

**Technology primer for
integrated reporting**
A Chief Information Officer guide

Technology primer for integrated reporting: A practical guide for Chief Information Officers

Why we need technology to support next-generation reporting and management

Today's business environment is changing at a phenomenal rate. Technology has played a key role in driving some of that change, particularly through disruptive business models, the use of big data, and the speed of business interactions. But it also offers a path that enables businesses to understand, assess and act on the wider issues that drive superior performance.

For years, businesses have been held back by gaps in data, lack of longer-term thinking and a shortage of information on the true sources of reliable value creation in a company over time — things like innovation, brand equity, customer loyalty, and key stakeholder relationships.

Fortunately, there is a better way for businesses to understand, manage and communicate about the sources of value creation: Integrated reporting brings together material information about an organization's performance across all relevant resource areas or 'capitals' in ways that enable better informed management of the business and enhanced communication outside it.

This sort of next-generation approach to business thinking, management and reporting depends on broader information sets and quicker, more sophisticated ways of analyzing the material information required for decision-making. In modern companies, it will require the application of technology to the transition from the current model of management practice and corporate reporting (largely financials only) to an integrated view.

This document, developed by the participants in the <IR> Technology Initiative, offers practical guidance for those seeking to craft technology capabilities that support and enable next-generation business management and reporting practice. Today's business problems are daunting to address, but there are companies already doing practical things to change the way they work, and introduce a new information culture into their organizations. The purpose of this document is to introduce CIOs to these issues, and provide straightforward, practical ways to negotiate this fast-changing landscape¹.

For more information on the <IR> Technology Initiative, please email techinitiative@theiirc.org

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¹ There is a companion document, *Technology for Integrated Reporting: A CFO Guide for driving multi-capital thinking*, which is aimed at chief finance officers (CFOs) who are adopting integrated reporting.

Contents

The <IR> Technology Initiative	4
Executive Summary.....	5
Introduction to the CIO Guide.....	6
Multi-capital thinking is the new norm.....	9
Integrated reporting provides a framework for structuring the conversation about data	13
Next steps for the CIO and CFO.....	19

The <IR> Technology Initiative

The information challenge is increasing all the time. Already, corporations have to produce regulatory financial information and prescribed environmental, social and governance (ESG) disclosures, while many add corporate social responsibility (CSR) sustainability reporting to this list. Integrated reporting is a high-level approach that connects the material elements of all that information and helps to identify any missing pieces, to ensure concise, decision-relevant reporting that enables strategic, integrated thinking.

The <IR> Technology Initiative is a multi-year programme of the International Integrated Reporting Council (IIRC) that seeks to build a deep understanding of how technology can be applied to assist progressive report preparers and users to achieve their goals, and to consider how the evolution of corporate reporting is impacting – and being impacted by – technology.

The participants in the <IR> Technology Initiative have collaborated on this Technology Primer.

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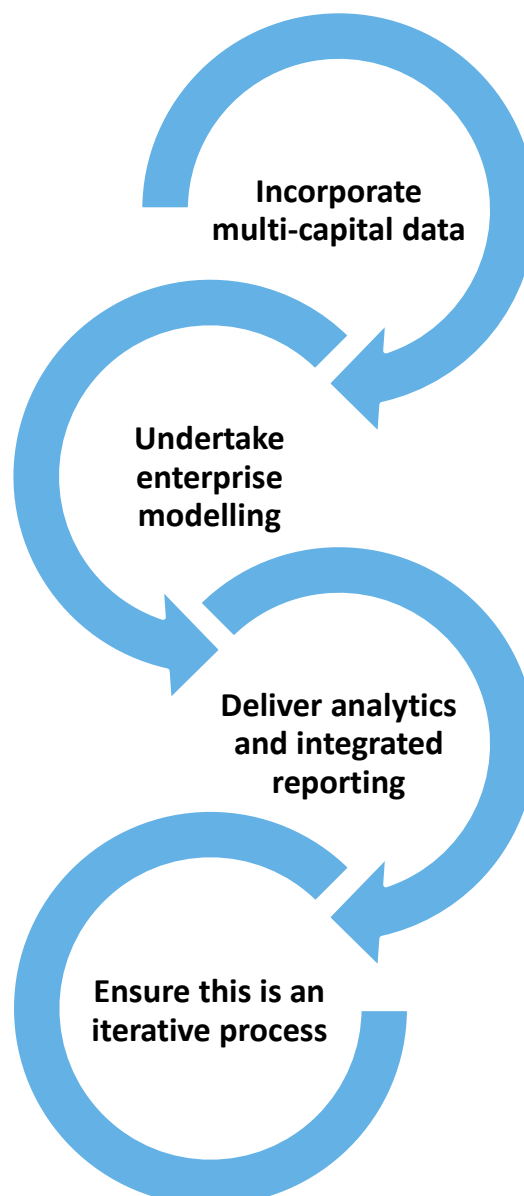
Input to this work has also been collected during meetings with representatives of various stakeholders, including participants in the <IR> Network. As with any collaborative document, the views represented in this document are a collective from across the working group but may not represent the official positions of the individual organizations.

Find out more on the IIRC website: www.integratedreporting.org/ir-networks/ir-technology-initiative

Executive Summary

Technology is rapidly developing to enhance the way businesses analyse, use and communicate data. As the volume of data grows - alongside demands for transparency - Chief Information Officers (CIO) must be at the heart of harnessing these technological developments to identify how the organization is creating value in the short, medium and long term. A successful CIO will take responsibility for building the information architecture that feeds into the integrated report, so that the business can think, plan and communicate their story of value creation, ultimately leading to internal and external benefits for the business.

Participants of the <IR> Technology have identified four steps that CIOs can take to build an information architecture that supports integrated reporting:



Introduction to the CIO Guide

“It is a capital mistake to theorize before one has data.” Arthur Conan Doyle, Author of Sherlock Holmes

In this chapter

- The demand for broader value-relevant insights is growing rapidly, both internally and externally. Financial reporting is not enough on its own. We are heading towards data-rich decision processes.
- CIOs can close the information gap by looking beyond the core financial systems to a richer data set, but they must focus on the factors that drive value in the business.
- Integrated reporting systems look across data silos to deliver the most value-relevant information.

Organizations today have entered a new paradigm. Advances in technology and the connectivity that these advances have enabled have occurred at such pace over the last decade that we are now in what is becoming commonly known as the ‘Fourth Industrial Revolution’. Data and the information that can be derived from it are at the heart of this revolution and the volumes and types of data are growing at exponential rates. On the one hand this provides opportunities for greater insight and understanding; on the other it provides challenges in terms of governance, culture and process across the enterprise.

Organizations that seek to derive maximum insight from the mountain of data they hold and produce are focusing on a question that gets to the heart of company strategy: “How do we create value?” Stakeholders outside the organization are asking the same question and globally governments and regulators are requiring the answer to be formally communicated in corporate reporting. The organizations that apply technology to generate, govern and analyse relevant data will clearly have market advantage.

Why is the CIO so important?

In this new paradigm, most organizations are adapting their operating models and organizational roles and responsibilities. The response differs not only by sector but also at the individual level as culture, executive and board experience come into play. Some organizations, for example, have appointed Chief Digital Officers and/or Chief Data Officers and Chief Technology Officers, while others will expect the Chief Operating Officer or even the Chief Executive to handle the technology brief. The more progressive organizations will have business unit leaders championing and leading on the digital agenda.

Most organizations, however, will have a Chief Information Officer (CIO). The CIO will either collaborate with these other related roles or will have subsumed them within the CIO’s own activities. With CIOs typically accountable for the technology strategy, they have a vital role to play in working with their CFOs to help answer the question, “how do we create value?”

Managing the data that underpins the value story

Not only are volumes of data increasing, but so are demands for transparency and insight. The data management challenge that most organizations have been addressing for a number of years has suddenly got more acute. A key issue is that so much data is sitting in silos: although local or functional experts can curate and manage that data efficiently, viewing data across silos can be difficult. The finance community has addressed this issue (albeit largely with its own data for its own consumption) through the adoption of common charts of accounts. However, data management standards and good practice within and across business operations and functions are still evolving. This means that sharing and interpreting data from across the organization can be difficult – but only by achieving this can the value story be revealed. Therefore the imperative of creating an organizational culture that collaborates and adopts common languages across silos of data, enabled by technology, adds to the strategic importance of the CIO. As boards get access to greater amounts of data, but are still insight-poor, the opportunity is there for the CIO to drive better information throughout the business, but particularly to the boardroom.

Time to evolve the CIO's strategy

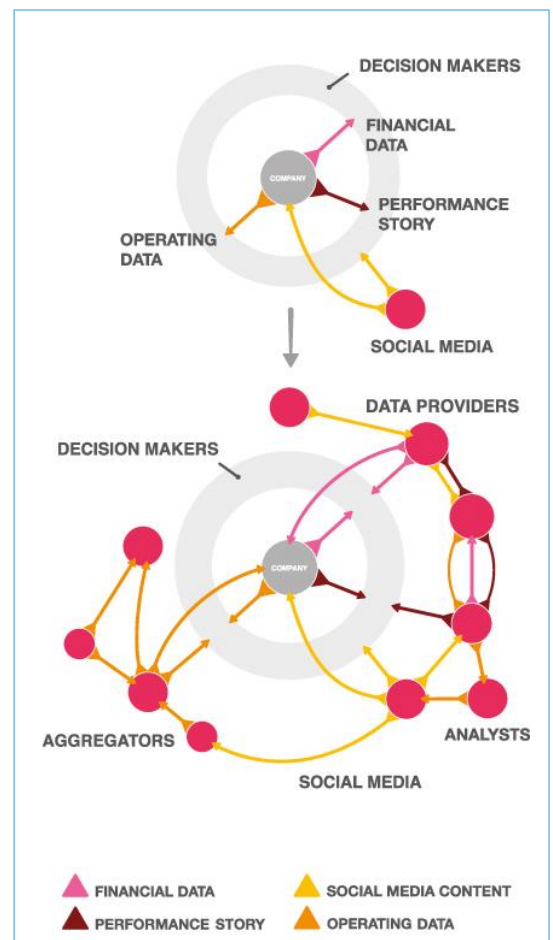
If asked about their strategy, most CIOs today would talk about managing and promoting the adoption of new technologies to support the achievement of business objectives. They might refer to tapping into the Internet of Things (IoT), mobile, cloud, self-service and developing the necessary enterprise architecture to do so. The chances are that few CIOs would specifically talk about the organization's value story – but the time has come for them to do so.

The application of technology across the business will be constantly generating new data on the organization's people, customers, relationships with suppliers and intellectual property. The value story of an organization is hidden in this data and the demands for CIOs to reveal this value will increase. Calls for insight will not only be internal, but will also increasingly come from external parties in line with evolving regulatory requirements and the increasingly open data culture. As investors focus more intensely on an organization's value creation potential, they will have rising expectations about the provision of intelligent insights.

Not only will organizations themselves be revealing more data externally, but so will competitors, trade bodies, regulators, NGOs and others: more information will be released across the entire corporate value chain. It is therefore important that organizations take the initiative by understanding their own value creation story and then presenting it to the outside world. If they fail to do, others may attempt their own analysis and draw their own (not necessarily correct) conclusions.

The changing flows of information

Corporate information used to be quite tightly controlled by the company, but that is no longer the case



Source: PwC 2017

The CIO strategy therefore needs to evolve to take account of both internal and external interest in value creation over the short, medium and long term. It will need to encompass roadmaps for managing, governing, storing and securing data relevant to value creation. CIOs that develop data and technology strategies that provide management teams with this kind of support will not only be meeting reporting needs, but also enabling better decision making and more effective strategy execution.

Closing the information gap

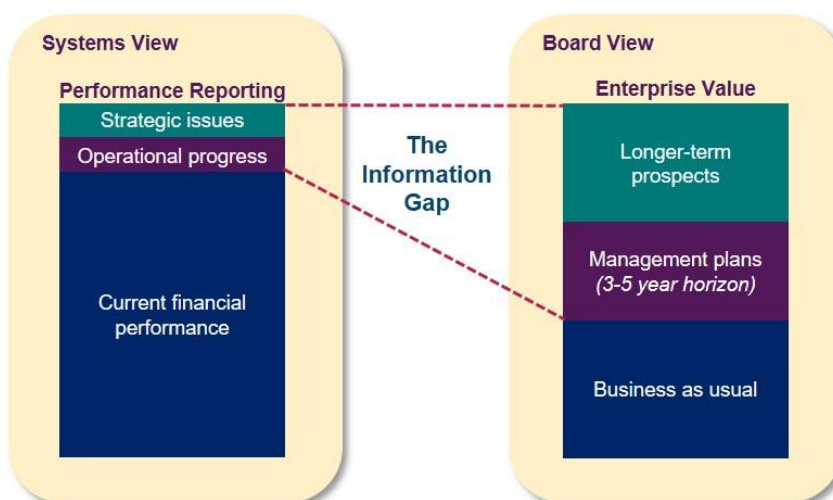
CIOs have an important role to play in closing the current information gap – a gap that reflects the way that performance reporting has evolved over time. Corporate reporting has long had a financial focus and CFOs have a deep focus on financial reporting. They then often pass that focus on to their CIOs. But are we all asking too much of financial performance reporting? It plays an essential role in providing a ‘business as usual’ perspective on past performance, but can’t on its own provide the breadth of view needed to manage business value over the longer term. Management teams have responded with ad hoc analysis of operational performance measures. There is a danger with this approach, however. The quality and scope of such analysis can vary, and boards may be concerned that some of the company’s most important performance measures are produced outside of its core information systems.

CIOs can offer a structured approach to close this information gap, focusing on management information that addresses:

- the operational drivers of performance
- the resources that the business depends on for its long-term success
- analysis that aligns with the evolving strategic priorities of the business.

However, extracting insight from the mass of data available in order to provide this management information is not easy – performance drivers don’t work in isolation, and they evolve with the circumstances of the business. This publication explains how an integrated reporting approach can help. It highlights the constraints imposed by traditional silo-based approaches to data management, and offers a framework for a more structured approach to the management and use of data needed to deliver real strategic insight.

The information gap found in most businesses that focus their reporting on financial issues



Boards and investors focus on managing enterprise value – the future earnings potential of the business. But information systems remain rooted in current financial performance, delivering lots of information on ‘business as usual’, but far less on the medium-term management plans and longer-term business prospects.

Source: KPMG

Investor communication has traditionally focused on the short-term financial performance articulated in annual reports. However, demand is now growing from shareholders and stakeholders such as BlackRock CEO Larry Fink² for the board to additionally articulate a clear strategy for longer-term value creation, as well as the metrics to support it. Investors increasingly believe that a longer-term perspective helps them to understand short-term financial results in the right context. The rise of index funds is reliant on consistent, high-quality information on a range of indices. Furthermore, an increasing trend for ESG information (environmental, social and governance information) by investors as part of their mainstream investment processes is driving greater interest in information on a wide range of value creation factors and impacts.

Multi-capital thinking is the new norm

In this chapter

- An integrated approach realises the power of business's growing data resources by connecting and aligning them behind the business strategy.
- Integrated reporting promotes an effective data architecture based on a single version of the truth.

The availability of data covering every organizational aspect and at ever more granular levels offers tremendous opportunities for performance insights and improvements. Each data point hypothetically can serve as a potential lever to steer the organization towards achieving its goals. In practice, however, many organizations experience 'paralysis by analysis' due to a lack of shared metrics and poor technical connectivity between IT applications and systems. CIOs have a critical role in overcoming these issues by harmonizing and prioritizing the use of data, as well as ensuring the necessary IT capabilities are in place.

More specifically, CIOs can work with their CFOs to ensure management has access to the information needed to support a value creation strategy for the short, medium and long term. This goal underpins the International <IR> Framework, which also helps to facilitate an organization-wide dialogue for setting information priorities.

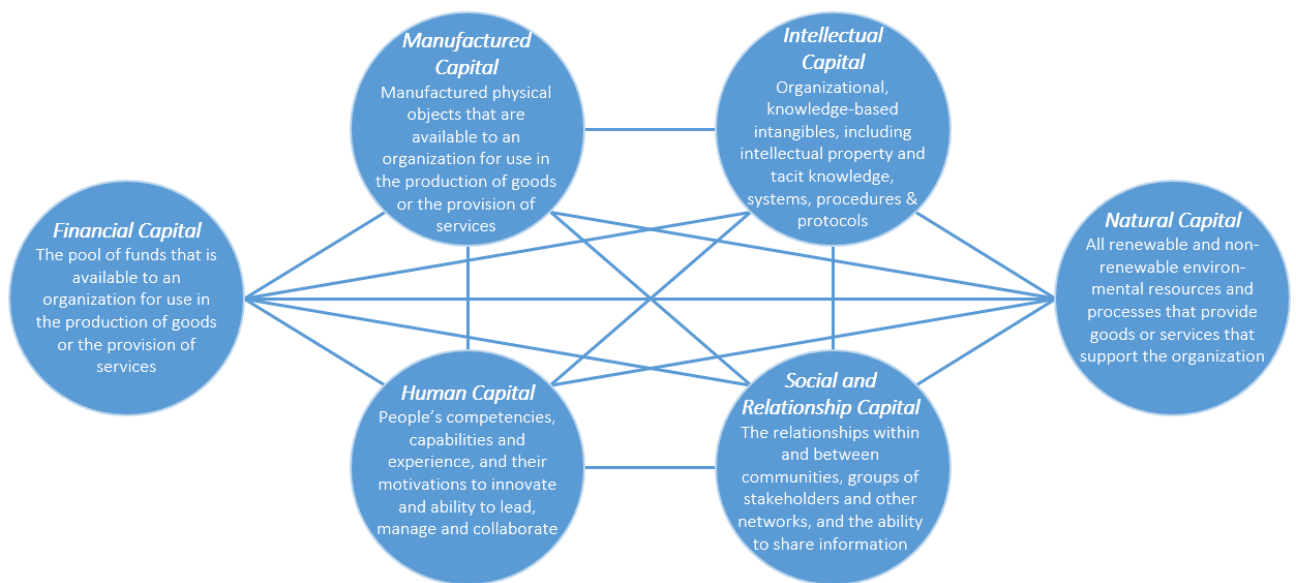
The <IR> Framework: what and why?

The <IR> Framework promotes a cohesive and efficient approach to management decision making. It encourages management to think about the business in a more holistic way – called 'integrated thinking' – as well as enabling integrated reporting. It doesn't just look at traditional financial capital, but establishes that organizations will use multiple capitals when pursuing their objectives. The <IR> Framework in fact identifies six broadly defined capitals: financial, manufactured, intellectual, human, social and relationship, and natural. In this way, the <IR> Framework helps organizations to identify the critical activities and capabilities that lie at the core of value creation.

² Footnote source: Larry Fink letter to S&P CEOs February 2016, <https://www.blackrock.com/corporate/en-gb/literature/press-release/df-corp-gov-2016.pdf> and <https://www.blackrock.com/corporate/en-no/investor-relations/larry-fink-ceo-letter>

By mapping and measuring the inputs and results critical for success, organizations gain an overview of which data streams to focus on. A pharmaceuticals company, for example, would have to focus more on measuring relevant facets of its human and intellectual capitals than its operational efficiency as compared to a logistics service provider. Keeping a holistic view on value creation and applying industry knowledge can help individual organizations to focus on their own high-impact areas and avoid unnecessary data analysis.

The multiple capitals listed in the International Integrated Reporting Framework from the IIRC



Source: Satriun

Understanding materiality and connectivity

In addition to multi-capital thinking, the <IR> Framework also stimulates materiality assessments and the understanding of connectivity between different capitals. Materiality helps to focus on those matters, both positive and negative, that really influence the organization’s ability to create value over the short, medium and long term. Connectivity reflects the dynamic and systemic interactions between the organization’s activities. This creates the need to break down information silos that may exist between divisions or departments. The more that integrated thinking is embedded into an organization’s activities, the more naturally the connectivity of information will flow into management reporting, analysis and decision-making. Only then, will the organization be able to achieve a holistic view of value creation.

From connectivity to integration

As connectivity reflects the dynamic and systematic interactions between the organization’s activities, we need information that goes beyond the silos within a company. In parallel, more connectivity will be realized when the external sources for information (e.g. social media) are also incorporated in the decision process. The value creation process needs to be based on all relevant integrated capitals. Integration of the information processes will be achieved when the internal

and external, financial and non-financial information are integrated into a robust performance management model.

An integrated data model is a data reflection of the ‘value creation process’ in which all relevant capitals are taken into account. The relationships between the drivers of value and the quantitative impacts they have upon each other need to be reflected in the integrated data model. Such a model cannot be created in the short-term. Instead, it is an ongoing activity that will be executed by deep-dives into specific value creation options. While creating integrated data models (including internal-external data and relationships between different capitals), we need to extend the ‘object-attribute’ related modeling with more semantic-based modeling techniques.

The integrated data model can be derived using different approaches:

- **Common sense evaluation** - what capitals (for example, human capital – training) are relevant for value creation (e.g. revenue) and how big is the respective impact (e.g. 50 Euro spent on training leads to 100 Euro increase in revenue).
- **Via a big data analysis (correlation algorithms) of business data** - through ‘correlation algorithms’ on a business data set, correlations and relationships between specific capitals might be deduced that provide new insights into the value creation process.
- **Values derived from a ‘hidden capital’ analysis** - in such an analysis, the ‘hidden capitals’ from a company and the impact they have upon each other can be explored. Human, intellectual and relationship capitals are referred to as ‘hidden capitals’ because organizations are often quite muted in their analysis of such information.

While performance metrics can be specified in more detail at the divisional and operational levels of the organization, an integrated data model’s primary purpose is to facilitate organization-wide alignment of the different data flows and stimulate the automation of data streams. A single version of the truth across the organization slashes process complexity and reduces the risk of bad data.

Armed with the information requirements coming from an integrated data model, the CIO can put in motion the harmonization of the IT infrastructure across the organization. A common set of information requirements allows the phasing out of redundant or unsupported technologies, ultimately leading to a simpler IT landscape, lower maintenance costs and procurement economies of scale. The alignment of software capabilities with data requirements ensures that acquired technologies are fit for purpose and cost effective, reducing or even eliminating the need for spreadsheet-driven data collection and enrichment. The common set of metrics will also help to prioritize future investments, based on the urgency of the need to improve business capabilities and the extent to which existing technologies are able to meet new information requirements.

In summary, CIOs have key roles to play in defining and delivering the IT infrastructures capable of supporting integrated thinking and integrated reporting. They are therefore essential for helping organizations to define, manage and communicate their value creation story. The <IR> Framework helps CIOs structure their information systems to deliver this value creation story.

SAP case study: integrated reporting supports integrated thinking

An early adopter of integrated reporting, SAP has realized that measuring, reporting and managing non-financial information can lead to deeper insights about corporate performance and tangible financial returns. Decisions taken to achieve one objective can have other positive and negative impacts. Integrated reporting helps with understanding this connectivity and developing integrated thinking.

Being committed to environmental sustainability, in 2014 SAP started to collect data about CO₂ output in its efforts to reduce its carbon footprint. Company cars were the single greatest source of direct emissions, so SAP promoted the use of ride-sharing solutions and incentivized employees to purchase electric cars. As well as reducing emissions, the use of electric cars brought an additional benefit: it enabled some employees to get to work faster in special lanes.

Together with other measures aimed at reducing indirect pollution, management realized that CO₂ reduction efforts made their employees feel better about the company they worked for. SAP's efforts to act more sustainably have in fact increased both employee engagement and customer loyalty, both of which have been shown to have a positive financial impact. However, not all sustainability-related initiatives resulted in positive outcomes. For example, travel moratoriums led to diminished sales.

Overall, by exploring its own data, SAP has made several rewarding findings about the ways in which different capitals are connected in their corporate context. Multi-capital thinking therefore has the potential to provide better support for decision making and foster superior business outcomes.

Integrated reporting provides a framework for structuring the conversation about data

In this chapter

- Four steps to deliver an integrated information model:
 - a. Bring together multi-capital data
 - b. Use enterprise modelling to align behind management priorities
 - c. Deploy integrated analytics to deliver better internal and external reporting
 - d. Make this an iterative process.
- If the CIO has a clear vision for an integrated information system, systems can evolve to meet these challenges.

Bringing the <IR> Framework to life depends on data – the right data, of the right quality, available at the right time. CIOs therefore need to develop a data-driven business architecture that supports the goals of integrated reporting. To recap, the <IR> Framework describes an approach for understanding and representing an organization’s performance across six capitals. It challenges companies to understand their business **holistically and in a connected** way that takes account of how relevant aspects of the different capitals create value.

When thinking about the data – the performance indicators – needed to understand the capitals, it is important to **contextualize** the data. Basic details of kilowatt hours or tons of input used, for example, do not directly lead to practical knowledge or insights. They need to be combined with thresholds, allocations and other context-based information, such as its relevance to the organization and the extent to which the information is seen as significant to its value creation process. Ultimately, are the business leaders using these data sets to manage the organisation?

When developing the data-driven business architecture needed to enable integrated thinking and reporting, CIOs also need to ensure that insights the systems provide are **actionable**. Management teams should be able to use those insights to make decisions related to the capitals that have a real impact on the organization’s ability to create value over time.

Employee retention in the spotlight

To understand the importance of data for underpinning integrated reporting, let’s take employee retention as an example. Employee retention is a popular key performance indicator (KPI) in many organizations. The ability to keep hold of talent can suggest, for example, the existence of a healthy culture and high quality leadership, as well as reduced costs from constant recruitment. Employee retention therefore gives insights into several capitals: financial, human and social and relationship capitals.

Our example also indicates the complexity of just one ‘simple’ performance indicator. In each case, it will be necessary to:

- Decide how to define the KPI
- Choose a metric that supports the definition

- Identify in which systems the data may be located
- Assess the reliability of the data
- Understand which capitals may be impacted by the KPI.

Assessing the data requirement

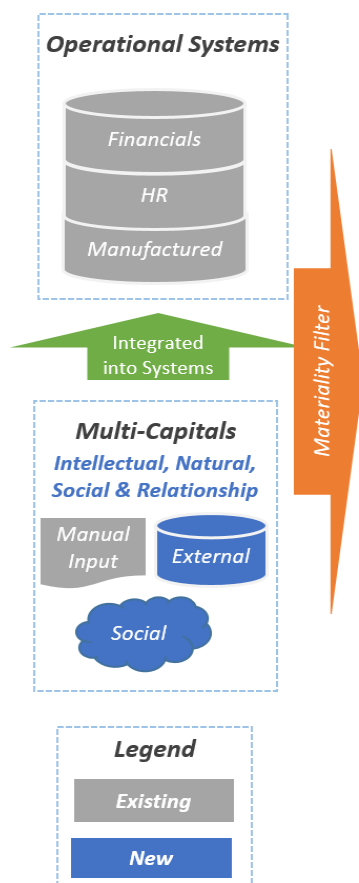
	Example	Comments
KPI	<ul style="list-style-type: none"> • Employee retention. 	Employee retention reflects the organization’s ability to retain its employees. It could be shown simply as the percentage retained during a given period. An alternative would be to show the number or percentage of employees that left the organization. The definition needs to be precise as this determines the metrics needed.
Metric	<ul style="list-style-type: none"> • Total headcount or full-time employees (FTE) • Leaving headcount or leaving FTE • New headcount or new FTE. 	A number of metrics could be used to measure employee retention. For example, the organization needs to decide whether to use total headcount or FTE. Should it use an average or year-end number? Are temps and contractors included?
Data: where	<ul style="list-style-type: none"> • HR System (in-company or on the cloud) • ERP System • Corporate reporting system • Spreadsheets (possibly for each company in a group.) 	Data can be stored in various sources in different group companies and country locations.
Data: reliability	<ul style="list-style-type: none"> • For HR systems/corporate reporting systems: moderate to high (although definitions might differ) • For spreadsheet(s): low. 	Data needs to be reliable to avoid the risk of ‘garbage in, garbage out’. Reliability includes comparing like with like, i.e. that data from different sources has been defined in the same way.
Connectivity	<p>Employee retention affects:</p> <ul style="list-style-type: none"> • Financial capital (e.g. operating expenditure) • Human capital (e.g. knowledge, experience, skills) • Social and relationship capital (e.g. partnerships with suppliers, customers and business partners.) 	KPIs are likely to have an impact on several capitals. Employee retention typically affects three: financial, human, and social and relationship capital. The impact could be positive or negative.

Mapping an information architecture

As the employee retention example shows, even an apparently simple KPI raises many questions related to data identification and management. In order to implement integrated reporting in the organization, the CIO will therefore need to map an information architecture.

This architecture will take account of multi-capital inputs and a variety of data stores, as well as business and value modelling, analytics and reporting. It will ultimately produce the KPIs and integrated reports that management and other stakeholders need to understand the organization's value creation story and take decisions that support ongoing value creation.

Sample steps to build an information architecture to support integrated reporting:



Step one: Incorporate multi-capital data

- To calculate integrated reporting KPIs, additional data needs to be incorporated into the systems architecture.
- To understand all the capitals, data may be needed from external or social media sources, and may be non-traditional or pre-financial data types.
- New data is incorporated into existing systems or new systems may need to be created.
- In some cases, relevant data is already being collected and captured throughout the organization, but it may need to be standardized.

Step two: Undertake enterprise modelling

A number of different modelling activities may be needed to ensure data supports integrated thinking and management.

Value modelling

- This outlines how the company creates value
- The model defines how to apply (digital) technology to create value for existing and new capitals
- It structures and visualizes the interconnections between capitals, activities and their KPIs in relation to the achievement of strategic objectives
- Value modelling works in conjunction with business and process modelling.

Integrated data model

- A meta-data layer aims to harmonize data to enable a unified, corporate-wide usable view
- The model links data from all relevant capitals to facilitate value modelling
- The objects for the Integrated Data Model can be generated from operational systems, the value modelling tool and/or management reporting systems.

Enterprise performance management

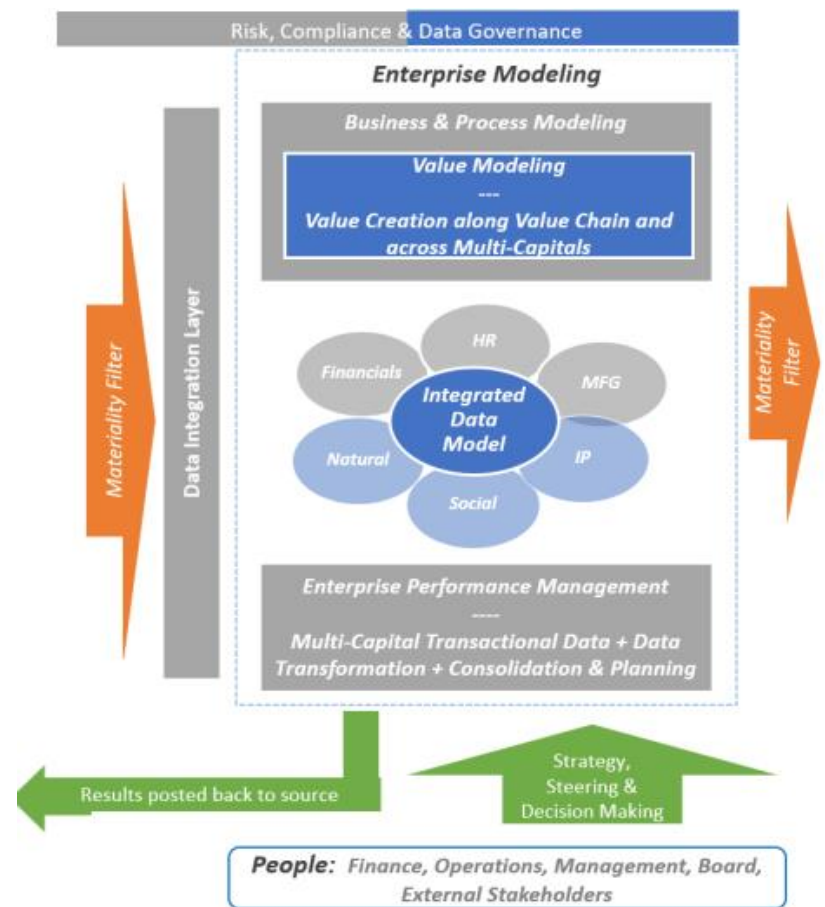
- Using transactional data, carry out data transformation and data rollups that bring together disparate data sets
- Conduct traditional performance management activities of consolidation and planning.

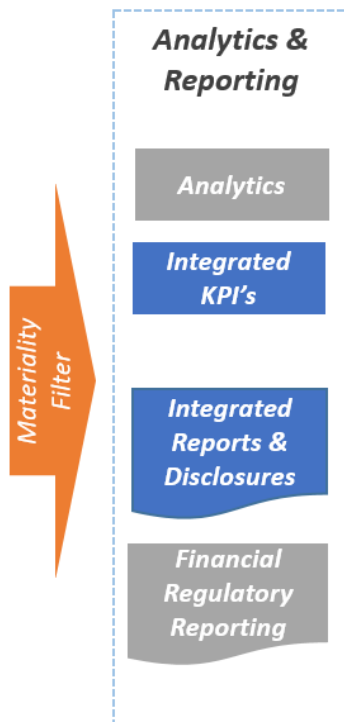
Risk, compliance & data governance

- There is a need for increased risk, compliance and data governance due to the higher volume, complexity and inter-dependency of the data.

People

- Enterprise modelling needs to take account of internal and external stakeholders' needs (e.g. in relation to strategy, performance management and decision making).
- Modelling is an iterative process that should adjust to changing internal and external business drivers.





Step three: Deliver analytics and integrated reporting

Access to multi-capital data and comprehensive enterprise modelling enables improved analytics and reporting.

Improved analytics and integrated KPIs

- Fully integrated KPIs can now be calculated from multi-capital data
- Real-time data increases the quality of analytics and transparency, including drill-down capability
- Big data, artificial intelligence and machine learning can all be applied to improve analytics
- Advanced analytics provide better insight into the connectivity between the different capitals
- The creation of a '360 degree' view of the organization should give management increased strategic advantage.

Integrated reports and disclosures

- Beyond standard reporting, additional multi-capital data can now be reported and disclosed in the integrated report and enhanced disclosures
- This more integrated reporting provides the broader view and transparency that shareholders and investors now demand to give them confidence in the organization
- Management teams can gain a strategic advantage from their improved understanding of the value creation process and their ability to take key decisions quicker.

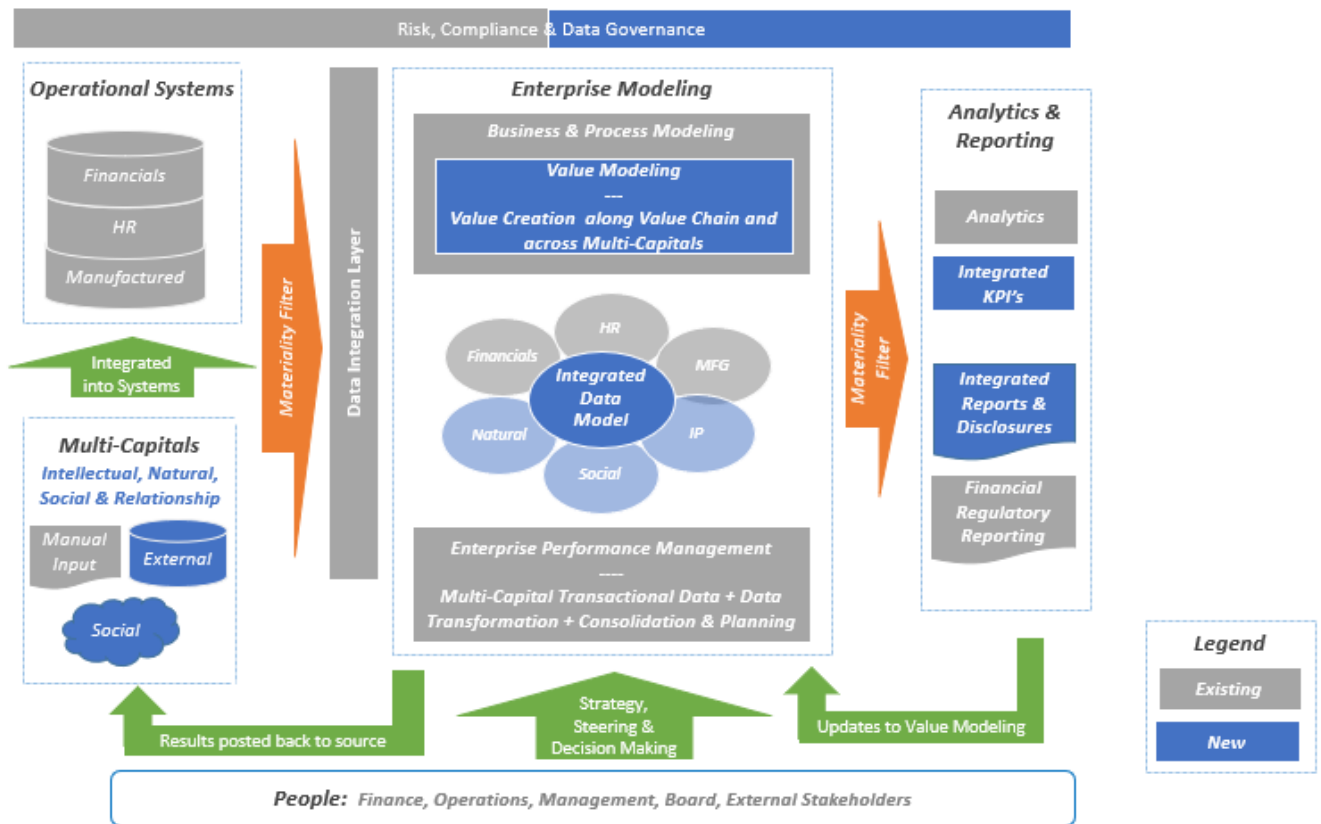
Step four: Iterative process

- This is an iterative process. By analyzing the results, the value model and data model are continuously updated.

Tying together the elements of an information architecture

By following the four core steps outlined above, the CIO can create a complete information architecture to support integrated thinking and reporting. This brings together multi-capital data, operational systems, enterprise modelling and analytics and reporting – in a way that supports the organization's value-creation strategy over time.

A connected information architecture that supports integrated thinking



This approach puts an end to the silo-based data structure that exists in many organizations. It enables a **connected information architecture** that supports integrated business management across strategy and planning, operations, performance management and disclosure.

From a practical perspective, the information architecture will generally be implemented in a phased way. Implementing integrated reporting is often described as a ‘journey’, one where individual advances inspire and lead on to further developments.

However, when developing the architecture, CIOs may find it helpful to apply four key concepts:

1. Taking account of the new, non-financial capitals will create the need for new data and information that can be managed in existing (financial) systems but may require new systems or processes.
2. We need a clear approach (and the appropriate tools in place) to uncover the value creation process in the organization
3. The connectivity between the capitals (qualitative and quantitative) should be made explicit in the data model to better understand the possible impacts of a business process
4. Advanced analytics should provide better insight into the relationships between the different capitals, the impact they have on each other and how they affect value creation.

Next steps for the CIO and CFO

In this chapter

- A strategic discussion between CIO, CFO, and CEO is needed to address the business's integrated information needs
- The foundation of an integrated approach is built on:
 - a. A culture of analysis
 - b. A realistic assessment of current data management maturity
 - c. Visible, decision useful, insight
 - d. Integrated thinking and reporting best practice
 - e. An integrated information architecture.

What are the practical next steps that CIOs can take to bring such an information architecture into place in their organizations? This chapter identifies the ground work that needs to be done, and some early wins that you can go after.

Questions to ask your CEO and CFO

Before taking any action, CIOs need to make sure that they understand how the business – as represented by the CEO or CFO – perceives integrated reporting and the value creation process, and the related information needs. They need to ask appropriate questions to understand the data required, the reliability of that data, analysis and reporting needs and capabilities. The ultimate goal is to ensure that the organization generates trusted information.

Appropriate questions could include the following:

1. Do we know the drivers of the value creation process for our company?
 - a. What are the material data points that we should be focusing on (internally and externally)?
 - b. What value gets destroyed while creating value somewhere else in the organization?
 - c. What outcomes are we tracking in the organization?
2. Are all material drivers for value creation (the multiple capitals and their attributes) included in our operational systems?
3. Do we have a common understanding of the value drivers and do we know the impact of these drivers on each other?
4. How up-to-date is the data you retrieve from your operational systems and other sources?
5. Are we able to properly evaluate our KPIs relative to value creation / destruction in our organization?
 - a. Do we apply big data analysis (correlation algorithms) to investigate multi-capital impacts?
 - b. Do we apply predictive solutions to create insight in future scenarios (e.g. customer behaviour or climate scenarios)?
6. Are we able to create (internal / external) stakeholder-focused reports and dashboards for evaluating our business results?

The CIO-CFO collaboration

How can the CIO work with the CFO to ensure the foundations are laid for the right kind of information architecture? There are four concrete actions CIOs and CFOs can take to ensure the foundations are laid for the right kind of information architecture to evolve along the company's integrated reporting journey.

Action One: Build on integrated thinking and reporting best practices

Integrated thinking is increasingly applied in the business environment. At the same time, different stakeholders are demanding a more inclusive approach to management. Continuous support to take up integrated reporting is therefore required.

Creating the information architecture to enable integrated thinking is a process that evolves over time. The first objective must be to find ways to enhance existing systems and refine existing business processes with minimal impact. At the same time, the company can use this process to identify information gaps, assess data maturity and build a roadmap to improve information management and analysis.

Companies that already have internal collaboration portals, executive dashboards, or processes in place to build a sustainability report can extend these capabilities first, whilst working on the cultural issues relating to information transparency in a multi-capital environment.

The role of the CIO:

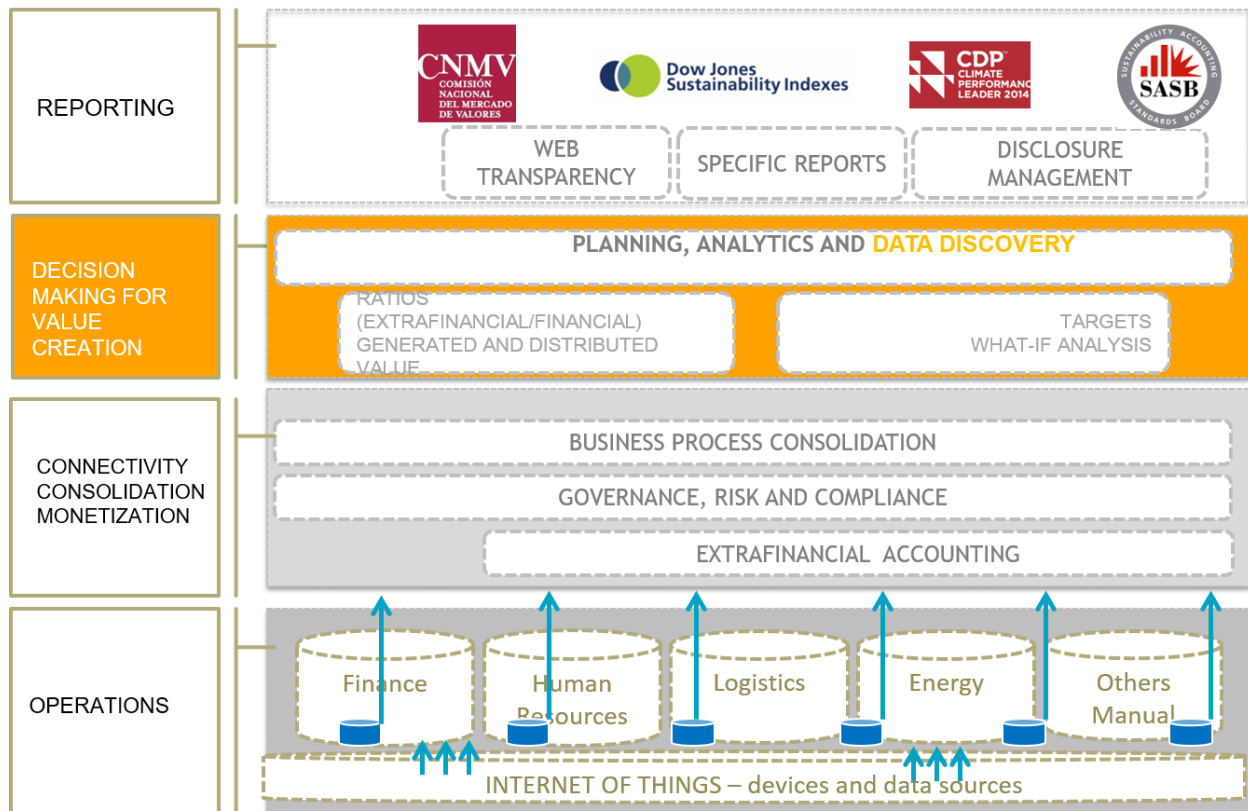
- Identify and embed best practices for bringing rigour to legacy systems and processes for collection, consolidation and disclosure of multi-capital information.
- Work with the CFO and key data owners to build a roadmap for improving data maturity, connectivity and decision-making that can help to optimize value creation.

Action Two: Aim for an integrated information architecture

By creating a single information architecture across the enterprise, CIOs have the opportunity to drive understanding of value creation and how to influence it in the organization: cutting through the silos so that the right people are connected to the information they need.

The diagram on page 21 shows how Indra, a Spanish technology company, has progressed on this journey to create such a system, which it refers to as the Indra <IR> Lab. By using a single information architecture to tie together processes relating to analysis, planning, operations and disclosure, the company has created a laboratory where information from multiple capitals can be analysed, set in context against the company's plans and strategies, and then reported against, internally and externally.

Indra provides an example of an information architecture to achieve integrated thinking



Source: Indra

Organizations must trust the data they use to understand the business and ensure that the risks of misleading stakeholders with reporting is minimised. This trust can be built in by assessing the maturity of data available for a KPI. The assessment needs to cover multiple dimensions, including the type of systems used to generate the information and the reliability of its conversion from raw data into a KPI metric. The illustration on the next page illustrates the way Indra visualises the maturity of its KPI definitions as well as the systems and processes used to collect, consolidate and report this information.

Companies can use this approach to identify areas for improvement, both in performance and in the systems used to collect data. This mapping can also inform decision-making on which KPIs to focus on based on the resources available, because it reveals the level of effort required to achieve a thorough understanding of each KPI. The illustration on page 23 shows how SAP does this.

Assessing the maturity of multi-capital data sources

#	KPI	Clear Definition	Quantifiable?	Required effort & data research
1	Ecological Indicators	Yes	Yes due to clear and operational definition	Low/moderate Core data available
2	Employee Retention	Yes	Yes due to clear definition	Low/moderate Review & adjustment (if applicable)
3	Business Health Culture (BHCI)	Yes	Yes due to clear and operational definition	Moderate Core data available
4	Employee Engagement (EE)	Yes	Yes due to clear and operational definition	Moderate Core data available
5	Women in Management	Yes	Yes due to clear definition	High due to complex cause-effect relation
6	Employer Ranking	No	Difficult because information about candidates' attitudes seems hardly quantifiable	Very high due to behavioral impacts which mainly effects candidates
7	Capability Building	No	Difficult due to clear and operational definition	High due to definition deficiency
8	Social Investment	No	External effects quantifiable (e.g. iooi methodology), internal effects hardly quantifiable	Very high due to external impacts

Timeline (vertical arrow on the left of the table)

Legend: =Focus =Out of scope in phase II

Source: Indra

The role of the CIO:

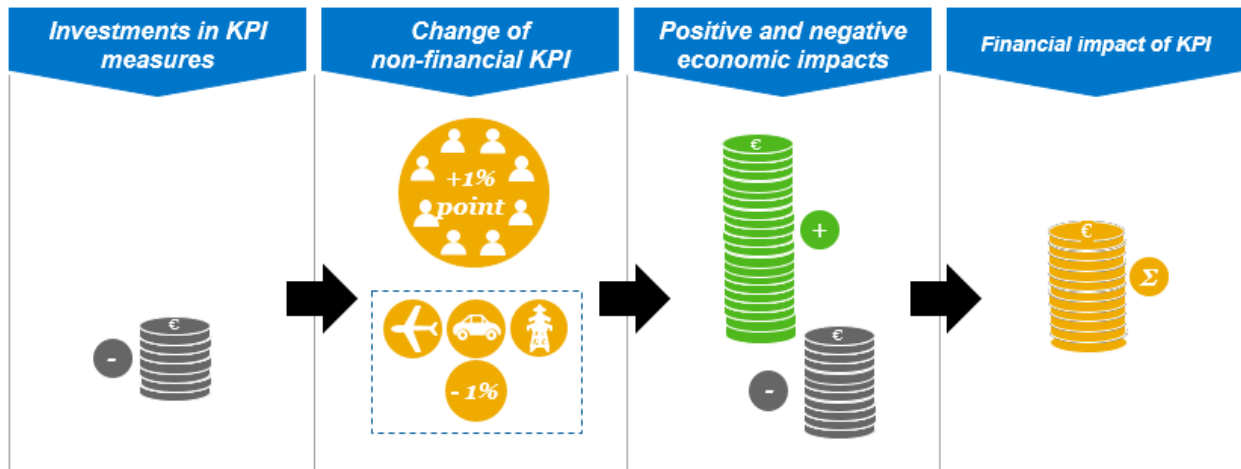
- Work with the CFO to enable a comprehensive assessment of data maturity, aligned as closely as possible with the standard the CFO expects for financial information
- Support internal stakeholders to balance the expected progress in the quality of reporting at each stage in the company’s journey with investment in the right level of internal resources, time and effort required to source material information.

Action Three: Promote a culture of analysis

It is unlikely that most companies can immediately determine the financial impact of indicators across all material capitals. Many start by developing a strong understanding of the correlation between indicators: identifying whether a change in a particular KPI has a positive or negative economic impact. These correlations are often logical. Employee retention has an impact on profit, for example, and so does customer satisfaction, while employee trust in management has an impact on employee retention.

The company can build on these correlations to identify opportunities to calculate the financial impacts of a broad set of performance indicators, starting with a selection of metrics that point to material drivers of value creation. This requires more advanced analysis of data to model the pathway of the impacts. Once a foundation for this type of analysis is created, levers can be identified that have an impact on changes to the indicators, ultimately affecting the bottom line. The chart on the next page shows how this process can work over time.

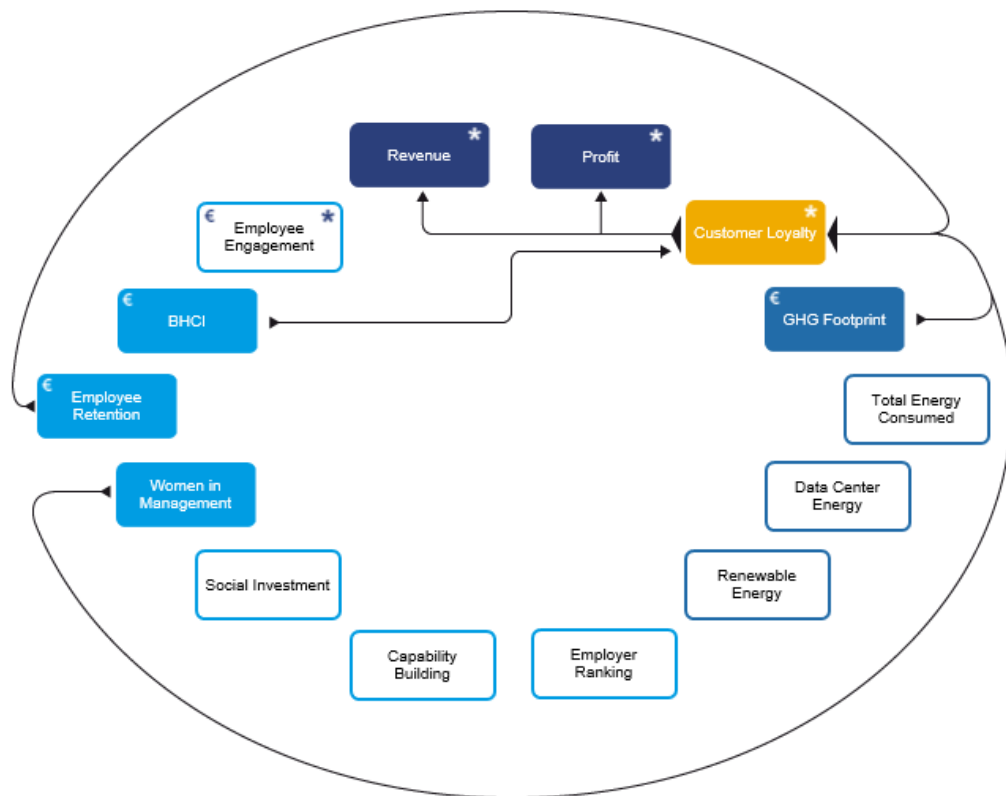
An example process to understand KPI interdependence from SAP



The chart above shows an impact analysis for the ‘customer loyalty’ KPI as used by SAP. The diagram illustrates the material issues that have an impact on this indicator, and those that are affected by the indicator. This analysis helps organizations understand their business more deeply. Various stakeholder groups, especially shareholders, are increasingly looking to companies to illustrate this level of understanding about what is affecting their ability to create value.

The interdependence between SAP’s corporate objectives

★ Our corporate objectives € Impact on operating profit ■ Economic indicators ■ Social indicators ■ Environmental indicators



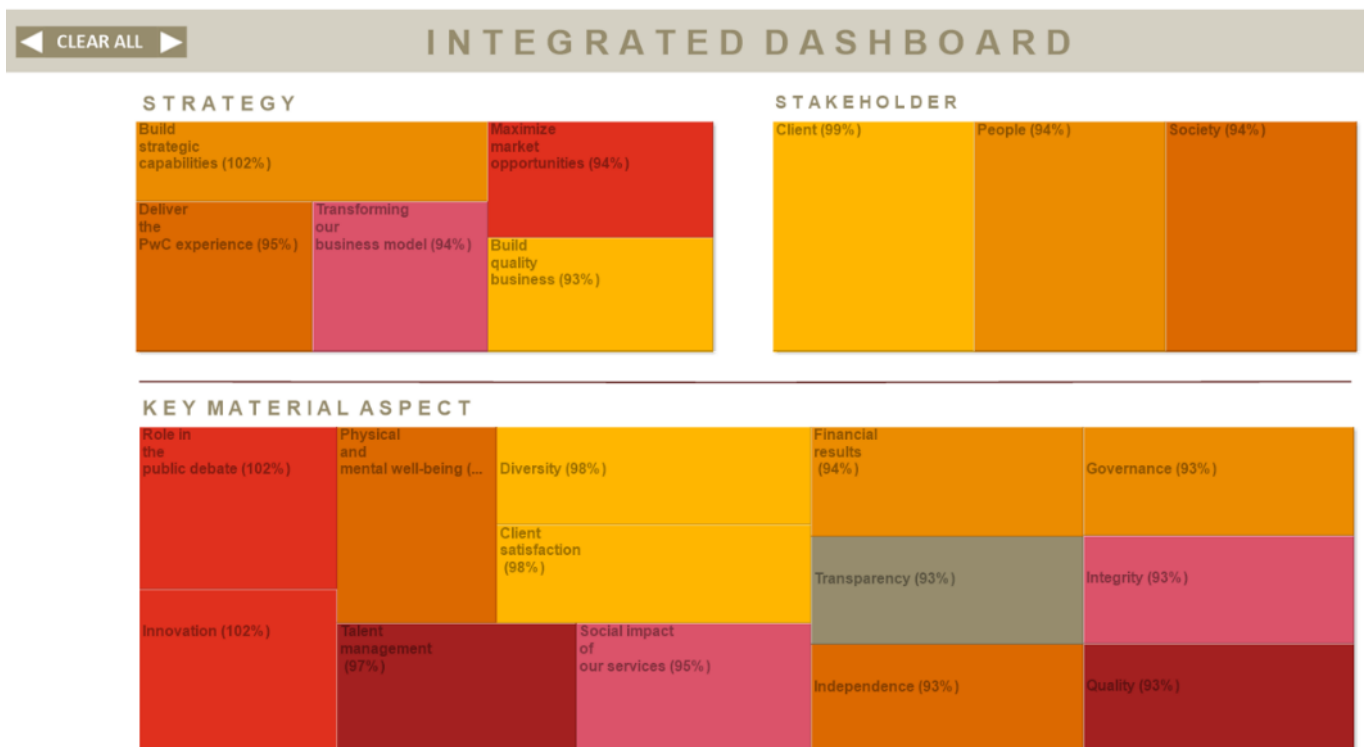
Source: SAP Integrated Report 2016

Action Four: Make integrated reporting insight visible and useful for decision-making

Many companies avoid providing any transparency on information that is not fully vetted or complete. However, transparency is a key tool for advancing integrated thinking and reporting. Making insight visible across the organization encourages employees and managers alike to understand the impacts of their decisions in a more integrated way.

Leading companies provide internal sustainability or integrated dashboards that are regularly updated and allow employees to explore information in more detail. The screenshot below illustrates PwC’s approach to develop an integrated dashboard for management – in this case, for the PwC Netherlands leadership team.

An example of an integrated dashboard from PwC



The role of the CIO:

- Make information more transparent across the organization by including a broader set of material information, and any associated impacts, on management and company-wide dashboards.
- Continue to highlight what needs more clarity where information and analysis is lacking, and promote the role of issue owners in finding it.

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- You will achieve recognition and visibility for being a leader in corporate reporting internationally – taking a leading role on the path towards sustainable development
- The IIRC will profile your company at IIRC events, on-line and in the media, where appropriate.

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