



Digital Innovation: Opportunities, Risks, and Responsibilities

Strategic IT investments can bring all manner of business innovations to life. Digital transformation can lead to better patient outcomes, higher ecommerce sales, greater research discoveries and more.

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6 Ways to Improve Customer Experience & Address the Digital Divide

The digital divide refers to the gap between those who benefit from the Digital Age and those who don't.

By Mary Shacklett



To address the issue of social and economic equity and inequity, companies can create digital environments that better enable more people to access services and use digital technology. Public agencies have responsibilities to serve the entire population, and commercial enterprises want to gain customers and increase revenues, and greater numbers of people customers who are digitally adept at using their technology support these goals.

Unfortunately, not every user has equal access to technology resources — like broadband and computing devices. Many others don't understand how advanced IT works. And others have disabilities that make it impossible to use certain tools.

It's easy for companies to assume that everyone has broadband, and many people do. Unfortunately, the reality is that 19 million Americans, or 6% of the US population, still lack access to broadband service. In rural areas of the US, nearly one-fourth of the population, or 14.5 million people, lack access to broadband, based on figures from the Federal Communications Commission (FCC).

The CDC (Center for Disease Control) reports that over one fourth (26%) of Americans have a disability of some kind. This is a substantial population that companies potentially leave out of applications (and revenues) if they fail to meet disabled accessibility needs.

The divide — particularly that between those with and without broadband access — has only continued to widen throughout the COVID-19 pandemic. Broadband users have been able to work remotely, engage in remote, digital learning and classes, connect with friends and family on video calls, and visit their doctor via secure telemedicine calls — but those without broadband access have had far less access to these capabilities.

As long as these realities exist, there are risks for companies that totally digitalize and expect that their customers will simply follow suit. Here are ways businesses can design systems with both the opportunities and the risks in mind.

Include Human Factors Engineering and QA in the Application Development Process

As human factors specialist Martin Anderson describes it, Human Factors Engineering (HFE) is: “the application of human factors knowledge to the design and construction of equipment, products, work systems, management systems and tasks. The objective is to provide equipment and systems that reduce the potential for human error, increase system availability, lower lifecycle costs, improve safety and enhance overall system performance.”

The main purpose of HFE in application development is to make applications seamless and user-friendly for users

and customers.

Unfortunately, most corporate software development de-emphasizes HFE. Application development deadlines are tight. This forces developers and quality assurance personnel to focus on the goodness of the software itself. (e.g. Does the application support the functions that it is supposed to support? Does the application integrate and exchange information with the systems it is supposed to? Etc.)

In the process, many application–human interfaces are decided by software developers themselves. Developers do their best, but in designing these interfaces they are hindered by their own abilities: their advance knowledge of the application and how it should work;

their overall technology expertise; their sight, hearing, and other physical abilities. It is hard for them to empathize by stepping into the shoes of a user or a customer who does not have the same tools.

Especially for companies focusing on e-commerce and other types of Web engagement with customers, missing the human element of ease-of-use and navigation can be catastrophic. It can cost money and goodwill.

For example, if you’re using e-commerce to sell and a customer can’t easily find products, navigate a site, negotiate through the shopping cart and checkout process, or find content, provide feedback, or execute returns, you’re going to lose that customer.

How do companies prevent this?

One strategy is to include the customer (or user) experience (CX/UX) in the software development process by adding it to the checkout list for developers and quality assurance (QA).

Individuals with limited technology experience and/or with physical disabilities can be used for prototype test-

Developers do their best, but in designing these interfaces they are hindered by their own abilities.

ing, and also in the QA process. Getting direct feedback from a variety of users and customers during application prototyping and testing will aid both developers and QA in creating applications that are ergonomically and functionally sound for a wider audience.

Consider Using UX and CX Tools

It can be a challenge for IT to align its development and

quality functions to incorporate usability into application development, even if it wants to. This is because of IT's limited experience with human factors engineering.

The good news is that the market knows this. There is a wealth of UX and CX tools that can help IT to include usability development and testing in the applications it deploys.

These tools can be used in combination with standard user interface (UI) development and testing tools that check if data is flowing in and out of an application correctly, and if the application is performing as it should.

the help of UX tools and methods as well as standard UI development and testing methods, IT and business analysts can directly observe how users and customers interact with a new application in a variety of circumstances and make the necessary adjustments to improve usability.

The final stage of usability is CX. The goal of CX is to ensure that all of the different channels (e.g., chat, phone, in-person, etc.) through which a customer engages with a company are integrated, and that anyone throughout the company who is working with the customer has a 360-degree view of the customer and every transaction that has

return of your item. I'm standing in your shoes, I feel your pain, I know what you want to do, and I'm going to help you do it.

Evaluate Performance From the Customer's Viewpoint

Users and customers want applications to work seamlessly and fast. If an application is to meet these criteria, it must have rapid throughput, great response times and non-existent failure rates.

How achievable is this?

Performance metrics depend upon where your users and customers are located and the kind of bandwidth and technology that is available to them. These can be unknown factors that are difficult to know when you're only QA'ing an application for performance internally.

One way around this limitation is to QA an application under a variety of conditions that users and/or customers are likely to experience.

- If there are bandwidth limitations in some geographies, is it possible to deploy a slimmed-down version of an application that runs on a mobile device and requires fewer bells and whistles?
- If you're hosting your application in the cloud, does your cloud provider run data centers in all of the geographies you want to reach, and does it have ro-

Especially for companies focusing on e-commerce and other types of Web engagement with customers, missing the human element of ease-of-use and navigation can be catastrophic.

Additional UX tools complement UI testing by developing and testing for user satisfaction and usability. UX tools can test for questions like: Does the workflow of the application fit the environment in which the user or customer will be using it? Is the interface pleasing to look at and easy to navigate?

IT can begin by prototyping applications with diverse sets of users and customers, and with a diverse set of situations that users are likely to be operating within. With

transpired between the customer and the company.

Both the UX and CX levels of application design have a broad set of commercial software development and testing tools that can improve results with usability. In other words, if you call me to return an item, I can already see on my system that you worked with technical personnel and chat to attempt to work through your issue, and that you even stopped at a brick-and-mortar store. Without asking any more questions, I can process an immediate

bust failover between data centers?

- Finally, are you regularly surveying your users and customers? What do they think about performance?
- The key is stepping into the shoes of the end user or customer, because you can't always tell in the clinical conditions of an IT test lab how an application is really performing.

For example, an internet service provider may trouble-shoot poor response time and connectivity with a rural customer. The telecom's metrics show that Internet service is working well and that bandwidth is great,

Can Use

In 2019, 98% of U.S.-based web pages failed to meet Web Content Accessibility Guidelines (WCAG), according to research by AccessiBe, a maker of automated web accessibility products. It indicates that there is still much work to be done.

IT should include core assistive technologies and accessibility requirements included in its application specifications. Subsequently, IT should develop and test for compliance with WCAG guidelines and other relevant regulation. Some questions to ask:

- If a customer is sight-impaired, do you have a text-

functions is to use individuals with these actual conditions to perform testing and to render feedback.

Don't Presume User or Customer Readiness

Many companies presume customer readiness and literacy with digital technology because they believe that customers are already adept with digital technology.

This can be a misconception.

Users and customers still need to know how an application works and what it does. There is a tendency today to dispense with explanation and to just let individuals intuit how applications flow and work. This will work for users and customers who are highly digitally adept, but it won't work for everyone.

Instead, it's best to anticipate initial user/customer confusion and to prepare for it by having an effective helpline coupled with clearly presented online resources.

Provide Nimble and Responsive Support

A 2021 customer service survey, conducted by Nextiva, revealed that excellent customer service was the number one driver of consumer trust in a brand.

Seventy-two percent of customers said that when they contacted customer service, they expected the agent to "know who they are, what they have purchased, and

There is a wealth of UX (user experience) and CX (customer experience) tools that can help IT to include usability development and testing in the applications it deploys.

but the user isn't experiencing this. Finally, the telecom sends out a technician who discovers an electrical issue in a transformer not far from the customer. This wasn't showing up in network metrics. Something was happening in the "last mile" that the telecom's standard metrics couldn't detect.

Provide Technology Options That Everyone

to-speech audio reading function that he or she can use, or a way to size for large print?

- If a customer is physically impaired, are buttons and other aids on the application interface designed to compensate for limited hand or finger movements?
- If a customer is hearing-impaired, do you use captioning on videos?

The best way to test for these disabled accessibility



have insights into their previous engagements.” The survey concluded that companies excelling in the customer experience drive revenues 4% to 8% higher than those of their market competitors.

Whether a customer touch point is a call center, a website, social media, or a brick-and-mortar store, companies are doing a better job of making the connections between these various customer touch points — but are they addressing digital accessibility as an element of service?

Depending upon the demographics of the communities your company serves, you may need to localize customer service and technical support in different languages for non-English speaking populations. If you use automated technologies like natural language processing (NLP), these NLP engines must be carefully trained so they can effectively interact with users, and you may need the help of a specialist-consultant to do this.

Today’s phone trees, which route customer and users to different departments and options in your company based upon which button or audio response they give to an automated phone attendant, need be pruned. Phone trees should be no more than three levels deep.

Doing this work is a tall order for application developers and testers, because most of this functionality is not incorporated in today’s applications. Nevertheless, expanded accessibility pressures from the market and regulators are growing. It’s time for companies to look at what they

are already doing well in the area of accessibility, and to also identify their weaknesses. In this way, weaknesses can be planned for and addressed so digital accessibility can be expanded for disabled and disadvantaged segments of the population.

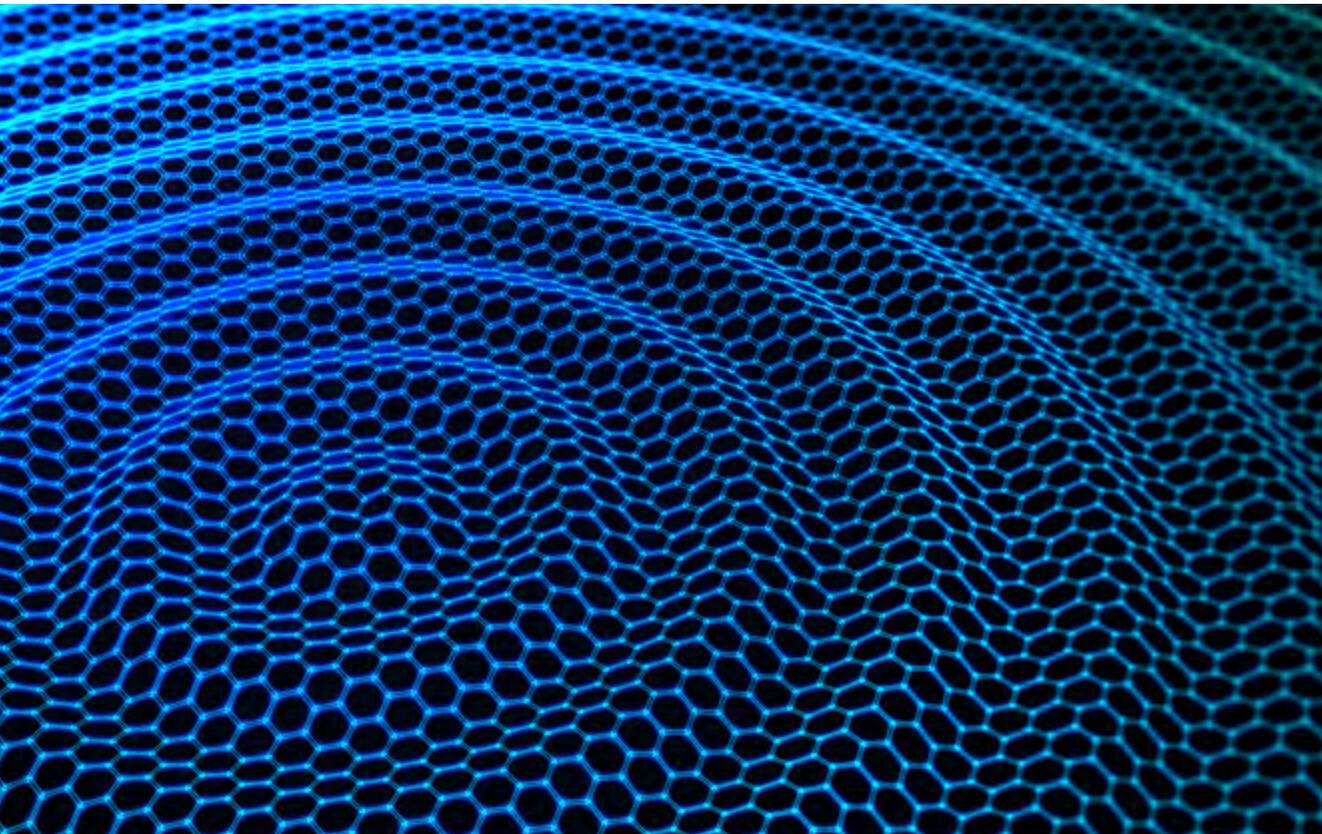
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Litigation vs Google May Cause Ripples in Data Collection

With Data Privacy Week underway, a new lawsuit adds another wrinkle to questions about data governance, ownership, and profit.

By Joao-Pierre S. Ruth, Senior Writer at Information Week



On Monday, at the start of Data Privacy Week, attorneys general from Washington, D.C., Indiana, Texas, and the state of Washington filed a lawsuit against Google that alleges deceptive tracking of users' location history. It stems from claims about how data settings actually function in relation to user privacy, the public's awareness of such data collection, and the way that data is allegedly applied in apps and recommendations. Google issued statements that it plans to defend itself, asserting such claims are inaccurate.

It is far from the first data privacy litigation to go to court, might not be the last, and bears watching. Other companies that gather and use data as part of their business models — for example, to frame recommendations to users — continue their dance with regulators and end users who increasingly question where control and ownership of such data should reside.

Ambiguity is the Enemy

A top concern emerging from such discussions is a desire for greater transparency, says Jeremy Barnett, chief commercial officer of web privacy management solution provider Lokker. "I think the attorneys general want to point out there's a lack of trust because there's a lack of transparency," says Barnett.

There is also a lack of clear vocabulary around data capture and usage, Barnett says. Regulators and lawmakers who evaluate privacy seem focused on the language, he says, because the terminology used may be confusing to the layperson.

“How those policies are written and what that language means has to become a lot more clear and companies have to step forward and own that,” he says. Companies have a responsibility, Barnett says, to communicate with more clarity to the customer regarding what information will be collected, how long it will be collected for, what the information will be used for, and what options customers have to opt-in or opt-out. “That is a fundamental issue with all of these lawsuits.”

The layers of development in the internet, mobile devices, and apps can make it difficult to see how many faces are behind the curtain. “There’s a lot of people that the end consumer is doing business with that they don’t really understand,” Barnett says.

Litany of Litigation

Legal challenges on how data is handled often come from varied state entities, which can lead to multiple lawsuits over the same issues. That has raised a call among some stakeholders for precedence and law to be established at the national level to clear up the confusing landscape. “We’ve seen three states in the last few years have

comprehensive privacy legislation and others have passed more targeted legislation,” says Daniel Castro, vice president for the Information Technology and Innovation Foundation (ITIF). “Others have proposed and are considering moving forward with similar efforts.”

ITIF is a think tank on public policy on science and technology; its backers include such entities as the National Philanthropic Trust, Energy Innovation Fund, as well as companies from the private sector such as IBM, Google, Microsoft, and Oracle.

Castro says given the way prior tech legislation has passed at the state level, more states might take this route and create a patchwork of laws that companies must navigate unless Congress passes federal law that preempts states. That can expose businesses that operate across stateliness to a multitude of laws, he says.

“When you look at the Google lawsuit that was filed this week,” Castro says, “what it comes down to is questions about how Google was communicating to its users about control of their privacy settings.” In various privacy laws, legislators express a desire for such communication to be conducted in specific ways, he says. The patchwork approach of different policies in different states can find companies subject to lawsuits if they deviate from those rules.

“That’s obviously risky for companies,” Castro says. “It’s going to make them think twice about how they’re





operating in this environment. I think it's questionable how effective that is for actually raising consumer privacy versus increasing regulatory complexity on companies." He sees a way forward through the establishment of clear rules for companies and rights for customers at the federal level.

Continued Friction

The contentions in the lawsuit brought against Google speak to the ongoing conversation about commercial gains and data ownership. "These types of lawsuits show that using data is a high-risk proposition for firms," Castro says. The issues raised in the Google lawsuit are different from instances of intent to deceive users, he says. In Google's case, Castro says the activity happened out in the open. "This isn't something like [Cambridge Analytica](#), where they're collecting massive amounts of data that nobody knew about."

Some policymakers and regulators continue to be at odds with companies in terms what they expect to be happening, Castro says. This can include an expectation from legislators that companies ensure all consumers must first opt-in to share data and that there is a choice to not share data but still gain access to services. "Those types of requirements are pretty far apart from where most companies are," he says.

While many companies are willing to work with

legislators on how they gain consent from users or how users express their preferences, Castro says those companies likely do not want to say users can opt out of sharing data and still get access to their services if that is their business model. "That's where there's definitely tension," he says.

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The Cost of AI Bias: Lower Revenue, Lost Customers

A new survey shows tech leadership's growing concern about AI bias, AI ethics, as negative events impact revenue, customer losses, and more.

By Jessica Davis, Senior Editor at Information Week



Organizational technology leaders have grown more concerned about AI bias over the last two years, according to a new survey from analytics company DataRobot. It's not just about damage to a brand's reputation, either. Of those who have experienced negative impacts of AI bias, the largest percentage, 62%, lost revenue as a consequence. Another 61% lost customers.

No wonder technology leaders are growing more concerned.

A full 54% of technology leaders surveyed said they are very or extremely concerned about AI bias, compared to 42% who expressed this level of concern in 2019. The 2021 online survey of 350 US and UK-based CIOs and other IT leaders was conducted in June 2021. A similar online survey was conducted in June 2019.

The results indicate that more organizations are looking more closely at their algorithms, the data sets that go into training them, and the explainability of AI results — just how did the algorithm arrive at that conclusion?

Indeed, in September 2021, Gartner identified responsible AI — including transparency, fairness, and auditability of AI technologies — as one of four trends driving near-term AI innovation. Forrester Research analyst Brandon Purcell told InformationWeek that the market for responsible AI solutions would double in 2022, giving organizations more help with technology to help them ensure their AI meets ethical requirements, is explainable, fair and privacy-compliant.

“It's become a priority in any highly regarded industry,” Purcell says. There are any number of companies working on solutions, too, from tech giants to startups.

Top Concerns

When it comes to AI bias, just what are CIOs and other IT leaders worried about in particular? The top concern was loss of customer trust at 56%, followed by compromised brand reputation or social media backlash at 50%. Increased regulatory scrutiny was next at 43%, followed by loss of employee trust at 42%, mismatch with personal

ethics at 37%, lawsuits at 25%, and eroding shareholder value at 22%.

These concerns are not merely about some hazy future consequences to AI bias. Organizations also cited real consequences realized from AI bias, too. A full 36% said their organization had suffered a negative impact due to an incident of AI bias in one or several of their algorithms. Of those:

- 62% reported lost revenue;
- 61% lost customers;
- 43% lost employees;
- 35% incurred legal fees due to lawsuits or legal action, and;
- 6% experienced damage to brand reputation or a media backlash.

The ramifications are due in part to discrimination caused by biased AI. Respondents said their organization's algorithms have inadvertently contributed to discrimination based on gender (32%), age (32%), race (29%), sexual orientation (19%), and religion (19%).

However, many of those surveyed are already working to mitigate AI bias. More than two-thirds (69%) say their organizations do data quality checks to avoid AI bias. Another 51% are training staff about how to identify and prevent AI bias. Still another 51% have hired an AI bias or ethics expert. And a full 50% said they were measuring AI decision-making factors.

Others were deploying tools to help. For instance, 47% said they were monitoring when the data changes over time, 45% said they were deploying algorithms that detect and mitigate hidden biases in training data, and 35% said they were introducing explainable AI tools.

Only 1% of respondents said they were taking no steps at all to prevent AI bias.

Who Is Responsible?

CIOs have become less involved in the AI bias initiatives over the last two years. In 2019, 49% of CIOs were involved in AI bias prevention, but the number dropped to 28% in 2021. The job title most frequently cited as involved in AI bias prevention initiatives was data scientists at 48%. Others included a third-party AI bias expert/consultant (47%), an AI ethicist (35%), a C-suite executive (32%), a customer experience team (30%), business subject matter experts (28%), and regulators and marketers, tied at 24% each.

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Outage and Recovery: What Comes Next After AWS Disruption

Though many services were eventually restored, questions remain about the risks of concentrated reliance on cloud providers.

By Joao-Pierre S. Ruth, Senior Writer at Information Week



On Tuesday (Dec. 9), which should have been AWS Innovation Day at re:Invent 2021, Amazon Web Services instead was contending with yet another region outage that affected vast segments of the internet. Analysts with Forrester and Gartner say while the issue was significant it was not a reason, nor realistic, to backslide on cloud migration.

According to updates from AWS, the cause of the outage was resolved for the most part after some seven hours. Recovery of services continued after that. Beyond questions about how it happened, concerns turn to what systemic breakdowns in the cloud of this scale mean in a world dominated by a small group of hyperscalers.

AWS indicated the latest outage stemmed from “an impairment of several network devices” that affected the company’s Northern Virginia, US-East-1 Region. The outage struck EC2, DynamoDB, Athena, and Chime as well as other AWS APIs and services. This caused issues and downtime for third parties such as Disney Plus and Netflix. It also affected Amazon’s own resources such as its package delivery management software and the Alexa virtual assistant.

If this seems a bit like déjà vu, it should. About one year ago, in late November 2020, the US-East-1 Region of AWS saw an outage that the company attributed to issues as more capacity was added to its front-end servers for its Kinesis data stream.

While the frequency of such cloud outages has not necessarily increased, the overall impact increases, says Sid Nag, vice president of cloud services and technologies research for Gartner. “This was one of the largest since AWS started conducting business.”

Mission-Critical Apps More Susceptible

Back when organizations mostly ran non-mission critical applications on the cloud, outages could be taken in stride more readily. The migration to the cloud has meant more mission-critical apps are susceptible to such disruptions, Nag says. “The cloud is a multitenant model,” he says. “Many different organizations were affected, not just IT services.” For example, the latest outage also cut off customers of Amazon Prime Video and Ring home monitoring service. “We’re seeing a bigger impact because of reliance on the cloud,” Nag says.

Consolidation of the cloud landscape has put the responsibility of maintaining this resource on the shoulders of a shrinking set of providers. That concentration may be a point of concern. “When they get impacted it’s almost like ‘too big to fail,’” Nag says. “That kind of thing worries me.”

In addition to wanting to see greater architecture resiliency across data centers, he says it may be time for major cloud providers to work hand in hand when outages occur and cover each other’s traffic during widespread

outages. “They’re not doing that today,” Nag says.

There are competitive business reasons that keep that from happening, he says, but there may come a time when providers either do it on their own or under some form of regulation. “These cloud providers have gotten so big; they just can’t go down and have the whole world around them crash for 24 to 48 hours,” he says. “Not acceptable.”

If the major cloud providers do not adopt such a strategy, Nag says there could be a way for those providers to create ecosystems of smaller cloud providers as their backups. There also may be a way to use edge computing solutions to run distributed cloud as another alternative, he says.

Hyperscalers Have Different Risk Profile

Brent Ellis, senior analyst with Forrester, says hyperscalers have a different risk profile than other data centers and with that brings complications to their environments, which can cascade. “You can have a localized problem spread very quickly,” he says.

Outages are not just a problem for AWS. Other hyperscalers, Microsoft Azure and Google Cloud, have seen their share of outages and issues that were dealt with, Ellis says. In some instances, an outage may occur because of a mistyped command. Human error should not be an issue though, he says, if greater automation is prop-

erly deployed. He still sees significant value in adopting cloud, but organizations should also think about how they might mitigate against risks. Attempting to revert to on-prem data centers may be harder than expected. “Once you’ve started a wholesale migration, it’s hard to replicate that infrastructure,” Ellis says.

As systems and cloud infrastructure become more interconnected, he says outages may mean organizations will just have to wait for the matter to be resolved. “Not a whole lot you can do,” Ellis says. “There is a reason why everything is measured in nines.”

The consolidation of cloud resources consolidates the risk, he says, which can be of great concern in a country where a large amount of the economy is dependent on hyperscalers. “When one of those very large data centers goes down, it affects 10s of thousands of companies, if not more, at the same time,” Ellis says.

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Cryptocurrency's Climate Impact: What's Really Being Done About It?

Cryptominers hungry for hashrate are generating enough emissions to single-handedly increase global warming. Is 'clean crypto' clean enough?

By Samuel Greengard, Contributing Reporter at Information Week



While evangelists and critics argue whether cryptocurrency represents the future of money or is nothing more than a giant Ponzi scheme and haven for ransomware gangs, drug dealers and terrorists, a basic fact is often overlooked: Cryptomining devours enormous amounts of energy.

According to Digiconomist, a site that tracks Bitcoin and other cryptocurrencies, just over 0.5% of world energy goes to mining these digital coins. And well on its way to equaling the total energy consumed by data centers globally.

The Cambridge Centre for Alternative Finance (CCAF) in the UK reports that current cryptomining operations consume about 118.79 TWh a year — higher than many countries around the world, including the likes of Argentina, The Netherlands, Finland, and New Zealand.

Yet the problem isn't only that cryptocurrency consumes so much power — it's the type of power that

it consumes. Around the world, previously shuttered coal and fossil fuel-powered facilities are suddenly reopening to accommodate these mining operations.

"The carbon footprint that cryptomining generates is enormous and continuing to grow," says Camilio Mora, a data analytics professor at the University of Hawaii. "It represents a significant environmental problem."

Power Shift

Cryptocurrency mining operations operate on a straightforward principle. Regardless of the type of crypto coin — Bitcoin, Ethereum or Dogecoin, for example — a miner uses a computer to solve highly complex mathematical puzzles. When a miner cracks the code on the blockchain, a digital coin is minted. As of early November, 1 Bitcoin was worth about \$61,300.

Mining systems rely on specialized processors — these typically consist of Application Specific Integrated Circuits

(ASICs), GPUs or cloud mining frameworks — to power through the blockchain puzzles. “These aren’t typical desktop computers. They are specialized machines that consume a huge amount of electricity,” says Chris Bronk, an assistant professor at the University of Houston.

Adding to the energy consumption problem is the fact that participants compete within a winner-take-all model. Greater processing power translates into higher odds of being first to grab the limited number of coins available. CCAF says that unlocking a single bitcoin requires about 150,000 kWh of electricity. The energy is equivalent to powering about 170 homes in the US over a one-month span.

Today, cryptomining companies operate enormous banks of these specialized computers. Mora and a group of researchers at the University of Hawaii found that at the current rate, Bitcoin emissions alone could push global warming above 2°C. “It is playing a substantial role in accelerating climate change,” he warns.

Mining the Business

Some, like Alex de Vries, founder of Digiconomist, argue that cryptomining is actually negating years of progress in reducing greenhouse emissions. There’s substantial evidence to support the notion. A group from the University of California, Berkeley, reported that cryptomining primarily relies on fossil fuels, with 48% of the energy de-

rived from coal.

In fact, coal and gas-powered energy generation plants are re-opening around the world. For example, in Seneca, N.Y., a private investment firm converted a previously shuttered coal facility to natural gas in 2017. It stated that its intent was to power the grid — though the region had no electricity shortage. Today, it operates thousands of supercomputer bitcoin mining operations at the facility.

The company, Greenidge Generation, generated electricity for 19 megawatts of mining capacity in March 2021. However, capacity is expected to quadruple by the end of 2022. In addition, the firm is drawing water from Seneca Lake for datacenter cooling but returning it at a warmer temperature. Nevertheless, the company states that the project doesn’t harm the environment and that it is 100% carbon neutral.

Another issue — and one that’s often overlooked — is embedded carbon in computers used for cryptomining. Manufacturing and transporting these devices requires large volumes of energy. In addition, their carbon footprint extends back to the mining and processing of rare earth materials but also to the e-waste they generate. Some estimates run as high as 135 grams per cryptomining transaction, roughly equivalent to an iPhone.

It should come as no surprise, then, that there’s a growing backlash against cryptomining — even as Wall Street





and investment firms join the cryptocurrency party. “One of the problems,” Bronk says, “is that it’s not clear that bitcoin mining is contributing anything significant to society. It’s consuming enormous amounts of energy and making a few people wealthy, but not creating meaningful jobs or societal gains.”

Alternating Currents

The cryptomining picture continues to shift. In September 2021 China banned cryptocurrencies as well as all mining operations. China had been the top miner of digital coins — with an array of companies operating in the space. The Chinese government cited a lack of transparency and anonymity in cryptocurrencies as primary reasons for the ban.

Immediately, many of the miners began moving operations out of China, and now the US has emerged as the world’s top cryptomining country. But Mora says that operations are also flourishing in developing nations with few environmental controls and near-zero regulation.

While cryptomining can conceivably be located anywhere — including adjacent to sustainable energy sources such as a wind farm or hydroelectric facility — this isn’t typically the case. “There is a clear pattern of cryptomining pairing with coal,” he states.

Meanwhile, the cryptomining industry says it is taking major steps to reduce the footprint of cryptocurrencies

and introduce green mining methods. This includes computers and systems that easily connect with wind, solar, hydroelectric and other renewable energy components — and use advanced battery technology.

New energy models are also emerging. For example, in Texas, a demand-response model allows cryptominers to pull electricity under normal conditions but shut down mining computers and receive rebates during peak demand periods. This, proponents say, makes it possible to use less electricity and generate a bitcoin for about \$2,000 per coin, versus a typical figure of \$11,000.

Some cryptocurrencies, open-source blockchain Ethereum is an example, are also building mining frameworks that require lower levels of energy to mint coins. In fact, Ethereum now bills itself as a greener alternative.

Yet the energy consumption problem and socio-political overtones aren’t likely to disappear anytime soon. Concludes Mora: “The social costs of cryptocurrency and cryptomining are something that we need to pay a lot more attention to. It isn’t clear whether cryptominers will find ways to make their operations truly environmentally friendly.”

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Technology Transformation Happens Faster Than You Think

How do IT organizations manage the daily needs of the business, while also investing to meet their customers' evolving needs? Eric Varness explains.

By Eric Varness, Chief Marketing Officer, Micro Focus



The speed at which technology transforms is amazing — and at the same time overwhelming. Some of us can remember (a little too easily, perhaps) a time before personal computers and before the internet. We can even remember before smartphones let us order dinner from our recliner, and smart speakers could answer (almost) any question we could think of the moment we think of it. Most of us have not only assimilated all that technology into our lives, but we also can't imagine living without it. Equally, we wait with excitement to see what might be next. In a day where entrepreneurs can build their own rocket ships and head to space, why wouldn't we be next? But does everyone feel this way?

The scary part of technology transformation

The point of view of the CIO can be quite different when it comes to enterprise technology. Digital transformation represents a fundamental program of technology change to underpin significant business change. IDC predicts that global spending on solutions in the digital transformation space will continue at a compound annual growth rate of 15.5%, reaching a projected \$6.8 trillion by 2023. That's a lot of investment in change

in a short amount of time.

But along with these changes can come significant risk, creating a serious dilemma for CIOs. How do they manage the day-to-day needs of the business, while still investing in the innovation that meets the demand for the new experiences customers want? You can't stop what you're doing today to focus on tomorrow. CIOs must learn to walk the tightrope that lets them run their business today while transforming IT to meet future demands. There's only one way forward, so you have to do both — at the same time.

Embracing IT technology, now and in the future

At Micro Focus, we have a broad portfolio of enterprise software, support, and professional services to help CIOs with the strategies they use to achieve success, both today and tomorrow. These include:

- **Accelerate Application Delivery:** Employ Agile and DevOps practices, supported by value stream management capabilities, to sustain delivery velocity requirements as operations run. At the same time, create digital value — from strategy through release — as you transform using AI and machine learning to deliver high-quality applications at scale.
- **Modernize Core Applications:** Build on the IT investments your organization relies on, continuously delivering value as you run your business in an

evolving environment. Transform by integrating innovation across your entire IT portfolio — from mainframe, to distributed, to cloud.

- **Simplify IT Transformation:** Simplify the complexity of running a mix of traditional and cloud services by taking a Digital Factory approach. With a unified platform for IT operations, you can integrate or replace incompatible tools collected over decades — freeing up resources and accelerating transformation.
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- **Analyze Data in Time to Act:** Unify your analytics without moving your data to one place so you can run your analytics practice more efficiently. As you transform your organization to grow, ensure that you can support more users and greater data volumes with the highest performance at scale for accurate and actionable predictive insights.

With more than 45 years of enterprise software experience and tens of thousands of customers worldwide, we can be that single vendor on whom you can count. Micro Focus can help you solve your digital dilemma and gain a competitive advantage for whatever tomorrow brings.

About Micro Focus: *Micro Focus is one of the world's largest enterprise software providers. We deliver mission-critical technology and supporting services that help thousands of customers worldwide manage core IT elements of their business so they can run and transform — at the same time.*

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