BOOK EXCERPT

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The Integrated Reporting Movement:

Meaning, Momentum, Motives, and Materiality

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CHAPTER 8: REPORTING WEBSITES

Today, companies use their websites for a multitude of purposes: to market their products, advertise, engage with customers and employees, post important information on a real-time basis, enhance their image, and reinforce their brand—not to mention to sell products themselves. In comparison, how a company uses its website for corporate reporting purposes is fairly narrow. Because it is an increasingly significant channel through which the company can communicate with shareholders and other stakeholders, however, it is an important one. By capitalizing on their reporting websites, companies can move beyond the paper constraints of an integrated *report* in order to create a platform for the company's integrated *reporting*—a more multidimensional, interactive, and engaging form of communication. In the previous chapter, we saw that most companies producing integrated reports were doing little to support these documents online in a way that would make the information they contain more useful and usable. While the Internet has the potential to dramatically enhance integrated reporting and integrated thinking, it can also do so for more traditional corporate reporting. To the extent this is happening, it is reasonable to expect that large companies have the resources to do so.

To assess how the world's most sophisticated companies are leveraging the Internet for corporate reporting purposes, we studied the websites of the largest 500 companies in the world: the "Global 500."[1] The list came from *Fortune* for fiscal years that ended on or before March 31, 2013. While size is not equal to sophistication, we reason that it is a good proxy. Furthermore, a few statistics indicating the economic significance of these companies give them, in our view, a responsibility to be effective in communicating their performance to shareholders and other stakeholders through both reports and websites. Their revenues ranged from $467.2 billion for the number-one-ranked Royal Dutch Shell to $24.1 billion for Ricoh at number 500. Market capitalization ranged from number 11-ranked (in revenues) Chevron's $ 504.8 billion to 309-ranked (in revenues) Alliance Boots at $17.0 million.[2] In 2012, their revenues totaled $24.3 trillion, and they had profits of $1.9 trillion. Their market cap of $21.9 trillion represented 42% of the global market cap of the world's approximately 46, 000 listed companies. This tremendous economic power is concentrated in a very small number of companies, and even within this elite group, there is also a high degree of concentration. The top 100 represent 48%, 43%, and 32% of the revenues, profits, and market cap, respectively, of these 500 companies.[3]

Based upon detailed studies of over 100 companies' websites,[4] including some of the best examples of how integrated reporting companies are using their websites, we developed an inventory of items to cover general website characteristics (e.g., did the company have a separate website focused on the corporation itself or was it part of its e-commerce websites, as under an "About Us" tab), how the website was being used for financial reporting (e.g., how many years of annual reports were available online and whether reports provided in different languages), and how the website was being used for sustainability reporting (e.g., does the company provide information about sustainability on their website such as a report and how difficult it was to find it). Only 24 of these companies were practicing integrated reporting.

Methodology

The data collection exercise proved challenging[5] due to the vast variation in structure, functionality, and presentation of websites. Approximately 75% of the companies on our list were headquartered outside the United States. Consequently, we encountered language barriers and cultural differences, such as lower use of social media in China compared to the United States and Europe. This may be explained by China's comparatively lower percentage of Internet users and the growing use of social media services unique to China that would not appear on the English version of the site.[6] Determining which languages were covered on a site was sometimes difficult due to the number of languages and alphabets used by some companies. In some cases, the website did not offer an English version and we relied on Google Translate.[7] While we initially sought an automated method for gathering the data, we found that it had to be done by hand and carefully checked.[8] We created a template for coding up the features of each company's website, and the data were then transferred into a spreadsheet.

The last step in the data collection and preparation process was to create a set of logical categories for grouping the individual features (shown in Appendix 8.A).[9] The categories we created were Financial Transparency (amount and quality of financial information), Sustainability Transparency (amount and quality of sustainability information), Connectivity (easy and obvious linkages of related parts of the website to each other),[10] Interactivity (features to engage the user), and Utility (features to make the website as usable and user-friendly as possible).[11] The raw score for each company was aggregated by category and converted to a Z-Score, which was then normalized between 1 and 100.[12]

Website Category Analysis

Table 8.1 shows the average category scores by sector. Technology & Communications has the highest score of 61 (Healthcare is 59 and Resource Transformation is 58) and Infrastructure the lowest score of 40. The high scores may be a result of companies in these industries needing to have high-quality websites in general. Technology & Communications companies attempt to differentiate commodity products through branding and Healthcare companies need to educate consumers and build trust. Resource Transformation companies are necessary, but highly controversial, and need to ensure their license to operate.

For the separate categories, Connectivity shows the least variation across sectors ranging from Consumption (51) to Services (42). Utility has the widest range in scores by sector, from 64 for Healthcare to 32 for Infrastructure. This could be due to the fact that Consumption companies need to have much more useful websites for selling their products in comparison to Infrastructure companies. Financial Transparency, Sustainability Transparency, and Interactivity all have virtually the same range in scores across sectors.

Total Score by region saw more variation, with Europe highest at 67 and Asia lowest at 35 (Table 8.2). However, this comparison may be somewhat artificial since it is possible that the native language version of Asian company websites would receive a higher score. While it is easy for companies based in non-English-speaking countries to translate an integrated report document into English, creating a fully functional English corporate reporting website is more challenging. How much a company should invest in doing so largely depends upon how important its foreign investors and other stakeholders are to it.

Table 8.1
Global 500 Reporting Website Categories by Sustainability Accounting Standards Board (SASB) Sector

SASB Industry	Number of Companies	Financial Transparency	Sustainability Transparency	Connectivity	Interactivity	Utility	Total
Consumption	64	54.51	51.01	51.13	55.66	60.75	57.28
Financials	108	54.1	51.58	47.68	45.71	50.79	52.36
Healthcare	28	63.36	43.65	50.89	60.42	64	59.45
Infrastructure	43	41.57	42.96	43.14	40.04	31.93	39.98
Nonrenewable Resources	100	43.2	49.54	46.66	41.95	45.3	46.28
Resource Transformation	41	54.53	52.08	48.19	55.35	59.42	58.02
Services	14	50.25	44.04	41.65	47.88	55.08	48.45
Technology & Communications	51	58.9	62.97	47.48	55.36	58.66	60.57
Transportation	51	49.1	52.3	44.15	50.95	42.98	49.76
Average score		52.17	50.01	46.77	50.37	52.1	52.46

"Most major industry classification systems use revenue as their basis for classifying companies into specific sectors and industries. However, a company's market value is determined by more than financial performance: in many industries as much as 80 percent of market capitalization is made up of intangibles. To address this shortcoming, SASB developed the Sustainable Industry Classification System™ (SICS™), which categorizes industries based on resource intensity and sustainability innovation potential. The system is tied back to traditional classification systems such as Global Industry Classification Standard (GICS) and Bloomberg Industry Classification System (BICS). SICS is structured in three levels. The lowest level, industry, is comprised of the 80+ industries for which SASB is developing standards. The middle level, industry working groups, groups industries based on sustainability impact similarities. The highest level, sector, is comprised of ten sectors that reflect the ultimate purpose given to these resources." Sustainability Accounting Standards Board. Industry Classification, http://www.sasb.org/industryclassifica-tion/, accessed April 2014.

Table 8.2
Global 500 Reporting Website Categories by Region

Region	Number of Companies	Financial Transparency	Sustainability Transparency	Connectivity	Interactivity	Utility	Total
Asia	187	34.08	44.06	41.81	30.58	31.33	35.25
Europe	150	68.68	64.09	56.21	62.89	55.51	66.78
Latin America and the Caribbean	13	41.77	54.3	48.08	42.43	46.03	51.09
North America	141	56.58	45.04	44.11	59.39	72.3	58.23
Oceania	9	51.6	64.52	56.19	43.61	53.43	59.27
Average score		50.54	54.4	49.28	47.78	51.72	54.12

Note: For the definition of regions, Global Reporting Initiative's (GRI's) Sustainability Disclosure Database was used. https://www.globalreporting.org/reporting/report-services/sustainability-disclosure-database/Pages/default.aspx

Table 8.3 contains data for the six countries with the largest number of Global 500 companies. The variation across each category is even greater than that by region due to the extremely low scores of China, which ranged from 18 to 25 across all categories. The European countries of Germany, France, and the United Kingdom mostly score higher than U.S. or Japanese companies. After China, U.S. companies have the lowest Sustainability Transparency and Connectivity scores. Yet on Interactivity, their score is in the same range as the European countries, and they have the highest Utility score by a wide margin.

Table 8.3
Global 500 Reporting Website Categories by Country

Country	Number of Companies	Financial Transparency	Sustainability Transparency	Connectivity	Interactivity	Utility	Total
United States	131	55.83	44.92	44.06	60	73.83	58.53
China	84	18.71	24.22	25.45	20.42	13.34	15.03
Japan	61	50.84	66.26	60.92	38.3	50	57.83
France	31	67.46	58.87	52.5	67.57	43.6	62.36
United Kingdom	30	63.84	62.27	58.92	63.41	64.15	66.49
Germany	29	76.78	66.24	54.99	63.22	54.9	70.17
Average score		55.58	53.8	49.47	52.15	49.97	55.07

Note: Information on the country location for each company was from *Fortune*, "Global 500."

The variation in Total Score by size range is the same as it is for the sector differences (Table 8.4). On balance, these data confirm our use of size as a proxy for sophistication. There is a clear relationship between Total Score and size of company, following a rank order aside from the last two size ranges, in which the order is reversed. Yet even the 100 largest companies in the world only received a Total Score of 61. The lowest variation was seen in Connectivity: the 100 largest companies actually received a score virtually identical to that of the companies ranked 200–300 in size. Although these differences are not large, the greatest variation occurred in Interactivity and Utility, suggesting that only the very largest companies see the benefit in making these important features of their reporting website. The least variation occurred in Financial Transparency and Sustainability Transparency.

Table 8.4
Global 500 Reporting Website Categories by Company Size in Revenues

Rank	Number of Companies	Financial Transparency	Sustainability Transparency	Connectivity	Interactivity	Utility	Total
1–100	100	60.52	57.46	49.99	57.67	62.58	61.46
101–200	100	54	56.1	47.25	58.13	55	56.45
201–300	100	53.13	51.3	51.09	48.72	51.02	53.43
301–400	100	43.21	42.27	41.27	38.25	40.28	41.34
401–500	100	45.74	47.77	46.4	41.93	45.71	47.48

Note: Information on the revenue for each company was from *Fortune*, "Global 500."

Since listed companies have more reporting requirements than State-Owned Enterprises (SOEs) or private companies, we correctly expected them to have higher scores for their reporting websites. We compared the scores of the 415 listed companies to the remaining 85 unlisted ones (Table 8.5), most of which are SOEs, with a few private family-owned companies. Our expectations were confirmed. Reflecting the fact that they have no obligations to outside shareholders, the unlisted companies rank much lower, with scores of one-quarter to one-half of the listed companies and especially low scores on Financial Transparency and Utility. However, unlisted companies are still subject to scrutiny and pressures from civil society, perhaps explaining their higher but still modest Sustainability Transparency score and comparable scores on Connectivity and Interactivity.

Finally, we compared the websites of a subset of the integrated reporting companies (Table 8.6) discussed in the previous chapter to the Global 500. Using the same methodology, we analyzed the top 40 non-South African companies in terms of their total score on their integrated report and the same for the top 10 South African companies.[13] The websites of the South African companies rank distinctly lower in every category except Connectivity, an ostensible artifact of their integrated report production. These results clearly indicate that having a high-quality integrated report and a high-quality corporate reporting website are completely independent of each other.

Table 8.5
Global 500 Reporting Website Categories by Type of Company

	Number of Companies	Financial Transparency	Sustainability Transparency	Connectivity	Interactivity	Utility	Total
Listed	415	58.11	55.55	50.97	53.53	58.17	58.84
Unlisted	85	18.16	28.64	28.81	26.52	15.52	18.82

Note: We used Bloomberg LP's market status coding to classify each company as Active, Private, and Unlisted.

Table 8.6
Website Categories of Integrated Reporting Companies

Region	Number of Companies	Financial Transparency	Sustainability Transparency	Connectivity	Interactivity	Utility	Total
Non-South Africa	42	55.71	54.2	49.56	53.49	54.31	53.17
South Africa	10	32.29	43.4	73.93	31.19	32.45	40.92

Website Feature Analysis

The aggregate category scores analyzed above do not reveal some important differences in the individual features comprising each category. Since it is through these features that companies create effective reporting websites, we examined them in order to gain insights into exactly what a company needs to do to improve its corporate reporting website. These data are shown in Tables 8.7 (by SASB sector), 8.8 (by region), 8.9 (by country), 8.10 (by size), 8.11 (by type), and 8.12 (for companies publishing an integrated report). As expected, much of the variation in these specific features matches the patterns discussed above, since these categories are comprised of the items shown in these tables. While some features, such as social media, are used by most of the Global 500, others, like providing data in the Extensible Business Reporting Language (XBRL) format, are used by very few. Most companies could dramatically improve the quality of their corporate reporting website with relatively little effort.

Table 8.7
Global 500 Reporting Website Features by Sector

SASB Industry	Number of Companies	Social Media (%)	Videos (%)	Feedback (%)	Account (%)	Games (%)	Webcasts (%)	Contact (%)	Tools (%)	Excel (%)	Custom (%)	XBRL (%)
Consumption	64	78	36	3	3	0	70	36	61	48	0	41
Financials	108	62	26	5	1	1	54	33	52	31	6	19
Healthcare	28	86	46	7	0	0	79	61	71	54	4	50
Infrastructure	43	53	21	0	5	0	40	23	30	14	0	5
Nonrenewable Resources	100	53	26	4	0	0	42	29	48	32	3	15
Resource Transformation	41	71	34	12	5	2	66	34	56	49	2	41
Services	14	71	29	0	0	0	57	36	71	43	14	21
Technology and Communication	51	78	33	14	0	0	63	35	63	43	2	24
Transportation	51	63	37	8	10	0	41	25	41	24	0	18
Average score		66	31	6	2	0	54	33	52	36	3	24

Table 8.8
Global 500 Reporting Website Features by Region

Region	Number of Companies	Social Media (%)	Videos (%)	Feedback (%)	Account (%)	Games (%)	Webcasts (%)	Contact (%)	Tools (%)	Excel (%)	Custom (%)	XBRL (%)
Asia	187	34	14	3	0	0	19	9	25	13	2	4
Europe	150	83	47	10	6	0	71	63	67	31	4	5
Latin America and the Caribbean	13	62	15	0	0	8	38	8	54	38	0	0
North America	141	88	38	6	2	1	84	35	72	72	4	73
Oceania	9	78	11	0	0	0	89	44	78	11	0	0
Average score		66	31	6	2	0	54	33	52	36	3	24

Table 8.9
Global 500 Reporting Website Features by Country

Country	Number of Companies	Social Media (%)	Videos (%)	Feedback (%)	Account (%)	Games (%)	Webcasts (%)	Contact (%)	Tools (%)	Excel (%)	Custom (%)	XBRL (%)
United States	131	89	38	7	2	1	83	36	71	76	3	78
China	84	12	10	0	0	0	5	6	5	0	0	0
Japan	61	48	21	5	0	0	34	0	41	26	5	10
France	31	87	48	19	6	0	61	45	45	13	3	0
United Kingdom	30	80	60	7	0	0	80	60	90	43	0	10
Germany	29	76	52	10	21	0	66	76	62	38	7	0
Average score		62	33	6	3	0	54	29	49	39	3	30

Table 8.10
Global 500 Reporting Website Features by Size

Ranking	Number of Companies	Social Media (%)	Videos (%)	Feedback (%)	Account (%)	Games (%)	Webcasts (%)	Contact (%)	Tools (%)	Excel (%)	Custom (%)	XBRL (%)
1–100	100	76	41	10	5	0	74	41	62	50	4	39
101–200	100	72	49	7	5	1	52	29	57	41	4	21
201–300	100	74	23	5	1	0	59	30	53	31	4	19
301–400	100	53	16	3	0	1	39	30	41	25	1	18
401–500	100	53	24	4	1	0	48	35	49	31	1	22
Average score		66	31	6	2	0	54	33	52	36	3	24

Table 8.11
Global 500 Reporting Website Features by Type of Company

Ranking	Number of Companies	Social Media (%)	Videos (%)	Feedback (%)	Account (%)	Games (%)	Webcasts (%)	Contact (%)	Tools (%)	Excel (%)	Custom (%)	XBRL (%)
Listed	415	74	34	7	3	0	65	38	63	42	3	29
Unlisted	85	26	13	0	0	0	4	11	2	2	1	0
Average score		66	31	6	2	0	54	33	52	36	3	24

Table 8.12
Website Features of Integrated Reporting Companies

Region	Number of Companies	Social Media (%)	Videos (%)	Feedback (%)	Account (%)	Games (%)	Webcasts (%)	Contact (%)	Tools (%)	Excel (%)	Custom (%)	XBRL (%)
Non-South	42	83	38	5	0	5	60	67	76	60	21	5
Africa												
South Africa	10	70	0	0	0	0	70	70	80	20	0	0
Average score		81	31	4	0	4	62	67	77	52	17	4

Two-thirds of these companies use social media; one-half use webcasts and provide tools for users to help analyze data; one-third provide videos, the name of a specific contact person at the company (vs. a general "Investor Relations" email address); and one-quarter provide data in XBRL. Very few companies ask for feedback on their website (29 companies), ask the user to create an account so they can analyze website usage by type of person (12 companies), enable the user to create a "custom report," or provide interactive games to help the audience understand the trade-offs the company is grappling with (two companies). The larger companies, especially the largest 100, are more likely to have taken advantage of most of these features. The exception lies in asking for the user to register an account, to participate in instructive games, or create a custom report; even for the very largest companies, only an extremely small percentage have this functionality on their website. This raises the question of whether these are simply not important features or whether even the largest companies are only beginning to tap into the power of the Internet. The private companies, as expected, have extremely low scores: 0% on 4 of the 11 factors and less than 5% on 8. One-quarter use social media and a little more than 1 in 10 had videos.

Unlike financial reporting, integrated reporting can perform a transformation function. With this in mind, we looked for evidence of companies trying to do so by comparing the integrated reporting companies to the Global 500. For the entire sample of integrated reporting companies, they score noticeably higher on providing the name of a specific contact (67% vs. 33%) and tools for analysis (77% vs. 52%). Both features contribute to the transformation function. The latter enables the user to better understand the meaning of what the company is reporting. Perhaps indicative of a desire for greater engagement that comes with integrated reporting, the former gives the user an accessible channel through which he or she can ask the company questions. The latter indicates a desire to foster integrated thinking on the part of the audience. On all other features, this group looks about the same as the Global 500. However, again we found a few areas in which the South African companies are notably weaker: videos (0% vs. 38%) and providing data in Excel spreadsheets (20% vs. 60%).

Three Examples

We will conclude this chapter by looking at the reporting website use of three leading integrated reporting companies previously mentioned in this book: Novo Nordisk, Philips, and SAP.[14] In highlighting their websites, we simply wish to illustrate some of the interesting and useful things being done today that could be replicated with modest effort by any company of significant size. Each company scored high on its integrated report and corporate reporting website.[15] Novo Nordisk uses its website to supplement the PDF version of its integrated report with rich detail and interactive games. The approach to website use at Philips is similar to Novo Nordisk's; however, unlike Novo Nordisk's site, Philips engages the website visitor with video presentations. SAP is distinctive in that it places much greater emphasis on making the site itself, rather than a document, the basis of its integrated reporting.

Novo Nordisk

While Novo Nordisk's primary communication vehicle for the company's integrated report on financial, social, and environmental performance is a PDF document that can be viewed online or downloaded, information supplementing the annual report, as on materiality and stakeholder engagement, is available via the Home Page with a single click on the "Sustainability" tab.[16] Materiality is covered at a very high level in the integrated report. Using the path, Home; Sustainability; Our Priorities, brings the reader to six topics: Access to health, Responsible business practices, Our people, Environment and climate change, and Communities and Bioethics. Each topic, in turn, has links to as many as six subtopics, each of which can be explored further. "Our positions," a subsection of Sustainability, also provides position papers on issues of relevance to Novo Nordisk and insights into how the company views its role as a global corporate citizen. In addition, the website also presents interactive games[17] that simulate business ethics, climate change, and economics and health dilemmas illustrative of the trade-offs the company might encounter among its stakeholders. Finally, the company recently introduced a publication called "TBL Quarterly" (for Triple Bottom Line) which "tells the actions, challenges and opportunities of conducting a sustainable business. Each quarterly issue offers articles, photos, videos and infographics that demonstrate how responsibility supports long-term value creation."[18]

Like materiality, stakeholder engagement is not covered in depth in the PDF report. Rather, the "Sustainability" page links to a discussion of stakeholder engagement that identifies several key stakeholders and makes clear

that patients are the ultimate stakeholder to which the company must hold itself accountable.[19] In addition to consulting with employees, investors, suppliers, and other business partners and neighbors, the company considers memberships in industry and business associations, advocacy organizations, and affiliation with think tanks to be integral parts of stakeholder engagement.

Insofar as "behind the scenes" website user tracking features are concerned, Novo Nordisk tracks content areas by interest to the company's stakeholders (seen in Table 8.13) via the number of downloads. Few users downloaded quarterly financial figures for 2011 and 2012, most likely because this information is readily available elsewhere, but they expressed a high level of interest in how much of the company's shares are held by management, management's interpretation of accomplishments and results in 2012, the consolidated statements of all types of performance,[20] and what assurance has been given on the report.[21]

Table 8.13
Most Viewed Sections of Novo Nordisk Annual Report 2012

Section	Views
Management's holdings of Novo Nordisk shares	1086
Accomplishments and Results 2012	402
Consolidated financial, social and environmental statements	286
Assurance	246
Our business	149
Quarterly financial figures 2011 and 2012	79
Additional Information	36
Outlook 2013	24
Governance leadership and shares	23

Note: Special thanks to Novo Nordisk for providing this data, especially Susanne Stormer, Vice President, Corporate Sustainability; Christina Salomon, Project Manager, Corporate Sustainability; and Scott Dille, Team Leader, Insights and Outreach. Specific sections of Novo Nordisk's 2011 and 2012 annual reports can be downloaded and viewed from Novo Nordisk's reporting website. Although only overall count data is provided on the number of downloads, we surmise that those visiting and downloading information from the annual report are an accurate reflection of the company's stakeholders.

Philips

While Philips uses its website to supplement information in its integrated report,[22] the company does much more than provide additional information. It weaves interactive elements throughout the site to connect with visitors in a more visceral way than narrative and numbers can accomplish alone, while simultaneously gathering data about the kinds of people using the site. Visitors to the Philips annual report website are greeted by a request to identify which constituency they represent. The selections include customer, shareholder, financial analyst, sustainability analyst, employee, supplier, nongovernmental organization (NGO), portfolio manager, journalist, job seeker, or student. Philips also provides an "other" category with space to enter a brief description.

The use of video to engage a visitor has been a humanizing feature on the Philips website since it published its first integrated report in 2008. The 2012 website includes video commentary from the chief executive officer (CEO), chief financial officer (CFO), and Chief Human Resources Officer. The Message from the CEO brings the traditional CEO Letter to life; a visitor can hear the CEO's passion and commitment. The CFO's review of financial performance provides texture that the corporate Balance Sheet and Statement of Income cannot offer. Similarly, the Chief Human Resources Officer delivers remarks on how Philips is driving structural and cultural change.

An example of using animation creatively, "Interactive charts" encourage visitors to design their own presentations of Philips' performance. Seven charts are available—Balance

Sheet, Statement of income, Profitability, Cash flow, Key figures per share, Employees, and Sustainability. Each allows manipulation based on several different properties. For example, the Statement of income charts provide sales and different computations of earnings for five years for the Group or individual business segments.

The report download center[23] offers a visitor several choices for accessing report information. While one may download the entire annual report, the visitor can also compile a personalized report by selecting individual sections. Philips also provides three prefabricated reports: Analyst selection, Sustainability selection, and Employee highlights.

SAP[24]

Containing the only report available exclusively online, SAP's website does an excellent job of organizing integrated reporting content (Table 8.14). Because of its logical structure, for example, "The International <IR> Framework" Content Elements related to the Guiding Principles of Strategic focus and future orientation are relatively easy to find.

Materiality is a separate section accessed from the "About This Report" tab. The materiality discussion provides a link to Stakeholder Engagement, an integral part of the process to determine materiality.

One of the most significant features of SAP's 2012 Integrated Report[25] is the interactive graphic connecting financial and nonfinancial performance. The graphic depicts three economic indicators, four environmental indicators, and seven social indicators (Table 8.15) and shows the relationships between them.

Table 8.14
"The International <IR> Framework" and SAP's Corporate Reporting Website

"The International <IR> Framework" Content Element	Path on SAP website
Business model	Performance; Business Activity
Strategy and resource allocation	Performance; Vision, Mission and Strategy
Risks and opportunities	Performance; Risk Report
Outlook	Performance; Outlook

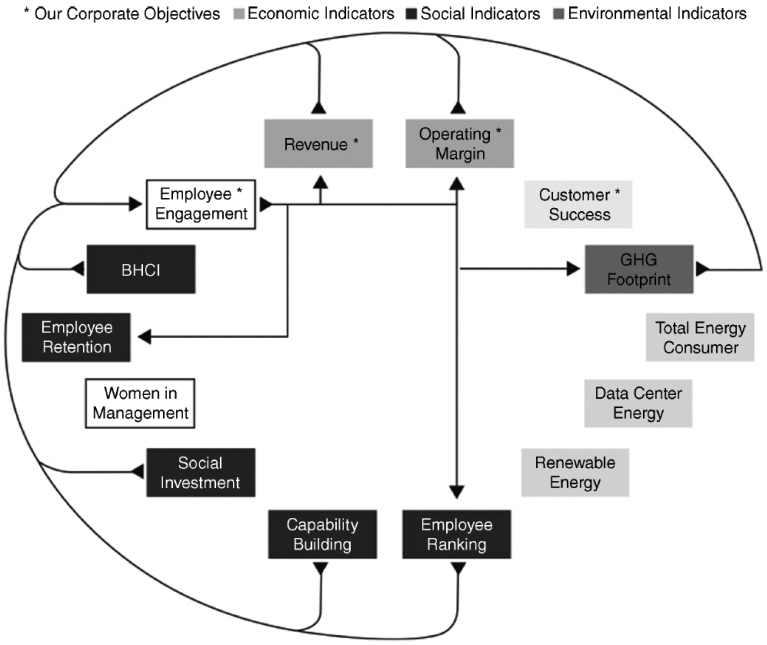
Table 8.15
SAP Connecting Financial and Nonfinancial Performance

Economic Indicators	Environmental Indicators	Social Indicators
Revenue	GHG Footprint	Employee Engagement
Operating Margin	Total Energy Consumed	Business Health Culture Index
Customer Success	Data Center Energy	Employee Retention
	Renewable Resources	Women in Management
		Social Investment
		Capability Building
		Employer Ranking

Data Source: SAP Integrated Report 2012. "Key Facts: Connecting financial and non-financial performance," http://www.sapintegratedreport.com/2012/en/key-facts/connecting-financial-and-non-financial-performance.html, accessed April 2014 (site discontinued).

SAP's approach allows the reader to click on an indicator to display its relationship to other factors. For example, clicking on the environmental indicator, total energy consumed, displays a link to an economic indicator, operating margin, and to an environmental indicator, greenhouse gas (GHG) footprint. The environmental indicator, data center energy, is identified as the direct driver of total energy consumed. Similarly, Figure 8.1 illustrates this for employee engagement. No other company website we studied illustrated its interdependencies between financial and nonfinancial factors to the same degree.[26]

Figure 8.1
The Performance Implications of Employee Engagement Source: SAP Integrated Report 2012, "Connecting Financial and Non-Financial Performance," (site discontinued).



A first step in a process toward quantitative valuation of the relationships between financial and nonfinancial performance as contemplated by the International <IR> Framework,[27] this graphic representation demonstrates SAP's understanding of how different dimensions of financial and nonfinancial information are related to each other.[28]

Further, the SAP Integrated Report 2012 includes an Independent Auditors Report[29] and an Independent Assurance Report.[30] The Independent Auditors Report provides a traditional opinion on the company's consolidated financial statements. The Independent Assurance Report provides both limited and reasonable assurance on selected sustainability information.[31] Limited assurance is provided on SAP's application of the AA1000 AccountAbility Principle Standard (2008) and on selected qualitative claims and quantitative indicators on sustainability performance. Reasonable assurance is provided on the indicators for Business Health Culture Index, employee engagement, employee retention, women in management, GHG footprint (Scope 1 and 2 as well as selected Scope 3 emissions including business flights and employee commuting), renewable energy, total energy consumed, and customer success.

The fact that SAP's reporting website is one of the most sophisticated we studied is not surprising given that it is a technology company. Yet its website features are based more on the exercise of integrated thinking than sophisticated technologies, and virtually everything their website contains could be easily replicated by any company of significant size. Important as a reporting website is, however, it is only one way information technology can be used to improve integrated reporting and in the process, foster integrated thinking.

References

[1]From the *Fortune* magazine methodology: Companies are ranked by total revenues for their respective fiscal years ended on or before March 31, 2013. All companies on the list must publish financial data and report part or all of their figures to a government agency. Figures are as reported, and comparisons are with the prior year's figures as originally reported for that year. *Fortune* does not restate the prior year's figures for changes in accounting. (Source: *Fortune*, July 8, 2013) Procedure: Using the Global 500 rankings as the data set, we created a checklist of items to look for and record. The websites were viewed over a period of time (Oct. 2013-Feb. 2014) and the data was recorded on paper and entered into an Excel spreadsheet for later analysis.

[2]Revenues and market capitalization downloaded from Bloomberg LP and calculated in U.S. dollars as of December 31, 2012.

[3]Revenues were summed to produce a total aggregate revenue and world market capitalization downloaded from Bloomberg LP and calculated in USD as December 31, 2012. Market capitalization is in trillions.

[4]Preliminary data gathering was done with over 100 sites, including known integrated reporters, the big pharmaceuticals, and a sample of the *Fortune* 500 before we settled on the *Fortune* Global 500 as our target population.

[5]This chapter would not have been possible without the indefatigable efforts of Barbara Esty, Senior Information Research Specialist in the Knowledge and Library Services Department at Harvard Business School. Over many months of hard work, starting in October 2013 and ending in February 2014, she single-handedly coded up the Global 500 websites, spending hundreds of hours immersed in this effort. Barbara was also deeply involved in the analysis and interpretation of the data. To this day she remains, in our view, the world's foremost expert on corporate reporting websites. After preliminary data gathering to determine which website features we wanted to collect and the Global 500 was selected as our company set, we developed a score sheet to record the findings. The score sheet was created to maintain consistency when looking at a site. For each feature, the score sheet identified the feature, how the feature would be scored, a place to record the score, and any additional comments. While recording these on paper knowing that they would need to be entered into a spreadsheet may seem redundant, this provided an extra check for items which were missed or required a second look due to website complexity. Further, the flexibility of the form allowed for the recording of textual data that we were unsure of how to score at the onset of data collection. Each website was approached in the same way, starting at the home page, looking at the general attributes of the site, which include treatments of multiple languages, use of social media, videos, etc. We then clicked to the investor relations section and sustainability pages. The appearance of a feature was recorded if clearly visible on the site or through a simple search of the site. The feature needed to be part of the text on the webpage, not in documents found through links on the webpage.

[6]eMarketer. "MOBILE SOCIAL PLATFORMS IN CHINA: Marketing Challenges and Opportunities, December 2013, http://d1vumxoj4hmk29.cloudfront.net/system/attachables/main/MuLOyIpwdFtw6WpVw4U/original/Mobile_Social_ Plateforms_in_China.pdf?1389666464, accessed May 2014.

[7]Very few Global 500 companies do not have an English version of their website. However, for those who do not, Google's Chrome browser provides a translation feature that allows for basic navigation and understanding of the website's contents.

[8]Ideally for a dataset of this size we would aim to automate the process, both for time and for consistency. However, successful web scrapping relies on seeking specific items that we did not know at the onset. Rendering a complete copy of a website is difficult due to not only the sheer volume of pages of text and images but also the complex arrangement of files that comprise the site. Lastly, we wanted to be respectful of each company's website's terms of use, which in most cases limited the amount of material that can be copied and stored for future use. While there are no doubt some individual coding errors given the number of websites reviewed (a careful eye only goes so far and items can be missed), given the aggregate way in which we are analyzing the data, we do not believe any errors have a material effect on the analysis. A double check occurred when transferring data from paper to spreadsheet—if something was missing or appeared odd, it was rechecked.

[9]Ideally, we would have had these categories defined in the beginning, but it took the process of manually gathering the data from the websites to have them emerge. Due to the variety of website features, category labels, and functionality, the data elements the categories grew organically through observation. To base the list of data collection points from a small sample would have biased the set. To determine the final list of categories to inventory, a preliminary list of data points was created and through viewing a set of integrated reporting companies, large pharmaceutical companies, and a subset of the *Fortune* 500 list. Items were added based on the frequency or uniqueness of when items appeared, such as the years of an annual report archive or games.

[10]By "connectivity" we are referring to a website property, not "connectivity of information" as defined by "The International <IR> Framework."

[11]Detail on the meanings of each category is included in Appendix 8A.

[12]We generally follow the scoring framework employed in Thomson Reuter's Asset 4 ESG database (http://extranet.datastream.com/data/ASSET4%20ESG/documents/ASSET4_ESG_Methdology_FAQ_0612.pdf). Individual items are typically scored 1 (Yes) or 0 (No) depending on whether or not we find that item in the company's website. These individual item scores are aggregated to provide a raw score for each company in each of the 7 categories. Each company's raw score in each category is then converted into a z-score measuring the raw score as a number of standard deviations from the mean across all companies in that category. Z-scores make it easier to identify differences among companies when there is less variation of scores across companies and also give greater weight to atypical scores. In the latter case, for example, a company will typically score higher for having a particular item on its website if relatively few companies have that item than if many companies have the item. Finally, the z-scores are normalized by ranking them on a scale of 0 to 100.

[13]Our website analysis was composed of the top 40 non-South African companies plus Novo Nordisk and SAP. There were 13 companies—AEGON, Banco do Brasil, BASF, CEBU Holdings, Chubu Electric Power, Eni S.P.A., Maersk, Nokia Corporation, Philips, Société Générale de Surveillance (SGS) Switzerland, Statoil ASA, UBS, and YIT OYJ—that published a self-declared integrated report and were named in the Global 500. Self-declared integrated reports were from Global Reporting Initiative, Sustainability Disclosure Database, GRI [Excel] Reports List, http://database.globalreporting.org/pages/about, accessed April 2014. See Appendix 8A for the details of website coding and our scoring criteria.

[14]For more background on integrated reporting at Novo Nordisk and Philips see Eccles, Robert G. and Michael P. Krzus. "Novo Nordisk: A Commitment to Sustainability." Harvard Business School Case 412-053. (Revised January 2012). Eccles, Robert G. and Daniela Saltzman. "Integrated Assurance at Philips Electronics N. V." Harvard Business School Case 412-054, January 2012. (Revised May 2013.)

[15]The website characteristics of Novo Nordisk, Philips, and SAP were evaluated using the same scoring methodology as we used for the Global 500.

[16]Novo Nordisk. Sustainability, *Annual Report 2012*, http://www.novonordisk.com/sustainability/online-reports/online-reports.asp, accessed March 2014.

[17]Novo Nordisk. Sustainability/Interactive Challenges, http://www.novonordisk.com/sustainability/games/interactive-challenges.asp, accessed April 2014.

[18]http://www.novonordisk.com/sustainability/how-we-manage/tbl-quarterly.asp, accessed April 2014.

[19]The importance of the patient in the Novo Nordisk culture is based on the Novo Nordisk Way, principles dating back to the 1923 founding of the company. Two of the principles are: "Our key contribution is to discover and develop innovative biological medicines and make them accessible to patients throughout the world" and "Growing our business and delivering competitive financial results is what allows us to help patients live better lives, offer an attractive return to our shareholders and contribute to our communities." Jakob Riis, executive vice president of Marketing & Medical Affairs, brings that point to life in the 2013 Annual Report saying, "Our goal is to make a difference to patients…." Novo Nordisk. *Novo Nordisk Annual Report 2013*, http://www.novonordisk.com/investors/annual-report-2013/default.asp, accessed May 2014, pp. 4 and 25, respectively.

[20]Consolidated financial statements refers to consolidated balance sheet, statements of income and cash flows, and notes to financials.

[21]The company's shares held by management are in the report section "Shares and capital structure" beginning on p. 44. Management's interpretation of accomplishments and results in 2012 is in the report section "2013 Performance and 2013 outlook" on p. 6. The consolidated statements of all types of performance are under "Consolidated financial, social and environmental statements, " beginning on page 55. What assurance has been given on the report is described under "Assurance" on page 109. Novo Nordisk annual report 2012, http://www.novonordisk.com/investors/annual-report-2012/ar2012.asp, accessed April 2014.

[22]Philips. *Annual Report 2012*, http://www.annualreport2012.philips.com/index.aspx, accessed March 2014.

[23]Philips *Annual Report 2012*. Downloads, http://www.annualreport2012.philips.com/downloads/index.aspx, accessed April 2014.

[24]Our analysis and discussion of SAP's integrated reporting content is based on the SAP Integrated Report 2012, which is no longer available. *SAP's Integrated Report 2013* may be found at http://www.sapintegratedreport.com/2013/en/, accessed May 2013.

[25]*SAP Integrated Report 2012*. http://www.sapintegratedreport.com/2012/en/home.html, accessed March 2014 (site discontinued).

[26]*SAP Integrated Report 2012*, "Connecting Financial and Non-Financial Performance, " (site discontinued).

[27]For more discussion about connecting financial and nonfinancial performance see "The International <IR> Framework", Section 3B, Connectivity of information, paragraph 3.8, Financial information and other information. For example, the implications for: expected revenue growth or market share of research and development policies, technology/know-how or investment in human resources; cost reduction or new business opportunities of environmental policies, energy efficiency, cooperation with local communities or technologies to tackle social issues and revenue and profit growth of long-term customer relationships, customer satisfaction, or reputation. International Integrated Reporting Council. "International <IR> Framework", http://www.theiirc.org/international-ir-framework/, accessed April 2014.

[28]For more discussion of SAP's integrated report see Eccles, Robert G., and George Serafeim. "A Tale of Two Stories: Sustainability and the Quarterly Earnings Call." *Journal of Applied Corporate Finance* 25, no. 3 (Summer 2013): 66–77.

[29]*SAP Integrated Report 2012*. Independent Auditor's Report, http://www.sapintegratedreport.com/2012/en/to-our-stakeholders/independent-auditors-report.html, accessed April 2014 (site discontinued).

[30]Ibid.

[31]The terms "reasonable assurance engagement" and "limited assurance engagement" distinguish between the two types of assurance engagement a practitioner is permitted to perform. The objective of a reasonable assurance engagement is a reduction in assurance engagement risk to an acceptably low level in the circumstances of the engagement as the basis for a positive form of expression of the practitioner's conclusion. The objective of a limited assurance engagement is a reduction in assurance engagement risk to a level that is acceptable in the circumstances of the engagement, but where that risk is greater than for a reasonable assurance engagement, as the basis for a negative form of expression of the practitioner's conclusion. Source: International Auditing and Assurance Standards Board. International Standard on Assurance Engagements (ISAE) 3000, "Assurance Engagements Other Than Audits or Reviews of Historical Financial Information, " http://www.ifac.org/sites/default/files/publications/files/B005%202013%20IAASB%20Handbook%20ISAE%203000_0.pdf, accessed April 2014.

APPENDIX 8A: METHODOLOGY FOR WEBSITE CODING

This appendix describes the scoring methodology used to evaluate the websites of the Global 500 companies. We developed a unique scoring framework and Table 8A.1 presents the selected features, why they were chosen, and how data were collected. Website features were grouped into categories for scoring. Category names and our definition of each category follow:

Financial transparency. These items assess how much financial information is provided and how easy it is for the user to find.

Sustainability transparency. These items measure how much sustainability information is provided and how easy it is for the user to find.

Interactivity. These items assess the degree to which the user is able to engage with the website.

Connectivity. These items assess the degree of integration in the reporting of the company's financial and nonfinancial performance.

Utility. These items assess the availability of tools and formats provided to aid understanding and analysis of the company's data.

Table 8A.1
Website Coding Categories and Features

Category	Feature	Why the Feature Was Chosen	How the Data Were Collected
Financial transparency	Separate consumer and corporate site	Many companies, especially retail, put all their corporate information in an "About Us" section that is extensive or they have separate sites.	A separate site was identified by its use of a different URL, for example, www.thewaltdisneycompany.com and www.disney.com.
Financial transparency	Multiple languages or global/regional presence	Having a global web presence indicates a desire or need to reach customers or shareholders worldwide. Limitations: Entering a site from the U.S. brings up the "English" site. All effort was made to determine which languages were available. Where sites did not have an English option, Google translate through Chrome was used.	Site provides an option to "change languages" or choose a regional or country-specific site. Most regional sites are in English and most investor sites of the other language sites are in English.
Financial transparency	Other formats	Users access websites from multiple devices.	Does the site identify other formats such as mobile websites, iPad, iPhone, Android, and apps? Scoring was based on whether one of these other formats was available or not.
Financial transparency	Webcasts	Webcasts are popular ways for companies to include shareholders and stakeholders in earnings calls, analyst presentations, and other events.	A "yes" was recorded if the company provided links to webcasts, audio casts or podcasts of presentations, earnings calls, etc.

Table 8A.1 Continued
Website Coding Categories and Features

Category	Feature	Why the Feature Was Chosen	How the Data Were Collected
Financial transparency	Investor relations—individual contacts	How easy it is to contact company investor relations' departments varies. Some companies are more transparent than others.	A "yes" was recorded if the company provided names, pictures, email addresses, or phone numbers of the members of the investor relations' team.
Financial transparency	Investor relations—general mailbox	How easily one can contact the investor relations departments varies. Some companies are more transparent than others.	A "yes" was recorded if there was a link to a phone number, email form, or general email address.
Financial transparency	Investor relations FAQs	Companies vary in providing shareholders with self-service information.	A "yes" was recorded if there were FAQs located on the "Information for Shareholders" pages, Investors sections, or investor-related FAQs on the site.
Financial transparency	Annual report archive	The web allows for the ability to post many years of information in a cost-effective manner.	The number of years for which annual reports were available was determined by subtracting the start year from 2012.
Financial transparency	Path to investor relations' section	Websites are designed with a specific strategy in mind for the location of all content. Location of content on a website is intentional. We compare the location of the investor relations information to that of sustainability information.	The path to investor information was scored by taking the inverse of the number of steps from the homepage. For example, home/investors is two steps and was scored as .5. Companies with fewer steps received a higher score.
Financial transparency	Annual reports in other languages	Much like language use across the entire site, companies can offer documents in multiple languages.	A "yes" was recorded if there were non-English versions available on the site.
Sustainability transparency	Path to sustainability section	Location of content on a website is intentional. We compared the location of the investor relations information to that of sustainability.	The path to sustainability was scored by taking the inverse of the number of steps from the homepage. For example, home/investors is two steps and was scored as .5. Companies with fewer steps received a higher score.

Table 8A.1 Continued
Website Coding Categories and Features

Category	Feature	Why the Feature Was Chosen	How the Data Were Collected
Sustainability transparency	Substantive information provided on sustainability webpage	Information provided about sustainability effort varies in substance and volume.	A "yes" was recorded if the site provided data on key performance indicators (KPIs), information on initiatives, reports, etc. Sites with just a CSR report or public relations' information about philanthropy or marketing were not counted.
Sustainability transparency	Path to sustainability report	Companies vary in the location of their sustainability reporting. It is not always clearly visible on the sustainability or investor sections. The location of the Annual report is typically visible on the top investor relations page. The variability of the sustainability report warranted measuring.	The path to the sustainability report was scored by taking the inverse of the number of steps from the homepage. For example, home/CSR/CSR report is three steps and is scored as .33. Companies with fewer steps received a higher score.
Sustainability transparency	Sustainability report in other languages	Much like annual reports, we wanted to see if reports were produced in other languages.	A "yes" was recorded if non-English version available.
Sustainability transparency	Sustainability archive	The web allows for the ability to post many years of information in a cost-effective manner.	The number of years for which sustainability reports were available was determined by subtracting the start year from 2012.
Sustainability transparency	Sustainability standards/ guidelines	Companies can use the webpage to inform the user about which standard or guidelines they follow. For example, Global Reporting Initiative, UN Global Compact, and CDP.	A "yes" was recorded if the standards or guidelines were mentioned in the sustainability section or through a search of the site.
Interactivity	Social media	Social media has spread as a corporate communication to reach customers and shareholders. Limitations: Some countries limit social media use or the company has made a choice not to participate.	All prominently displayed links to various social media platforms were recorded. The number and type of social media outlets varied greatly. The ones noted were mostly located on the home page, investor relations page, or prominently displayed on the site. While major individual services were recorded, the number of services/outlet provided did not add to the score.

Table 8A.1 Continued
Website Coding Categories and Features

Category	Feature	Why the Feature Was Chosen	How the Data Were Collected
Interactivity	Video	Video enables a company to communicate to the user in a more "human voice."	A "yes" was recorded if the site prominently displayed one or more videos on the site on the home page, media page, or through a quick site search.
Interactivity	Visitor type (survey of who the user is)	Sites can deliver custom content based on the identity of the user.	A "yes" was recorded if there was a mechanism on the site to identify the user. For example, "Are you a shareholder, student, journalist, etc.?"
Interactivity	Feedback	Site has the ability to gather feedback from the users about content and their experience using the website in order to make improvements.	A "yes" was recorded if a pop-up survey appeared on the site or the site provided a prominent link for feedback. We did not consider the general "contact us" link as a feedback mechanism.
Interactivity	Registration/ Account	Site asks the user to register for custom content or to access areas of a website.	A "yes" was recorded if the site asked the user to register for content-newsletter, custom feeds of articles, etc. RSS feeds were not considered part of this category.
Connectivity	Link from sustainability to investor relations	We wanted to understand how the website links the two sections.	A "yes" was recorded if there was a clear link from the sustainability page to the investor page.
Connectivity	Link from investor relations to sustainability	We wanted to understand how websites link the two sections.	A "yes" was recorded if there was a clear link from the investor page to the sustainability page.
Connectivity	Integrated report	Does the company produce an integrated report?	A "yes" was recorded if the company identified the report as an integrated report or displays "annual and sustainability report" in one document or provides language on the site that says they participate in integrated reporting.

Table 8A.1 Continued
Website Coding Categories and Features

Category	Feature	Why the Feature Was Chosen	How the Data Were Collected
Utility	Investor tools	There are many easy to use graphing and charting options available for companies to provide their users a way to look at data.	A "yes" was recorded if the site provided any tools allowing the user to change inputs and manipulate data to produce a table, graph, or spreadsheet.
Utility	Annual report as a .PDF	Companies provide annual information in many forms, but we feel that the .PDF format provides the user with a portable form that is universally easy to read and to use.	A "yes" was recorded if the annual report was provided in a downloadable .PDF format. 10-K fillings were not counted as .PDF annual reports as the Form 10-K in .PDF format does not add to the utility of the document.
Utility	Sustainability report as a .PDF	Companies provide sustainability information in many forms, but we feel that the .PDF format provides the user with a portable form that is universally easy to read and to use.	A "yes" was recorded if there was a sustainability report and it was provided in a downloadable .PDF format. Many sustainability sites are microsites, but the report can be downloaded.
Utility	Spreadsheet for financials	Companies can provide multiple ways to make it easy for the user to download and manipulate financial information.	A "yes" was recorded if an export-to-spreadsheet feature was provided.
Utility	Games	Sites can provide information and education through interactive games.	A "yes" was recorded if the site contained a game that asks for a response from the user and provides information based on the response.
Utility	Custom views	The web allows for information to be parsed in custom ways. We wanted to see how companies were using these features.	A "yes" was recorded if the user could pick and choose pieces of information and create a single new document.
Utility	XBRL (Extensible Business Reporting Language)	We wanted to see if companies are using this technology to make data more usable to the user.	A "yes" was recorded if the user could download the raw XBRL data.

CHAPTER 9: INFORMATION TECHNOLOGY

Although the use of information technology (IT) is not a focal point of the integrated reporting movement's conversation today, it should be. IT, which involves the "development, maintenance, and use of computer systems, software, and networks for the processing and distribution of data,"[1] poses a major challenge for integrated reporting. Yet it is also an opportunity. Not only can IT dramatically improve the process and quality of integrated reporting to the benefit of both the company and its audience, it can also improve both parties' integrated thinking.

To understand how this can be accomplished, corporate reporting in general and integrated reporting in particular must be considered in the context of four technological trends sweeping the business world today: big data, analytics, cloud computing, and social media. Companies have rightly focused on how these technologies can support and transform their business model. Virtually no attention, however, has been given to their application in integrated reporting. We believe that should—and will—change. Until senior management gives proper consideration to how to leverage IT for corporate disclosure, the full promise of integrated reporting (<IR>) and integrated thinking (<IT>) will not be achieved. The previous two chapters' analysis supports this contention. As shown in Chapter 7, paper-based reports have severe inherent limitations and, as shown in Chapter 8, the corporate reporting websites of the 500 largest companies in the world today only scratch the surface when it comes to using currently available IT. To put IT more directly into the movement's conversation about integrated reporting, we have devoted an entire chapter of the book to this topic.[2]

We will begin by explaining how existing IT can be used to support the processes required for integrated reporting. Emphasizing the role intelligent, machine-readable data will play in the not-too-distant future, we review the four trends and how they might contribute to <IR> and <IT>, ultimately introducing the concept of "contextual reporting"—a kind of reporting in which any single piece of information is easily viewed in the context of the "big picture." The chapter concludes with a brief glimpse into the future of integrated reporting with the hypothetical company World Market Basket.

Integrated Reporting Process

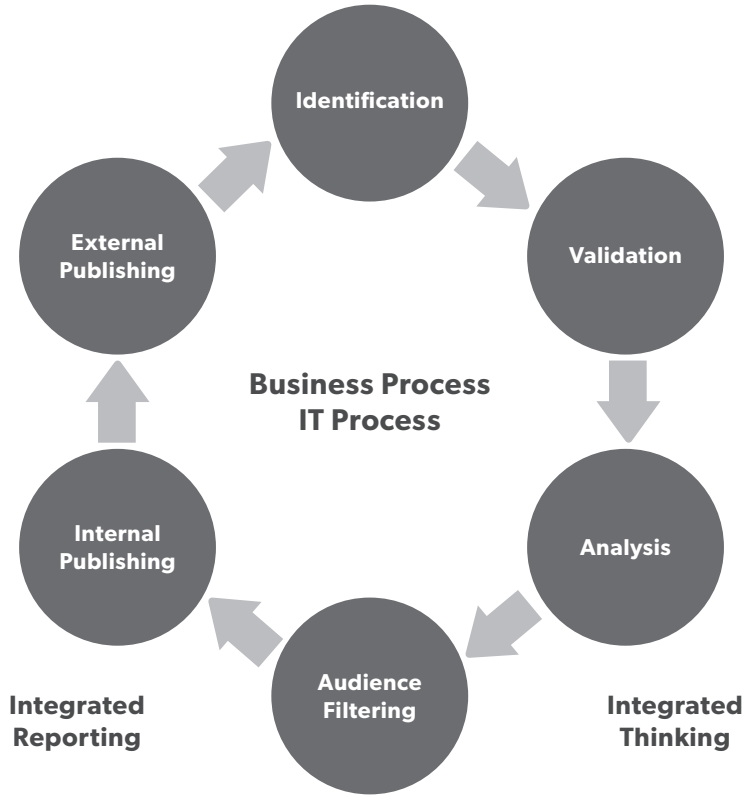
Used properly, IT, along with supporting internal control systems, can play a major role in the support of integrated thinking and integrated reporting. But this can only be accomplished if the company has a clear strategy for how to use IT to support its fundamental business processes. In an integrated reporting context, these processes are identification, validation, analysis, audience filtering, publishing to internal audiences, and publishing to external audiences (Figure 9.1).[3]

Identification

Integrated thinking inside a company is contingent on management's access to information about business processes, their outcomes, and the positive and negative externalities created as the company uses the International Integrated Reporting Council's (IIRC's) six capitals to create value for its shareholders. This information exists in at least three different forms: narrative or story format, structured information, and unstructured information. Given the broad scope and holistic nature of integrated reporting, the information that drives <IT> and <IR> could come from any unit in the company or outside the boundaries of the enterprise, including its suppliers, customers, business and partners, nongovernmental organizations (NGOs), and members of civil society. For this reason, it is necessary to identify relevant sources of information and, when it is not available, use proxies or develop new sources.

While a company's enterprise resource planning (ERP) system[4] offers one major source of information, others include employee spreadsheets, online databases, and social media platforms like Twitter. The ERP's carefully structured information usually relates to the tracking of transactional data. As they exist now, these systems are limited in their ability to track the sort of nonfinancial information integrated reporting requires. Much of it is unstructured; it is not neatly organized within the company's ERP system or any other information system that has conventions to which the data must adhere. The challenge for IT is to pull together the structured and unstructured information that comprises the content elements in the International <IR> Framework (<IR> Framework), which, taken together through the Framework's guiding principles, create the narrative backbone of an integrated report.

Figure 9.1
IT Support for Integrated Reporting Processes



Validation

While audit and validation processes for financial reporting have been in place for a very long time, they are largely still immature when it comes to nonfinancial information. As a result, report producers and consumers alike are justifiably suspicious of the reliability of the nonfinancial information they report on and use. IT can provide a greater degree of comfort regarding the quality of information being used in integrated reporting by ensuring that there is a single source of truth—that all who consume information inside the company acquire it from a single, systemic source, like a relational database, a data warehouse, or virtual cloud solution. This will reduce errors like the incorrect transposition of numbers or the loss of connection between narrative reporting and the underlying data. IT solutions that deliver a single source of truth are available, but their implementation requires a good alignment between business and IT processes inside the company.

Analysis

The key to analysis is to use information from internal and external sources to link the content elements—such as strategy and resource allocation, governance, performance, and outlook—in a meaningful way. IT tools for analysis are becoming increasingly available, many for a low cost or even free. Earlier analytical systems focused on transactional data, and subsequent ones then incorporated information tucked away in relational databases.[5] The advent of big data, however, has catalyzed the development of more sophisticated analytical tools that can use both structured and unstructured data. Discussed below, these tools can generate new insights on how different pieces of information can be understood and how they might be related to each other.

Audience Filtering

While integrated reporting is holistic by nature, not everyone needs all information all the time. As discussed in Chapter 5, what is regarded as material by each audience varies widely. Both the producer and user of information can filter it and, in both cases, numerous IT tools are available for doing so. However, filtration processes certainly need to mature as most companies using integrated reporting have not yet reached this level of sophistication in their integrated thinking processes. When availing themselves of filtering

capabilities, audience members should also be conscious of the fact that information they filter out may be related to information they think is material, so users should approach the process with a certain degree of judgment.

Publishing to Internal Audiences

Once the information has gone through a "materiality filter," it needs to be published for the relevant audience. Currently, a number of potential audiences for integrated reporting information are found inside the company, including line management and the strategic planning, performance monitoring, risk, sustainability, corporate reporting, and investor relations functions. If the information needed by each audience is available in systems or formats that enable portability, then each audience can choose to view and work with the information that is delivered to them using tools appropriate for their task. The challenge for those responsible for the provision of IT is to ensure that any time the users of integrated reporting information massage it, their action does not abstract the information from the context that gives it meaning. The IT system also needs to preserve audit trails, keep track of version control, and maintain links to underlying data sources.

Publishing to External Audiences

For external audiences, the challenge for integrated reporting is to ensure that the important content elements are crafted and honed out of the process of integrated thinking before they are delivered to external consumers of the company's reports. While traditional reports are delivered on pieces of paper (or as PDFs, the digital equivalent of pieces of paper), IT enables more powerful methods of report delivery and consumption. Already, companies are using websites to deliver digital reports that enable role-based or interest-based consumption. While concision is an important guiding principle of integrated reporting, IT can be used to supplement the information in the integrated report by providing metadata (such as through Extensible Business Reporting Language (XBRL)),[6] context, and access to underlying data sets for those who are interested in more detail.

Four IT Trends

While use of big data, analytics, cloud computing, and social media is mainstream in the IT community, it is also pervading the broader, global business world today. The terms "big data" and "analytics" are used somewhat interchangeably because they are so closely related to each other. Analytics—looking for patterns, trends, insights, and outcomes—are performed on big data sets, but it seems that the more evocative term of big data is what has caught on and is most commonly used. Little work has been done to examine the relevance of these big trends for integrated reporting, but we think that all can be relevant.[7]

Big Data

Big data is defined as a vast quantity of structured and unstructured data from traditional and digital sources inside and outside an organization that represents a source for ongoing discovery and analysis.[8] From the perspective of integrated reporting, its power lies in the ability to access sources of information ignored by traditional IT systems and to offer proxies for performance outcomes that are difficult to measure (e.g., the value of intellectual property or the benefits of employee engagement) or difficult to track (e.g., customer satisfaction or social impacts). When it comes to big data, companies are doing more than just talking about it; they are spending money on it. According to Gartner, big data investments in 2013 continue to increase. Compared with 2012, in which 58% of organizations surveyed were investing or planning to invest in big data technology, 64% of organizations had taken the plunge.[9] To date, the main areas companies have addressed through big data concern customers (enhanced customer experience, new products/new business models, and more targeted marketing) and internal operations (process efficiency, cost reduction, and improved risk management).[10]

Big data can be both structured[11] (prepared according to a well-defined convention) or unstructured[12] (not prepared according to a well-defined convention). For integrated reporting, both financial and nonfinancial data are important. While they can both be structured or unstructured, nonfinancial information is more likely to be the latter. Both can be delivered in terms of three different formats, ordered from least to most useful: (1) human-readable data,[13] (2) semiautomated data,[14] and (3) intelligent, machine-readable data. The type of data format a company uses for its integrated report heavily determines how quickly, accurately, and cost-effectively a company and its audience can use that information to make decisions.

The most useful, accurate, efficient, and cost-effective form of data is intelligent, machine-readable data. Intelligent data has built-in validation rules, calculations, and formulas

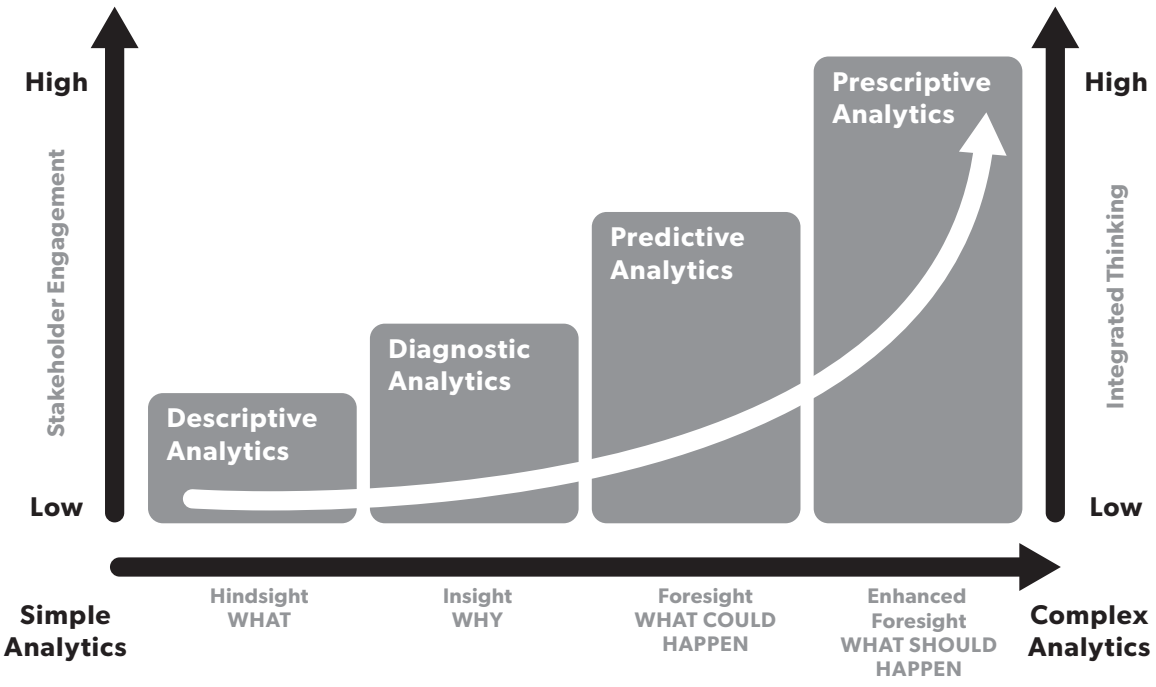
that verify its accuracy. It can also be linked to other data or narrative information in order to illustrate its relationships and interdependencies. The latter is important for fostering integrated thinking because it makes it easy for the user to see how one piece of information is related to others. Finally, it contains tags of "metadata"[15] (data about data) that point to other useful information, such as the accounting standard on which the information is based if it is financial information, or the standard or method of calculation used if it is nonfinancial information. Intelligent, machine-readable data means that almost no human intervention is necessary to work with it: the data go directly from the entity's machine that produces it to the entity's machine that consumes it.

To enhance its utility and value while reducing the amount of manipulation and risk of error later in its life cycle, data should be created as intelligent, machine-readable from the outset. XBRL, a proven global technology for making business information machine-readable, offers one way to accomplish this. As only a handful of the world's largest companies currently provide data in this format for their annual reports on their websites, this is an area of immense opportunity for companies to improve their corporate reporting and their integrated reporting.

Analytics

Analytics helps companies identify relationships between financial and nonfinancial performance across functions, operating divisions, and their supply chain to provide greater understanding of the "connectivity of information" in support of integrated thinking. Broadly speaking, big data analytics has four basic types of applications: (1) descriptive analytics[16] for hindsight or understanding *what* happened, (2) diagnostic analytics[17] for insight *why* and *how* it happened, (3) predictive analytics[18] for foresight or understanding about what *could* happen, and (4) prescriptive analytics for understanding what *should* happen.[19] The extent to which they create value for the business and foster integrated thinking varies (Figure 9.2). In all cases, the greater the degree to which the input is intelligent, machine-readable data, the greater the power and flexibility of the analytics will be to support integrated thinking on the part of both the company and its audience. Companies typically begin with descriptive analytics, to which they add diagnostic analytics, and ultimately predictive and prescriptive analytics, building from one application to the next as the company gains experience with this IT. Predictive and prescriptive analytics are today's big data "frontier."

Figure 9.2
The Four Types of Big Data Analytics



Cloud Computing

Cloud computing, in which a wide variety of business functions are performed on dispersed servers in a secure, on-demand, capacity-sharing, and scalable manner available from wherever an Internet connection exists, is an increasingly important way to perform analytics on big data. In the Gartner study, cloud computing was cited by 41% of participants as the single most popular information technology for deriving value from big data.[20] Cloud computing is also regarded as one of the most effective ways of encouraging collaboration—which itself fosters integrated thinking—across functions, geographies, time zones, and organizational boundaries.[21]

Social Media

Social media, which enables individuals to share information and communicate with each other and the company on a real-time basis, from anywhere in the world, on platforms like LinkedIn, Facebook, Twitter, and Google+ is an increasingly important source of big data. Through it, companies can access the perspectives of employees and customers, which can be used in an integrated report. It can also help foster more robust integrated thinking, as humans have a natural tendency to see an issue through the lens of their knowledge and experience, often without the full context in which it resides. When people share these perspectives, all of them develop a more complete picture of the causes of outcomes they care about and what can be done to improve them.

Leveraging These Trends

There is no reason why companies and their audiences cannot use big data and analytics with cloud computing and social media to improve the creation, distribution, and consumption of integrated reports. Most simply have yet to do so—in our view, because compliance and filing requirements in a largely regulatory-driven corporate reporting world have reinforced a paper-based paradigm for decades. When the power and collaborative benefits of cloud computing are brought to bear on big data analytics' applications, using information generated from many different sources, companies can significantly improve their integrated reporting and integrated thinking.

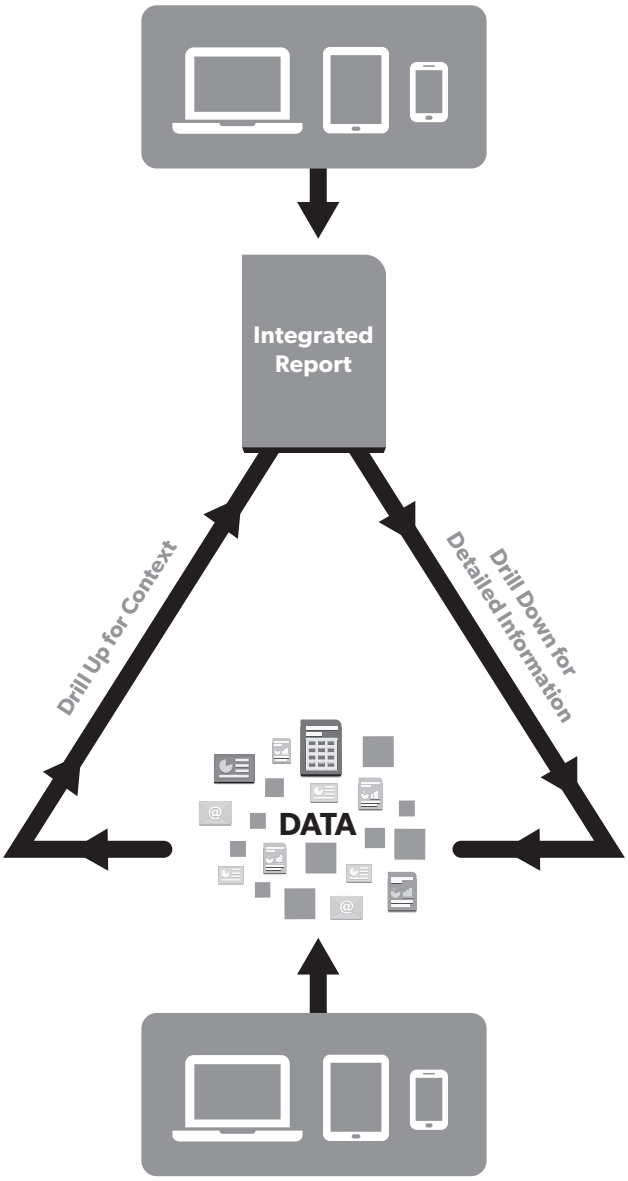
The Gartner report cited above identified the types of data analyzed. Most common were transactions (cited by 70% of respondents), log data[22] (55%), machine or sensor data (42%), emails/documents (36%), social media data (32%), free-form text (26%), geospatial data (23%), images (16%), video (9%), audio (6%), and others (12%).[23] Virtually all of these types of data are or can be used in assembling an integrated report. Social media in particular offers a two-way information channel for companies; they can monitor websites to see what employees, customers, and NGOs are saying about them in order to generate data relevant to human and social and relationship capitals, as well as to communicate their integrated report to these audiences.

Contextual Reporting

Connectivity, a key guiding principle in integrated reporting, comes from the mutually reinforcing relationship between integrated thinking and integrated reporting. In enabling both <IT> and <IR>, IT can help the company understand and report on the links between the content elements of the company's value creation story. IT can play a similar role for the audience of a company's integrated report. Once published, the integrated report becomes *context* for the user. Beyond simply being a report, it is a means of providing access to underlying data sets that provide more detailed information than is contained in the integrated report. Conversely, when a company has published an integrated report, users who access information from outside the report from another source can trace it back to the larger context of the integrated report. We call this technology-enabled "two-way street" between an integrated report and specific pieces of information "contextual reporting" (Figure 9.3). Without the appropriate IT, an integrated report is simply a very useful report. With the appropriate IT, it becomes a vehicle for enabling the user to deepen their own understanding of connectivity in terms of the topics that are of interest to them.

Corporate reporting today supplies vast volumes of information, often made available to users via online methods, such as a data terminal, but it often lacks context. These terminals offer the user news, market prices, and messages, in addition to company data. What this plethora of information typically lacks is context regarding a company's strategy, its business model, and its understanding of the

Figure 9.3
Contextual Reporting



risks and opportunities it faces—something an integrated report can provide. With IT embedded in the report, the user can link disparate pieces of information. Conversely, relying solely on the integrated report without the additional insight provided by the underlying data can also result in an incorrect or limited understanding.

Ideally, we need both: large and disparate sets of structured and unstructured data, with the linking apparatus of the integrated report. This way, the user who starts with the integrated report can find the data relevant to the content elements of interest to them, while the user who starts with the data can locate the context for that data via the integrated report. Such an approach would add contextual value to the typical user of the data terminal and the rigor of multiple streams of data to the typical consumer of narrative reporting.

Bringing contextual reporting into existence will require standards (e.g., in the definition of electronic reporting formats, as is being discussed in the European Union's Transparency Directive),[24] the application of big data analytical methods, and the integration of digital reporting information with other forms of corporate information. It also

potentially challenges the notion that integrated reporting lacks detail because of its focus on brevity. In effect, the integrated report becomes a concise contextual map that points to a rich load of information that can be found beneath the ground for both internal and external users of the integrated report. Without the use of technology, the capability for integrated reporting to provide context and connectivity is limited.

世界市场篮 (World Market Basket)

We will conclude this chapter with a short scenario of the 2022 integrated reporting practices of World Market Basket (WMB), a hypothetical Chinese company based in Shanghai that has annual revenues of $225 billion. WMB is a global manufacturer and distributor of food products, both through its 8,000 retail stores—located in Asia, Europe, the Americas, and Canada—and online (from anywhere in the world). Listed on both the Shanghai and New York stock exchanges, WMB has a market cap of $165 billion due to its high margins and growth rate, making it one of the largest 50 companies in the world in terms of market cap. In its 2022 "Statement of Significant Audiences and Materiality" (found in the "Description of Business" section of the company's Form 20-F), the board notes that the company's financial objectives and executive compensation are based on five-year targets. It also notes that its most significant audiences are long-term investors (those which have held the company's stock for three years or more), the more than 100,000 farmers (both company employees and independents) located all over the world from which it sources its products, and, for the first time, its "Big Basket" customers. In its 2021 Statement, the board simply said, "customers," but it made this change when "Big Basket" customers, representing 5% of the company's 175 million customers (defined by making at least one purchase in the past year), crossed the threshold to account for 80% of the company's annual sales.

Qualification as a "Big Basket" customer is based on an algorithm that reflects the amount and range of purchases within certain time periods, adjusted for local buying habits (Chinese and European customers tend to shop more frequently than North and South American ones) and for self-declared income levels, with this declaration being a requirement for achieving "Big Basket" status. Incentives to do this are great because this status results in automatic 25% discounts on all list prices, along with periodic 50% discounts only made available to them. Incentives to be honest about self-declared income levels also exist because many of the 50% discount products are geared to particular income levels. Purchases by "Big Basket" customers are a key metric included on the company's integrated reporting website. The company's integrated report is a contextual one; users are able to drill down for more detail on individual pieces of intelligent, machine-readable information. Conversely, information on WMB accessed through other sources can be linked back to the integrated report. Detailed analytical tools are also made available to the many different internal users.

Issues that are especially important to the company's audiences are so indicated on WMB's "Sustainable Value Matrix (SVM)." For example, the SVM shows that the company perceives genetically modified food (GMO) as a societally significant issue but not something that is material to the company; it is not an issue that is important to its long-term investors, its farmers, and its "Big Basket" customers. One consequence of this is that NGOs opposed to GMO food are actively campaigning against the company to modify its stance. In response, the company actively monitors social media and includes metrics of NGO perception on its integrated reporting website, available in both Chinese and English. These metrics are updated on a weekly basis. The page on which they are reported also has links to relevant articles and is an open platform for anybody, including company employees, to share their views and debate this issue with others.

The frequency with which performance metrics are updated is determined by the cycle deemed relevant by management. For example, aggregate sales are reported on a daily basis, sales to "Big Basket" customers and farming injuries on a monthly basis, and profits on a quarterly basis. Most metrics regarding material natural, human, and social and relationship capital issues are updated annually. 您可信赖保险 (Assurance You Can Trust), the only China-headquartered member of the Big Five, provides a real-time integrated assurance opinion to individual data items (which can be accessed as such) through certificates that indicate which of five levels of assurance has been provided

and when. Assurance for the entire website is done on a pass/fail basis every month. All assurance opinions are delivered quickly and inexpensively and are largely based on technology, with relatively little human intervention.

WMB has outsourced its integrated reporting website to a boutique IT service and consulting firm, London-based Integrated Reporting Solutions (IRS), that specializes in integrated reporting and helping companies build integrated thinking into their strategic planning process. IRS has contracts with cloud computing facility providers and has licensed big data and analytics applications that it uses to do descriptive, diagnostic, predictive, and prescriptive analyses under WMB's direction. Social media data are free and are gathered through IRS-proprietary search engines. Executives in functions spanning finance, procurement, supply chain management, marketing, and stores have access to these applications to do whatever analysis they want. 您可信赖保险 also provides an assurance opinion on IRS's capabilities for its clients. To the extent humans are involved in assuring WMB's reporting, most of this effort is devoted to the scope of audit and contractual terms with IRS.

Simple versions of these analytical tools are provided for free on WMB's integrated reporting website. More sophisticated ones from third-party app providers are available for a fee. Users can download any of the data the company is reporting into these tools, integrating them into their own analytical models if they so choose. For each metric, the company provides equations specifying how this metric is related to other metrics, along with supporting data. A tool is also provided for users to create their own equations to test hypotheses about connectivity. To the extent that competitors are providing similar information, WMB's provides links to their website so that the user can download this information as well for benchmarking purposes.

The SVM is also one of the main platforms for stakeholder engagement. When users connect to WMB's integrated reporting website, they are asked to identify which type of audience member they are. (Long-term investors, farmers, and "Big Basket" customers are automatically tracked.) IRS tracks the usage patterns of website visitors in order to provide data for updating the SVM on an annual basis. All of the issues above the "Societal Issue Significance Boundary" are linked to a page for stakeholder engagement, as is done for GMO foods. This is an important input for the company in developing next year's SVM, which has a page detailing the methodology that is uses for constructing it. Each issue page also has relevant reports and studies done by WMB and other parties, such as academics and consulting firms, who give permission to post them, along with relevant videos produced by the company and its stakeholders (with approval by the company).

While WMB is a hypothetical example, all of this could be done today.

In addition to better incorporating information technology into the integrated reporting movement, there are four other pressing issues that must be addressed as well. We discuss them in our next and final chapter.

References

[1] *Merriam-Webster Online*, s.vv. "information technology, " http://www.merriam-webster.com/dictionary/information%20technology, accessed May 2014.

[2] Since we are not experts on information technology, we could not have written this chapter without an extensive amount of constructive criticism and support from Jyoti Banerjee of the International Integrated Reporting Council, Brad Monterio, and Liv Watson. We learned much from them in the process of writing this chapter. We alone, however, are responsible for any errors and omissions this chapter contains. Our hope is that this chapter will prove to be the start of an ongoing conversation about the role of information technology in supporting integrated reporting and integrated thinking.

[3] Jyoti Banerjee is exploring the relationship between reporting processes and information technology through a series of workshops with leading companies practicing integrated reporting. He plans to publish the results of this study in the first half of 2015.

[4] An enterprise resource planning (ERP) system serves all departments within an organization. It can include software for manufacturing, order entry, accounts receivable and payable, general ledger, purchasing, warehousing, transportation, and human resources. For more information see, Shehab, E.M., M.W. Sharp, L. Supramaniam, and T.A. Spedding. "Enterprise resource planning: An integrative review." *Business Process Management Journal*, Vol. 10, No. 4, 2004, pp. 359–386, http://miha.ef.uni-lj.si/_dokumenti3plus2/192008/vseoERP-BPMJ-2004-1570100401_nov.pdf, accessed May 2014.

[5] "A database is a means of storing information in such a way that information can be retrieved from it. In simplest terms, a relational database is one that presents information in tables with rows and columns. A table is referred to as a relation in the sense that it is a collection of objects of the same type (rows). Data in a table can be related according to common keys or concepts, and the ability to retrieve related data from a table is the basis for the term relational database. A Database Management System (DBMS) handles the way data is stored, maintained, and retrieved. In the case of a relational database, a Relational Database Management System (RDBMS) performs these tasks. DBMS as used in this book is a general term that includes RDBMS." Oracle. The Java Tutorials, A Relational Database Overview, http://docs.oracle.com/javase/tutorial/jdbc/overview/database.html, accessed June 2014.

[6] Introduced in approximately 1996, eXtensible Business Reporting Language (XBRL), is a globally adopted and freely licensed open standard for providing structure and context to information to facilitate the digital exchange of financial and nonfinancial information. "XBRL is a member of the family of languages based on eXtensible Markup Language (XML), which is also a standard for the digital exchange of information between organizations over the Internet." Under XML, a standardized set of unique "tags" is applied to information so that it can be processed efficiently and automatically by computer software. "XBRL is a powerful and flexible version of XML that has been specifically defined to meet the requirements of business information reporting. It enables unique identifying tags to be applied to individual pieces of information, such as 'net profit'" or tons of carbon that provide context and structure to the information, identifying whether it is a monetary item, percentage, fraction, or other form of measure. XBRL allows labels in any language to be applied to the information. It also links each piece to any relevant contextual information, like accounting or reporting framework references. XBRL can show how items are interconnected. It can also represent how they are calculated and validate the accuracy of that calculation. Most importantly, XBRL is easily extensible so organizations can adapt the standard to meet a variety of special reporting requirements unique to that organization. The rich, powerful structure of XBRL allows very efficient handling of business data by computer software. It supports all the standard tasks involved in compiling, storing, and using business information, which can be converted into XBRL by suitable mapping processes or generated automatically in XBRL by software applications. It can then be searched, selected, exchanged, and analyzed by a computer or published for human viewing. For more information, visit XBRL International's website at www.xbrl.org. The above information is excerpted from "XBRL Basics, How XBRL Works" at http://www.xbrl.org/how-xbrl-works-1, accessed June 2014. For more information about XML, please visit www.w3.org/XML/.

[7] Watson, Liv and Brad Monterio, "Integrated Reporting Technologies in the NOW Economy, " September 2014, https://www.workiva.com/resources.

[8] SAS. Insights, Big Data, What is Big Data, http://www.sas.com/en_us/insights/big-data/what-is-big-data.html, accessed May 2014; OgilvieOne worldwide. A Day in Big Data, http://adayinbigdata.com, accessed May 2014; and Lisa Arthur, "What is Big Data, " *Forbes*, August 15, 2013, http://www.forbes.com/sites/lisaarthur/2013/08/15/what-is-big-data/, accessed June 2014.

[9] Gartner. "Gartner Survey Reveals That 64 Percent of Organizations Have Invested or Plan to Invest in Big Data in 2013, " press release, September 23, 2013, http://www.gartner.com/newsroom/id/2593815, accessed June 2014.

[10] Ibid.

[11] "Data that resides in fixed fields within a record or file. Relational databases and spreadsheets are examples of structured data. Although data in XML files are not fixed in location like traditional database records, they are nevertheless structured, because the data are tagged and can be accurately identified." *PC Magazine Encyclopedia*, s.vv. "Structured Data, " http://www.pcmag.com/encyclopedia/term/52162/structured-data, accessed June 2014.

[12] "Data that does not reside in fixed locations. The term generally refers to free-form text, which is ubiquitous. Examples are word processing documents, PDF files, email messages, blogs, Web pages and social sites." *PC Magazine Encyclopedia*, s.vv. "Unstructured Data, " http://www.pcmag.com/encyclopedia/term/53486/unstructured-data, accessed June 2014.

[13] Human-readable data is information in a digital or electronic format that humans can see on a computer screen, as in a PDF document or on a website (in HTML or similar format). This is the most common way in which companies provide data today for their financial, sustainability, and integrated reports because it is an effective and inexpensive way for the company to make its report easily available to its audience. It also has its limitations, particularly when it comes to being searchable. As discussed in Chapter 7, information is typically scattered throughout the integrated report and it is difficult to locate. Although this information is easily readable by humans, it is not in an ideal form to be automatically consumed by computer software. It often requires manual manipulation, copying, and pasting into other software or spreadsheets, and this can introduce errors into the data. Typically, this information has little or no structure or context around it. Giving it sufficient structure to make it useful and meaningful is time consuming and expensive.

[14] More useful is semiautomated data. This type of data can be automatically processed and converted by software tools that use built-in automation capabilities (e.g., optical character recognition or OCR) to perform a key function (e.g., OCR uses pattern recognition and artificial intelligence to convert text into usable data), but it still requires some type of human intervention given that machine-converted information is generally seen to have a lower level of trust and credibility. Nevertheless, semiautomated data is less time consuming and more cost effective to use than human-readable data, making it more useful overall.

[15] "Data that describes other data. For example, data dictionaries and repositories provide information about the data elements in a database. Digital cameras store meta-data in the image files that include the date the photo was taken along with camera settings. Digital music files contain meta-data such as song title and artist name. Meta-data are stored in an HTML page (Web page) to help search engines define the page properly, and most especially, make it rank higher in the results list. Meta-data has existed for centuries. Card catalogs and handwritten indexes are examples long before the electronic age." *PC Magazine Encyclopedia*, s.v. "Metadata, " http://www.pcmag.com/encyclopedia/term/46848/metadata, accessed June 2014.

[16] Companies venturing into the world of analytics typically begin with less complex, descriptive analytics that help the company summarize and present results regarding what has happened in their business operations. It is a way of condensing large volumes of data, perhaps dispersed in many different physical and virtual locations, in order to see patterns which, in hindsight, can be reported internally and externally. Because data are presented in a way that leaves more time for reflection, as opposed to spending that time preparing it for consumption, descriptive analytics lays the foundation for a modest degree of integrated thinking. It involves little internal collaboration or external stakeholder engagement because it is simply and ultimately about "reporting, " rather than initiating a dialogue within and outside of the company. Descriptive analytics are explained at, Advanced Software Applications Corp. "An Introduction to Descriptive and Predictive Analytics, " https://faculty.washington.edu/socha/css572winter2012/ASA_Introduction_to_Analytics.pdf, accessed May 2014.

[17] Reflection on the patterns identified by descriptive analytics generates hypotheses about why and how these patterns emerged, what caused them, and relationships between them. Diagnostic analytics describe ways to test these hypotheses, enabling the company to develop insights into why things happened the way they did. Users can do the same. In both cases, insights that are obtained about cause-and-effect relationships and interdependencies improve integrated thinking. The number and quality of these hypotheses, and the insights they can generate, is a function of the degree of internal collaboration and stakeholder engagement involved in generating them. Throughout this book we have emphasized how linkages between different kinds of information, or "connectivity of information, " are essential for a company to move from a combined report to a truly integrated report. While some degree of connectivity can be obtained without diagnostic analytics, it is more difficult to do so and the possibilities are limited. For more information about diagnostic analytics see, IBM. "IBM Watson and Medical Records Text Analytics, " http://www-01.ibm.com/software/ebusiness/jstart/downloads/MRTAWatsonHIMSS.pdf, accessed May 2014.

[18] The insights from diagnostic analytics form the basis for the more sophisticated predictive analytics. With predictive analytics, companies gain foresight about what could happen in the future. Forward-looking, predictive analytics utilizes a variety of statistical, modeling, data mining, and machine-learning techniques to study recent and historical data, enabling companies to make predictions about the future. Predictive analytics can forecast what could happen in the future because it looks at probabilities. It does not necessarily predict just one possible future but "multiple futures" that can be proposed based on the decision-maker's choices. Because greater insight into what stakeholders care about (e.g., what is material to them, how they might respond to a new product offering, and what they think about the company's reputation) yields more context and data points to use in the modeling, predictive analytics depend upon higher levels of internal collaboration and external stakeholder engagement to source those additional data points. For more information, see Waller, M.A. and Fawcett, S.E. (2013). "Data Science, Predictive Analytics, and Big Data: A Revolution that Will Transform Supply Chain Design and Management, " *Journal of Business Logistics*, Vol. 34[2], Forthcoming, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2279482, accessed May 2014.

[19]The future orientation of predictive analytics provides the basis for the most advanced form of analytics, prescriptive analytics, which uses the former's predicted possible outcomes to determine what should be done to achieve the desired outcome. Prescriptive analytics requires the highest levels of internal collaboration and stakeholder engagement to provide input into optimization models for defining what are considered to be the most desirable outcomes. This type of analysis is of the greatest value to a company and its audience insofar as it intelligently prescribes future actions to achieve the desired outcomes. In terms of the <IR> Framework, prescriptive analytics can be used to assess different strategy and resource allocation decisions that will enable the company to achieve its desired level of future performance given its outlook and the risks and opportunities it is facing, adjusting its business model as necessary. Prescriptive analytics helps companies achieve the highest level of integrated thinking by assisting internal collaboration on determining the best possible outcomes and contributing to the creation of economic value over the short-, medium- and long-term. See the following for more information. IBM Software. "Descriptive, predictive, prescriptive: Transforming asset and facilities management with analytics, " http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?infotype=SA&subtype=WH&htmlfid=TIW14162USEN, accessed June 2014. "Predictive analytics is the next step up in data reduction. It utilizes a variety of statistical, modeling, data mining, and machine learning techniques to study recent and historical data, thereby allowing analysts to make predictions about the future." Bertolucci, Jeff, "Big Data Analytics: Descriptive Vs. Predictive Vs. Prescriptive, " *Information Week*, December 31, 2013, http://www.informationweek.com/big-data/big-data-analytics/big-data-analytics-descriptive-vs-predictive-vs-prescriptive/d/d-id/1113279, accessed June 2014. Wu, Mike, "Big Data Reduction 3: From Descriptive to Prescriptive, " Lithium Technologies (Science of Social blog) http://community.lithium.com/t5/Science-of-Social-blog/Big-Data-Reduction-3-From-Descriptive-to-Prescriptive/ba-p/81556, accessed June 2014.

[20]Gartner. "Survey Analysis: Big Data Adoption, " September 12, 2013, Figure 10, p. 14, https://www.gartner.com/doc/2589121/survey-analysis-big-data-adoption, accessed June 2014.

[21]"When it comes to the strategy and practice of collaboration, nothing can compete with next-generation cloud-delivered tools and processes." "Collaborating in the Cloud, " Forbes Insights, p. 2.

[22]Log data is data generated by any activity, such as by a click on a website that has a time stamp and perhaps other data associated with it, such as type or location of the person that generated the data (i.e., meta-data).

[23]Gartner, "Survey Analysis: Big Data Adoption, " Figure 8, p. 11.

[24]Effective January 2020, publicly traded European companies will be required to prepare their annual financial reports in a single electronic reporting format. The European Securities and Markets Authority (ESMA) has been charged with the development of draft regulatory standards for adoption by the European Commission. The text of the Directive follows. "With effect from 1 January 2020 all annual financial reports shall be prepared in a single electronic reporting format provided that a cost-benefit analysis has been undertaken by the European Supervisory Authority (European Securities and Markets Authority) (ESMA) established by Regulation (EU) No 1095/2010 of the European Parliament and of the Council. ESMA shall develop draft regulatory technical standards to specify the electronic reporting format, with due reference to current and future technological options. Before the adoption of the draft regulatory technical standards, ESMA shall carry out an adequate assessment of possible electronic reporting formats and conduct appropriate field tests. ESMA shall submit those draft regulatory technical standards to the Commission at the latest by 31 December 2016." DIRECTIVE 2013/50/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2013 amending Directive 2004/109/EC of the European Parliament and of the Council on the harmonisation of transparency requirements in relation to information about issuers whose securities are admitted to trading on a regulated market, Directive 2003/71/EC of the European Parliament and of the Council on the prospectus to be published when securities are offered to the public or admitted to trading and Commission Directive 2007/14/EC laying down detailed rules for the implementation of certain provisions of Directive 2004/109/EC. http://ec.europa.eu/internal_market/accounting/legal_framework/transparency_directive/index_en.ht, accessed June 2014.

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