetic pressure from international firms towards domestic firms, rather than true implementations of ISO 14001. Similarly, trust in investors' decisions also supports the negative relationship among environmental management and stock market performance in developing markets. A wide range of prior literature quoted that where organizations enjoy investors' loyalty, confidence, and trust, investors do not vacillate while paying high premiums (Yee et al. 2010;

Hammond and Slocum 1996). On the other side, this positive image of the firm, in the lenses of investors, positively affects organizational performance. Furthermore, the scenario may be quite different in cases of developing countries where weak regulatory bodies, ambiguous public policies, and poor judicial systems exist (Montiel et al. 2012). In light of the above discussion, finally, the current study argues that mental approaches of investors and ISO 14001 are negatively associated in cases of emerging countries of the region which, in response, affects the firms' performances negatively.

This research has important policy implications for managers and policy makers. The negative association between market performance and ISO 14001 in the case of emerging markets has significant interference for the enhancement of environmental management systems. It is necessary for managers and policy makers to dig out the main invisible causes of this negative association. To cope with the issue, changing the awareness of investors' is very important regarding the welfares of environmental management schemes (Jacobs et al. 2010), for example with mind-changing initiatives of the investors regarding environment management schemes by the management of firm aiming to certify with ISO 14001. Furthermore, the efforts of government offices and NGOs should be directed towards investors' awareness regarding environment management. Similarly, firms having ISO 14001 certifications should also address their investors and all the stakeholders regarding the benefits of voluntary ISO 14001 adoption.

The study points out its limitations to provide venues for future research. This study does not study the interaction between EMAS and ISO 14001. Firms already having EMAS are left with less space to get benefits from ISO 14001. Furthermore, the current study is only focused on India and domestic firms. Further studies should be conducted on other emerging countries and multinational firms for more suitable inferences. Further survey-based studies should also be conducted to identify the factors responsible for the negative positioning of environmental strategies in the lenses of investors in emerging countries. The current study revealed that environmental management schemes do not help in achieving legitimacy and, as a result, harm market performance. Further studies can be conducted to determine the forces that can help ISO 14001 to get legitimacy among stakeholders. Further researches can also be conducted to analyze selection effects versus treatment effects, in order to get a clearer picture of whether ISO 14001 leads to better financial performance or firms with better financial performance have improved performance preceding ISO 14001 adoption. Lastly, other methodological approaches, i.e., using Panel or Difference and Difference methodologies, may advance the current aspects of the study, as the event study cannot clarify all the dimensional explanations and was also unable to investigate the possible interference of other macro- and micro-level control variables (like environmental regulations in the country, growth opportunities, size, and industry) on the relationship between ISO 14001 and market performance.

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