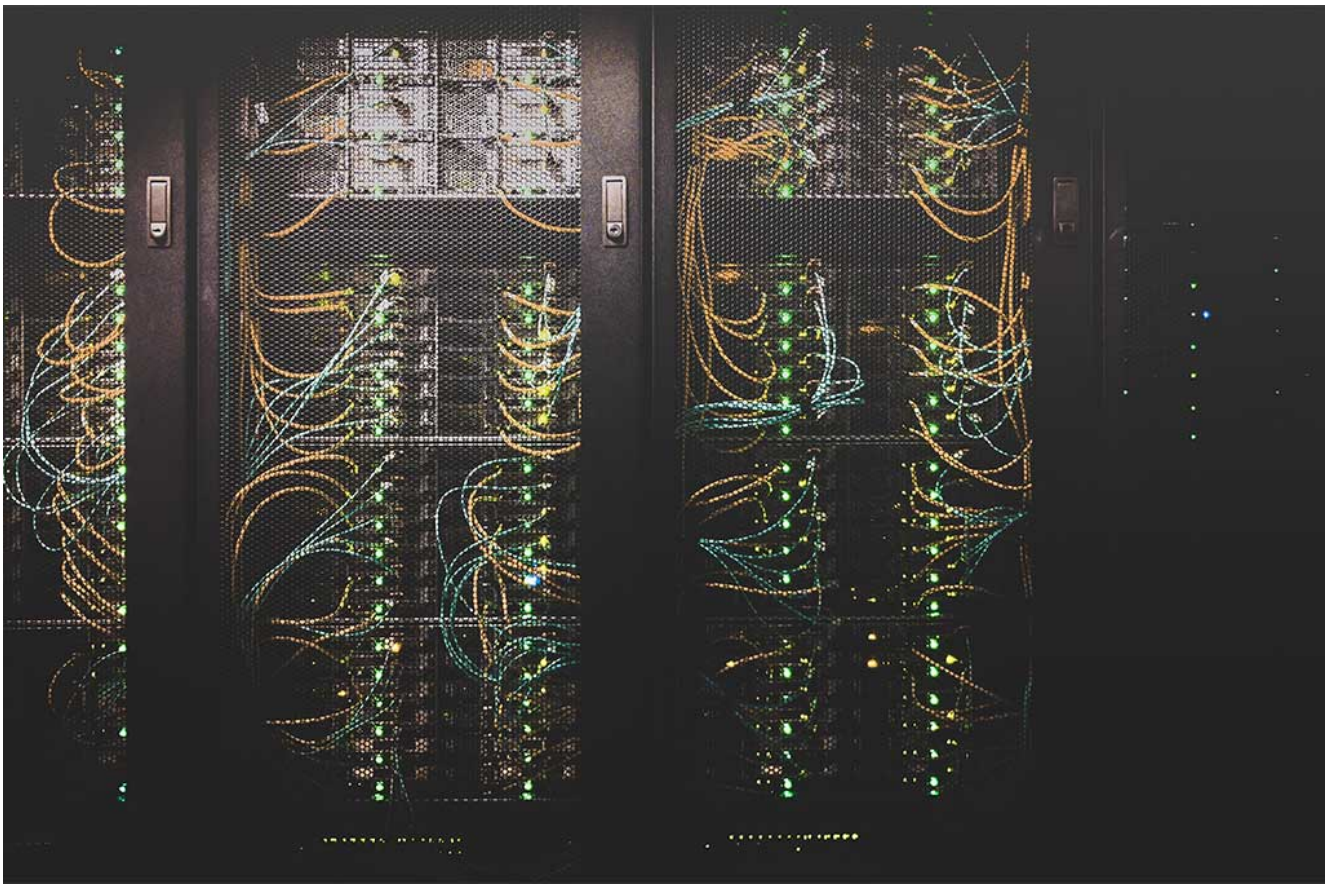
Six steps to corporate responsible computing



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Digital technology also harms the planet. We need a framework for responsible use.

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As the United Nations steps up warnings that the world is far off track for meeting climate goals in the coming decades, businesses are under increasing pressure to make their operations more sustainable. Clearly, digital technology will be a central part of delivering the green enterprise, and yet by one estimate, digital technology is expected to blaze through more than a fifth of energy used globally.

This is the new digital paradox: digital technology must be deployed in ever more innovative ways to tackle climate change, and yet the technology itself may cause environmental and broader societal and economic damage.

The good news is that to overcome this paradox, there is now a Responsible Computing Framework. This systemic framework integrates energy consumption and emissions with many other vital social and economic aspects to deliver a practical blueprint that firms can use to make their digital technology more green, ethical and sustainable.

The framework is, in part, the result of conversations IBM conducted with hundreds of chief technology officers (CTOs) across industries for its regular Architecture Decision Points report. These CTOs agreed that a fundamental re-architecting of digital infrastructure was needed to address environmental, social and governance (ESG) concerns, and that no one organization could fix this alone. The CTOs sought a collaborative model to foster industry-wide cooperation to address business sustainability, systems simplification, and broader business and ESG impacts. They agreed that, to achieve real and lasting change, a holistic approach is needed that encompasses every aspect of the computing ecosystem, from emissions and materials right through to ethical sourcing, data stewardship and social responsibility.

One of the main obstacles to reducing the impacts of digital technology is identifying them in the first place. Today's organizations operate in complex cloud environments with distributed architectures. These abstracted structures put computing out of sight and out of mind — and they hide costs, too. Let's say you're watching *Stranger Things* on your smartphone. All you pay is your telco's mobile data rate and your monthly subscription to Netflix. Maybe you suspect that all this computing power must have some sort of cost, someplace — but when even the experts can't agree how to calculate its total carbon impact, who could put a figure on it?

However, there's nothing abstract about the environmental impact behind your experience. The global power capacity of data centers has grown by 43% in the last three years, and the average server runs at a mere 12% to 18% of its full capacity while still drawing 30% to 60%

of maximum power. Indeed, according to the International Energy Agency, global data centers account for approximately 1% of worldwide electricity demand and 0.3% of all carbon emissions. And, recent research suggests that the transition to music streaming has done more harm to the environment than physical vinyl and CDs ever did.

Irresponsible computing can also occur as managers go it alone. The heads of business units no longer need to collaborate — they can just build technology solutions themselves. With less collaboration within firms, it's harder to reduce waste and manage computing in ethical ways. Do you reuse computers within your firm or outside it? Could you offer computing reuse as a service? Or even donate it to the community? The circular economy is on everyone's lips right now — but until we can answer questions like these, computing won't be a part of the conversation.

Irresponsible computing is also driven by the way businesses approach minimum viable products (MVPs). In the race for market share, digital technology practices have gotten sloppy and wasteful. On top of that, everyone has their own idea of what an MVP is. Sometimes it means a prototype, but other times it's more of a market trial. And when managers differ on such basic ideas, duplication and wasted effort will surely follow.

To top it all off, the issues around digital technology — the environment, inclusion, openness and bias — are so complex that business leaders are left scratching their heads. For example, how would you create a "green data center"? Use green energy, where green certificates compensate for fuel-based energy? Or use renewable energy? And how do you factor a "climate" or "responsible" component into a CPU cost per hour?

For business leaders, our Responsible Computing Framework highlights six key domains that they can use to enable their organization to become a responsible computing provider. We have also suggested some key KPIs that business leaders can start to utilize now to aid in deployment of the framework.

1. **Responsible Data Centers.** Developing and delivering computing requires the physical infrastructure of data centers. Some companies run data centers themselves and others outsource them. Regardless of the data center sourcing strategy, data centers should be designed and operated with an emphasis on sustainability. That means working to reduce energy consumption and switching to renewable energy sources. Given the high environmental cost, energy use around cooling systems should also be reviewed.
2. **Responsible Infrastructure.** Organization computing also comprises hardware

and networking. Again, measuring energy usage is important, as is monitoring the lifecycle of equipment and electronic waste. It's also key to optimize the use of infrastructure, consolidating workloads and taking other measures to ensure high levels of utilization.

3. **Responsible Code.** Beyond the data centers and the computing infrastructure, business leaders must also consider the impact of their software architecture, programming language and platforms that they deploy. Responsible computing requires ongoing evaluation of whether code in use is appropriate, how efficient it is, as well as the potential environmental, societal and economic impact of the code in use.
4. **Responsible Data Usage.** The quality, acquisition and management of data, as well as the subsequent usage, privacy and sharing, are also vital aspects to responsible computing. Business leaders need to ensure that their organization can guarantee that data, processes and people accessing it can be trusted. Strong policies are required to address the ethical, legal and social responsibility of processing data across its lifecycle.
5. **Responsible Systems.** Business leaders also need to ensure that their systems are inclusive and address possible bias and discrimination. Computing systems, broadly defined, should be ethical, privacy-preserving, secure and resilient, and this approach should form part of a culture across the entire organization.
6. **Responsible Impact.** Finally, business leaders also need to proactively consider how their computing and digital innovations can produce a positive impact on society. Companies should consider ways to put their computing to use to support sustainability and circularity, diversity and inclusion, and transparency and ethics.

Implementing the Responsible Computing Framework is a complex, long-term task, requiring that business leaders genuinely understand their full computing ecosystems. All stakeholders should be on board: employees and suppliers, partners and customers.

Everyone has a part to play, and everyone stands to gain.

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