

SME sustainability dashboards: An aid to manage and report performance

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ABSTRACT

This applied paper introduces the concept and potential application of sustainability dashboards by SMEs as an aid to meet growing demands for sustainability management and reporting. It suggests how dashboards can be integrated into the planning and control systems of SMEs to facilitate data visualization for the purpose of sustainability decision making. The paper highlights benefits including low cost and discusses practical implications, such as use of dashboards beyond sustainability management and the need for policymakers to provide better access to training and software for SMEs.

Introduction

Small to medium enterprises (SMEs) have large economic, environmental, and social impacts. A significant portion of the U.S. economy, they represent 99.9% of all U.S. businesses and employ almost half (47.5 %) of workers (U. S. Small Business Administration Office of Advocacy, 2018). Concomitant with their prominence in the global economy, SMEs have substantial consequences for the natural environment. For example, in Europe it's been estimated that SMEs generate two-thirds (64%) of industrial pollution (Danish Technological Institute, 2010). Thus, sustainability is a growing concern for SMEs as global consumers, governments, and businesses awaken and commit to its importance.

The concept of sustainability centers around the need for organizations to operate in a fashion that does not diminish the opportunity for future generations and stakeholders to have their needs met (Hubbard, 2009; World Commission on Environment and Development, 1987). This concept requires a long-term perspective and must, by necessity, encompass economic, environmental, and social

factors (comprising the Triple Bottom Line).

Not only do SMEs tend to be more values driven (Sloan et al., 2013), but they currently are facing increasing demands for sustainability actions in the face of rapidly escalating consciousness and acceptance of the importance of sustainability. There are rising expectations for public disclosure of economic, environmental, and social impacts. This is occurring simultaneously with large corporations' scrutiny of their SME supply chain partners' sustainability performance. Driven by a variety of forces, larger SMEs have even joined in the movement to audit their own supply chain partners (see Intel, 2019). Investors and communities increasingly join in the demands for sustainability performance reporting by SMEs (Caldera et al., 2019; Eccles & Kilmenko, 2019; Jackson-Moore et al., 2019; Mathiyazhagan et al., 2013).

However, despite pressure to adopt sustainability practices and to incorporate them into their business practices, SMEs vary in their levels of commitment (Jansson et al., 2017) and in their integration of sustainability into their business models (Broccardo & Zicari, 2020). A variety of factors have been identified as barriers to implementation of sustainability management, including a lack of awareness of environmental and social impacts and issues and a lack of resources to facilitate implementation (Johnson &

Schaltegger, 2016).

Systems for planning and control to provide feedback on the results of their business can enable SMEs to correct and adapt to changes in their internal and external environment to facilitate meeting sustainability goals (Braun & Tietz, 2018; Datar & Rajan, 2018). One such system, not yet fully explored in the literature, could be the use of “sustainability dashboard” technology. A dashboard is a visual display that fits on a computer screen that allows managers to focus on key metrics of performance. Just as it is used to portray other measures of performance (e.g., sales), this technology has been deployed to address sustainability goals in some larger organizations; however, its use in SMEs appears to be largely untapped. As a management aid or tool to facilitate sustainability in SMEs, a dashboard is a relatively low-cost way to incorporate sustainability into management decisions and reporting, potentially transcending resource constraints.

This applied paper offers an introduction to the concept and potential application of sustainability dashboards by SMEs for sustainability management and reporting. It highlights some possible benefits and includes a discussion of practical and policy implications. In this way, it raises awareness of this tool and may provide impetus for its application in SMEs.

SME Sustainability Reporting Requirements

SMEs are experiencing growing demand for disclosures of their economic, environmental and social impacts. Nearly all (93%) of the largest corporations by revenue generate corporate responsibility reports. Fully three quarters (75%) of the 100 largest corporations in 34 countries provide corporate responsibility reports (KPMG, 2017). Making public reports on the business’s economic, environmental, and social effects is known as the process of sustainability reporting (Global Reporting Initiative, 2017).

A number of different sustainability reporting agencies and frameworks exist. Nearly four hundred (383) sustainability reporting instruments existed globally by 2016 (KPMG, 2016). We mention only a few here that are most well known in the United States.

The Securities and Exchange Commission (SEC) requires the disclosure of material climate-related risk in public traded companies’ annual legal filing with the SEC. Consistent with this, the Sustainability Accounting Standards Board (SASB) provides standards for financial disclosure of material economic impacts related to environmental and social issues (Romero et al., 2014; Schooley & English, 2015). The SASB has been researching the financially-related material issues facing 11 sectors of the economy

which comprise 77 industries (Sustainability Accounting Standards Board, 2017). The product of this research is a set of standards for sustainability reporting from the SASB (Sustainability Accounting Standards Board, 2018a). The SASB materiality map provides an overview of the standards (Sustainability Accounting Standards Board, 2018b). The materiality map illustrates that 24% of these 77 industries face financially-related material issues with respect to their supply chains. This adds to the growing demand for supply chain audits by larger entities, which, like the other reporting frameworks for large firms, can directly impact SMEs as sustainability expectations are transmitted downward.

Perhaps the best known and articulated reporting framework is The Global Reporting Initiative (GRI) methodology for sustainability reporting. The GRI’s G4 reporting framework calls for supplier environmental assessments. In response to these forces, large corporations are increasing their number of supply chain audits with respect to their suppliers’ environmental and social impacts (i.e. sustainability performance) (e.g., Intel, 2019; Samsung, 2019). These corporations are working their way down supplier tiers by examining dollar purchases per supplier. Some are requiring suppliers to publish their own sustainability reports (see, for example, Intel, 2019). The Financial Stability Board, associated with G20, has released a report with recommendations for climate-related financial disclosures (Financial Stability Board, 2017). This report mentions the risks that companies are exposed to in their supply chains. These risks increase large corporations’ propensity to audit their supply chains.

For a decade, the Carbon Disclosure Project, now known as CDP, has been sending out requests to suppliers to respond and fill out a lengthy online questionnaire to report on their environmental impacts. The supplier project started with 19 requesting organizations and has grown to 119 requesting organizations with purchasing of \$3.3 trillion. Ten years ago, the CDP supply chain project had 634 suppliers respond to requests to report. In 2017, 5,500 suppliers responded to request for reporting, 2000+ of which were SMEs (CDP, 2019).

On a voluntary basis, SMEs may choose to attain B Corp® status as a way of demonstrating their ongoing commitment to sustainability. To become a certified B Corporation, the SME must complete the B Impact Assessment and earn enough points on its environmental and social impacts to become a Certified B Corporation as determined by the privately owned B Lab organization (Honeyman, 2014). This sustainability reporting framework is designed explicitly for small businesses and social entrepreneurial startups. As of September, 2019, there were 3,038 business-

es that were certified B Corporations within 64 countries, representing 150 industries (B Lab, 2019). While a growing number, these are just a small fraction of the total number of SMEs, estimated at roughly 30 million in the United States alone (U. S. Small Business Administration Office of Advocacy, 2018).

Increasingly, external reporting organizations that provide frameworks are incorporating a requirement for supply chain audits. Many SMEs in supply chains therefore are now facing requests to report on their sustainability performance. While SMEs are not required to adhere to standards set by the larger sustainability reporting frameworks (e.g., SASB), the larger firms that must adhere to them communicate their expectations to their SME supply chain partners. These large firms often are the smaller SMEs' biggest customers and, as such, create an external incentive for SMEs to adopt related sustainability performance measures (Johnson & Schaltegger, 2016). The large companies' requirements are translated into key performance metrics for SMEs; the SME itself does not have to deal directly with the larger frameworks' reporting standards.

In addition to supply chain requirements, SMEs are driven by competitive pressures, compliance, company ethos, and personal motivation (Oelze & Habisch, 2018) to engage in sustainability practices. Different motivators function to drive implementation of sustainability actions such as green practices (Rekik & Bergeron, 2017). Likewise, communities, customers outside an SME's supply chain, and investors are placing demands on SMEs for increased sustainability reporting (Caldera et al., 2019; Eccles & Kilmenko, 2019; Jackson-Moore et al., 2019; Mathiyazhagan et al., 2013).

As a benefit, SMEs that are transparent in their environmental, social, and governance reporting incur a lower cost of debt (Dunne & McBrayer, 2019). SMEs with a sustainability orientation may also experience an increase in the market performance of their new products (Obal et al., 2020). This empirical evidence is consistent with the business case for SMEs to adopt sustainability business practices (Braun & Tietz, 2018; KPMG, 2017). All of the above factors (i.e., supply chain demands, competitive pressures, and benefits, etc.) are incentives and provide a rationale for SMEs to do more than the minimum and to develop their focus and capabilities.

There are a variety of well-known constraints characteristic of small businesses such as a lack of abundant financial and human resources (Nicholas et al., 2011). SMEs typically face time limitations, limited staffing, limited expertise, and limited financial resources and, at the same time, can lack the management and organizational structure needed to develop processes to address sustainability

(Schulz et al., 2011). Some evidence suggests that, perhaps due to these constraints, some SMEs adhere to the most basic, simplest form of reporting for their needed certifications (Corazza, 2017). Given the constraining forces, technology that can facilitate sustainability performance management and reporting can be beneficial.

There are a number of criteria that sustainability management tools must meet to be viable for use in SMEs. These include simplicity, cost effectiveness, flexibility, and the ability to be adapted to the company (Johnson & Schaltegger, 2016). These correspond to the resource limitations that SMEs face and the nature of small businesses as opposed to larger, more highly formalized organizations. Sustainability dashboards are a tool that meets these criteria.

Sustainability Dashboards

SMEs need systems for planning and control to provide feedback on the results of their business which can be used to correct and adapt to changes in their internal and external environments (Braun & Tietz, 2018; Datar & Rajan 2018). Sustainability reporting and performance management relies on the planning and control functions in an organization. Planning includes selecting objectives, strategies, programs, and actions to achieve the objectives as well as formulating and implementing budgets (Braun & Tietz, 2018; Datar & Rajan, 2018). Control involves monitoring results and comparing actual to planned results to intervene and to provide feedback to the next round of planning (Braun & Tietz, 2018; Datar & Rajan, 2018).

Currently, these planning and control systems in small SMEs are facilitated by the use of low cost and easy to use accounting software technology (e.g., QuickBooks). The proven value of such accounting software for an SME is in the ability to readily generate information and reports to monitor variables like sales, accounts receivable, accounts payable, customer revenues, inventory, and bank balance. These same systems can be used for sustainability-related performance. From an accounting perspective, sustainability-related accounts and performance measures (i.e., metrics) can be added within the accounting software to augment existing accounting and operational information (Braun & Tietz, 2018; Venturelli & Pisili, 2005).

Another use of technology that is becoming common is data visualization. Consistent with the adage, "a picture is worth a thousand words", the ability to see a graphical presentation of information can help in understanding and recall. As cited by Ertug et al. (2018), there is longstanding evidence that people understand (Carney & Levin, 2002) and more effectively recall information when it is presented visually via imagery than when it is provided in written text

(Shepard, 1967). Modern data visualization technology has emerged from the evolution of the field of data analytics over the past decade or more to facilitate this.

One form of data visualization is a dashboard (Few, 2013). Dashboards are the visual display of the most important information needed to achieve objectives (one or more) that fits on a single computer screen (Few, 2006; 2013). This allows the information to be monitored at a glance (Few, 2006, 2013). Dashboards can display a variety of performance-related management information (e.g., total sales, sales by product or location, etc.).

Dashboards address the lack of structure that businesses can face in their attempts to incorporate sustainability factors into their business decision making (Kiron et al., 2013). Given the demands on SMEs for reporting their environmental and social impacts (i.e., sustainability), there is a great potential for the use of dashboards in the management of sustainability performance. For example, dashboards could be used to increase monitoring and adaptation to feedback. They could give visible feedback (i.e., monitoring and control) on sustainability-related performance goals. This encompasses performance measures related to sustainability goals such as recycling of outputs, use of recycled materials as inputs, energy usage, waste, volunteer hours, donations to community organizations, percent of purchases from local sources, and so forth. Table 1 suggests some of the most common performance measures for sustainability reporting (Shields & Shelleman, 2017, 2019)

Table 1
Examples of important SME sustainability performance measures for dashboards

Community engagement & contributions
Diversity policies & practices
Employee development, satisfaction, health, & safety
Energy sources & usage
Fair compensation ratio & pay equity
Fair trade & labor practices
Greenhouse gas emissions
Landfill diversion
Local sourcing
Sustainability-related performance measures
Product & packaging resource efficiency
Recycled inputs
Reuse & recycling of waste
Sharing & collaboration
Supplier audits
Water usage

that can be relevant to SMEs' dashboards. These will vary by type of business, industry, size of the business, etc. The maturity of an SME's sustainability reporting also will determine which of these are relevant.

In practice, sustainability dashboards should be used by SMEs in their planning and control systems to actively manage their sustainability performance. During planning, SMEs will need to establish goals addressing reduction in their potentially negative environmental and social impacts. These goals are typically long term in nature. For example, large companies such as Dell, Intel, Samsung, and UPS all use a ten-year time horizon for their environmental goals (Dell, 2019; Intel, 2019; Samsung, 2019; UPS, 2017).

The goals established during planning by an SME should include goals that address their largest and thus most significant negative environmental and social impacts. For an SME embedded in a supply chain, it must anticipate being a participant in a large customer's supply chain audit to assess its suppliers' environmental and social impacts. This has been rapidly evolving over the past few years (i.e., report cycles). These supply chain audits now are major sections within the sustainability reports of many large corporations (e.g., Dell, 2019; Intel, 2019; Samsung, 2019; UPS, 2017).

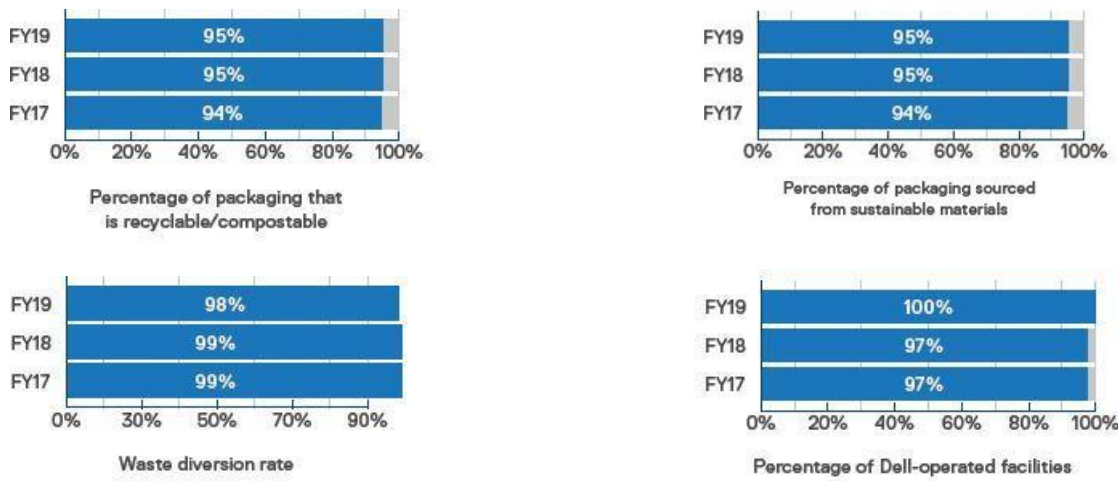
Supply chain audits include information on and discussions of a variety of sustainability performance measures like suppliers' energy use, Greenhouse Gas (GHG) emissions, recycling, waste, and water use. Once the goals for these kinds of sustainability-related performance measures are established in the planning process, a reporting structure for the goals and their related programs will have to be developed. New accounts will have to be added to an SMEs' chart of accounts associated with the expenditures for sustainability-related programs (Venturelli & Pisili, 2005). Likewise, a set of performance measures will have to be developed to access the outcomes of these programs (e.g., percent of waste bypassing the landfill, percent of raw materials consisting of recycled content, percent of purchasing dollars spent on local sources). Depending on the industry, such environmental sustainability metrics are applicable to businesses of any size, not just large corporations.

From a control perspective, dashboards can play an important role in the monitoring and control of these sustainability programs and their associated goals. For dashboards to function, they need to be attached to SMEs' data. By selecting performance data from SMEs' sustainability programs, dashboards can facilitate the control function. A well-designed sustainability dashboard can provide on a single screen the important performance measures for a particular program. This can make salient to a dashboard user anything which needs their attention by way of intervention

(Few, 2013; Rikhardsson & Yigitbasioglu, 2018). Examples gleaned from large organizations include Dell’s use of dashboards in its 2019 sustainability report to illustrate its progress on meeting sustainability-related goals (see Ex-

hibit 1). Similarly, Harvard University uses sustainability dashboards to help manage its sustainability performance, (see Exhibit 2).

In an example from a privately owned and operated



(with at least one sustainability-related program)

Exhibit 1. Dell 2019 Sustainability Report Dashboards

Note: Images reproduced from <https://corporate.delltechnologies.com/en-us/social-impact/reporting/fy19-csr-report.htm#scroll=off>

company, the family firm Huon Aquaculture presents its sustainability dashboard on its website: <https://dashboard.huonaqua.com.au/>. The interactive dashboard opens to underlying data and highlights key metrics in three areas: Our Fish (its main product), Environment, and People & Safety. Under People & Safety, for example, it provides data on employee composition and training, research and development, community relationships, and lost time injuries.

The use of dashboards in the planning and control systems of SMEs should help them manage and improve their sustainability performance. This in turn can help them to meet demands by their customers to provide evidence of and to improve on their sustainability performance as an SME. Moreover, the use of dashboards by SMEs can be facilitated by low cost and relatively easy to use software (e.g., Microsoft BI). Such software can link to a variety of other programs such as Excel and QuickBooks (Microsoft, 2019; O’Connor, 2019).

There are some specific factors that would assist SMEs and some that would have to be overcome to use dashboards to aid with sustainability planning and control. These are discussed in the following section of the paper.

Implications for Practice

SMEs can take advantage of several facilitators to implementing data visualization in the form of dashboards. Lower cost data analytics software (e.g., Microsoft BI) that

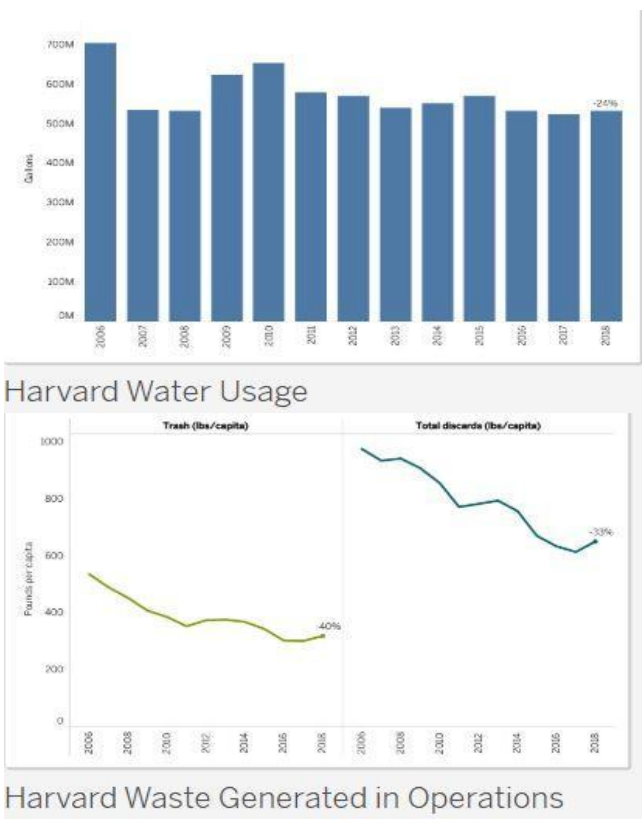


Exhibit 2. Harvard University Sustainability Dashboards

Note: Images reproduced from Harvard (2018) <https://public.tableau.com/profile/greenharvard#!/>

a user of Excel can readily learn (Noonpakdee et al., 2018) is available to facilitate the use of dashboards. The use of dashboards itself can save time during the processes of decision-making, monitoring of operations, and identifying goal achievement. This “at a glance” feature of dashboards is a benefit. In addition, dashboards are relatively simple to build, flexible, and can be tailored to individual issues and company-specific considerations, meeting many of the key criteria to facilitate SME adoption and use (Johnson & Schaltegger, 2016).

Dashboard technology is relatively inexpensive or even free in some cases, a major benefit that may facilitate its use by even the smallest SME. Thus, it provides a means to overcome the cost barrier faced by many SMEs when they seek to integrate a sustainability tool into their business model (Johnson & Schaltegger, 2016). There are a range of dashboard technologies and plans available, ranging from use by just one or two users to licenses for large companies. For example, Google Data Studio is offered in a free version that provides data visualization and an interactive dashboard (GetApp, 2020). Among other features, it includes: an ability to connect to different data sources; templates; interactive reporting features; drag-and-drop editing to create charts, tables, and graphs; and collaboration capability. Other comparable software provides similar features free or at affordable rates (e.g., \$25/month).

SMEs face several barriers to implementing data visualization in the form of dashboards that are consistent with the typical constraints faced by SMEs. There is a general lack of knowledge about data analytics (Iqbal et al., 2018). Further, the employees and owners in SMEs may tend to lack expertise at data visualization (Noonpakdee et al., 2018). These barriers can be overcome with the greater awareness and learning opportunities presented by organized programs that we recommend be provided by policymakers and small business development agencies, discussed further below. In

addition, low cost online courses are available to teach SME managers the basics of developing and maintaining dashboards and data visualization technologies.

An advantage of implementing sustainability dashboards is that similar dashboards also can be used for monitoring nonsustainability-related variables including key performance indicators such as sales-to-date or sales by product or by customers, receivables, payables, order backlog, order cycle time, or other financial data (see Exhibit 3) (Few, 2013; Noonpakdee et al., 2018). Data mining and data visualization also can be useful to identify opportunities in sales and marketing (Llave, 2017) and to minimize mis-targeting customers (Trieu, 2016).

Policymakers and agencies need to establish programs tiered to begin to address the integration of data visualization and dashboards in SMEs. The vast majority of programs today are focused on basics of how to start a business and manage its growth. The use of big data, data visualization, and data dashboards as management tools currently is underdeveloped in such programs. Similarly, there appears to be little emphasis on the sustainable performance of an SME. Because SME managers not subject to supply chain pressure often can see little economic benefit to sustainability practices, they may view tools such as dashboards as costs with no concomitant benefit (Johnson & Schaltegger, 2016). Individual SMEs can be quite small businesses, so the owner/managers may fail to grasp SMEs’ collective impacts as a whole with respect to sustainability issues (Brammer et al., 2012), as do many observers (Morsing & Perrini, 2009).

There is an enormous role for policymakers to provide external incentives to apply management aids that support sustainability practice. The first step is to educate and raise owners’ and managers’ awareness about the environmental and social impacts of SMEs overall and the importance of sustainability practices to their business. Alongside this, the

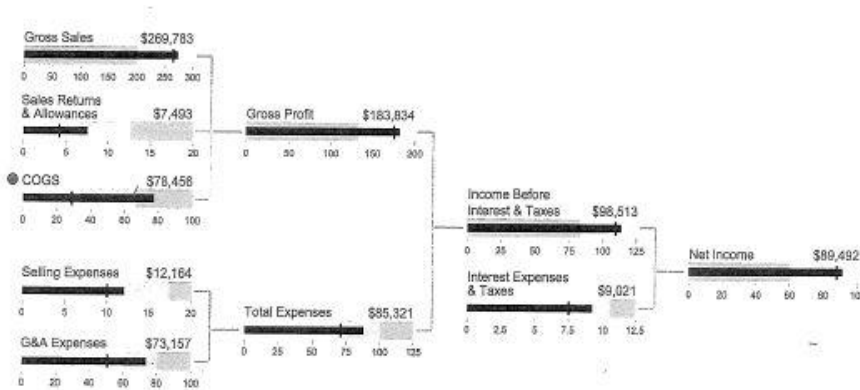


Exhibit 3. Financial Accounting Information Dashboard
 Note: Image reproduced from Few, 2013.

implication for policymakers is that, like the Small Business Development Centers' push for the use of accounting software technology in the form of QuickBooks in the years around the mid-2000s, a new impetus to deploy data visualization and dashboards within SMEs seems imperative. Analogous access to training and software should be a priority. Linking it to sustainability would help SMEs deal with managing their sustainability practices and the burgeoning sustainability reporting incentives they face.

Conclusion

SMEs stand to gain many benefits by adopting and using sustainability dashboards. By adding dashboards to their planning and control systems, we believe they can better manage their sustainability performance. By doing this, they can be positioned to meet the growing demand by customers, communities, and investors for disclosure of, reporting on, and improving on sustainability performance over time. Dashboards facilitate both decision making and monitoring by making a small set of performance data available at a glance. Moreover, they do it in a way that is flexible to the needs of the business and low cost. Finally, policymakers' embrace of advances in technology and dashboards is long overdue to facilitate the management of SMEs, specifically with respect to the need for SMEs to fully embrace the sustainability impacts of their businesses today.

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