

## Appropriateness of Performance Measures to Strategic Orientation Toward Sustainability

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**Abstract:** This study aimed to determine the appropriateness of performance measures to strategic orientation toward corporate sustainability. It was applied on the Saudi industrial firms listed on the Saudi Securities Exchange Market. The study community was divided into two groups, i.e., petrochemical firms and firms involved in other industries. Data were collected using a questionnaire designed for this purpose in addition to some unstructured interviews and reports of some firms published on the internet. The study results reveal that with the exception of the environmental dimension there is no difference between the petrochemical firms and the other industries. Besides, there is lack of appropriateness between the performance measures of strategic orientation toward sustainability and the tendency of the Saudi industrial firms to measure sustainable performance using economically centered measures.

**Key words:** Sustainable performance, sustainability strategic, EVA, BSC and performance measurements, Saudi industrial firms, measures

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### INTRODUCTION

According to the World Commission on Environment and Development (WCED), sustainability as a general concept refers to “Development which meets the needs of current generations without compromising the ability of future generations to meet their own needs of natural resources” (Burton, 1987). Therefore, the characteristics of sustainable development as an activity are identified by taking into account the rights of future generations, the long-term focus and the non-depletion of natural resources. In other words this is an integrated development that hinges on the coordination between the resource consumption policies, investment trends and technology selection and that combines them all to work in harmony within and ensure preservation of the ecosystem and at the same time achieve the desired development.

Despite the fact that policies of and reports on sustainable development are essentially a matter of national responsibility, the increasing pressure on business organizations by relevant stakeholders has not only transferred the brunt of this responsibility from governments to business organizations (Isaksson and Garvare, 2003) but also given birth to the concept of “Corporate sustainability”. This concept has recently been gaining greater and greater significance and growth in the accounting thought (Hahn and Figge, 2011; Linnenluecke and Griffiths, 2010; Matos and Silvestre,

2013; Herbohn *et al.*, 2014). Apparently, the concept of corporate sustainability is no different from the concept of macro-level sustainability, considering that corporate sustainability, too, highlights long-term focus as one of its most important features (Dyllick and Hockerts, 2002). According to the World Business Council for Sustainable Development (WBCSD), corporate sustainability refers to the commitment of firms to fulfill overall sustainable development and assist employees and the community to improve the quality of their life (Anonymous, 2004, 2018). Jamali (2006) reformulated this concept more accurately she defined corporate sustainability as the organization’s skills to maintain and deploy resources concomitantly to reflect positive environmental, societal and economic performance in the long term.

Shy attempts to report on the sustainable performance of organizations began at the turn of the 3rd millennium by adding data on the environmental and social dimensions to the reports of some firms such as Shell, Dow Chemical, Nissan and Ford Motors (Clikeman, 2002). The purpose was to collect information and data needed to measure and analyze the burdens and benefits realized by relevant stakeholders. Such trends complied with the recommendations of several studies regarding the need to shift manager’s attention from short-term financial results to long-term sustainability by the integration of environmental and social objectives in the long-term strategic plans (Dyllick and Hockerts, 2002; Gladwin, 1995). The logical premise for that is the idea that

the measurement of the environmental and social impacts along with the economic ones would reflect all the efforts undertaken by the enterprise in order to maintain its market share that ensures the realization of the target profit in addition to the efforts exerted at the same time to preserve environment and maintain the rights of workers, consumers and future generations. This in turn, prompted the sustainable performance measurement to adopt a strategic perspective and move toward measuring and expressing performance from three integrated dimensions: economic, environmental and societal the three combined are known as the Triple Bottom Line (TBL) (Bieker, 2001; Elkington, 2004; Kumar, 2014).

As accounting is the language of business, organization's strategic orientation toward achievement of sustainable performance prompted accounting literature to pay attention to the issues of identification, measurement and delivery of economic, environmental and societal impacts and incorporate these issues in to organization's strategy and administrative decisions (Deegan, 2002). Burritt and Schaltegger (2001) classified such attention into three main approaches. The inside-out approach is primarily based on the management of the various areas of the sustainable development dimensions and integrating them in to organization's strategy and mean while paying attention to the collection and delivery of information needed to support internal administrative decision-making processes on the implementation of this strategy. The outside-in approach is based largely on stakeholder's point of view. Finally, the twin-track approach expresses an integrated view between the internal point of view (represented by the enterprise management) and the external point of view (of the stakeholders) and is considered one of the best and most comprehensive and appropriate approaches for the purposes of decision-makers. The case is more particularly, so as the accounting literature is still committed to TBL viewpoint for measuring sustainable performance, i.e., by dividing performance measures into three main dimensions in accordance with TBL concept (Bell and Morse, 1999, 2003, 2008; Boron and Murray, 2004; Schaltegger and Wagner, 2006; Epstein, 2008).

In spite of the comprehensiveness and superiority of the integrated approach there are many challenges faced by enterprises to achieve integration of the internal and external points of view, particularly with regard to the development of performance indicators and measures that are associated with the various areas of the sustainable performance dimensions and which can measure the success of organization's strategic orientation in this regard. Venkatraman and Nayak (2010) indicate that there is a wide gap between theory and practice with

regard to sustainability because many organizations lack knowledge of the overlapping relationships of TBL dimensions. Jamali (2006) believes that the essence of the problem lies in the management of the conflicting relationships between the three dimensions in a way that realizes the overall goal of sustainability but without having a significant impact on the performance of one dimension at the expense of another one. Asif *et al.* (2008) explicitly confirm that most of the tools and techniques used in sustainability management failed to reflect the true picture of sustainability with its three dimensions as these are basically environmental management tools. Joseph (2012) adds that with regard to sustainable performance there is always a gap of interests between the stakeholders and the organization with respect to profit. According to Padua and Jabbour (2015) and Sarkis *et al.* (2006), the problem of the management of conflicting relations can be overcome by managing sustainability through business processes. However, such management is in need of an integrated measurement system because a thing that cannot be measured cannot be managed. Searcy (2011) believes that an integrated system of sustainability measurement should have three major characteristics: capacity to measure progress toward set goals, focus on the long term and capacity to process measurement within TBL framework. These characteristics require the use of various measurement methods beyond the cash-based measurement method in financial accounting or the quantification methods in management accounting. Rather they should include multi-dimensional measurement methods without being solely dependent on one particular method only in order to provide information that can reflect the characteristics of the environmental, social and economic aspects, phenomena and impacts being measured and which can therefore, be used as inputs into the strategic planning process. Moreover, it is equally important that the indicators and measures reflect all performance aspects relevant to these impacts in order to assess organization's success in the achievement of its strategic goals in the context of sustainability. Likewise, Fonseca *et al.* (2011) point out that this issue is not an easy task and even if there is relative success there remains difficulties related to interpreting the results obtained from the performance appraisal process and linking such results with each other, so as to come up with the final (overall) performance of the organization from the perspective of its ability to strike a balance in the realized value for all stakeholders.

Research attempts in this field were headed toward two approaches or models to measure and evaluate sustainable performance. The first model is the Economic Value Added (EVA), given its various advanced

indicators such as the measures of Environmental Economic Value Added (EEVA) and the True Economic Value Added (TRUEVA) (Repetto and Dias, 2006a, b; McDaniel *et al.*, 2000; Rabin, 2006; Aldama and Zicari, 2012). The second model is the Balanced Scorecard (BSC), presented and advocated by Kaplan and Norton in a series of academic and scientific papers and references (Dias-Sardinha *et al.*, 2002, 2007; Dias-Sardinha and Reijnders, 2005; Moller and Schaltegger, 2005; Butler *et al.*, 2011). Both models have pros and cons. For example, EVA provides pure financial signals that reflect overall performance in a monetary form but fails to provide signals on the causes of such performance. By contrast, BSC not only provides such signals but also adds assurances on how far performance keeps up with organization's strategy. However, the determination process of the dimensions of this model in accordance with sustainable performance and the measures of these dimensions remain a matter of broad debate, particularly since any failure in the determination process would result in misleading results. Therefore, it can be said that the investigation of the appropriateness of financial, operational and strategic performance measures to the strategic goals of sustainability still needs exploration and research.

The reasons indicated above can obviously give a big impetus to conduct this research with reference to the Saudi industrial business organizations which are supposed to be concerned more than anyone else with the environmental issues and which at the same time constitute the backbone of the Saudi economy. Such research should assess how far the performance measures used in these organizations are appropriate to sustainability dimensions, according to TBL and the objectives of each dimension and based on the financial and strategic measurement approaches. Studies, such as this one can open up the door to conducting further research to investigate methods to harmonize performance measures and strategic orientation toward sustainability as an intrinsic goal for organizations, particularly in view of the scarcity of research dealing with such issues in the Arab environment in general and Saudi Arabia in particular. Consequently, the key question of this research is:

**R.Q: Do performance measures used in the Saudi industrial corporations reflect the strategic orientations of these corporations toward sustainability according to TBL?:** The answer to this question requires first an analysis of the Saudi industrial sector. By looking at its components, the Saudi industrial sector appears to be dominated by the petrochemical industry activity with a

percentage of about 52% of the total investment in the sector (<http://www.alriyadh.com/860008>). This provides an incentive to determine the differences in this activity's orientations toward sustainability in terms of goals, dimensions and measures compared to the other activities of the industrial sector. Generally, many factors can influence the development of sustainability strategy (Baumgartner and Ebner, 2010). Besides, the petrochemical activity often has negative and detrimental effects on the environment and frequently stirs the concerns of economists, environmentalists and local public opinion (Herbohn *et al.*, 2014; George *et al.*, 2016). Therefore it is relevant here to raise the first research sub question:

**R.Q.1: Does activity type influence the Saudi industrial organization's orientations toward sustainability in terms of dimensions and measures?** The focus on financial measurement using EVA measures as a model of evaluation of sustainable performance creates a need to determine the appropriateness of the measures used in this model to the Saudi industrial organization's orientations toward sustainability. Therefore, the second research sub question can be formulated as follows:

**R.Q.2: Do Saudi industrial organizations adopt EVA measures that are appropriate to their strategic orientations toward sustainability according to TBL?** Strategic measurement of sustainable performance using BSC requires the selection of measures that are capable of determining the extent of success of project in the achievement of its strategic goals. This in turn, gives birth to another sub question, i.e:

**R.Q.3: Do the performance measures of the various BSC dimensions reflect the strategic orientations of Saudi industrial organizations toward sustainability according to TBL?:** The results of this study constitute a direct input in attracting the attention of the Saudi industrial organization to the methodology of aligning performance measures to strategic orientation toward sustainability from TBL perspective.

#### **Literature review and hypotheses development**

**Type of activity, sustainability dimensions and performance measures:** There are many variables that influence organization's strategic orientation toward sustainability and the performance measures used to evaluate the strategic performance of such organizations. In this regard, numerous studies have attempted to determine the impact of some of these variables on performance measures. Using a survey of a number of

organizations in the French market, Gates and Germain (2010) concluded that sustainability indicators are more commonly used in organizations listed on the securities exchange, followed by industrial organizations whereas distribution organizations were the least to use such indicators. The results also revealed that there was no statistically significant correlation between organizations origin and the use of these indicators. Pineno (2013) offered a presentation on how to prepare sustainability reports according to BSC, adding a fifth dimension related to sustainability. The study made a comparison of sustainability reports between the University of North Carolina and the sustainability reports of three other universities. This comparison revealed that BSC-based sustainability reports make it easy to put sustainability strategy in to action.

Bourlakis *et al.* focused on the evaluation of sustainability in a dairy supply chain in Greece. The study results emphasized that major manufacturers were the cornerstone of the sustainability of dairy firms. The results of the study of Quader *et al.* (2016) stressed that, although, UAE medium-sized industrial organizations began to understand the environmental commitments in the framework of sustainability, these organizations did not show willingness to implement sustainability initiatives over the next short-term period. The study classified the studied organizations into public and private but observed no difference between both groups in terms of the general objective of the study. The construction sector was present in the study of Tan *et al.* (2015) which tested the relationship between sustainability and competitive advantage on an international level with "Competitive advantage" interpreted in terms of international revenues. The results of the study generally revealed a positive correlation between sustainable performance and revenues from international contracts. Siminica *et al.* (2015) showed the superiority of the activity of energy industry over the rest of industrial activities in the Romanian industrial sector, i.e. in connection with the strategic orientations toward sustainability from an environmental perspective. Based on a survey of public sector institutions in Australia, Adams *et al.* (2014) found that sustainability measures were least used in surveyed organizations which were often concerned with the measures of efficiency and effectiveness and to a lesser extent, learning and growth. The study concludes that it was not expected to adopt comprehensive sustainability measures because there were no mandatory directives to impose such measures on the one hand and because sustainability was not one of the competitiveness hubs in the Australian business environment on the other hand. Adams (2013) exposed

that sustainability reports and sustainability management practices at universities are still largely primitive compared with sustainability reports and practices in other sectors and are far from realizing the benefits of the potential of the academic sector to bring about an impact on changes related to knowledge transmission. James (2015) aimed to explore the views of accounting practitioners and scholars on sustainability reports and integrated reports, focusing on the expected benefits to stakeholders, scope and type of information covered by the report, report time-frame and the need for internationally acceptable reporting standards. The results of the study revealed that in the preparation of sustainability reports, accountants showed a preference for information related to environment and safety, community and personnel and corporate governance of organizations whereas accounting scholars tended to emphasize that sustainability reports would be more useful to big organizations than to medium and small size ones. The study also concluded that the existence of high-quality sustainability reporting measures, along with such aspects as mandatory reporting and report integration, would improve periodic sustainability reports. Gadenne (2012) attempted to explore the relationship between sustainable performance management practices and sustainability indicators according to organization size. Data were collected using a questionnaire sent to 314 medium-size and large organizations in Australia, as well as personal interviews with some managers. The study results indicate that organizations applied eight management practices related to sustainable performance in order to develop seven key sustainable performance indicators and that there was a positive relationship between each of the sustainability management practices with at least one of the sustainable performance indicators. Herbohn *et al.* (2014) tried to highlight the relationship between sustainability disclosure and sustainable performance developments by analyzing data from 339 extractive industry firms listed on the Australian Securities Exchange (ASX). The results confirmed that there was of a positive relationship between the two research variables. George *et al.* (2016) stressed that the integration of sustainability in to performance management systems could lead to better sustainability monitoring, particularly in oil and gas industry.

It is noted that previous studies have tried to focus on organization size (Gadenne *et al.*, 2012; James, 2015) or type of activity (Adams, 2013; Pineno, 2013; Gates and Germain, 2010) from the perspective of the used measures only without extending to sustainability dimensions which have a direct impact on the measures used. Those studies that focused on the petrochemical industry

(Siminica *et al.*, 2015; George *et al.*, 2016; Herbohn *et al.*, 2014) did not provide information about the impact of this type of industry on sustainability compared to other industries both in terms of strategic orientations or measures. In applying this study to the Saudi industrial sector, therefore, the first hypothesis of this study can be formulated as follows:

- H<sub>1</sub>: the type of industrial activity has a significant effect on sustainability dimensions and sustainable performance measures

**EVA measurements and sustainable performance:**

McDaniel *et al.* (2000) presented EEVA measure as a financial measure for occupational health and safety strategies. Their study found that only a small number of organizations took in to account occupational health and safety strategies while conducting financial performance measurement by use of EVA which can be considered as the cornerstone for the evaluation of the financial contributions to the occupational health and safety strategies applied through the EEVA Model. The study also confirmed that ensuring effective adherence to the application of occupational health and safety strategies enhanced enterprise's ability to create value and that the management of activities by means of these strategies required a follow-up of the operational results of these activities and determination of the extent of their impact on the final financial results. Repetto and Dias (2006a, b) developed EVA measure to include costs of environmental damage caused by organization and proposed and applied TRUEVA measure on a group of energy firms before returning to use the model again on some electricity and aviation organizations in USA to assess enterprise's ability to cover the environmental impacts caused by its activities and operations from the surplus of operation processes without compromising organization's ability to attract or maintain the current capital. Rabin (2006) stresses on the possibility to use TRUEVA effectively to show organization's environmental dimension to the investors who prefer to invest their money in investments less vulnerable to environmental risks and consequent financial risks. The study also maintains that TRUEVA can provide useful guidance for the management to enhance its ability to track the opportunities to improve organization's environmental performance, thereby increase the financial benefits resulting from this performance and in turn influence organization's overall financial performance. In addition, Rabin indicates that it also plays the role of a benchmark to compare the performance of an organization with that of other similar organizations. Aldama and Zicari

(2012) presented a set of practical experiments on EVA-based reporting in Latin America in order to highlight the limitations of reports based on the foundations of traditional financial accounting to display information that would not go beyond social corporate responsibility.

The majority of the above-mentioned studies agree that it is useful that EVA measures include external social and environmental costs and benefits of the activities of organization's internal operations because this can give a clear picture of the extent of success of the applied environmental and social strategies to improve the final results of performance in financial terms and also represent a way to convey organization's objectives and achievements to stakeholders. However, these studies did not attempt to examine the relevance of this measure to organization's concern with sustainability in terms of economic, social and environmental dimensions. Therefore, the second hypothesis of this study can be formulated as follows:

- H<sub>2</sub>: there is significant correlation between organization's concern with sustainability dimensions and the use of EVA measures in the evaluation of sustainable performance

**BSC and sustainable performance:** The study of Epstein and Wisner (2001) is one of the pioneering studies to use BSC model to link sustainable development goals with all performance outcomes. The results of the study have showed the ability of the model to apply and implement sustainability strategy, thus, improving the accounting capabilities necessary to provide guarantees to the management that the organization has an acceptable performance. O'Rourke and Hockerts (2001) presented a BSC-based guiding framework of direct and indirect monitoring of the corporate social impact. The framework hinges on a matrix composed of two parts. The first part is related to understanding the nature of the social impacts of organization's activities and how to reduce the effect of these impacts on the financial side. The second part reflects the types of the various groups of stakeholders classified into 5 groups based on their relationship to the value chain of the enterprise (i.e., shareholders, customers, suppliers, employees and community). By combining the components of the matrix, the organization can determine the extent of social impacts on financial performance (low impact, average impact or high impact) and their relationship to stakeholders. Based on a number of personal interviews a study by Bieker *et al.* (2001) concluded that BSC Model mechanism has the ability to determine and interlink the

environmental and social objectives through cause-result series and can be used according to the various sustainability strategies.

Moreover, two studies by Figge and Hahn (2002) are relevant here. The first tried to determine the initial steps to draft various forms of BSC Model of sustainable performance while the second investigated the appropriateness of the traditional approach to BSC Model to express sustainability management. Dias-Sardinha *et al.* (2002) proposed an integration of BSC and sustainability management through the formation of a partial model, particularly for the aspects of environmental and social performance to be applied to Strategic Business Units (SBUs), so that, it can consider the measures of learning and growth, processes and stakeholders as leading performance measures. Zingales (2002) aimed to assess the possibility of using BSC Model to integrate environmental and social issues into management accounting systems. Based on the same methodology, the study of Zingales and Hockerts (2003) went beyond environmental and social issues and was concerned with sustainability management by identifying the causality relationship between the use of BSC Model and sustainability management. Based on theoretical deduction, Bieker and Waxenberger (2002) stressed on the need for BSC Model to include an additional dimension (community dimension) intended to create social value. The social value would be realized through a number of sub-goals such as firm's country of origin, corporate responsibility and dialogue with stakeholders, provided that this dimension include several major and minor performance measures that reflect these objectives. Sidropoulos *et al.* (2004) proposed a theoretical framework consisting of indicators that are divided into two groups. The first group of indicators is related to the product or service, i.e., percentage of recycling, 'Average elapsed time of product' and 'Sales returns'. The second group is related to internal processes which in turn are divided into two sub-groups: those associated with the use of resources and those associated with the measurement of emissions in air and water, solid waste and hazardous waste which can be used as leading indicators. Based on a number of personal interviews, Dias-Sardinha and Reijnders (2005) showed the possibility to use BSC Model as a tool to analyze the various aspects of sustainability that have not appeared within the various organizational levels of enterprise before. In this regard, BSC Model can contribute to the clarification of the relations these aspects have with the enterprise's strategic objectives, measures, initiatives and achievements, hence, narrowing the gap that may arise between what enterprise intends to achieve and the actual reality. Based on theoretical deduction, Schaltegger

and Wanger (2005) emphasized that eco-efficiency analysis can constitute a bridge between BSC Model for sustainable performance and organization's environmental accounting and furthermore, BSC Model helps to link both the economic and environmental dimensions (i.e., in the eco-efficiency analysis). Based on a survey distributed to some professionals, Jasch and Stasiskiene (2005) proposed a framework for management accounting and concluded that BSC Model is one of the most important management accounting tools that narrows the gap resulting from embedding sustainable development strategies in management systems and can thus, lead to the integration of management accounting and sustainability. Applied on a fishing enterprise in South Africa a study by Esterhuysen (2008) presented a model to evaluate performance from the perspective of sustainability whereby sustainability is included in the dimensions of BSC Model. The model includes 5 perspectives i.e. the financial perspective (aims to determine the way the enterprise's image appears to stakeholders in order to maintain financial sustainability), the customer perspective (aims to determine the way the enterprise's products appear to customers in order to maintain sustainability), community perspective (added, and seeks to determine the way the enterprise's image appears to community), the operations perspective (is associated with identifying the internal and external operations that the enterprise should implement to achieve sustainability) and the learning and growth perspective (determines what the enterprise should learn in order to be sustainable). Hubbard (2009) presented a theoretical analysis confirming that BSC Model includes both internal and external views for stakeholders and treats long and short-term issues, hence, can be used in the measurement of sustainability. Moreover, Hubbard opines that BSC Model is recognized by everyone to be efficient and that it is easier to use it as a practical foundation than leaving it and starting a new model. Butler *et al.* (2011) aimed to determine the role and significance of BSC Model in the integration of the various areas of sustainability dimensions in organization's strategy and the factors that must be taken into account while selecting the strategic objectives and performance indicators related to these areas. The study also confirmed the contribution of BSC in understanding the role of the various areas of sustainability dimensions in the achievement of organization's strategy and its impact on profitability in the long term. In the context of sustainability as a strategic goal, Pineno (2012) presented a theoretical foundation of how to take advantage of the measures provided by the time-driven activity-based cost approach in BSC, determining scales for the model's measures during the product life cycle. Zhou *et al.*

(2013) proposed a framework to measure sustainable performance in terms of three dimensions, i.e., environmental, societal and economic with an attempt to apply the model during acquisition life cycles in projects of privately financed initiatives.

Reviewing of previous studies concerned with sustainability and BSC it is noted that emphasis is basically placed on the need to develop BSC in its traditional form without any agreement on the direction of such development. Some of the studies merely added to the four traditional perspectives some measures that reflect sustainability dimensions and aspects (Wisner and Stein, 2001; Hockerts and Ourke, 2001). Some other studies sought to add a 5th perspective that reflects some aspects of sustainability not included in the 4 traditional perspectives (Figge and Hahn, 2002; Sidiropoulos *et al.*, 2004). Other studies focused on developing a performance model for the units related to environmental and social issues, separate from the BSC used in enterprise as a whole (Dias-Sardinha *et al.*, 2002, 2007; Dias-Sardinha and Reijnders, 2005; Moller and Schaltegger, 2005).

However, those studies did not attempt to examine the relationship between sustainability dimensions and corporate performance measures and their ability to evaluate the strategic orientation toward sustainability. Even those studies that have tried to derive performance indicators and measures from sustainability strategies (Figge and Hahn, 2002; Bieker and Waxenberger, 2002; Zingales, 2002; Bieker *et al.*, 2001) did not provide practical evidence that enterprise's interest in these measures is consistent with the sustainability strategies adopted by these enterprises. Therefore, the third hypothesis of the study can be formulated as follows:

- H<sub>3</sub>: there is significant correlation between organization interest in sustainable performance dimensions and the measures used to evaluate sustainable performance according to BSC perspectives

## MATERIALS AND METHODS

**Data collection:** The study relies essentially on the primary data collected from the Saudi industrial sector firms which are listed on the Saudi Securities Exchange in addition to information derived from the internet, including the website of the Saudi Arabian Ministry of Industry. Data were also enhanced by some unstructured interviews with officials from these firms and some people interested in corporate sustainability issues on the one hand and by financial statements and reports of some Saudi industrial firms published on the internet on the other hand. Firms have been distributed according to the nature of activity into two groups: one for petrochemical

firms, the other for the remaining industries. This distribution is attributed to two reasons. The first is the dominance of the petrochemical activity on Saudi industrial sector investments, the second is the nature of the activity itself as it is known to have a negative effect on society and environment and thus the firms involved in this activity must have more obligations toward society and environment (i.e., corporate social responsibility) than others do (Herbohn *et al.*, 2014; George *et al.*, 2016). Four questionnaires have been distributed to each sample firm to be distributed to firm's Executive Director, Finance Manager, Administrative Manager and Management Accountants, i.e., these are the functions most relevant to the formulation of strategies and performance measurement and assessment. The first group included 36 firms while the second group included 26 firms.

**Study tool:** Primary data were collected by questionnaire developed for this purpose. At its beginning, the questionnaire included a welcoming message to informants and explained to them the importance of the study and their role in achieving its goals. It was structured into two major sections the first was intended for demographic data of respondents while the second was devoted to the study questions. Fundamentally, the study questions were divided into three sections. The first section dealt with enterprise's strategic orientations according to TBL the second addressed performance measurement and assessment indicators according to EVA Model and the third contained sustainable performance measures according to BSC Model. The questions of both the second and third sections, too were made taking into account the TBL concepts in the determination of the measures. The first draft of the questionnaire was initially distributed to a small sample of corporate managers and employees in the business sector as well as some people interested in the issues of corporate social responsibility, during unstructured personal interviews. Their intrinsic observations were taken into account in the development of the final draft of the questionnaire. Of the final questionnaire, 248 were distributed to 62 firms, including 144 questionnaires to petrochemical industries (i.e., by %58.1) whereas the remaining 104 questionnaires were distributed to the other industries. Questionnaires were sent via three ways: in an electronic form (using emails) to the firms having websites and electronic communication channels by regular mail and through personal relations with employees of some of these firms. Table 1 shows the numbers and methods of distribution of the questionnaire. The tool reliability was tested using Cronbach alpha, revealing that the reliability of the study tool amounted to 0.83 which is an acceptable rate to a large extent.

Table 1: Questionnaires distribution and retrieval and response rate

Industrial activity	Distribution by regular mail			Distribution by e-mail			Distribution through relations with employees			Total		
	Sent	Received	Percentage	Sent	Received	Percentage	Sent	Received	Percentage	Sent	Response	Percentage
Petrochemicals	36	12	33.3	68	20	29.4	40	36	90.0	144	68	47.2
Other industries	24	16	60.0	36	20	55.5	44	24	54.5	104	60	57.7
Total	60	28	46.7	104	44	42.3	84.0	60	71.4	248	128	51.6

Table 2: Study variables

Strategic orientations	Dimension	Economic	Social	Environmental
	Purpose	Financial performance	Decent work practices	Materials of used
		Firm's existence in the market	Energy conservation	Water and biological resources
		Economic impacts	Human rights	Emissions, waste and residues
			Community performance	Environmental investments
			Product responsibility	Environmental commitment
<b>Performance measures</b>				
EVA approach		Economic value added		
		Environmental economic value added		
		True economic value added		
BSC approach	<b>Dimension</b>	<b>Financial</b>	<b>Customers</b>	<b>Suppliers</b>
	Measures	Return on investment	Customer complaints reduction rate	Growth rate of local suppliers
		Operational cost reduction rate	Growth in market share rate	Percentage of purchases from local suppliers
		Profitability growth rate	Rate of sold recycled products	Suppliers efficiency rate
		Earnings Per Share (EPS)	Green products rate	Green material supply rate
	<b>Dimension</b>	<b>Operations</b>	<b>Employee</b>	<b>Community</b>
	Measures	Throughput rate	National employment growth rate	Percentage of donations to net income
		Capacity utilization rate	Percentage of training costs to total operating costs	Eco-protection expenditure rate to total expenditure
		Negative environmental aspects rate	Rate of average wage in firm to minimum wage at national level	Number of community-related courses in which firm participated
		Energy consumption reduction rate	Rate of achieved wishes of trade union	Percentage of implementation of environmental health and safety programs in workplace
		Workplace-related accidents reduction rate		Firm's contribution in support of total value-added
		Eco-efficiency rate		Percentage of exports to total sales
		Transportation exhaust reduction rate		Growth rate in treatment costs of environmental damage
		Non-productive time reduction rate		

**Study variables:** As regards the study variables, the study has included two sets of variables. The first set included 13 variables related to organization's strategic orientations toward sustainability. These were formulated depending primarily on G4 Guidelines of the Global Report Initiatives (GRI) 2016 ([www.globalreporting.org](http://www.globalreporting.org)), adjusted in accordance with the nuances revealed during the unstructured personal interviews with officials from surveyed firms and with some people interested in corporate sustainability issues indicated in the first part of Table 2. The second set included variables related to performance measures in relation to financial and strategic measures of sustainability, classified according to the perspective of measurement into two subgroups. The first subgroup is allocated for EVA financial measures and was based on the views on EVA and EEVA as presented by McDaniel *et al.* (2000) in addition to the views offered by some other studies (Aldama and Zicari, 2012; Repetto and Dias, 2006a, b; Rabin, 2006) on the development of TRUEVA compared to the traditional conceptualization of EVA. The second subgroup included BSC measures and

was divided into 6 dimensions, i.e., financial dimension, customer-related dimension, supplier-related dimension, internal operations dimension, employee-related dimension and community-related dimension. Each of these dimensions included a set of measures provided by GRI standards 2016 in relation to sustainability ([www.globalreporting.org](http://www.globalreporting.org)) these are meant to take effect in stages starting from April 2016 and will replace G4 Guidelines. In addition, relevant views were also derived from several studies related to BSC-based measurement and management of corporate sustainability (Epstein and Wisner, 2001; Hockerts and O'Rourke, 2002; Zingales and Hockerts, 2003; Butler *et al.*, 2011) and also the experimental studies that relied on some multi-dimensional sustainability measures (Maletic, 2013; Maletic *et al.*, 2014a, b). These measures ranged between uni-oriented measures and multi-oriented ones that are able to assess more than one TBL dimension. The second part of Table 2 shows the variables of performance measures, according to the sub-groups.



**Measuring:** Variables are measured and descriptive perceptions of respondents are converted into quantitative data using 5-point Likert Scale.

alternative, nonparametric tests of variation analysis and correlation detection are adopted, i.e., Mann Whitney test and Spearman's rank correlation coefficient.

**Statistical tests:** Kolmogorov-Smirnov (K-S) test results revealed that the study data were not subjected to normal distribution and therefore for the purposes of testing the validity of the study hypotheses,

**RESULTS AND DISCUSSION**

Table 3 displays the results of Mann-Whitney test, analyzing the variations between the two study groups

Table 3: Variations between petrochemical activity and other industrial activities regarding the strategic orientations toward sustainability and performance measures

Variables	Sub-variable	1	2	3	4	5	6
<b>Strategic orientations</b>							
Economic	Financial Performance	61.63	67.760	1844.50	0.291	4.46	0.6510
	Firm's presence in the market	66.45	62.290	1907.50	0.462	4.55	0.5860
	Economic effects	57.50	72.430	1564.00	0.017	3.86	1.1600
Social	Decent work practices	67.02	61.640	1868.50	0.390	3.59	1.3400
	Human rights	66.04	62.760	1935.50	0.590	4.12	1.0200
	Community performance	59.82	69.810	1721.50	0.112	3.64	1.2500
Environmental	Product liability	86.64	39.410	534.500	0.000	3.64	1.1800
	Materials used	83.49	42.980	749.000	0.000	3.78	1.1800
	Energy conservation	59.63	70.020	1709.00	0.071	4.48	0.6870
	Water and biological resources	64.51	64.490	2039.50	0.998	4.47	0.8030
	Emissions, waste and residues	87.05	38.940	506.500	0.000	4.20	0.8990
	Environmental compliance	63.48	65.660	1970.50	0.710	4.39	0.7770
EVA measures	Environmental investments	70.24	58.000	1650.00	0.045	4.14	0.9930
	EVA	66.02	62.780	1936.50	0.585	2.73	1.0900
	EEVA	64.02	65.040	2007.50	0.856	2.32	0.7520
	TRUEVA	67.25	61.380	1853.00	0.328	2.13	0.8350
<b>BSC</b>							
Financial	ROI	59.79	69.830	1720.00	0.088	4.42	0.6820
	Operational cost reduction rate	65.28	63.620	1987.00	0.766	4.54	0.6500
	Profitability growth rate	71.11	57.010	1590.50	0.014	4.38	0.8970
	Ordinary share profitability	62.32	66.970	1891.50	0.421	4.48	0.9300
Customer	Reduction rate in number of customer complaints	63.49	65.640	1971.50	0.730	3.65	0.9340
	Growth rate in market share	65.76	63.070	1954.00	0.638	4.50	0.6640
	Recycled product sales rate	61.46	67.950	1833.00	0.210	4.63	0.6380
Suppliers	Green products rate	92.04	0.2250	377.000	0.000	3.46	1.3000
	Local suppliers growth rate	78.57	48.550	1083.00	0.000	3.64	1.1900
	Supply efficiency rate	60.57	68.950	1773.00	0.160	4.30	0.8560
	Compatibility rate of supply operations with plans	64.32	64.710	2027.50	0.947	4.35	0.9010
	Green raw material supply rate	80.43	0.4450	1053.50	0.000	3.39	1.3700
Operations	Internal operations productivity rate	66.44	62.300	1908.00	0.484	4.38	0.75400
	Production capacity utilization rate	65.82	63.000	1950.00	0.656	3.6641	1.21200
	Negative environmental aspects rate compared to plans	87.28	38.680	491.000	0.000	3.65	1.28000
	Energy consumption reduction rate	68.39	60.090	1775.50	0.164	4.17	1.1000
	Workplace-related accidents reduction rate	83.75	42.680	731.000	0.000	3.76	1.2800
	Eco-efficiency rate	85.28	40.950	627.000	0.000	3.74	1.2200
Employee	Transportation exhaust reduction rate	84.60	41.730	673.500	0.000	3.80	1.2300
	Reduction rate of non-productive time	66.96	61.710	1872.50	0.305	4.64	0.6600
	National employment growth rate	64.25	64.780	2023.00	0.919	4.59	0.7140
	Training costs oercentage to total operating costs	66.85	61.840	1880.50	0.343	4.57	0.7390
	Average wage rate in firm compared to minimum wage at national level	68.74	59.690	1751.50	0.109	4.40	0.9080
	Rate of achieved wishes of trade union	44.29	36.410	354.500	0.182	1.84	1.3600
	Community donations rate to net income	66.21	62.570	1924.00	0.546	4.04	1.1800
	Eco-protection expenditure rate to total expenditure	82.49	44.120	817.000	0.000	3.87	1.2600
	Number of community-related courses in which firm participated	81.40	45.350	891.000	0.000	3.72	1.3200
	Rate of application of environmental health and safety programs in workplace	86.79	39.240	524.500	0.000	3.72	1.2500
Firm's contribution in support of total value-added	61.82	67.540	1857.50	0.282	4.52	0.8600	
Rate of exports to total sales	79.27	47.760	1035.50	0.000	3.89	1.2800	
Growth rate in treatment costs of environmental damage	82.13	44.530	841.500	0.000	3.28	1.3900	

with regard to all variables. Regarding the economic dimension, the first part of the table reveals obviously that there is general agreement over strategic orientations toward sustainability between Saudi industrial firms (whether involved in petrochemicals or other industries) with some exceptions in the economic effects in favor of the petrochemical industry firms. Petrochemical firms pay more attention to economic effects compared to other firms, i.e., the Mann-Whitney value is 1564.5 at a signification level of 0.05. This may be attributed to the diversity and multiplicity of the economic effects of this type of activity, particularly in consideration of the fact that most of the firms operating in this sector are giant corporations have a significant impact on and are influenced by the Saudi economy more than other industrial firms do:

- Mean rank of petrochemical industries
- Mean rank of others industries
- Mann-Whitney value
- p-value
- Total mean
- Standard deviation

With respect to the social dimension, variations are limited only to product liability at a signification level of 0.01, with a Mann-Whitney value of 534.5. Attention is also clear in favor of petrochemical firms. This can also be attributed to the nature of the products of petrochemical firms, spurring many of these firms to show interest in this dimension. Petrochemical products are always seen as hazardous products and any defects in such products can pose direct risks to user's life. The big strategic concerns for Saudi petrochemical firms compared to the other Saudi industrial firms concentrated in the environmental dimension. The petrochemical firms showed great interest large by to materials used, energy conservation, emissions, waste, residues and environmental investment with Mann-Whitney values ranging between 506.5 (for emissions, waste and residues) and 1650 (for environmental investments) and at a signification level of 0.05 (for energy conservation and environmental investments) and 0.01 (for materials used and emissions, waste and residues). The differences in terms of the environmental dimension are natural and due to many reasons. For example, most petrochemicals firms belong to the public sector and often prioritize environment-related issues. Besides, we should consider the nature of the petrochemical industry in terms of industry inputs, amount of energy used in the industry and its various environmental effects in addition to the pressures pointed

at in Herbohn *et al.* (2014) and George *et al.* (2016) often exerted on such industries as contaminators of environment.

The second part of the table reveals that the type of activity has no significant effect on performance measurement from the perspective of EVA measures. This is due to the attention paid by the Saudi industrial firms to EVA measures. Overall averages ranged between 2.73 for EVA and 2.13 for TRUEVA. This result is confirmed by the review of the financial statements published by some industrial firms on the Internet, i.e. there is no reference to the use of such measures in performance assessment.

The third part of the table shows the results of the variation analysis of BSC dimensions of the evaluation of corporate sustainability in the Saudi market in terms of the type of activity. With regard to the financial dimension, there is an agreement in all financial measures, except for profitability growth rate which leans in favor of other (non-petrochemical) industrial firms with a Mann-Whitney value of 1590.5 at a signification level of 0.05. This agreement on the financial performance measures is basically a result of the fact that most industrial firms are pro-profit firms in nature. Therefore, profitability in these firms must be the priority goal, also considering that the measures used in the study are among the most commonly used in measuring profitability. As for the variation between the two groups with respect to the measure of 'profitability growth rate' it might be due to differences in business volume and profitability rates that, in the case of petrochemical firms, reached to such rates that make it difficult to surpass, particularly in light of the current oil prices. Therefore, attention is drawn to more important aspects such as operational cost reduction rate. Some of the interviewed executives in the petrochemical firms pointed out explicitly that oil market conditions made them pay more attention to cost reduction.

Results for the firm-customer relations dimension reflect agreement between the firms of the two groups. In their nature, these measures are no different from the financial measures: both are ultimately effect-oriented measures and not cause-oriented measures. This is indicated by Kaplan and Norton (2004) in their classification of effect-cause BSC measures. However, there is a difference with respect to the environmental measure within this dimension. In green product rate', petrochemical firms pay more attention to this measure compared to the non-petrochemical ones. There is a difference in Mann-Whitney value (i.e., 0.377) at a signification level of 0.01. This may be due to the nature of the petrochemical activity which makes such firms try hard to highlight their environmental concerns, along with the orientation of many big petrochemical firms toward

adopting international measures. For example, SABIC publishes a sustainability report according to G4 Guidelines and there it indicates a large number of environmental measures and full application of various measures in this regard ([www.sabic.com/corporate/ar/sustainability/gri-profile](http://www.sabic.com/corporate/ar/sustainability/gri-profile)). On the whole the overall averages for firm-customer relations measures indicate the attention paid by industrial firms to this dimension, i.e., these averages exceed the overall average.

The firm-suppliers relations dimension reveals variation only in the 'local suppliers growth rate' and the 'rate of green raw materials supply' in favor of the petrochemical firms with Mann-Whitney values of 1083 and 1053.5, respectively at a signification level of 0.01. The first measure is considered to be social in nature and differences there in result from the fact that most of the raw materials in petrochemicals are local raw materials, unlike other industries which import their raw materials from abroad. Therefore, it would be difficult to rely on this measure to judge the social dimension of the relations with suppliers. The other measure is environmental and the differences in the orientations of the two groups may support the view explained above in relation to the differences regarding 'green products rate'. The total averages for this dimension show the attention paid by the Saudi industrial firms to firm-suppliers relations measures the averages came to be higher than the overall average.

The variations in the internal operations dimension are also limited to the environmental measures, i.e., negative environmental aspects rate compared to plans workplace-related accidents reduction rate eco-efficiency rate and the 'transportation exhaust reduction rate' with Mann-Whitney values being 491, 731, 627 and 673.5, respectively, at a signification level of 0.01. This result confirms the attention paid by petrochemical firms to environmental measures compared to the other industries in Saudi Arabia. Such attention has had an effect on the overall averages for the measures of the internal operations dimension which exceeded the estimated overall average.

Regarding firm-employee relations dimension it is noted that there are no differences between petrochemical and other industries. The general averages exceeded the estimated overall average, except for the 'rate of achieved wishes of trade union' which did not exceed 1.84. This is due to the lack of an effective trade union in industrial firms in KSA to help us assume that the rate of meeting the demands of trade union could be seen as a measure of firm-employee relations.

Big variations have been observed in firm-community relations dimension. With the exception of the 'rate of

donations to net income' and the rate of firm's contribution in support of total value-added which are environmental measures with an economic effect there are variations between the petrochemical firms and the other industries in the measurement of social contributions with Mann-Whitney values ranging between 1035.5 (for rate of exports to total sale's) and 524.5 (for percentage of application of environmental health and safety programs in workplace) at a signification level of 0.01. Most of these measures reflect the environmental perspective of the firm-community relations dimension. All variations came to be in favor of petrochemical firms which pay more attention to the environmental perspective in performance measurement and evaluation. However, the total averages reflect a significant attention paid to these measures, i.e., these averages exceeded the estimated overall average.

Table 4 and 5 shows Spearman correlation coefficients of the averages of strategic orientations toward sustainability in the Saudi industrial firms (according to TBL) and the performance measures. The first part of the table reveals the lack of a significant correlation between the orientations and EVA measures. The result may be a natural outcome of the lack of attention by Saudi industrial firms to EVA measures. The averages of informants' responses described in Table 3 ranged between 2.73 for EVA and 2.13 for TRUEVA. Besides, the review of the financial statements of some of these firms revealed a lack of disclosure concerning the use of those measures:

With respect to the measures of the BSC financial dimension it appears that there is a correlation ranging between moderate to weak between these measures and the strategic orientations toward sustainability from the economic perspective. The correlation values ranged between 0.393 for 'ROI' and 0.228 for 'EPS' at a signification level of 0.01. In addition, the correlation coefficient value came to be 0.183 at the signification level of 0.05 for 'profitability growth rate'. These coefficients are normal, given that performance measurement from the economic perspective depends heavily on such measures. Besides, as long as there is much attention paid to the economic dimension of sustainability it is natural to observe corresponding attention to the measures of performance measurement from an economic perspective. 'EPS' also recorded a moderate correlation with the strategic orientations toward sustainability from the social perspective: such correlation may be warranted once we come to know that most of the sample firms are listed on the Saudi Securities Exchange Market and are also concerned with fluctuations in stock prices. Moreover, fluctuations in stock prices are influenced by firm's social trends, particularly in view of the emphasis of Wagner

Table 4: Correlation coefficients between sustainability dimensions and sustainable performance measures

Performance measures	Strategic orientations					
	Economic		Social		Environmental	
	1	2	1	2	1	2
<b>EVA</b>						
EVA	-0.024	0.786	0.161	0.069	-0.013	0.888
EEVA	0.041	0.647	0.079	0.376	0.041	0.647
TRUEVA	0.012	0.889	0.053	0.554	0.148	0.096
<b>Financial</b>						
ROI	0.393**	0.000	-0.117	0.190	-0.143	0.108
Operational cost reduction rate	0.299**	0.001	-0.050	0.572	0.010	0.913
Profitability growth rate	0.183*	0.038	0.110	0.218	0.082	0.357
EPS	0.228**	0.010	0.240**	0.006	0.032	0.716
<b>Customer</b>						
Customer complaints reduction rate	-0.023	0.798	-0.103	0.249	-0.031	0.725
Growth in market share rate	-0.135	0.128	0.030	0.741	-0.046	0.609
Rate of sold recycled products	0.127	0.153	0.244**	0.006	0.405**	0.000
Green products rate	-0.028	0.757	-0.121	0.172	0.013	0.883
<b>Suppliers</b>						
Growth rate of local suppliers	-0.131	0.139	0.106	0.235	0.201*	0.023
Suppliers efficiency rate	-0.024	0.784	-0.007	0.937	0.036	0.688
Variation rate between actual and planned supply	0.136	0.125	0.040	0.657	0.095	0.287
Green material supply rate	0.002	0.979	-0.045	0.617	0.256**	0.004
<b>Operations</b>						
Throughput rate	0.151	0.088	0.106	0.233	0.415**	0.000
Capacity utilization rate	-0.050	0.579	0.070	0.435	0.689**	0.000
Updated negative environmental aspects rate compared to plans	-0.191*	0.031	0.173	0.051	0.384**	0.000
Energy consumption reduction rate	-0.094	0.289	0.214*	0.015	0.423**	0.000
Workplace-related accidents reduction rate	-0.140	0.114	0.155	0.081	0.328**	0.000
Eco-efficiency rate	0.068	0.447	0.035	0.695	-0.013	0.887
Transportation exhaust reduction rate	-0.102	0.252	0.065	0.468	0.107	0.230
Non-productive time reduction rate	-0.085	0.340	0.108	0.224	0.454**	0.000
<b>Employee</b>						
National employment growth rate	0.089	0.319	-0.006	0.948	-0.088	0.322
Percentage of training costs to total operating costs	0.160	0.071	0.186*	0.036	0.348**	0.000
Rate of average wages in firm to minimum wage at national level	0.220*	0.013	-0.010	0.913	0.146	0.100
Rate of achieved wishes of trade union	-0.129	0.146	0.437**	0.000	0.009	0.923
<b>Community</b>						
Percentage of donations to net income	0.088	0.321	0.039	0.665	0.110	0.215
Eco-protection expenditure rate to total expenditure	0.208*	0.019	0.288**	0.001	0.098	0.272
Number of community-related courses in which firm participated	-0.025	0.783	-0.006	0.950	0.113	0.204
Rate of application of environmental health and safety programs in workplace	-0.093	0.295	0.341**	0.000	0.161	0.069
Firm's contribution in support of total value-added	0.041	0.644	0.185*	0.036	0.099	0.267
Rate of exports to total sales	-0.042	0.642	0.183*	0.038	0.008	0.925
Growth rate in treatment costs of environmental damage	-0.141	0.112	0.298**	0.001	0.093	0.294

Spearman correlation coefficient; p-value; \*\*Significant at 0.01; \*Significant at 0.05

Table 5: Correlations of strategic orientations and BSC measures

Orientations strategy		Measures	
Environmental	Social	Economic	Nature of measures
Recycled products sales rate	EPS	ROI	Economic
Green material supply rate	Percentage of training costs to total operating costs	Operational cost reduction rate	Social
Capacity utilization rate	Firm's contribution in support of total value-added	Profitability growth rate	
Energy consumption reduction rate	Exports to total sales rate	EPS	Environmental
Non-productive time reduction rate	Percentage of application of environmental health and safety programs in workplace	Rate of average wage in firm to minimum wage at national level	
The growth rate of local suppliers			
Updated negative environmental aspects rate compared to plans			
Reduction in the rate of accidents at work			

(2010) and Maletic *et al.* (2014) on the existence of a link between sustainability practices and firm's final financial performance. (As far as firms listed on the securities exchange market are concerned their financial performance is often expressed in terms of the market value of the firm's shares).

Evidently, Table 4 shows clearly that, with the exception of the measure of the 'rate of recycled products sold' which is moderately to weakly correlated to social and environmental trends with correlation coefficients of 0.244 and 0.405, respectively at a significance level of 0.01 the correlation means that the attention paid to social and environmental sustainability dimensions is equivalent to the attention paid to the 'rate of recycled products sold'. This measure is dual and also implies an economic dimension represented by the retrieved sales figure of damaged, expired or lost products. The attention paid to social and environmental dimensions from the economic perspective is common not only in the Arab region but also at the level of developed countries. For instance, Quader *et al.* (2016) have found that there is unanimity among the managers of small and medium sized firms in the United Kingdom regarding the orientation toward environmental activities that have an economic dimension and support corporate profitability, such as recycling. The firm-suppliers relations dimension is one of the typical dimensions with respect to the measurement of environmental orientations toward sustainability. There is a weak correlation between the environmental dimension of sustainability and both the 'green raw material supply' and the 'growth rate of local suppliers' with correlation coefficients of 0.256 and 0.02, respectively, at significance levels of 0.01 and 0.05, respectively.

The measures and indicators of the internal operations dimension are the most common measures used in performance measurement and evaluation, according to statements declared in the personal interviews. This point is confirmed by the results of correlation analysis which also revealed that the measures are not directed in a way consistent with sustainability dimensions. In other words, the attention to the measures of internal operations is equivalent only to the attention to the environmental dimension of sustainability, as there is correlation between this dimension and 'productivity rate of internal processes' production capacity utilization rate' negative environmental aspects rate compared to plans' energy consumption reduction rate' and 'non-productive time reduction rate'. The correlation coefficients came to be 0.689 (for 'production capacity utilization rate') and 0.328 (for 'workplace-related accidents reduction rate') at a significance level of 0.01.

These measures can be divided into three groups: environmental measures, including negative environmental aspects rate compared to plans and 'workplace-related accidents reduction rate' economic measures, including 'productivity rate of internal processes' and dual measures which can be used to assess both economic and environmental dimensions and include 'production capacity utilization rate' and 'energy consumption reduction rate' and 'non-productive time reduction rate'. This means that the focus of those in charge in the Saudi industrial firms is still placed on economic measures to measure sustainability. This result is consistent with the conclusions of the study of Quader *et al.* (2016) regarding the point that managers are always primarily concerned with the economic measures. Table 4 also suggests a correlation between the social dimension and 'energy consumption reduction rate' with a correlation coefficient of 0.214 at a significance level of 0.05. This result confirms again the point that attention is primarily paid to the measures of the economic dimension to evaluate the environmental and social dimensions. With regard to the firm-employees relations, the focus is placed on the 'percentage of training costs to total operating costs' which is weakly correlated to the social and environmental dimensions with correlation coefficients not exceeding 0.186 and 0.348, respectively, at significance levels of 0.05 and 0.01 for the two dimensions. The measurement of the relations with employees from an economic perspective is correlated with 'rate of average wages in the firm to the minimum wage at the national level by a coefficient of 0.22 at a significance level of 0.05. Both measures are dual and related to more than one dimension. Although, both measures are apparently economic their main goal is to assess the attention paid by firms to human resources, albeit from an economic perspective. With the exception of 'number of community-related courses in which firm participated' the correlation coefficients of the firm-community relations dimension with the social dimension of sustainability were generally moderate to weak and ranged between 0.437 (for 'donations rate to net income') and 0.183 (for 'rate of exports to total sales') at a significance level of 0.01 for all measures of, except for 'firm's contribution in support of total value added' and 'rate of exports to total sales' which both obtained correlation coefficients at a significance level of 0.05. There was also correlation between the economic dimension and 'eco-protection expenditure rate to total expenditure'. The attention paid to the measure of 'donations rate' is due to the traditional point of view of firms that the corporate social responsibility of the firm is fulfilled by donations paid to associations and this

viewpoint seems to have emanated from the Muslim community's general conceptualization of a firm based on this firm's charitable donations in general. Therefore, this view may have motivated the firms to pay attention to this measure, particularly as firms exploit many environmental and social activities as an opportunity for business promotion. In fact, this is a well-known matter and has been revealed by several studies. For example, Quader *et al.* (2016) indicate that medium and small size firms in the United Kingdom take into account the marketing process while selecting environmental and social initiatives.

**Results of study hypothesis test:** The study is based on three hypothesis, as follows:

- H<sub>1</sub>: the type of industrial activity has a significant effect on sustainability dimensions and sustainable performance measures

Taking into account the results of Mann-Whitney test it appears that there were differences between petrochemical firms and other industries in 5 strategic orientations, 3 of which were related to environmental orientations. It is also noted that there are differences in 13 performance measures out of the 32 measures distributed among BSC dimensions. With regard to EVA measures, both groups of firms reflected complete agreement. With this result it becomes difficult to accept the first hypothesis and to a great extent it is possible to say that there is an agreement between the petrochemical firms and other industrial firms.

- H<sub>2</sub>: there is significant correlation between organization' concern with sustainability dimensions and the use of EVA measures in the evaluation of sustainable performance

This hypothesis is rejected. The coefficients of these variables are not significant due to the fact that the Saudi industrial firms do not use EVA measures in performance measurement and evaluation in general.

- H<sub>3</sub>: there is significant correlation between organization' interest in sustainable performance dimensions and the measures used to evaluate sustainable performance according to BSC perspectives

Spearman correlation analysis confirms the existence of such a relationship in 13 out of the 32 measures. This result creates rather a conservative attitude toward this hypothesis than emphasizing the non-existence of such a relationship.

## CONCLUSION

This study focused on determination of the appropriateness of performance measures to strategic orientations toward sustainability from three angles: the first is related to the impact of the type of the industrial activity on these orientations and measures whereas the second and the third focus on the correlation between performance measures and strategic orientations. There is no doubt that the nature of the industrial activity has an effect on the strategic orientations toward sustainability and the measures of sustainable performance. This fact emerged albeit faintly in the Saudi industrial firms and was focused mainly in the environmental dimension. Saudi petrochemical firms pay attention to the environmental orientations toward sustainability more than other industrial firms do. The same also applies with regard to uni-oriented environmental measures. This matter is expected and can be attributed to the big impacts on environment caused by the petrochemical industry as pointed out by several eco-accounting studies (Herbohn *et al.*, 2014; George *et al.*, 2016). Petrochemical firms are generally more concerned than others with eco-performance measures, such as 'green products rate', 'green material supply rate', 'negative environmental aspects rate compared to plans' and 'eco-efficiency rate'. Such concern may, according to Quader *et al.* (2016), be for the sake of promotion and advertising for the firm, emphasizing on its environmental commitments. However, the great agreement between the two study groups with respect to the social and economic dimensions and even the dual or economically hybrid eco-performance measures makes us accept that there is an agreement on the overall level of sustainability in terms of both strategic orientations and performance measures.

With regard to the appropriateness of the performance measures to the strategic orientations toward sustainability in the Saudi industrial firms in general it can be said that the measures are not compatible with such strategic orientations. In other word, EVA measures are not a center of interest by the study sample while BSC-based performance measurement (using the various BSC dimensions) often focuses on the economic aspect of the measures. Table 5 can explain this point, revealing the concentration of the Saudi industrial firms on performance assessment from an economic perspective. In their studies on small and medium-sized firms in the United Kingdom, Quader *et al.* (2016) confirmed the same, pointing out that executives of these firms tended to use sustainability initiatives that had economic dimension.

Such focus by the industrial firms in KSA may also be justified, given the decline in oil prices internationally. Quader *et al.* (2016) also confirmed this issue and pointed out that sustainability initiatives would not be of great interest during difficult economic circumstances. The measurement of social and environmental dimensions from an economic perspective might be acceptable if such measurement covers only some angles of these dimensions on one hand and is supported by uni-oriented social and environmental measures that can cover the other aspects of social and environmental sustainability on the other hand. But this is not available in the Saudi industrial firms, according to the results of the study. Table 5, for example, reveals that not much interest is observed in social measures to evaluate social orientations toward sustainability. Besides, the measurement of environmental orientations toward sustainability through uni-oriented environmental measures is limited only to 'negative environmental aspects rate compared to plans' and 'workplace-related accidents reduction rate'. So, it can generally be said that there is no appropriateness between the strategic orientations toward sustainability and the sustainable performance measures in the Saudi industrial firms.

### LIMITATIONS

Despite the importance of the findings of the study, there are many limitations to be taken into consideration. Perhaps the most important of these is the fact that the study sample has been limited only to firms listed on the Saudi Securities Exchange Market which constitute only a small percentage of the Saudi industrial firms, even though these firms are the most influential and most important ones in the Saudi industrial sector. The second limitation is the weak response by the sample firms to the study. Almost half of the sample firms did not respond to the study questionnaire many letters were sent by email and regular mail but no responses came back from the firms. There was also the problem of time, i.e., the period during which questionnaires were sent. There was a long wait for responses to come back. During that period of time, many ideas popped up and could have contributed to this study. However, this point can be addressed in future research. One of the most important of such ideas was perhaps the possibility to apply GRI Standards in Saudi industrial firms, particularly the big firms. Additionally, studies on sustainability evaluation through supply chains may have many scientific and practical additions to accounting literature.

### RECOMMENDATIONS

The recommendations of this study are first directed to the Saudi Securities Exchange Market Authority and Saudi Ministry of Industry and Trade. There is a need to force firms to disclose information on sustainable performance in their annual financial statements. In this framework it is possible to adopt one of the world's most common trends, i.e., GRI Standards or IFC (International Finance Corporation) experiment which includes nearly 111 sustainable performance measures, provided that the trend used should be amended in accordance with the peculiarities of the Saudi Arabian environment. One of the successful experiences of a Saudi business organization which may be generalizable to other Saudi enterprises is the experience of SABIC: SABIC voluntarily discloses information on sustainable performance in a special report in accordance with G4 Guidelines. The Saudi Securities Exchange Market can also include a direct monetary indicator of sustainability such as TRUEVA which reflects the economic value added after treatment of environmental and social effects and in the form of a single monetary indicator.

Regarding recommendations for industrial firms there is a need to draw strategy maps that are able to identify the needs for performance measures in accordance with the strategic orientations toward sustainability. Mean while it is necessary to take into account that such performance measures reflect all TBL sustainability dimensions and are not limited only to the measures that have an economic dimension. The development of BSC Models based on GRI or IFC might be appropriate so as to fit in with firm's strategy.

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