Contributors

CHRIS BEDI
Chris is the chief digital information officer of ServiceNow. He guest edited the winter issue of Workflow Quarterly.

NICOLAS CHAPADOS
Nicolas is the vice president of Research at ServiceNow. He co-founded Element AI, which was acquired by ServiceNow in 2021.

EVAAN RAMZIPOOR
Evan is a staff writer on the ServiceNow thought leadership team. Their work has appeared in McSweeney’s, Salon, and other publications.

STUART LUMAN
Stuart is the deputy editor of Workflow Quarterly. For 20 years, he has edited and written for science and tech publications.

TIM CATTS
Tim is the managing editor of Workflow Quarterly. Previously, he was a writer and editor for Business Insider, Bloomberg News, and many other publications.

PETER BURROWS
Peter is a longtime tech journalist who has written for Bloomberg Businessweek, Bloomberg News, MIT Tech Review, and other publications.

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In today’s world, companies need tech that boosts efficiency and productivity

LETTER FROM THE GUEST EDITOR

CHRIS BEDI

It’s hard to deny that our world is in the midst of profound change. An ongoing global pandemic, extreme weather, economic and market challenges, political instability here and abroad…and who can say what’s next?

As ServiceNow’s chief digital information officer, I ask myself every day how companies can use digital technology to navigate the challenges they face to better serve their customers.

That’s why I’m beyond pleased to announce the winter issue of Workflow Quarterly. It’s filled with insights designed to help business leaders meet the global challenges of today and the opportunities of tomorrow.

We paired up with our longtime research partner, ThoughtLab, to survey 1,000 global C-level executives on their biggest macro challenges and what they think the future holds for their organizations.

One key finding: Companies that have seen the benefits of digital transformation aren’t backing off these investments. Instead, they are focused on increasing the efficiency and productivity of their operations to help them thrive in tough times. The executives we surveyed said areas such as customer experience, employee experience, and cybersecurity will receive even more focus in the near term because they’re critical to navigating a fraught macro environment.

When asked to identify their top strategic priorities in coming years, organizations were more likely to name accelerating digital transformation and maximizing profit than any other goals. These same companies are bullish on the future, taking stock and investing now and predicting clearer skies ahead.

Additional results from the survey appear on the next two pages and are highlighted throughout the magazine.

In this issue of Workflow Quarterly, we bring you a collection of thought-provoking articles that explore these themes in even greater depth. On page 16, Evan Ramzipoor takes a deep dive into cybersecurity to see how the pandemic and other worldwide events have changed the nature of risk. On page 22, Peter Burrows reports on the deflationary potential of digital tech. And on page 10, VP of Research Nicolas Chapados explores ChatGPT and future applications of generative AI in the enterprise.

That’s just a taste of what’s in our pages this quarter.

As always, we thank you for reading.
According to a new global study of C-level leaders from ServiceNow and ThoughtLab, 70% of executives worldwide are optimistic about the future but concerned about the near-term impact of inflation, cyberattacks, and rising energy costs.

To stay ahead of competitors and be ready when the economy improves, more than 70% of companies are planning to increase digital innovation investments in the next year—in fact, 40% say it is a top strategic priority. Almost as many plan to invest in customer experience-related tech.

Leaders generally plan to focus their investments on cloud, Internet of Things, cybersecurity, and advanced data management, although priorities vary by industry. Digital leaders also plan to invest in emerging technologies, including RegTech, blockchain, digital twins, and augmented reality.

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Betting the future on CX
Great customer experiences can be a bulwark against economic uncertainty

BY STUART LUMAN

In every industry, companies are betting that investments in customer experience (CX) will pay dividends in tumultuous economic times, according to research by ThoughtLab and ServiceNow.

“Brands realize that experience is what attracts customers and keeps them coming back,” says Vishy Gopalakrishnan, chief transformation officer for digital technology at ServiceNow. “The challenge of experience is how do you knit together all of this complicated stuff behind the scenes and make it effortlessly simple for the customer.”

The answer is to give companies the tools they need to create seamless experiences for their customers across channels and touch points—and to differentiate their businesses and win new customers during a tough economy. Seven in 10 executives in our survey reported that their companies were planning significant or moderate investments in CX in 2023. Slightly more of them reported plans to spend on digital innovation over that same period as well.

“Companies are boosting investments in customer experience to bolster loyalty and retention, which continue to be hit hard due to the market downturn,” says Lou Celi, founder and CEO of ThoughtLab. “They are also spending more on digital innovation to drive cost-efficiency, productivity, resilience, and growth in other areas of their businesses.”

Sliced by industry, nearly 40% of telecoms have plans to invest heavily in CX this year, hoping to win over new customers or keep old ones in an industry known for its high customer churn rate. At the same time, almost a third of manufacturers and the public sector plan heavy CX investment.

Financial services and healthcare follow with 30% and 27%, respectively.

When it comes to plans for significant digital innovation investment in 2023, 40% of manufacturers say they plan to do so, versus 34% of healthcare firms, 31% of public sector and telecoms, and less than a quarter of financial services companies.

Surprisingly, companies that rank as digital leaders in the survey plan to invest less in digital transformation than those that are rated less digitally mature. Celi’s theory: Leaders are focused on using their advanced digital infrastructure to drive business performance, leaving laggards to play catch-up.

“It’s the hard way to tackle this, but it will probably save you more in the long run,” Davenport says.

Expertise on demand

The global economy may be in a rocky patch, but the race for talent is as competitive as ever. With the job market frothy and the business outlook uncertain, many organizations are looking for creative alternatives when it comes to filling key roles.

Mark Campbell, chief innovation officer at EVOTEK Labs, recommends “expert-as-a-service”—that is, plugging outsiders with the right skills into the right roles, on demand and with continuity, like subscription software. “I don’t have to go through recruiting and a bidding war, and I can get .3 of a headcount, and if that chief information security officer takes another job with another company, since it’s a service, I’ll get another person,” says Campbell.

Blockchain + ESG

Organizations face pressure from every direction to be transparent in their efforts to combat climate change and achieve other environmental, social, and governance (ESG) goals. Shuchi Rana, global head of whitespace intelligence at ServiceNow, sees a role for blockchain in meeting these expectations. “People are ready to make investments in climate efforts, but you need to account for them just as you would your finances,” she says. Logging this data in the blockchain creates a permanent, unchangeable record for all stakeholders.

Done right, these digital twins can show how changes in demand in key markets or fluctuations in the supply of a critical raw material could reverberate across the entire enterprise, according to Tom Davenport, president’s distinguished professor of information technology and management at Babson College. Building a digital twin requires close collaboration between data scientists, technologists, and operations leaders.

“Advances in digital technology have given them powerful tools to overcome these obstacles. All they need is a bit of creativity.”

The ability to spot opportunities when everyone else sees only challenges offers a competitive edge in any economy.

We asked three leading business experts to identify smart moves that can help organizations navigate today’s uncertain operating environment.

Here’s what they had to say. Read on.

Digital twins for everything

Advances in AI and the Internet of Things make it possible to create digital replicas of entire businesses, enabling scenario planning at previously unimaginable levels of sophistication.
Automation to the rescue

Hackers are leveraging new ways of working to wreak havoc on organizations. Here’s how we can fight back.

BY EVAN RAMZIPOOR

The COVID-19 pandemic is an object lesson in how cyber criminals thrive in times of uncertainty and disruption. Organizations worldwide were besieged by cyberattacks focused on the adaptations they had put in place to weather the pandemic. Bottom line: Too many organizations accelerated their digital transformation without fully updating their cybersecurity posture.

By now, most organizations have figured out how to manage the pandemic’s disruptions. That hasn’t significantly slowed the pace of cyberattacks, however. Breaches and other incidents climbed 38% in 2022, following a 50% surge the year prior, according to Check Point Research. Inflation, the war in Ukraine, and all the other challenges that have made “polycrisis” this year’s buzzword mean it’s far too soon to stop worrying about cyber risk.

Alarmingly, cyberattacks like ransomware are becoming “modularized,” making them more accessible to a wider range of attackers, according to Tom Winston, director of intelligence content at Dragos, a cybersecurity firm that focuses on industrial equipment and processes. For example, assailants are increasingly turning toward “ransomware-as-a-service,” which allows bad actors to lease ransomware tools for a price. As a result, attacks that once required a sophisticated understanding of computer and networking technologies are now available to unskilled criminals.

This phenomenon is part of a larger trend where a single attack can reverberate across entire networks and systems. In the case of major breaches like SolarWinds and Colonial Pipeline, security vulnerabilities impacted the target organization as well as its partners, customers, and vendors.

These distributed impacts make it more difficult for organizations to resolve threats. “The threats go so deep,” says Karl Klaessig, a director of product marketing for security operations at ServiceNow. “They touch every area of the enterprise and its partners. That means resolving them is everyone’s job.”

Big targets

The pace of digital transformation accelerated during the pandemic and shows little sign of slowing down. Yet companies have been slower to upgrade their cybersecurity. “We’ve made the attack surface monstrous,” Klaessig says, referring to the digital environment that is susceptible to attack from an unauthorized user. Corporate security teams aim to make their organization’s attack surface as small as possible. Yet attack surfaces grow whenever an organization adds technologies and software with vulnerabilities.

"Some companies have no idea what their attack surface looks like," warns Winston.

Organizations often layer new on top of outdated technology. This is especially true in manufacturing, where it’s often impossible to swap out old technologies without disrupting production.

Another problem companies face is shadow IT, in which employees run unauthorized software on company devices without approval. Each new piece of software increases the attack surface in ways that are often poorly understood and inconsistently monitored.

Defensible, visible, and secure

Most security teams are constantly playing catch-up and cleaning up after the latest breach, says Klaessig. This reactive posture significantly hampers their agility. With attacks happening everywhere, all the time, it’s almost impossible to remediate them before they impact the business.

Instead, organizations need automation to help them triage incoming threats. This can cut the time needed to detect an incoming threat by a third, according to an IBM report on the subject.

In the 2022 edition of its annual cybersecurity recommendations, Dragos urges organizations to use automation to make their infrastructure more defensible, visible, and secure. The report also advises companies to identify their vulnerabilities and have a plan to manage potential fallout.

"Organizations need to look at risk scenarios that cover their entire domain and make sure they can see everything on their network," Winston says. "This is a far bigger issue than people realize."
Are you ready for generative AI?

Buckle up: ChatGPT and similar chatbots will change business irrevocably

BY NICOLAS CHAPADOS
Late last November, the San Francisco startup OpenAI released ChatGPT, an experimental chatbot built on so-called generative AI technology. ChatGPT can perform a broad range of tasks—from writing code and passing exams to composing essays—at an apparently human level in response to queries written in natural language.

By January, even though it was still a research project, ChatGPT had more than 100 million monthly active users, making it the fastest-growing consumer app in history, according to data from the analytics firm Similarweb. In late January, Microsoft confirmed its multiyear, multibillion-dollar investment in OpenAI and in February offered limited access to new AI-powered capabilities based on ChatGPT in its Bing search engine and announced plans for a wider release of the technology via Azure Cloud and Office 365. Google, Baidu, and other big tech companies have also announced rival chatbots, all of which is sparking a generative AI arms race.

So far, most analysts have focused on how ChatGPT and its competitors will transform internet search, supplant human creativity, turbocharge plagiarism, or make millions of white-collar workers redundant. Few, however, are talking about the implications of this new technology for the enterprise itself. Going forward, tools like ChatGPT will be a source of uncertainty for organizations whose business models they threaten to disrupt. For companies that understand its potential, generative AI presents a huge opportunity.

**The possibilities and the limitations**

ChatGPT is built on what is known as a large language model, part of a broader family of technologies called foundation models. These systems are trained on gigantic volumes and varieties of data, but they are not specialized for any specific task. Rather, they are pregnant, if you will, with a huge set of potential capabilities. They can perform at near-human levels when given just a tiny amount of data related to a specific task.

In 2020, OpenAI released GPT-3 (Generative Pretrained Transformer 3), the underlying algorithm for ChatGPT. That version of the model encompassed 175 billion parameters and was trained from a multitude of data sources from across the internet.

The GPT-3 release was a breakthrough moment that changed how the AI community thought about what large language models could do. Most importantly, it reshaped the notion of generality in AI. After the system was trained, you could adapt GPT-3 for a specific task by training it on a few examples of text and then giving it simple instructions in natural language. That core ability to instruct a chatbot the same way you would a fellow human is what’s revolutionary about GPT-3.

The model’s emergent capabilities make it great at parlor tricks—chocolate chip cookie recipes written in the style of the Declaration of Independence and other feats of creativity and inventiveness, for example. It’s also very useful for retrieving information, and software developers have found it to be quite skillful at suggesting code when prompted with a programming challenge.

GPT-3 also has significant limitations. One is linked to “hallucinations,” in which the system provides made-up answers to questions. Hallucinations arise due to the static nature of the model’s knowledge, which is whatever the engineers burned into it on a specific date. Without the ability to update itself or access the internet, its knowledge is limited, and when it doesn’t know the answer to a question, it may make one up.
These limitations are not permanent. For now, ChatGPT can’t connect to real-time or updated corpora of knowledge or application programming interfaces (APIs). However, Microsoft’s more powerful version allows the model to search the internet and include very recent information and news. Such breakthroughs will unlock even more of this technology’s potential.

Coming soon

It’s easy to imagine everyone in an organization soon having access to cognitive assistants powered by large language model-based AI.

Sitting at your computer, you could ask your AI assistant questions throughout the day about the tasks you’re working on and have conversations with it. You could talk to it as you would a trusted colleague and get help testing hypotheses, trying things out, gathering information from a colleague and get help testing hypotheses, trying things out, gathering information from a knowledge base, organizing your day, and so on. Such functionality would help you do your job better and faster.

There’s also a lot of potential in functionality that resembles GitHub Copilot, a generative AI tool that offers on-the-fly coding suggestions for programmers. For everyday enterprise system users, we can imagine every text-entry box automated to suggest likely inputs based on the content and what you’ve done before. (Of course, the human user always needs the final word on what the system should do.) We can imagine Copilot-like technology deployed at scale everywhere.

A bit further out, it’s only a small speculative jump to having a digital twin for various work personas, such as IT help desk agents. In such a future, newly hired agents would get up to speed quickly because they would benefit from the autocompletion and automatic interface of their digital twin, which is the product of the AI system learning from hundreds of workers who came before them. Anything that a user produces can serve as feedback to further train these models through reinforcement learning, so the feedback itself contributes to making the models better. Soon the digital twin might be as capable as top human performers in a variety of everyday situations.

Looking at products, we can imagine companies providing highly trained foundation models for specific industries or verticals. A foundation model tailored for telecom, manufacturing, or the public sector would understand the specific vocabulary and processes unique to that particular sector. These models would be fine-tuned on specialized data sets that allow them to understand context-specific nuances. Companies would then provide them as part of a platform capability or service.

### Intelligence value chains

If we think about foundation models as a new kind of operating system for AI, the possibilities become quite exciting.

Looking into the future, we can imagine the emergence of what I’ll call “intelligence value chains,” an ecosystem of products, services, and applications based on the pervasive use and availability of AI-based foundation models. We’ve already seen the emergence of specialized AI prompt stores, where short pieces of natural language that efficiently query models to accomplish a task are being sold for a couple of dollars apiece.

This has two important implications for the future. One possible route is to imagine that standardized AI dialogue turns, consisting of a text-in/text-out exchange, become so important to business that they turn into a form of cognitive commodity. Not unlike a barrel of oil or a bushel of wheat, a cognitive commodity would be a standardized unit for AI services. From there, it’s not hard to imagine the creation of cognitive futures contracts to guarantee the future availability of AI services at a set price.

A second possibility, perhaps nearer and more concrete, is the emergence of an app economy for these models. This would allow not only prompts, but also a combination of prompts plus additional training parameters to plug into the model to produce new behaviors, in the same way that apps for iOS and Android can enrich our phones with new functionality.

If this market for customizing foundation models takes off, it might give rise to flywheel effects in favor of some models, which would garner more users because they have more apps, and more app developers because they have more users. (In effect, these models would become the AI versions of Microsoft Windows or Apple’s iOS.)

It’s always difficult to predict how revolutionary technologies will shape the future. I believe this moment represents the beginning of a new era in software, with the industry likely to change more in the next five years than it has in the last 50.
Companies that lean in during downturns tend to prosper in the long run

BY EVAN RAMZIPOOR
It feels like a no-brainer: When macro conditions are unsettled, a company’s appetite for risk should wane. If you don’t know what the future holds, slash spending and wait for pressures of inflation, rising interest rates, extreme weather, political instability, and a lingering pandemic to recede.

While macro uncertainty is nothing new, this round feels especially severe to Dave Wright, chief innovation officer at ServiceNow. “It feels like the first change we’ve gone through where there isn’t an expectation it’ll go back to the way it was,” says Wright, an enterprise tech veteran whose career started in the early 1990s. “There’s now an expectation that things are going to shift permanently.”

Global uncertainty is on the rise after receding from historic highs during the early days of the COVID-19 pandemic. That’s according to the World Uncertainty Index, created by researchers at Stanford University and the International Monetary Fund. They update the index quarterly by text-mining Economist Intelligence Unit country reports for words related to uncertainty.

“Measuring uncertainty helps firms make decisions,” says Stanford economics professor Nicholas Bloom, one of the creators of the uncertainty index. “In periods of high uncertainty, it is very valuable to pay for flexibility,” he adds. “For example, renting rather than buying property or hiring contractors rather than full-time employees. It is also a period where contingency planning is extremely valuable.”

Periods of uncertainty also present excellent opportunities for upstarts looking to leapfrog market leaders. Macro disruption can change consumer behavior, as when COVID-19 forced millions of employees to start working from home overnight. At such times, consumers are likely to reward firms that offer innovative solutions to their most pressing needs. In this light, it makes sense that some of the world’s most successful companies—think General Motors, Microsoft, Google, and IBM—were all founded during downturns.

Many companies around the world see today’s macro environment as a business opportunity, according to a recent global survey of C-suite leaders from ServiceNow and ThoughtLab. As you might expect, smaller firms are more likely to embrace riskier strategies. Among companies with fewer than 5,000 employees, 37% of respondents say they’re planning to take advantage of the next two years to improve their competitive position, versus 26% at companies with more than 10,000 employees.

Greater risk, greater reward

In economics, the connection between uncertainty and risk-avoidance is known as prospect theory, introduced in a seminal 1979 paper by Daniel Kahneman and Amos Tversky. The idea is intuitive: People are risk-seeking in the face of perceived potential gains and risk-avoidant in the face of potential losses. This is as true for firms as it is for individuals, says J. P. Eggers, professor of management and organizations at New York University’s Stern School of Business. “It’s hard to zig when everybody else is zagging,” he says. “It requires the strength of your convictions.”

When economic conditions worsen, the market’s appetite for risk goes down and leading firms get conservative. Since they’re already performing well, there’s no reason for them to risk falling behind by investing in unproven new products.

At the same time, stragglers can use downturns as opportunities to leap ahead, according to a 2020 paper by Columbia Business School assistant professor Daniel Keum. Although executives at such companies may believe they have more to gain from a wait-and-see approach, that is a mistake. If the straggler can find an innovative product or service that the leader isn’t investing in, it can pull ahead.
Korean automaker Hyundai is a great example of a straggler that used a business downturn to improve its competitive position. While many of its competitors retrenched during the Great Recession, Hyundai improved the quality of its vehicles and offered a novel buyback program for customers who lost their jobs. The gambit paid off. While most car companies saw sales decline precipitously during the period, Hyundai’s global unit sales rose 2% and revenues increased 5%.

“Originally, they thought maybe they should be very conservative and reduce their market share,” Keum tells Workflow. Ultimately, Hyundai decided to take risks, innovate, and reap the rewards.

The intuition behind this move is the same as running a race. It’s hard for laggards to catch up to the front of the pack in the early part of a race when everyone is running at full speed. The job often gets easier later in the race, when everyone slows down. “Uncertainty is good for those who are behind, and it can be detrimental to those who are ahead,” Keum says. “The leader may want to rest on its laurels, but doing so gives the competition the time and space to catch up.”

**Bold not crazy**

In times of change and tumult, companies that double down on innovation can hope to experience greater returns and better outcomes. However, executives should take care not to overcorrect.

In Keum’s words: “Uncertainty is not a time to try crazy, different things. It’s a time to catch up on the existing technological trajectory.”

Many business leaders in the ServiceNow/ThoughtLab study seem to agree. Despite fears for the future, about half plan to increase their digital transformation investments over the next two years. Slightly less than half report plans to significantly increase their investment in digital innovation.

“If you’re in a time of uncertainty, you want your innovation to be additive,” says ServiceNow’s Wright. “You want to maintain existing revenue streams and look at how to enhance those by building something that’s adjacent to that technology.”

Even if executives lean in during times of trouble, successful adoption and deployment of digital tools requires buy-in from across the enterprise. That gets harder during periods of economic uncertainty, when employees are worried about losing their jobs.

**All aboard**

Insecure workers tend to be less engaged and less open-minded about change. Over the past year, employee engagement—the degree to which U.S. employees feel connected to their workplaces and the jobs they do—hit an all-time low of 33%, according to a Gallup poll of U.S. workers. When organizations want to innovate and transform to address uncertainty, low morale can complicate that goal.

To motivate employees during a time of crisis, executives should adopt a forward-thinking strategy. Wright’s advice: “Show your employees empirical evidence of how customers used your products to make life easier for them. And paint a picture of what your future will look like in five years.”

Wright recommends innovation tempered by pragmatism. “There’s that whole concept of ‘run fast and break things,’” he says. “In a time of uncertainty, that becomes, ‘run fast and break things—but not in this room.’”

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**Top three strategic priorities over next two years**

- Accelerate digital transformation
- Maximize profit
- Achieve ESG goals

**SOURCE:** THOUGHTLAB/SERVICENOW

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**PHOTOGRAPH BY** KATLEHO SEISA
How software can help slay inflation

Automation lowers development costs while boosting labor productivity

BY PETER BURROWS
Uncomfortably high inflation isn’t likely to go away anytime soon. That was Federal Reserve Chair Jerome Powell’s message in early February, when he said bringing surging prices to heel will be “a process that takes a significant amount of time.” For companies contending with an already uncertain macroeconomic outlook, this was unwelcome news. With war in Ukraine and the lingering effects of the pandemic also disrupting business as usual, who could blame leaders for feeling at the mercy of forces outside their control?

At times like these, businesses should remember they have a tool at their disposal to temper the impact of inflation: digital technology. How so? There are two main forces at work:

- Software—usually rise more slowly than goods and services that require lots of repeated labor and physical parts. Second, investments in technologies like AI, robotic process automation, and natural language processing can provide a powerful boost to productivity and help blunt the impact of inflation for businesses.

The 22% of companies that have completed digital transformations have a distinct advantage over those that have not, posting 17.3% higher revenue growth and 14% greater net margins, according to the MIT Center for Information Systems Research. Given software’s inflation-fighting qualities, companies still at an earlier stage of their digital evolution would do well to lean in now.

“Tech has been a deflationary force for the past 20 or 30 years,” notes Marshall Reinsdorf, a former International Monetary Fund economist who has studied the impact of low digital inflation on the economy. “The fact that information technology products have not been going up in cost like everything else makes this a good time to consider how you can leverage technology.”

Cheap at the price

According to Michael Mandel, vice president and chief economist for the Progressive Policy Institute, prices for digital goods and services rose at an annual rate of 1.3% between 2019 and 2022, compared to an annual gain of 4.6% for consumer prices overall.

Indeed, the cost of producing the stuff is near an all-time low, according to the U.S. Bureau of Labor Statistics (BLS).

What’s more, one of the primary powers of software is its ability to automate processes—particularly repetitive processes that computers can often do better, and more happily, than humans. In this way, software helps companies make more efficient use of their human labor.

“The whole reason IT exists in the first place is to automate business processes,” says Mark Settle, former CIO of Okta and author of Truth from the Valley: A Practical Primer on IT Management for the Next Decade. “Anything that lets you get more out of your existing investment in talent can have big payoffs.” This is even more true in inflationary environments—like in the fourth quarter of 2022, when real wages grew 4.1%.

Reinsdorf notes that data on the deflationary impact of technology probably understates the true effects on the economy over the long run. That’s because it’s difficult to account for the impact of new features and improvements except through the rearview mirror. For example, current figures from the BLS don’t factor in how companies will use generative AI tools like ChatGPT to augment future labor productivity.

Economic data is continually adjusted to reflect improving quality of products and services. For software, the data might change once it becomes clear that newer versions are much less costly to deploy. “If the price stays the same but the quality goes up, we consider that a price decline,” says Reinsdorf. “Academic researchers tend to think the BLS under-adjusted for quality change in high-tech products.”

Productivity booster

While software has always been a hedge against inflation, we live in a time of technical breakthroughs that make it particularly potent. As anyone who has played with ChatGPT will tell...
Speed is a competitive advantage, and hyperautomation can be a powerful tool to speed up the most important processes and operations in a company.”

Digital urgency

Of course, launching expensive digital initiatives in times of uncertainty is easier said than done. Gartner recently cut its forecast for global IT spending growth in 2023 from 5.1% to 2.4%. And a survey of 800 IT professionals by Info-Tech found that just 40% of enterprises are planning to increase their technology spend to stay ahead of inflation.

On the other hand, the deflationary impact of software is not lost on your competitors either. While companies plan to scale back investments in hardware, devices, and cloud, Gartner expects enterprise software budgets to grow by 9.3% in 2023.

This is one more reason to view this period of inflation as an opportunity to harvest the business value of software now rather than put it off for another day.
Rx for the downturn

For executives facing macro turmoil, belt-tightening might seem like the sanest response. However, business history shows another way. Companies that support R&D, launch new products and services, or acquire competitors reap the rewards when conditions improve. It’s also when scrappy insurgents surpass industry leaders. Here’s a brief history of downturn bets that paid off big-time.

1892  
GENERAL ELECTRIC TURNS ON THE LIGHTS  
Thirteen years after Thomas Edison’s invention of the light bulb, amid a brutal depression, Edison General Electric Company merges with a rival firm to form General Electric. The rest is history.

1939  
TWO GUYS IN A GARAGE  
Two Stanford University graduates, Bill Hewlett and David Packard, start their famed electronics and computer company from a modest Palo Alto garage during the Great Depression.

1990  
THE WORLD WIDE WEB  
Created during a global recession by Tim Berners-Lee while he was at CERN, home of the Large Hadron Collider, the Web revolutionized every aspect of human life.

2001  
APPLE LEANS IN  
Amid the dot-com bust and the tragedy of 9/11, Apple opens its first retail store, introduces Mac OS X, and unveils the iPod and iTunes.

2009  
FERTILE GROUND FOR STARTUPS  
Although the Great Recession was a period of economic hardship, it also birthed Dropbox, Uber, and WhatsApp. Despite global financial gloom, the smart money bet on the future.

2023  
THE TREND CONTINUES  
Despite near-term recession fears, companies that understand the value of innovation are poised, yet again, to surge ahead. According to ServiceNow and ThoughtLab research, 55% of digital leaders view current conditions as an opportunity to improve their competitive position.

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