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A Heuristic Model for Establishing Trade-Offs in Corporate Sustainability Performance Measurement Systems

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Abstract A large body of the literature on sustainability indicators, assessments and reporting is currently available. However, sustainability performance measurement systems have an insubstantial presence in the literature. Invariably, a sustainability performance measurement system presents the potential for certain trade-offs or opportunity costs for organizations. Extant sustainability platforms and standards are largely silent about how to deal with trade-offs. Utilizing evidence from the literature, as well as contingency factors, this paper seeks to present a heuristic model for establishing trade-offs in corporate sustainability performance measurement systems. Trade-offs in this area revolve around performance measurement, stakeholder management, competitive advantage, as well as the vertical and horizontal integration of the performance platform. This is particularly important for organizations seeking to establish, integrate or expand their environmental management systems into the area of sustainability. As yet, formalistic attempts to deal with trade-offs in sustainability performance measurement systems are infrequent and vague.

Keywords Strategy · Sustainability · Performance · Measurement · Metrics · Trade-offs · Contingency factors

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Introduction

The diverse nature of sustainability presents unique challenges to an organization with no guarantee that a resolution will be brought about (Gray 2010). In fact, the very broadness of definitions of sustainability pose implementation problems at the systems level where the historical norm has been to use "end-of-pipe" solutions for environmental remediation (Lozano 2012). Indeed, it has been persistently rationalized in the business milieu that any undertaken activity should be justified as complimenting or enhancing the organization's bottom line (Friedman 1970; Wicks 1996; Karnani 2011). Consequently, as environmental challenges and costs continue to increase over time, there is growing unlikelihood of corporations encountering win–win situations while pursuing progress towards both sustainability and profit (Walleyand Whitehead 1994). In turn, this has led organizations to view sustainability in one of three ways: as a compliance issue, a cost to be minimized, or an opportunity for competitive advantage (Hubbard 2009). The overemphasis on win–win situations will likely lead to focusing sustainability on areas of activity within a corporation which are largely conflict free, or restricting sustainability to areas of limited ambition (Hahn et al. 2010).

The field of sustainability performance has some overlap with sustainability assessment, although the latter is primarily used in the promulgation of policy and aiding decision making (Gibson 2006; Ness et al. 2007; Bebbington et al. 2007; Gasparatos et al. 2008, 2009; Singh et al. 2009; Bond et al. 2012; Gasparatos and Scolobig 2012). However, sustainability performance measurement systems (SPMS) are a nascent subset of performance measurement systems (PMS) which have been used in various forms for several decades (Neely 2005). An SPMS

is defined as follows (Searcy 2012, p. 240): ''a system of indicators that provides a corporation with information needed to help in the short and long-term management, controlling, planning, and performance of the economic, environmental, and social activities undertaken by the corporation". Although, the growth of interest in sustainability in the corporate milieu has been fuelled by a burgeoning movement of shareholder activism and socially responsible investing, sustainability measures have the weakest presence when compared with other stand-alone performance measurement categories (Gates and Germain 2010).

With this in mind, the aim of this paper is to present a heuristic model of the trade-offs associated with corporate SPMSs. Research in the area of corporate SPMSs is in its embryonic stage and is marked by a lack of focus (Searcy 2012). However, SPMSs emerged from PMSs and, thus, share some common characteristics (Yadav et al. 2013). Furthermore, Margolis and Walsh (2003) note, "the field of organization studies has largely been silent about how to consider and manage the tradeoffs [*sic*] and dilemmas that arise when companies confront dueling expectations" (p. 283). This work seeks to examine the most important trade-offs and what aspects of an organization they converge upon. A large body of the literature in this area consists of attempts to confirm (i.e. test) or mitigate the downsides associated with performance measurement (Margolis and Walsh 2003; Orlitzky et al. 2003). Another separate body of the literature in this field merely contends with concerns arising from the design and implementation of an SPMS within an organization (Bourne et al. 2000; Neely et al. 2005). From either an individual or systematic basis, the extant literature to date has not articulated or cohesively organized the trade-offs associated with SPMS. Only Gibson (2006) cites the need to manage trade-offs in the context of sustainability assessments; however, the author outlines only a set of generalized rules to bring about more optimal sustainability outcomes and does not refer to real situations. The conceptual aims of this paper are to map out the trade-offs in various aspects of an SPMS and demonstrate them in an example. The very purpose for this was necessitated by the lack of a model dealing specifically with SPMS issues. In particular, the issue of incorporating and managing trade-offs plays a significant problem. That is, how to incorporate trade-offs into the core competencies of an organization in order to understand the ways sustainability issues affect them and how to go about making the decisions (or omissions) in their context remains an open question. As this is a conceptual paper, empirical testing of the model will be taken up in future publications.

The most prominent PMS framework in the literature, i.e. the balanced scorecard (BSC) of Kaplan and Norton (1996) does deal with the issue of trade-offs in performance measurement, but only in reference to the fulfilling of firm strategies and objectives. However, Kaplan and Norton (1993) only make reference to the trade-off between short-term profit and long-term growth. Opinion as to whether the BSC can deal with trade-offs in the first place seems to point in the exact opposite direction (Youngblood and Collins 2003; Ferreira 2013). In order to deal with the trade-offs in the BSC's criteria (metrics), Youngblood and Collins (2003) propose to use a multi-attribute utility theory (MAUT), while Ferreira (2013) proposes to use multi-criteria decision making (MCDM). However, in using MAUT/MCDM, the trade-offs between various metrics/criteria are dealt with by introducing weighting, which introduces yet another trade-off. Weighting introduces problems associated with bias and personal preferences (Delquié 1993, 1997; Keeney 2002).Nevertheless, some have gone so far as to adapt Kaplan and Norton's BSC to sustainability (Epstein and Wisner 2001; Figge et al. 2002; Möller and Schaltegger 2005). However, this necessitates an expansion of the core four perspectives of the BSC.

The purpose of the BSC—whether sustainability is included or not—is to function as a top-down performance platform which evaluates progress towards firms' strategic objectives: financial; customer; employee learning and growing; and internal processes. The BSC establishes a causal chain between lagging and leading indicators in order to account for performance qualities and evaluate strategy (Figge et al. 2002). Utilizing what Kaplan and Norton (1996) term double-loop, the BSC asks managers to "question underlying assumptions under which they are operating remains consistent with current evidence, observations, and experience"; whether "everything is going according to plan"; and "whether their planned strategy remains a viable and successful strategy" (p. 17). Kaplan and Norton's business strategy is all about dealing with the issues which the firm conceives are in its best interest (short and long-term): hence, why it is termed "a strategic framework for action". Although the BSC has some similar features to our model (e.g. Kaplan and Norton's concept of "financial perspectives"), this is purely ex post facto coincidental. Our model was independently assembled utilizing the extant literature and is not intended to only function as a performance platform. The emphasis on strategy evaluation on the part of the BSC is what hinders it from being able to fully inform and assess particular sustainability performance trade-offs. This will be further discussed and demonstrated in the Deepwater Horizon example included in this work.

The overall structure of this paper is as follows. "Back Ground" section is divided into two parts. The first part (2.1) deals with a discussion of trade-offs and the second part (2.2) deals with a discussion of Contingency Factors,

which is part of the research platform in this study. "Model for Trade-Offs in SPMS" section is a discussion of the trade-offs in a unique SPMS model, with individual sections being devoted to specific aspects of the model: 3.1 Vertical and Horizontal Alignment, 3.2 the Performance Prism, 3.3 the Stakeholder Prism, and 3.4 the Competitive Advantage Prism. Following this, the fourth Section will present an example which demonstrates the model (4.1) and a discussion of current SPMS platforms (4.2), followed by the fifth Section dealing with conclusions and areas for future research.

Back Ground

The purpose of this section is to frame the problem and set about establishing a framework around which the problem will be addressed. As such, the first subsection is directed towards establishing a definition and perspective of what is a trade-off in the context of sustainability. Followed by this is a background discussion of contingency factors, as well as the purposes for its utilization in this study.

Trade-Offs

Angus-Leppan et al. (2010) define a trade-off as "an exchange of one thing in return for another: especially relinquishment of one benefit or advantage for another regarded as more desirable" (p. 231). Porter (1996) states that trade-offs occur in organizations where "activities are incompatible" such that "more of one thing results in less of another" (p. 68). The reasons behind these trades-offs are given by Porter (1996) as follows:

(1) Inconsistencies in image or reputation.
(2) Changes in organizational activities. That is, changes in activities have associated consequences for products, equipment, employees, skills, and management systems. Also, trade-offs arise when activities are either overdesigned or underdesigned for their own specific use.
(3) Unclear priorities which expose the limits on internal coordination and control in the organization.

Typical trade-offs associated with sustainability involve intergenerational justice and material substitution (Toman 1994), as well as economy versus the environment issues (Gibson 2006). Trade-offs are usually associated with short-term planning, while win–win situations usually arise out of long-term planning (Slawinski and Basal 2009).

According to Hahn et al. (2010), trade-offs in sustainability occur between four different actors (individuals, industry, organizations and society) and in three dimensions (temporal, outcome and process). This has particular importance with SPMSs because sustainability activities are typically associated with increased operating costs (Ibid.). However, this should not be surprising as any investment in environmental technologies has traditionally been associated with high costs, due in part to the difficulty in assessing the extent of costs and benefits (Murovec et al. 2012). Sustainability costs can include implementing new technologies, material substitution, waste control, labour costs and, certainly, performance measurement. Opportunity costs need not necessarily be limited to financial metrics. Utilizing only financial metrics has shown itself to be inadequate since the early 1980s (Kennerley and Neely 2002, 2003) because they are "lagging indicators of results and are frequently difficult to link to managerial notions aimed at improving medium- to long-term performance" (Coleman 2006, pp. 12–17). In cases where there is no financial metric, the opportunity cost can be expressed in terms of intangibles such as the social opportunity cost. For example, eliminating seatbelts in automobiles presents a financial incentive to manufacturers, but ignores the social opportunity cost of decreased rates of fatalities.

In the case of this work, trade-offs are presented as the result of the choice between implementing an SPMS and doing nothing, as well as a shift in outcomes towards weaker or stronger sustainability.

Contingency Factors

Contingency Theory emerged out of the 1960s as a construct for understanding the structure of organizations (Perrow 1967). Contingency is "any variable that moderates the effect of an organizational characteristic on organizational performance" (Donaldson 2001, p. 7). Hence, any organization finds its structure associated with contingency (Ibid.). This introduces a relativistic element in the study of organizations because each one must address its own portfolio of contingencies. Contingency theory has pertinence in this study owing to the different ways sustainability issues present themselves and interact with various contingency factors. This limits the characterization of trade-off issues to macro level operations of the organization. However, the usage of contingency theory in this paper is specific and does not relate, for example, to styles of leadership or the structural design of organizations. Rather, what is pertinent here is how contingency factors inform the way in which organizations can potentially interact or deal with sustainability issues. Hence, contingency factors can be defined as both the internal and external characteristics and conditions of an organization (Kazanjian and Drazin 1987; McKeen et al. 1994; Damanpour 1996; Ambos and Schlegelmilch 2004; Sila 2007; Ifinedo and Nahar 2009). Thus, the reason for the usage of contingency factors is related to

the variegated aspects of different organizations. So, although the case study with British Petroleum as outlined below affects each level of the four prisms contained in the model, this need not necessarily be the case for every organization.

Sustainability problems do not present "one solution fits all" methodologies for dealing with all the aspects of the triple bottom line (van Marrewijk 2003). Winn et al. (2012) suggest the nature of sustainability is so case dependent that it is possible to manifest and constitute itself in many different ways depending on the industrial sector, such as determining a living wage, deliberating with aspects of scientific uncertainty and taking on new sets of decision-making paradigms. This is also confounding, as Hahn and Figge (2011) note that there are no explicit relationships between the economy, the environment and the social aspects of sustainability which are established by focusing on systemic efficiency. Gates and Germain (2010) found that factors as varied as strategy, industrial sector, stock market listing and nationality played their respective parts in the degree to which sustainability was incorporated into an existing strategic PMS.

The individual characteristics and needs of an organization can significantly influence the scope of priorities with regard to their environmental management system (Nawrocka and Parker 2009), and can be as diverse as increasing moral leverage in dealing with waste generation. The growth in contingency portfolios is also based on historical antecedents in performance measurement. Neely (1999) claims the motivations for the need for these new PMSs are multiple. They include increased levels of competition within a particular sector, the use of improvement initiatives which require strong performance measurement, the presence of national and international awards for performance merit, changing organizational roles, changing external demands and, lastly, the power of information technology. Along with these multiple factors, the complexity of sustainability lends itself towards the use of contingency (Fiksel 2003; Boons and Wagner 2009; Lozano 2012). In the text, contingency factors are implicated when trade-offs manifest themselves due to the type of organization, as well as their scale (size) and scope (type of variety) of operations. For example, the vertical and horizontal integration (explained further in "Vertical and Horizontal Alignment Prism" section) of an SPMS is dependent upon the particular type of organization under examination. Clearly, a multinational like Dow Chemical will have different issues related to integration, competitive advantages, stakeholder concerns, and types of metrics than, for example, a local nonprofit organization. A summary of relevant contingency factors is provided in Table 1.

Model for Trade-offs in SPMS

A summary of the trade-offs found in the extant literature may be found in Table 2. The first column indicates in which prism the trade-off occurred in, while the second column relates to the actual trade-off and its relation to Porter's (1996) typology outlined in "Trade-Offs" section. As an aside, the term "prism" merely reflects the locus around which a particular viewpoint centres. The third column ("Comments") indicates how these trade-offs affect various operations within an organization. This table is meant as a guide to begin an initial exploration of the domains of each of the prisms with the intent of adding more definition as it relates to each individual organization. More detailed discussion follows in the relevant subsections below.

Figure 1 depicts the model of an SPMS (enclosed within the oval circle with blue icons) as it is contained within the total systems embodied within a corporation (whose overall systems are depicted by the rounded red rectangle). The model was constructed using evidence from the available literature in order to map out the interactions between the SPMS and specific aspects of an organization. Its appearance as a top-down hierarchy model is purely to relate the downward flow of information from the metrics heptagon. Adjacent to this, capabilities of the firm (represented by a green rectangular box) are situated outside of the SPMS because this has to deal with processes such as financing, accounting, human resources, IT, marketing and the executive that are exterior, yet related, to the SPMS. Optics (the orange circle) is situated equally within and outside the corporate system, but outside the SPMS, to denote that this particular area is influenced by both internal and external forces. Within the SPMS, metrics is at the top of the four-sided polygon. From there, the model breaks down into further divisions of trade-offs (i.e. financial assets, intangible assets, as well as strategy and decision making). However, as mentioned in the Section on Contingency Factors (2.2), there is no particular ranking of the trade-offs, although metrics plays a key role in the SPMS. Again, this is necessary because each organization has its own portfolio of contingencies. Rather, it may be observed that there are a series of interactions or lines which indicate causality relationships between the various trade-offs. That is, the lines between the geometric shapes indicate that one trade-off within a single area has repercussions throughout the model. The exact telemetry of these routes will be discussed below with the aim of outlining weak to strong sustainability outcomes, as well as other system-based outcomes.

A minor digression must be made here to note that part of the influence for the model developed comes from Neely's *Performance Prism* (Neely et al. 2002), although

Table 1 Types of contingencies for consideration

Type of contingency	Examples
Types of stakeholders	Employees, investors, customers, suppliers, citizens directly or indirectly affected by operations, organizations, communities, and habitat
Scale of operations	Larger or smaller organizations; the volume of industrial activity
Scope of operations	Small and medium enterprises that supply unfinished raw materials; multinational organizations with many different products, processes and supply chains; highly specialized services
Types of products or services an organization provides (capabilities)	Financial services institutions have different priorities than, for example, petroleum producers
Vertical and horizontal integration	Integration problems vary according to the individual structure of each organization
Types of assets	Assets can be financial or intangible. There can also be varying degrees of liquidity in these assets
Views of sustainability	The construct of sustainability can vary. For example, some organizations do not address the social aspects of sustainability
Strategy and decision making	Decision-making processes as well as priorities vary from firm to firm. For example, each firm will use different weighting for similar issues. Strategies can be methodologically different and have a large degree of variance in terms of objectives
Degree of public presence	Some organizations (e.g. McDonalds) have a high public presence while others may be relatively obscure
Competitive advantages, market placement	Competitive advantages can vary according to sector and products. Market placement or penetration can depend on the degree of saturation of the market

the overall structure is different. Also, the stated function of the *Prism* was primarily to adopt a "stakeholder-centric view of performance measurement" (Neely et al. 2007, p. 151). This is not the case with the model presented in this work, as considerations in this work equally take into account the stakeholder perspective and organizational perspectives related to sustainability performance. It would also be meaningful to note that while Neely et al. (2002) consider individually the processes and capabilities of a firm, these have been amalgamated as part of an organization's overall competitive advantage. Further, our concept of strategy formulation does not study stakeholder strategies alone, but extends further into deliberations of what types of constructs of sustainability are formulated by a firm and how strategy influences competitive advantages. Additionally, Neely et al. (2002) frame two elements of their performance prism as stakeholder satisfaction and stakeholder contribution. The stakeholder prism in our model only considers stakeholders in relation to the overall sustainability performance of the organization.

Vertical and Horizontal Alignment Prism

The smaller, scaled-down version of the SPMS enclosed within the corporate system seen in Fig. 2 serves as a basis upon which to illustrate the theme of precisely where *within an organization* an SPMS should be placed. Naturally, this will vary from firm to firm. This "systems level" problem of integration is of fundamental importance because it relates to the issue of *vertical and horizontal alignment*. Porter (1980) defines vertical integration as "the combination of technologically distinct production, distribution, selling, and/or other economic processes within the confines of a single firm" (p. 300). Thus, vertical integration is the encapsulation of hierarchical transactions within a single organization. Conversely, according to Axelsson (2002), horizontal integration "concerns the coordination of work between different individuals or organization units on the same hierarchical level" (p. 145), or which have the same status (Axelsson and Axelsson 2006). The vertical and horizontal alignment prism involves interactions between the SPMS and corporate systems. The usage of this terminology (vertical and horizontal alignment) refers to how the SPMS is situated within the firm and how this affects its ability to capture firm activities related to sustainability performance.

The problems associated with vertical and horizontal alignment are endemic to all PMSs (Tonchia and Quagini 2010) and implementing any new structure presents problems regardless of their nature (Tolbert and Zucker 1996). The misplacement of the SPMS within an organization can have negative effects (i.e. trade-offs) arising from a lack of proper evolution which can reduce the returns on the SPMS over time (Kennerley and Neely 2002). In turn, this can directly affect the ability of the SPMS by limiting the organization can lead to conflicts within an organization which can impact upon the ability to strategize. Consequently, this can have further repercussions in terms of framing capabilities (Neely et al.

Table 2 Summary of trade-offs in SPMS

Prism	Trade-off and origin*	Commentary
Vertical and horizontal alignment	SPMS not properly integrated at systems level [3]	An improperly aligned SPMS has a trickle-down effect on the entire system. The reporting potential of the SPMS is undermined
	SPMS must be flexible and reviewed to address the dynamic the nature of sustainability issues [3]	Systemic antecedents must be routinely evaluated for possible reconfiguration and realignment. As contingencies change, so must the auditing process; otherwise, the result is an anachronistic performance evaluation
Performance	Metrics do not reflect sustainability strategy [3]	The choice of metrics is based on strategy and the construct of sustainability chosen by the organization. The broadness of sustainability definitions can lead to a "more is better than less" mentality with regard to metrics. This can introduce redundancies and waste of resources in the organization
	Wrong sustainability strategy developed [1]	This can result in incorrect delegation of assets for sustainability activities. This arises partially from improper stakeholder management and failure to consider properly the requirements of the organization
	No progress to report [2]	Continuous improvement may be difficult to maintain with changing market conditions; for example, resource scarcity. The limitations of technology may also limit progress towards sustainability
	Performance data do not lead to strategic direction [1]	Achieving eco-efficiency is fairly straight-forward. Moving beyond this achievement is difficult in terms of establishing new targets or directions
	Performance commitments (goals) may be difficult to determine or maintain [2]	Beyond the set of legal requirements, an organization may be asking itself where, along the spectrum from weak to strong sustainability, should our organization be positioned
	Can lead to better deployment of assets [2]	Performance measurement can lead to more efficient outcomes. This is typically seen in the early stages of using an SPMS
	Performance improvements may have nothing to do with SPMS [3]	This may have been due to residual effects such as procurements of expensive technology or low demand for products/services
	Difficult to deal with sustainability from a holistic perspective [1]	The social element of sustainability can be difficult in terms of formulating a management contingency or a method for measurement
Stakeholder	Presence of SPMS has positive outcomes with respect to stakeholders [1]	Stakeholders can influence the course of an organization's direction. This risks altering corporate activities to suit those of the stakeholders. These types of conflict can undermine strategic objectives
	Facilitates risk and visibility management [1]	An SPMS can aid in addressing aspects of an organization's due diligence. This can lead to better sustainability outcomes
	Sustainability reporting not standardized [2]	Reports that lack consistency and analytic rigour undermine sustainability activities. an organization may have to utilize established entities such as the global reporting initiative (GRI)
	Difficult to create long-term value [1]	Long–term value creation is predicated on correct strategy and the performance of intangible assets. This often involves making trade-offs with short-term financial goals
	Difficult to formulate stakeholder strategies beyond the micro level [3]	In some instances, it may only be possible to address the concerns of the primary stakeholders. Other larger societal issues at the macro level may not be addressed. This might involve government policies on issues such as labour standards
	There are a number of useful platforms such as ISO 26000 for providing direction in stakeholder management [2]	While guidance is provided, the requirements may be burdensome and not necessary in all situations. A considerable amount of refining might be necessary to find the correct stakeholder relationships for an individual organization
Competitive Advantage	Where possible, can aid in continuous improvement [2]	Depending on type of industry, it may not be possible to begin or facilitate continuous improvement. Competition in some sectors is too intense to facilitate continuous improvement

Table 2 continued

Prism	Trade-off and origin*	Commentary
	Competitive advantage may not last long in areas of sustainability [1]	Maintaining an exclusive competitive advantage may run contrary to the principles of sustainability. Furthermore, a competitive advantage is difficult to maintain when competition is too intense. Competitive advantages in sustainability issues may be limited to services or licenced technologies and knowledge
	Some aspects of the organization's activities may have to be outsourced [1]	The abilities of an organization are limited. Thus, an organization may have to defer to expert or regulatory authorities when the SPMS identifies areas of concern. Other instances may require expert services that are beyond the organization's capabilities

* The origins of the trade-offs are based on Porter (1996) as follows: [1] inconsistencies in image or reputation, [2] changes in organizational activities, and [3] unclear priorities which expose the limits on internal coordination and control in the organization

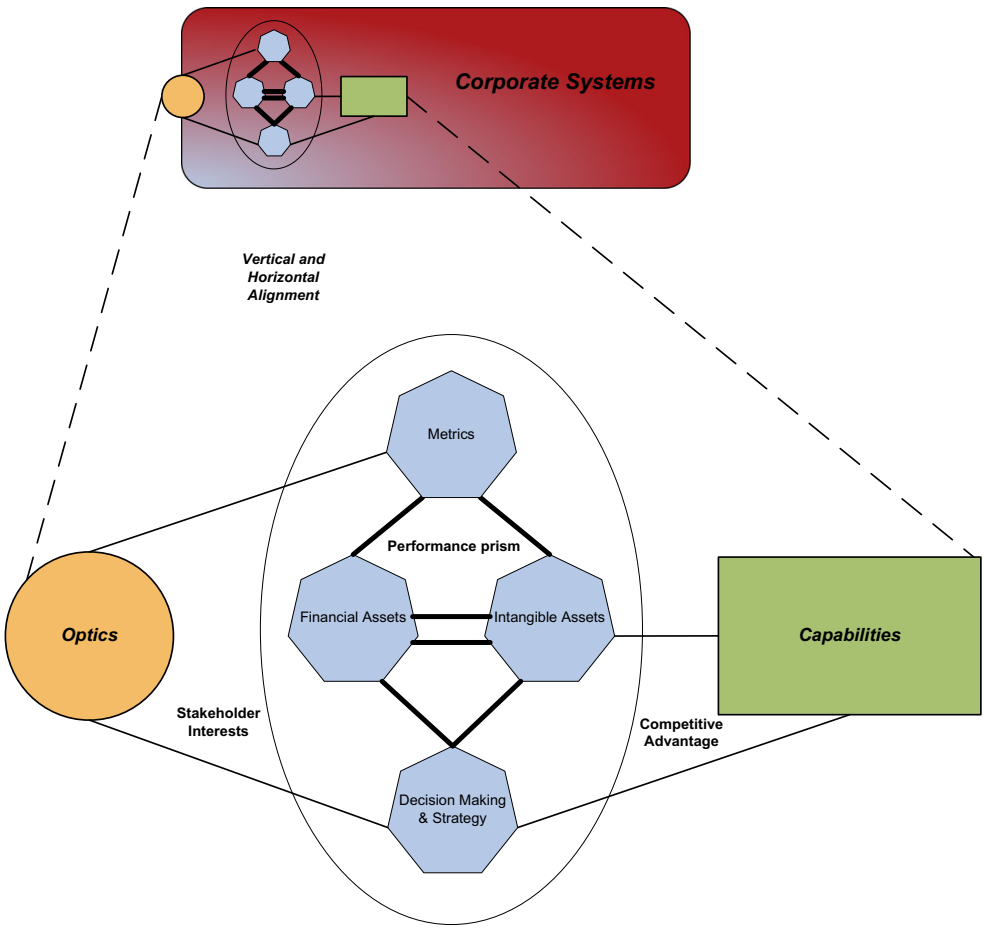

Fig. 1 SPMS model

2005). This particular aspect of integration is particularly important as few companies have managed to embed their sustainability activities successfully (Loorbach and Wijsman 2013). Some problems associated with sustainability activities might necessitate the altering of institutions because of incompatibilities between scientific and business aims and philosophy (Padmanabhan and Beckmann 2009).Contingent factors concern the scope of activities within an organization.

The Performance Prism

The two principle goals of a modern planning and control system are linking strategy to actions and performance

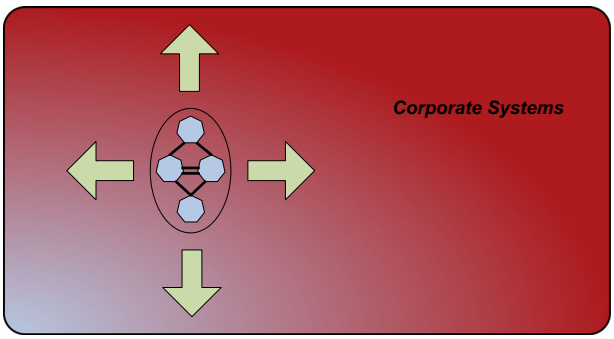

Fig. 2 *Vertical and horizontal* alignment

measures (Bonacchi and Rinaldi 2007). In such a way, it is possible to gauge implementation and measure efficiency and effectiveness (Ibid.). The performance prism (Fig. 3) involves all the elements within the SPMS model: metrics, financial and intangible assets, as well as decision making and strategizing. For the purposes of this paper, Hall (1993) defines intangible assets as intellectual property (patents, trademarks, etc.), organization reputation, skills and know-how, as well as organizational culture. However, the International Accounting Standards (IAS) adds some useful substance to Hall (1993) by noting that intangible assets are

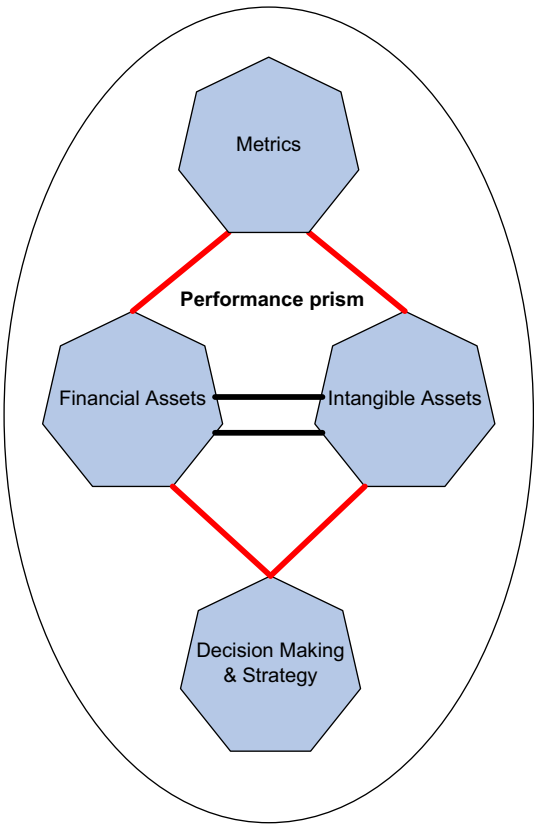

Fig. 3 The performance prism

nonmonetary assets without physical substance but which are identifiable, under the control of the organization and from which future economic benefits are expected (IAS 2012).A partial rationale behind this structure comes from Gates and Germain (2010) that there must be a very close connection between the performance measurement platform and the organizational strategic planning process. Further to the point of this particular configuration is that long-term strategic initiatives (a requisite for sustainability) are often linked with nonfinancial indicators (Mohamed et al. 2007). There are two parallel lines between financial assets and intangible assets as these may be interchangeable under circumstances where the intangible assets can be accurately valued. Indeed, there are many platforms by which this can be done (Tonchia and Quagini 2010). This is not to indicate that there are trade-offs between both types of assets. This arrangement is necessary in order to account for the growing trend of organizations which are almost entirely composed of intangible assets (Sullivan and Sullivan 2000). As well, Tonchia and Quagini (2010) note that the intangible assets of a company now outstrip financial assets in terms of importance. Furthermore, to represent merely the financial assets of an organization would be to emphasize one single dimension of the triple bottom line. That is, the differentiation between human, man-made, social and natural capital has led to the development of the concept of strong and weak sustainability (Gasperatos et al. 2008). More recently, some authors such as Lozano and Huisingh (2011) assert that the dimensions of the triple bottom line are interlinked. Thus, the need for holistic approaches to sustainability performance measurement is one particular trade-off as compared with previous stand-alone or compartmentalized forms of measurement.

Metrics[1] are positioned highest *within* the overall hierarchy of the SPMS model and have a trickle-down dynamic that informs the strata beneath it and vice versa. This is because indicators (metrics) have the purpose to measure progress towards goals, as well as asset allocation (Kanji 2002). Consequently, metrics is the basis for the dissemination of information related to performance, be it in the form of reporting, auditing, risk management, and so forth. Neely et al. (2000) define metrics as measurements which help define goals and performance expectations for the organization. They further add, "[manufacturers] adopt or develop appropriate metrics to interpret and describe quantitatively the criteria used to measure the effectiveness of the manufacturing system and its many interrelated components" (p. 1122). In addition, Ahrens and Chapman (2002) note that the key purpose of metrics in a PMS is to trigger a response (perhaps a correction) or to form the

[1] For the purposes of this paper, metrics are considered the equal of indicators.

basis for evaluation. Naturally, the organization's use of its financial and intangible assets forms a basis for evaluation, although not to the exclusion of evaluating organizational strategy but, rather, as a complement to it. Thus, assets must be part of the performance prism since they are part of the causal chain which links strategy to the use of assets which result in either greater or lesser sustainability outcomes. Hence, decision making and strategy cannot solely be the basis for evaluation since they do not explain systematic behaviour in its totality. The use of sustainability on the operational level is problematic in that managers have to make choices that impact their own niche (short-term quarterly profit) while in the course of bringing an organization in line with broader sustainability strategies (Epstein and Wisner 2005). However, any measurement of sustainability will be related to the construct of sustainability within the organization (Acquier 2010), which is formed through decision making and strategy contingent to the organization. In turn, this can run into poor sustainability outcomes when too much emphasis has been put on short-term perspectives with regard to the performance of financial assets(Neely et al. 2005; Marginson and McAulay 2008). Thus, a direct line of trade-offs exists between the performance of financial assets of the organization and the sustainability strategy it plans (Gates and Germain 2010), mainly because sustainability strategies involve the divestment of assets in order to fulfil their objectives. Similarly, corporate performance criteria are informed by strategy (Delmas and Blass 2010). The large number of available metrics makes for confusion when trying to strategize the organization's overall sustainability objectives (Székely and Knirsch 2005; Epstein 2008; Mayer 2008; Singh et al. 2009; Hubbard 2009).

While strategy and decision making sits on the bottom of the performance prism, this does not mean that it is less important. Strategy and decisions making involves both a combination of linear and adaptive strategy as envisioned by Chaffee (1985). That is, linear strategy involves planning in order to accomplish goals while adaptive strategy involves being able to assess both internal and external conditions, thus striving towards a balance between risk and organizational capabilities and assets. The reporting process is now very important for investors and stakeholders to make informed decisions (Skouloudis et al. 2010). Therefore, measurements of a process must correspond to the outcomes, although an over-reliance on benchmarks, self-reporting and nontransparent frameworks can result in a distorted picture of performance (Sullivan 2011). Benchmarking does not relate to a corporation's core competencies as these cannot be measured (Székely and Knirsch 2005). As data inform decision making (Neely et al. 2006), there is also the issue of accountability in management (Hahn and Figge 2011). However, the proper usage of sustainability metrics will inform the proper usage of financial assets (Hall 2010).

Financially efficient outcomes will have a direct input on the performance of the organization; conversely, negative financial repercussions present opportunity for new services to stakeholders and customers (Hall 2010). The social elements of the triple bottom line have posed significant problems with regard to their measurement (Hutchins and Sutherland 2008; Stapleton and Garrod 2008). Vice versa, Kemp et al. (2012) feel that corporate social responsibility is hampered by the constructs imposed by the auditing process. That is, auditing provides information, but no direction (Barrett 1991). However, the requirements for specialized knowledge in the area of sustainability activities could result in too much reliance on policy makers and environmental scientists to determine whether the results of the SPMS are adequate or not (Sullivan 2011). Also, the weakness in this area is partially suggested by Parker (2000) to arise from the circumstances that, in fact, there may be no progress to report. A troubling trend in some recent works finds a lack of a causative link between performance platforms and higher performance (Dick et al. 2008; Heras-Siazarbitoria et al. 2011; de Vries et al. 2012; Starke et al. 2012). As well, moving beyond addressing waste reduction and inefficiency issues into new areas like pollution control and eco-efficiency while producing tangible results can present more difficult challenges (Sharma and Henriques 2005). In summation, reasons for not pursuing sustainability activities centre on short-term constraints, lack of assets, the difficulty in measuring effectiveness of implementation, as well as the failure to add value or to relate to the financial bottom line (Lozano 2012).

The Stakeholder Interests Prism

Freeman (1984) defined a stakeholder in an organization as "any group or individual who can affect or is affected by the achievement of the organization's objectives" (p. 46). A performance system requires identifying which strategies, processes and capabilities are acting upon stakeholders (Neely et al. 2006). With that in mind, the stakeholder interest prism (Fig. 4) involves optics, metrics, as well as decision making and strategy. As mentioned above, the optics of an organization involve both the interior and exterior of corporate systems because shareholders are both external and internal to any operations which involve the environment. What optics involve may be best described as the management of stakeholder expectations and perceptions. The two methods which are relevant to this are the dissemination of information related to sustainability performance (metrics), as well as insights into corporate governance (strategy) arising from the

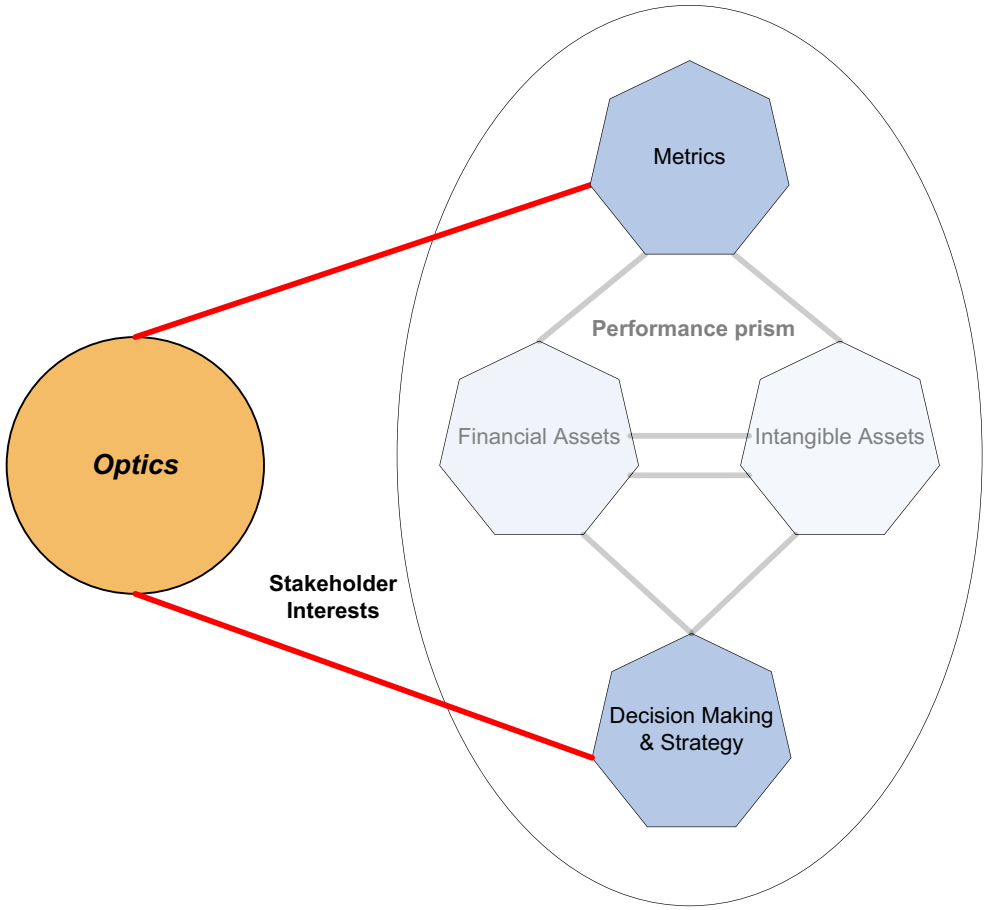

Fig. 4 The stakeholder prism

organization's mandate. Certainly, this may be understood to mean that quantitative information must augment qualitative information. In certain limited instances, the aims of this prism may be akin to public relations. As such, this can relate to value, reputation and communication.

The presence of an environmental management system is seen to have positive effects on the improvement of stakeholder perceptions which have an influence on organizations as promoters of greater environmental commitment of firms (González-Benito et al. 2011). This can be explained by the fact that disclosure strategies can motivate polluters to reduce emissions even in the absence of regulatory measures (Tietenberg 1998). As stakeholders, Campbell (2007) claims that organizations and institutions "influence corporations by constraining their behaviour—that is, by discouraging them through rules and negative sanctions or punishments from acting in socially irresponsible ways" (p. 958). Warhurst (2005) claims that stakeholders are central to the expansion of corporate social responsibility. However, the evidence that stakeholders play an important part in the area of environmental leadership in the regulatory sphere is not supported (Buysse andVerbeke 2003). Reporting initiatives are usually taken up by those who wish to mitigate risk and when visibility in the capital market is higher (Marimon et al. 2012). Nevertheless, the lack of transparency (Delmasand Blass 2010), standards (Székely and Knirsch 2005) and best practices (Hubbard 2009) are very problematic in this area. Also, there is not much evidence to show that there is equal focus on all the elements of the triple bottom line (Adams and Frost 2008). Furthermore, the act of simply participating in the social aspects of sustainability as part of an overall environmental management platform does not lead to a competitive advantage (Hillman and Keim 2001). Again, the lack of holistic approaches remains a persistent trade-off.

As well, there is a problem in creating value amongst all the stakeholders (Genaidy et al. 2010), although some research shows that focusing on primary stakeholders[2] can lead to increased shareholder value (Berman et al. 1999; Hillman and Keim 2001). Long-term value creation (intangible assets) is brought about by focusing on the

[2] Which includes employees, customers, and suppliers.

relational rather than the transactional aspects of stakeholder interactions (Genaidy et al. 2010). This is why optics has to be mediated by the decision making and strategy elements within the SPMS. Unfortunately, the majority of the time environmental mitigation and social benefits at the micro level are the ways in which organizations manage their stakeholders' expectations (Loorbach and Wijsman 2013). Some research has also shown that corporate social responsibility activities were not a key determinant in consumers' decisions (Loureiro et al. 2012). Institutional theory has also shown that the plethora of stakeholders involved can take an organization away from the trajectory envisaged by the original entrepreneurs (Brown et al. 2009). This is achieved by taking the firm into directions that are outside its technical efficiency (Delmas and Toffel 2004).

The Competitive Advantage Prism

As may be seen in Fig. 5, the competitive advantage prism takes into consideration interactions between the internal capabilities of an organization and two elements within the SPMS, namely decision making and intangible assets. A competitive advantage is formed by core competencies that facilitate performance gains over competition through differentiation and superior products (Prahalad and Hamel 1990).Although new, the link between intangible assets and a competitive advantage is established (Tonchia and Quagini 2010). For example, Nehrt (1996) did find that environmental investments on the part of the firm do increase its "repertoire of competitive advantage". He also found that investments in pollution reducing processing equipment resulted in greater profit growth when the investments were made earlier rather than later (i.e. the timing of the transactions was critical). Waiting too long can result in "time compression diseconomies [that] may constrain the firm's ability to gain an advantage from inherently beneficial investment" (Ibid., p. 544). Mohamed et al. (2007) note a competitive advantage is formed using both financial and nonfinancial indicators to complement each other. There is an interconnected relation between corporate strategy and social responsibility, which can be identified as part of the firm's capabilities (McWilliams et al. 2006). The reason behind this configuration is that the embedding of environmental management within corporate strategy helps identify the organization's intangible assets and drive the continuous environmental improvement strategy (Albelda-Pérez et al. 2007). In return, intangible assets drive the organization's competitive advantage through differentiation (e.g. of products or services) and, in turn, this

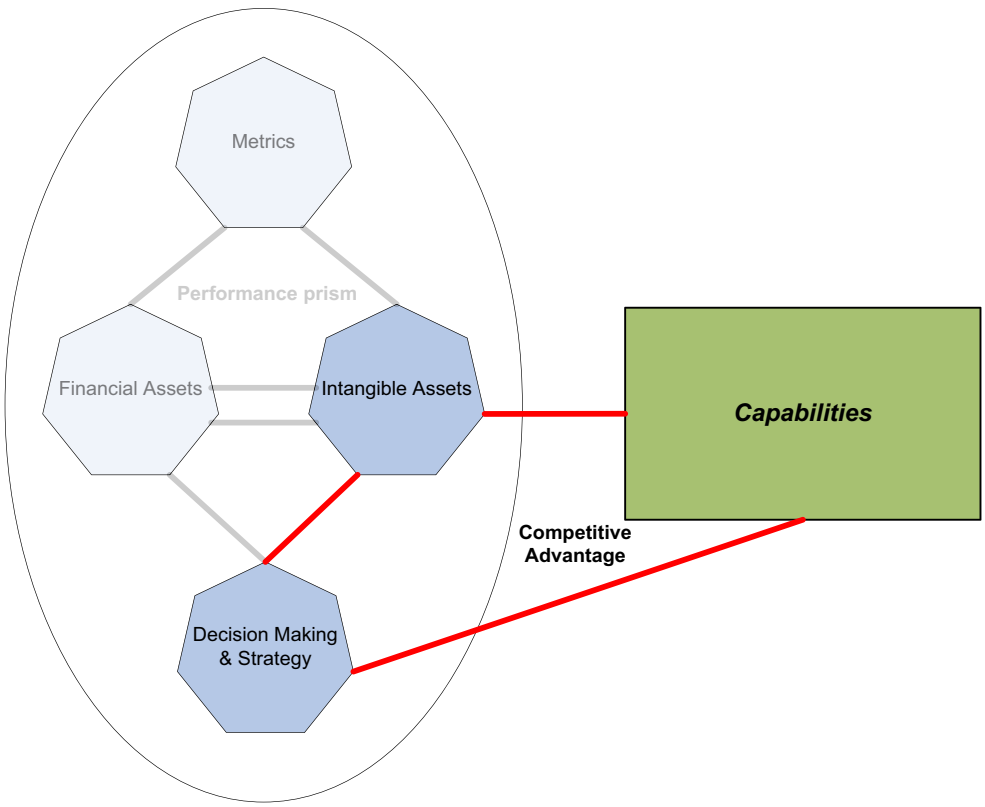

Fig. 5 The competitive advantage prism

affects overall strategy (Hall 1993). For example, a competitive advantage can be obtained through differentiation by a positive reputation (Porter 1985). Furthermore, knowledge is the most important facet of a competitive advantage (Kandampully 2002), which is why the intangible assets icon is linked into this prism. This is supported somewhat by Barney (1991) in that sustained competitive advantages arise not very likely from strategic management (unless its information processing system is deeply imbedded), but from the assets at its disposal. Competitive advantages arise from the fact that a firm possesses assets that are rare and valuable (Baas 2008).

Nevertheless, it must be remembered that competitive advantages may be short term if they can be replicated (McWilliams et al. 2006). And this can be problematic with the proliferation of environmental technology which, while bringing about better environmental outcomes, can result in greater competition (Murovec et al. 2012). Therefore, a strong competitive advantage arises out of a high degree of congruence between a firm's environmental, strategic and control systems (Nilsson and Rapp 2005). Some research has shown environmental strategies have positive impacts on an organization's capabilities and intangible assets (Neely et al. 2006; Epstein and Wisner 2005). However, most organizations focus their activities on reducing firm-level unsustainable activities, but furthermore often ignore the broader context of society (Loorbach and Wijsman 2013). There is also the potential for outsourcing of environmental burdens because of the widened scope of activities brought about by sustainability issues (Hall 2010; Jasch 2009). Therefore, the presence of an SPMS brings about the difficult trade-off of how precisely to go about formulating a unique competitive advantage.

Discussion

This Section is divided into two subsections, one dealing with the example of the SPMS model proposed in this work and the other with extant SPMS platforms. The example chosen to demonstrate the proposed model was based on the fact that certain chosen decision-making paths had ramifications throughout the model. Thus, it was more purposeful in using this example rather than an example with limited and localized ramifications. Another key factor in using this example was the completeness of publicly available information. The performance platforms in the second Section were chosen based on their presence in the sustainability performance literature. This list is not meant to be exhaustive, but to merely demonstrate the lack of consideration for issues concomitant with performance trade-offs.

Example: The Deepwater Horizon Oil Spill

In order to illustrate the performance prisms, the Deepwater Horizon oil spill in 2010 stands as an expeditious example since it has ramifications coursing throughout the model. Naturally, the spill stands as a sustainability problem in terms of destruction of habitat, loss of life, and lost assets (see below). But, it also stands as a clear example of sustainability performance systems failure in that the existing structures failed to capture the relevant information. In the years leading up to the 2010 Deepwater Horizon oil spill (1999–2009), BP (British Petroleum) saw a gradual decline in their total number of oil spills (BP 2003, 2005, 2009, 2010). During this same period, the overall volume of spills (millions of litres or ML) also declined, although that progress was not linear (see Fig. 6). Therefore, the Deepwater Horizon spill (roughly 795 ML) may have initially appeared anomalous to the overall tenor of the preceding ten years. Although operations at the site of the Deepwater Horizon spill (the Macondo Well) were shared between BP, Halliburton and Transocean, because BP leased and operated the Macondo plot, BP was ultimately responsible for all operations, drilling or otherwise. In fact, BP oversaw the operations as Well Site Leader and Well Supervisor.

The recently completed investigation by the U.S. Chemical Safety Board found inadequacies in testing procedures of the blowout preventer (BOP) and that the diameter of the drillpipe used at Macondo exceeded the BOP manufacturer's recommendations. The manufacturer of the BOP (Cameron) had made recommendations for independent systems tests; these would have revealed the incorrect wiring of both a battery and solenoid which failed during the moments leading to the blowout that killed 11 and injured 17. Consequently, this can be seen as a management failure: "Organizations maintaining effective safety critical elements (SCEs), such as the BOP, implement management activities to ensure they meet safety

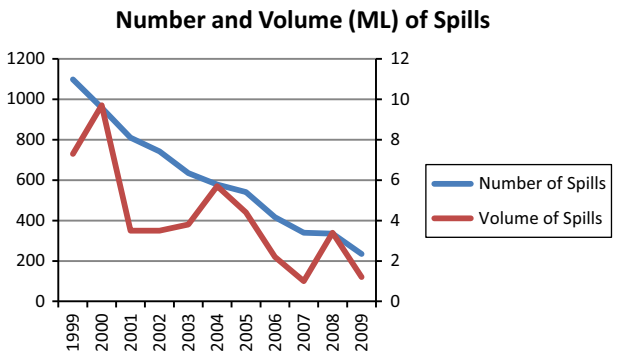

Fig. 6 BP sustainability performance leading up to deepwater horizon

objectives through the lifetime of the SCE" (U.S. Chemical Safety and Hazard Investigation Board 2014, p. 62). This was not done as there was not even a tracking system in place which accounted for modifications to the BOP leading up to the blowout (Ibid.). In terms of the trade-off model, this can be seen as a failure of the decision-making and strategizing element of the performance prism, especially in that management failed to direct assets towards proper systems evaluation (i.e. metrics). It can also be seen as a vertical integration problem since the system failure was the inability to capture actual sustainability performance relating to drilling activities. That is, the scope of activities was insufficient to the task (see "Vertical and Horizontal Alignment Prism" section). Hence, capabilities—mostly in the form of safety performance and the prevention of oil spills—were hindered by the lack of adequate measures. This is a loss of competitive advantage as other oil companies had much less problems with their safety record while BP accounted for 97 percent of "egregious, willful" violations within the US (Morris and Pell 2010). This adds up to a total of 760 citations; BP's competitors Sunoco and Conoco-Phillips each had eight, Citgo had two and Exxon one (Margonelli 2010). This led to significant ramifications in terms of company financial assets—between April and June of 2010, BP (PLC) stock fell from roughly £650 to £300 (Reuters 2014) and the Deepwater Horizon platform was lost, which initially cost US$350 M to construct (CBSNEWS 2010). As of mid-2013, the total bill to BP in terms of clean-up and legal ramifications has added up to between $42.2B and $42.4B (Macalister 2013; Gosden 2013). The intangible assets lost in this instance are the 11 casualties (see "Trade-offs" section). The environmental damage done to the US Gulf coastline—along with the seeming indifference of then CEO Tony Hayward—brought about a fury of public anger both in the US and the UK, the latter because British pension funds are tied to BP's stock performance. The reputation of BP still remains tarnished to this day as stock prices of the firm BP have yet to rebound years after the incident. Needless to say, investors play a significant role in this instance in the stakeholder prism. Consequently, it may be seen that all levels of the SPMS trade-off model are implicated in this model, thus demonstrating the utility of this platform (see Table 3 for a summation).

Discussion of Some SPMS Platforms

While Pintér et al. (2012) note there are a number of sustainability indices and reporting platforms available (the Global Reporting Initiative or GRI perhaps being the most visible), there are only a limited number of sustainability performance platforms. Also, most of the available standards on sustainability performance make no specific mention of trade-offs or how to manage them. These include the Sustainable Forestry Initiative (SFI 2010), World Business Council for Sustainable Development (WBCDC, n.d.), Ceres Coalition—*The Ceres Roadmap for Sustainability* (Ceres 2010), International Chamber of Commerce—*The Business Charter for Sustainable Development* (ICC 2000), Organization for European Cooperation and Development—*Guidelines for Multinational Enterprises* (OECD 2008), International Organization for Standardization—*ISO 14031 Environmental Management, ISO26000 Guidance on Social Responsibility* (ISO 1999, 2010), and the Global Environmental Management Initiative (GEMI 2007). The inclusion of ISO 14031 in this list is due to the fact that sustainability may be included as an environmental interest in the performance evaluation (ISO 1999). Similarly, ISO 26000 has many principles dealing with social responsibility including accountability, transparency, ethical behaviour, respect for stakeholder interests, respect for the rule of law, respect for international norms of behaviour, and respect for human rights (ISO 2010). In such a way, it broadly deals with some aspects of risk management. The standard also emphasizes the need for a review process and, to this extent, it deals with the trade-off issue of the dynamic nature of sustainability performance. Continuous improvement of performance which addresses aspects of the competitive advantage trade-offs is also advocated. However, the standard prescribes the entire ISO 14000 family of standards for environmental management systems as a complement to ISO 26000 in order to achieve a complete organizational platform. Therefore, this can be very cumbersome for organizations and, in turn, this has led some organizations to reject the use of standards outright (Pojasek 2011). However, ISO has recently published *Guide 82—Guide for addressing sustainability in standards*, which is a document for the writers to account for sustainability concerns in standards and other "deliverables" (ISO 2013). Again, trade-offs are only mentioned in that the "standards writer should reconcile the conflicts whenever possible" (Ibid., p. 12). A simple example is provided in the text in order to demonstrate how these "conflicts" are to be resolved—in this case, the drafting of a workplace standard. Here, the guide merely states that ergonomic issues outweigh economic or environmental concerns because the writer is drafting a workplace standard and not an economic or environmental standard. Of course, the obvious possibility that the exact opposite conclusion (economic or environmental issues overweighing ergonomic issues) may be arrived at by virtue of another standard is not discussed.

The question of longevity is foremost in the issue of competitive advantage and is highly dependent on the particular market niche. For example, competitive advantages based on information technology dissipate rapidly

Table 3 Summation of deepwater horizon events as related to SPMS trade-offs model

Prism	Implications and interactions
Vertical and horizontal alignment	At the systems level the monitoring of drilling activities was incomplete, thus leading to the loss of containment. This demonstrated the failure to capture relevant activities as related to systems testing with the blowout preventer (BOP), namely through independent systems tests. Proper alignment may have prevented the spill by persuading BP to follow the BOP manufacturer's recommendations
Stakeholder interests	The stakeholder interest prism revolves around outcomes emerging from strategy and decision making by the organization and realized at the metric level (e.g. CSR reports). negative consequences (the spill) arose out of poor management decisions and the physical evidence as indicated by metrics—poor safety record the size of the spill (volume), fatalities, legal consequences, etc. This led directly to negative impacts with the public and investors alike
Performance prism	The US chemical safety and hazard investigation board plainly identified the improper management of safety critical elements (SECs) as leading up to the failed BOP. The spill and explosion resulted in impacts to intangible assets:
	Loss of human life (11 fatalities)
	Destruction of habitat
	As well, the spill resulted in the following impacts on financial assets:
	Loss of natural resources
	Clean-up costs
	Civil suits
	Loss of infrastructure
	The incorrect establishment of correct metrics in independent systems testing also sees convergence upon these asset outcomes. This would also have been prevented had financial and intangible assets been properly deployed towards appropriate metrics
Competitive advantage	The poor safety record evidenced at BP derives from decisions made at the managerial level and the incorrect use of intangible assets (namely, human resources). this severely compromised BP's competitive advantage because its competitors had relatively minor safety infractions when compared to BP

(Powell and Dent-Micallef 1997; Dehning and Stratopoulos 2003). A sustained competitive advantage is a "value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy" (Barney 1991, p. 102). As Peteraf (1993) points out, maintaining a competitive advantage is based on maintaining "heterogeneity", which limits competition and immobility of assets. Homogeneous competing firms will not see the barriers required to maintain a competitive advantage; rather, they occur in heterogeneous situations where strategically relevant assets are evident (Barney 1991). Heterogeneity is the result of exclusion and the access to privileged resources, a structural imbalance which prevents rivals from damaging a competitive advantage (Valdini and Arbore 2013). For example, the elimination of CFCs from spray cans and refrigerators did not harm any competitive advantage because it was imposed by regulation and the burden of costs were put on the consumer (Barrett 1991). Consequently, logic necessitates addressing the question of what exactly is the prevalence of heterogeneous situations in sustainability issues.

Many of the organizations listed above, including the World Business Council for Sustainable Development (WBCSD n.d.), the Ceres Coalition (Ceres 2010), the International Chamber of Commerce (ICC 2000) and the Organization for European Cooperation and Development (OECD 2008) advocate collaboration amongst industries in issues of sustainability. This same effect of reducing competitive advantages can be seen with the advocacy of industry-wide best practices, as is the case with the Sustainable Forestry Initiative (SFI 2010). These two strategies are not surprising since standardization is the cheapest and least risky strategy as opposed to the one based on product differentiation or niche markets (Shrivastava 1995). Technology transfer is currently in the main only in the areas of low-carbon technology such as wind, solar, and biomass power generation (Schneider et al. 2008; Karakosta et al. 2010; Pueyo et al. 2011), as well as other smaller sectors such as agriculture and cement manufacture (Das 2011). Consequently, at this time, this does not appear to be a pertinent concern outside of these areas.

The relationship between stakeholder management and a firm's environmental strategy was associated with only "moderate importance" (Buysse andVerbeke 2003; see

also Berman et al. 1999). Firms which have a more proactive approach to environmental issues tend to perceive their key stakeholders' perceptions as more important (Henriques and Sadorskty 1999). However, Berman et al. (1999) found that the key stakeholder relations which have an impact on financial performance are the organization's employees and product safety/quality (i.e. customers), while the natural environment, diversity and communities do not. Thus, for example, calls by Perrini and Tencati (2006) for long-term value creation between organizations and a host of stakeholders (including public authorities, local communities and civil society) may be going beyond what is strategically necessary. For instance, the GRI's most recent reporting platform (G4) has nothing to say on how to determine which stakeholders are experiencing a "significant" impact (GRI 2013). A similar problem is seen in ISO 26000, with the expectations of stakeholders under their definition of social responsibility in Section 2.18 of the standard (ISO 2010).

Conclusions

The role of an SPMS is to measure progress towards sustainability outcomes at the organizational level. Sustainability presents numerous challenges to the organization because of the broad implications of the subject. These challenges manifest themselves in terms of trade-offs which involve stakeholders, organizational operations, as well as financial and intangible assets. Incorporating and managing these trade-offs is necessary in order to understand how different sustainability outcomes can present themselves to the individual organization. Achieving this level of understanding is purposeful because it facilitates informed decision making.

Contributions

This work presents a heuristic model for the trade-offs central to SPMSs. The model was constructed based on evidence found in the extant literature. This is purposeful as it attempts to map out these interactions at various levels within and exterior to organizations, which to date has not been done. Trade-offs resulting from implementing SPMSs involve either the betterment or degradation of sustainability outcomes or more efficient or inefficient uses of assets. Furthermore, trade-offs occur along four prisms of the SPMS. These include the performance prism, the stakeholder prism, the competitive advantage prism, as well as the horizontal and vertical integration prism. Systemic integration is particularly important as this is the point at which the performance data are generated. The performance prism involves the actual SPMS. Here, the emphasis is on the correct use of metrics and the development of sustainability strategies as both are linked together. Efficiencies and better use of assets can be brought about in the early stages of SPMS usage; however, long-term strategy formation must focus on intangible assets performance rather than financial performance. In the stakeholder prism, there is a link between the presence of an SPMS and the positive perceptions of the stakeholders. However, creating long-term value can be problematic in some industry sectors. There has been considerable improvement in terms of the guidance literature in aiding the process of stakeholder management. Yet, determining the level of involvement an organization may have to undertake with its stakeholders can be challenging. Lastly, the competitive advantage prism involves how the SPMS can aid the process of determining a competitive advantage with regard to its sustainability activities. However, at this point of time, the potential for competitive advantage generation in the sustainability area is debatable. Perhaps this may be addressed with further developments in sustainability science (Kates et al. 2001).

Academic Implications

One of the academic implications of this research is the establishment of a platform for further testing of the model. As there has been no substantial work done in this area, it would be purposeful to have even the rudiments of a model in order to move forward with the research. Certainly, this study is not intended to be an endpoint of this subject. This model also has the added cache in that there are now pathways in which the outcomes of decision making can be mapped out in terms of trade-offs through causal chains. This model is also useful for discovering the different ways sustainability affects the internal aspects of firms, as well as their interactions with various external actors. Because of the different implications sustainability has on each firm, there is a need for a largely generalized model. More specificity is required when moving towards studying real situations because of the implications of the Contingency Factors discussed in this paper.

Management Implications

Management also has the ability to map out what systems and core competencies it has to deal with in order to incorporate trade-offs and deal with them. The BSC presents a top-down feedback system which may not always capture all the aspects of desired performance outcomes. Sustainability performance requires more bottom-up systems-oriented approaches to be able to capture the full picture of what is going on. This may not be possible when

performance metrics are conceived to merely track and reflect the movement towards or away from firm-level strategies and visions. Consequently, top-down measures are not sufficient for the task of handling sustainability performance measures. BSC measures should be taken to task as to what exactly they are intended to accomplish. This model will be adaptable to many different sustainability platforms because it can be extrapolated to suit many different types of organizations. That is, the implications of the contingency factors used in this paper necessitate the move towards more specificity at the operations level. This may bring about more realistic ways in which to address sustainability performance in organizations.

Future Research

Future research in this area is driven by the problems outlined in the contingency factors Section. Namely, both the industrial sector and individual organizations present their own unique set of problems in dealing with trade-offs in their SPMS. Nevertheless, that does not mean that empirical work should not be pursued. In the area of performance, the lack of progress in maintaining continuous improvements merits attention as this must (at some point) be definitively correlated to variables such as technical and capital issues. Also, along this line is the relationship between organizational variables and sustainability performance. The issue of trade-offs in performance measurements merits attention as it does not currently have any pragmatic approaches, although this area may have recourse to risk assessment or sustainability assessment. A further problem seen of late is the lack of causative relationship found between performance platforms and sustainability improvements. Lastly, stakeholder theory and management are already decades old (Freeman 1984), and stakeholder performance is nearly as old (Wood and Jones 1995). The sophistication in this area is not unnoticed (see ISO 2010) and, subsequently, room for future research is limited. However, Harrison and Wicks (2013) point to the need for future stakeholder research to focus on value creation. With sustainability performance, this has particular interest in the area of creating value with regard to performance and how it responds to organizational factors such as firm size, environmental burdens and competitive intensity.

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