Interview with Edward Tenner, author, *The Efficiency Paradox*

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KENNEALLY: The optimism that greeted the dawn of the digital era in the early 1990s was not lost on journalist and historian Edward Tenner. He recognized and appreciated that access to information online, not to mention the time-saving advantages of word processing over laborious typing allowed him to research and write more easily than ever. It's something happened a decade ago to rethink his digital enthusiasm.

Welcome Copyright Clearance Center podcast series, I'm Christopher Kenneally for *Beyond the Book*. Since 2008, as the smartphone and the great recession both took hold around the globe, the futurist dream of a friction-free world has dimmed considerably. Handheld devices, mushrooming amounts of computing power, and algorithms able to digest data like digital whales have brought improvements in commerce and communication that are overshadowed by concerns about security, privacy, and the decline of civil society.

A distinguished scholar of the Smithsonian's Lemelson Center for the Study of Invention and Innovation, and a visit scholar in the Rutgers University Department of History, Edward Tenner first detailed the revenge effects of technological advancements in *Why Things Bite Back: Technology and the Revenge of Unintended Consequences*. His TED Talk on unintended consequences has seen nearly 800,000 views.

His latest book, out this week from Alfred Knopf, is *The Efficiency Paradox*. In it, Tenner uncovers the cost to our culture and our personal freedom from the relentless drive for efficiency. A self-described skeptic, though not an alarmist, he argues for a new approach to building algorithms that allows greater information diversity and leaves room for just plain luck.

He joins me now, from Plainsboro, New Jersey. Welcome to *Beyond the Book*, Edward Tenner.

TENNER: Thank you very much, Christopher.

KENNEALLY: We're looking forward to discussing this topic, *The Efficiency Paradox*, and I suppose to be efficient, Edward, we should start with a definition of efficiency, something you consider very specially in this book. It's a term that has roots in the 19th century.

TENNER: Yes. In the book, I describe how the modern idea of efficiency evolved since the early 19th century with the Industrial Revolution. The great contribution of industrialization, I argue, was a continuous process. For example, grain mills took grain from the top and transformed it into flour at the bottom. Papermills, instead of having a single sheet at a time, made possible newspapers and mass literacy, steel mills, glass works, so many factories turned out things in continuous streams.

More recently, especially since the late 20th century, we've had another kind of efficiency, and it's what Bill Gates described as friction-free. These are the platforms, these are online services that, in principle, reduce the cost of doing everything and make, again in principle, possible an extremely efficient way of life.

KENNEALLY: And efficiency really, I suppose, could be boiled down in a sense to reducing waste. There's a sense that time and resources, as you say, can be used efficiently, and there's an opportunity here to reduce the excessive use of either.

TENNER: That's right. You could also describe it as universal optimization, you can describe it as getting more for less. There are many ways to phrase it. Economists also have a technical way, but I use it in the commonplace sense of having the greatest output for the smallest input.

KENNEALLY: And in this digital world that we live in today, Edward Tenner, there's been a promise from big data that it was going to allow us to do even more in even less time. So I guess the question that you pursue in this book is whether or not that promise has been kept. What do you find?

TENNER: Well, technically it has, and thanks to big data, thanks to computing power, many processes are now more efficient than ever. However, there are problems that happen when this efficiency is incorporated in social institutions. For example, one economist has calculated that the financial sector now consumes a greater proportion of GDP than it did 100 years ago in the days of J.P. Morgan. Why is that? It's because this efficiency is used for more and more complex trading, for frequent buying and selling, for all kinds of risky business that has recently led to so much financial instability again.

KENNEALLY: And in your view, this is heading us down the wrong road. How did we end up here? What's your analysis of that?

TENNER: I think the problem is that we haven't paid enough attention to what happens when everybody starts using efficient means to compete against everybody else. For example, in baseball, many people are familiar with the concept of Moneyball, using much more sophisticated measures of players capabilities. Now, as long as one team has a monopoly on that technique, it works great for them. But when all teams adopt it, it doesn't necessarily increase the interest in baseball, it doesn't necessarily increase the revenue for teams. It can have all kinds of unintended effects when it is universally used.

KENNEALLY: As I mentioned, you have a TED Talk online that our listeners can view for themselves, with 800,000 views. It looks at unintended consequences. So you're someone who really understands the unintended consequences that surround us in life. I guess there are unintended consequences with this obsession that our culture has with efficiency. You see them in many different areas in the environment, for example.

TENNER: Yes. One of my favorites, actually, comes from that same TED meeting at which I spoke. There was another speaker from Uber, and he was talking about a future Utopia in which there would be fewer cars in which people could get from place to place more easily in a customized way, and in which pollution would be eliminated. But actually, according to a number of studies, one just published the other day, the opposite has been happening. People are using ride-sharing services to take more and more rides than ever before. In fact, they're having more journeys than they did, and there is more pollution, there's more congestion, there's also a problem for public transportation systems. So environmentally, it's turning out to be a minus.

KENNEALLY: It's really remarkable. I'm familiar with that story because it has made an impact on the traffic in my home town of Boston, we see it in New York City as well, all those Uber drivers out there are clogging up the roads, it's really something, instead of doing what was hoped for. It's a remarkable story there. But it also, this is obsession with the efficiency, has had an impact on our privacy and on our online security.

TENNER: Yes, those are important factors. They're not the main focus of my book because other people have described them so well, but one of the things that alarms me most when I read about that is how people who are accused of crimes are now

evaluated by programs that are secret, that their attorneys can't cross-examine, in effect, and these programs are used for determining sentences. So there is risk, not only to privacy, but to the right of justice from what one critic called the black box society.

KENNEALLY: The black box society – that sounds rather terrifying, in fact. But it doesn't only impact people's lives in the courtroom, it affects our daily lives, Edward. Tell us about that. What are the ways that this obsession with efficiency and the ultimate efficiency paradox do have an impact in our lives? And have you ever, yourself, felt victimized by this obsession with efficiency?

TENNER: Because I've been writing this book, I've been really very conscious of the risks of efficient technology. For example, I am a generally happy user of the Google program Waze for street navigation. I used it to come here to the Plainsboro Library for this session. However, if you're not very careful, even though Waze 99.5% of the time is great, that other half of one percent can be disastrous. It nearly pointed me in the wrong direction when I visited a historic site in northern New Jersey, and it told me to go north, but I knew the way home was south. But somebody who just blindly follows it can get misled. In fact, in Philadelphia, there are many stories of truck drivers who use the Waze program, and they get their trucks stuck or even destroyed when they go beneath underpasses that are too low for them. In that case, the drivers don't use the more expensive truckers databases that have that information. They are not very well paid, and so understandably they try to keep their costs down, but in the long run, that turns out to be disastrous.

KENNEALLY: Now, there are impacts for individuals, but there are impacts across society, and you identify certain areas where this driver efficiency is resulting in undesired effects such as hyperfocus and data deluge. Tell us about hyperfocus and the related impact on skill erosion.

TENNER: If people are too dependent on the efficient systems that they're using, they're not going to be able to respond efficiently when something goes wrong and they need to rely on what really should be reflexes. For example, we still don't have fully automated aircraft because people reasonably believe that pilots should be able to –in an emergency, if the systems fail, they should be able to execute the maneuvers that they've been trained to do.

KENNEALLY: What about this sense that we are driving towards a monoculture, that all these algorithms work in a single direction, and it's reducing what you think is a desirable state of information diversity.

TENNER: I can give you an example from business life. You can use big data to show what kind of people are most successful in a job – who are the best salespeople? In publishing, perhaps, who are the best acquisition editors? So as a result of that, based on your recent experience, you can have a team that is very, very effective at what they do. However, reality is always changing, the circumstances are changing. So the person who is really, really effective in a given environment may be less effective as the environment changes. So it's much better to have a staff of people with diverse backgrounds, with diverse ways of thinking. Even though in the short run, that might be a little less efficient, in the long run, it's going to be protection against a disaster that comes when everybody on your staff is unprepared for an new environment.

KENNEALLY: You pointed out in the book that relying on algorithms and data itself for driving our decisions locks us into certain patterns of behavior, and you suggest that we need to get out of those patterns in order to advance and innovate and just be creative. So is there an approach to developing algorithms that's possible to do all of those things and also rely on plain luck?

TENNER: In my book I mention people who are developing algorithms like that. I refer also to some researchers in search who have found that if you allow more time for a search, it can give you higher results. But of course people really want efficient search in the sense that everything should be available in a fraction of a second. If you have that condition for a search, even though in one sense it's more efficient, it's also less efficient or effective in finding the best results that you're really looking for.

KENNEALLY: It's a fascinating topic and a book that you can really walk away from and think about for quite a long time afterwards.

We've been speaking today with Edward Tenner, author of the new book, *The Efficiency Paradox* out this week from Alfred Knopf. Edward Tenner, thank you so much for joining us on *Beyond the Book.*

TENNER: Thank you very much for having me.

KENNEALLY: *Beyond the Book* is produced by Copyright Clearance Center, a global leader in content management, discovery, and document delivery solutions. Through its relationships with those who use and create content, CCC, and its subsidiaries, RightsDirect and Ixxus, drive market-based solutions that accelerate knowledge, power publishing, and advance copyright.

Beyond the Book co-producer and recording engineer is Jeremy Brieske of Burst Marketing. I'm Christopher Kenneally. Join us again soon on *Beyond the Book.*

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