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“AI, cybersecurity, and the future of geopolitics”
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DEWS: Welcome to the Brookings Cafeteria. The podcast about ideas and the experts who have them. I'm Fred Dews.

The topic of this episode is the complex intersection of artificial intelligence, cybersecurity, and geopolitics. Here in the Brookings Podcast Network studio to explain is John Villasenor. He's a nonresident senior fellow in the Center for Technology Innovation at Brookings and a professor of electrical engineering, public policy, and management, and also a Visiting Professor of Law at the University of California, Los Angeles.

Stay tuned also in this episode to hear from senior fellow Jennifer Vey, director of the new Bass Center for Transformative Placemaking.

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And now on with the interview. John, welcome back to the Brookings Cafeteria.

VILLASENOR: Thank you very much.

DEWS: Before we dive into the topic at hand, John, I wanted to ask you about your teaching, your research at UCLA. You're a professor of many things: electrical engineering, public policy, management, and law. How do all those things kind of fit in?

VILLASENOR: Well it's a great question, and really my focus is technology and to the extent that I teach in several areas at UCLA it's because technology impacts a number of areas. So I look at cybersecurity. I look at artificial intelligence. I look at digital communications technology. And of course all of those things have profoundly important technology implications and questions, but as well, in addition, implications with respect to policy, with respect to law, and with respect to business. So that's why in my work at UCLA I look at the technologies themselves as well as in this broader context.

DEWS: Well, I want to thank you for suggesting this topic and making time during your brief visit here to the East Coast to talk about this area, which is really important. So let's actually start with that theme. Lot of keywords in that theme: artificial intelligence, cyber security, and future geopolitics. And I think most of our listeners pretty much know what geopolitics is. We've talked about cybersecurity on other episodes, there is a lot on the Brookings website about that. So let's kind of hone in on artificial intelligence. People have heard this term a lot over the past few years. Maybe some people have heard it for longer but maybe people don't quite understand what artificial intelligence really is. Can you explain what AI means?

VILLASENOR: AI is the idea that computers can act in ways, do reasoning in ways that are similar to the way human beings do reasoning, and most fundamentally that involves learning. So if you think about an example of something that is not AI, is just a computer that, for example, adds two numbers together really quickly and it can do millions of those, or hundreds of millions of those computations per second. That's something that a human couldn't possibly do. But it's not intelligent it's just doing a rote task many times a second.

By contrast AI refers to computers that observe their environment and learn from it and then enhance their own behaviors to do something much better than they did before. And there's obviously a whole world of possibilities that gets opened up when computers can actually learn and become highly skilled at doing various tasks.

DEWS: But we think of AI as kind of a new technology but from earlier conversations with you it's really not that new, is it? This concept of machines learning, of making observations is not that new.

VILLASENOR: It's interesting. AI has been—I mean one of the pioneers of the questions that really foreshadowed today's AI work was the great mathematician and computer scientist Alan Turing in the UK in the mid-20th century. He came up with these

ideas of things called the Turing Test and formulated these fundamental questions. For example, can machines think? And throughout the latter part of the 20th century there was plenty of work at various research labs in artificial intelligence although the capabilities were limited in significant part just because the computers weren't fast enough and capable enough to do things. And so recently, by just recently I mean in past let's call it 10, 15, 20 years and especially in the past five years, we've just had an incredible growth in both the investment into AI and the capabilities that AI computers can generate. And there's plenty of just fascinating examples along those lines.

DEWS: And so that increased attention investment and growth is because of the increased computing speed? Or are there other factors involved suddenly paying a lot more attention to AI?

VILLASENOR: Well it's a great question. I think it— well certainly part of it is just the fact that computers today are far more capable just in terms of speed, the amount of memory and speed are far more powerful than they were even 10 or 15 years ago. But also the amount of investment that's going into AI is extraordinary. One of the most interesting anecdotes that I can think of that sort of illustrates the just incredible pace of change is back in 1997 IBM had a computer called Deep Blue which made headlines by beating Garry Kasparov in chess, and of course at that time Gary Kasparov was I believe the top chess player in the world. And that was hailed, rightfully so, as an incredibly important milestone in computers and computing playing chess. The fact that computers could perform that well.

But deep blue was not really using AI. It was basically just a very powerful, for its time, machine that was doing essentially a brute force or near brute force exploration of all the different possibilities. And it took many many person-years of work to program Deep Blue.

Now we fast forward two decades to December 2017 when Google's Alpha Zero

taught itself to play chess in only four hours, and the only input was the rules of chess. And after that the computer actually just used AI to learn how to play without any human input at all and to become essentially a really competitive level chess player after only four hours. And of course that's far exceeding, you know, what any human being could ever do. No person could ever be taught the rules of chess at 10 a.m. and be a competitive chess player by 2 p.m.

And so there was just a fascinating anecdote that illustrates this incredible progress that we've seen in AI.

DEWS: I think it also belies that the idea that an AI machine, an AI robot is only as smart as the human input into it.

VILLASENOR: And that's one of the most incredibly important observations there is about AI is that, you're absolutely right, it's not simply doing what we did faster. So, if you took go back to my example of a computer that adds, you know, hundreds of millions of numbers together per second, we as humans know how to add numbers and the machine isn't doing anything we can't do in terms of the task it's performing, it's just doing it much much faster. But with AI we've gone to the point where, as you noted, that machines can do things that we couldn't possibly do—learn to play expert level chess in four hours—and of course there's an infinite number of other examples, and so the potential created by that is just absolutely profound and it has implications including on geopolitics, as we're talking about today, but really across all sectors of society.

DEWS: Before we dive into geopolitics here in a minute, I do want to hear from you about where do we see AI playing out in our everyday lives. You know, people are really interested in, am I interacting right now with AI or not? Maybe people don't even see it.

VILLASENOR: Yeah, you absolutely do see AI, although not everyone necessarily recognizes it as AI. It's used in a number of products that many of us use in our daily lives. For example, it's used by companies such as Uber and Lyft when they're doing the

matchmaking between and the learning what routes to take. It's used by Siri for people who have iPhones, for example, and asked Siri. It's used by companies like Amazon to make suggestions or Netflix Pandora for Internet radio. It's used in an enormous number of products or services. It's also used and going to be used more in the future for a lot of fundamentally important things that aren't necessarily directly consumer facing but that are important. So, for example, pharmaceutical drug development, very advanced weather forecasting to improve our weather forecasting models, for agriculture to improve crop yields, for economic forecasting. There's just an enormous range of areas where AI has the potential to really give us very significant advances with very, very important positive outcomes as a result for society.

DEWS: So what does AI have to do with geopolitics?

VILLASENOR: AI is going to be a key enabler of geopolitical strength and that's going to be something that many countries understand and try to take advantage of. I'll give you an example of a quote from Russian President Vladimir Putin in 2017. As quoted, and he said quote, “artificial intelligence is the future not only for Russia but for all of humankind. Whoever becomes the leader in this sphere will become the ruler of the world.” Close quote. And so it's an observation that we would do well not to ignore because even if the goal was simply economic prosperity as opposed to global domination it illustrates the very important geopolitical role that AI is going to play, and that is reflected in the investments that countries are making.

DEWS: So is Vladimir Putin, do you think he's talking about AI and weapons systems? Or is he thinking about AI in terms of pharmaceuticals or economic trade or some other kinds of issues? I mean, how does AI impact geopolitical tools that nation states use to deal with each other?

VILLASENOR: So I don't know specifically what President Vladimir Putin might have had in mind when he said that, but certainly it's far more than, say, weapons

systems. AI is going to be a key enabler of economic strength. And economic strength of course has a direct correlation to geopolitical strength as well. And so economic strength through more efficiencies in agriculture, economic strength in terms of trade, strength in terms of the vitality of a technology sector in a particular country, and how successful that technology sector is in terms of healthcare delivery. Pretty much all of the things that are tied either directly or indirectly to geopolitical strength are going to be influenced in many cases quite strongly by AI. And so I think it's far more than military and weapons that is going to be the reason why AI is going to be so politically important in the next decade or two.

DEWS: So we bring cybersecurity back into the question. What are some examples where AI and cybersecurity and geopolitics kind of intersect in the world?

VILLASENOR: There are really multiple ties there. One is, if we just look at cyber security, for example, is obviously in part about defending your systems from being attacked by hostile actors and the cyber battles of the future are going to be often fought with AI. They're going to be fought essentially at light speed. And for example if a hostile entity is launching some sort of cyber attack the attack will be conducted with highly capable AI and the only effective defense will need to have AI as well because, you know, a human sort of looking at a screen and deciding to push keys on a keypad is going to be way behind it. These things are going to be fought at light speed. So AI is going to be key to defending against sophisticated cyberattacks and even to understanding where the vulnerabilities are.

I'll give you another example. If you look at a lot of critical infrastructure sectors, they are extremely complex and understanding where they might need to be shored up to make them more robust against cyber attacks is going to be very, very difficult unless you have extremely sophisticated modeling tools that are going to need to use AI if they're going to actually find these vulnerabilities.

DEWS: One area of AI and cybersecurity and geopolitics that a lot of Americans up and attention to over the past couple of years is in Russia's involvement in the 2016 presidential election and perhaps in other elections around the world. Is that going to continue to be kind of a critical area of interest or of activity at the intersection of AI, cybersecurity, and geopolitics—elections?

VILLASENOR: Yeah, that's a really, really important question and there's a few different ways in which it's critical. One is, there's the simple mechanics of conducting an election in the sense of logging and counting votes, and as that process has become increasingly digital then the obvious cyber security concerns arise with that. And from the standpoint of a hostile entity that's trying to disrupt that process or manipulate that process in some way, AI would be very important and potent tool in their arsenal. And the only way to defend against something like that would then be to have AI-based defense and for example identifying behaviors or patterns that were indicative of some sort of attempt at manipulating vote tallies, for example.

A second aspect relates to influencing how people perceive different candidates before the election. In other words, you want to use AI to manipulate an election one option you have is to actually manipulate the vote counts but another option you have is to manipulate what people perceive about the candidates who are up for election. And so this can involve one very interesting and important and sobering area, is the idea of bots that can mimic human behavior and, for example, can try to rally either support for or opposition to a particular candidate. And there was some of that in the 2016 election, but in the future the techniques are going to be just far, far more sophisticated. And it's going to be increasingly difficult to differentiate between online behavior of real people and online behavior of AI-enabled bots that are mimicking or pretending to be real people.

Now, the responses is, well AI can also be used to combat this as well. But that's going to be a very, very big challenge in an increasingly social media and online driven

environment where perceptions are shaped so much by what people see online.

DEWS: In an episode of this podcast a couple of months ago before the 2018 midterms, Alina Polyakova, Rubenstein Fellow here at Brookings, was talking about the issue of deep fake, of the videos that look like maybe of a politician speaking but it's not his or her words that are actually coming out of the mouth.

VILLASENOR: Right. That's a really potentially sobering application of technology. Yes exactly as you said deep fakes can be used to doctor or manipulate video and audio so it appears that somebody is saying something they never did. And of course if you have the power to do that you can create an enormous amount of damage. And it's terrifying in some sense from the standpoint of a politician who doesn't want to be a victim of that because, you know, and historically we've been able to reasonably rely on, you know, video, like, you know show me the video, you know, did he or she say that? And you look at the video and you then have the truth, the answer. But now and certainly more so in the future, just because you have video of a politician saying something doesn't necessarily mean that the politician actually said it, and it's going to be harder and harder to actually differentiate.

So these deep fakes, the best of them now are just extraordinarily realistic. And like all technologies that technology is going to get better as well.

DEWS: Let's talk about the AI landscape in a few specific countries. The U.S. What are the strengths and weaknesses of AI in the U.S?

VILLASENOR: Well I think that currently the United States is clearly the global leader in artificial intelligence and that's due in large part to the just enormous scale of commercial investment that's occurring there. There’s the giants like Google, Amazon, IBM, and there's in addition hundreds of smaller companies, including startups. And the collective investment is just enormous.

The other incredible advantage that the United States has in a global sense is our

human capital in AI is really world leading. And just in terms of the people who are working in these hundreds of companies, the people who are performing AI research at our research universities, the students who are getting trained and then entering the workforce where they're working and AI, is I really think an enormous strength of the United States.

And in addition the U.S. government is engaged. For example, earlier in 2018, there was an announcement from DARPA that it was planning to invest two billion dollars to develop what they called the next wave of AI technologies. And it's also a topic where enormous numbers of young people in the United States have a lot of interest. So the AI landscape in the United States is incredibly active and world leading.

DEWS: You're a professor at UCLA. So what do you recommend young people who are interested in pursuing a career in a I study while they even in high school and then when they go to college?

VILLASENOR: Well it's interesting because, you know, one of the obvious answers is, say, computer science, right, because AI as you know certainly about programming computers to do certain things and to learn from their observations of the world and so on. But AI is such a broad area that it's not only computer scientists who are going to get involved in these things. We're going to need ethicists. We're going to need legal analysts. We're going to need people who can understand the business implications of AI and how that changes the business landscape.

So I think it would probably depend on the student's interests. If you have someone who's really interested in actually rolling up his or her sleeves and writing the code then that's, you know, say, a computer science or engineering degree would be a useful thing to do. On the other hand, there's a really interesting set of opportunities in the business world, right? You know, to sort of think what business opportunities is going to create in the next five or 10 years? And the best way to capitalize on that if you're a student isn't necessarily to major in computer science. You could major in business or something else.

DEWS: What does the landscape look like in China?

VILLASENOR: China is extraordinarily active in AI. At the 19th Party Congress in October 2017, Chinese President Xi Jinping stated that the goal is for China to become a quote, science and technology superpower. And AI is a very important, central part of that push. In late 2017, the Chinese Government identified some of China's biggest technology companies, including Baidu, Ali Baba, and Tencent to be part of what they referred to as their AI National Team. And so those companies have been investing heavily, internally and as well in addition have been investing in AI startups all around the world, not just in China. In fact, in 2017 there was more investment in global AI startups that came from China than from the U.S. And the Chinese government, their plan calls for China to be world leading by 2025 and to be the world's primary AI innovator by 2030. That's the stated goal.

DEWS: So is that is that bad for U.S.? I mean if they're the world leader then the U.S. by definition is no longer the world leader.

VILLASENOR: I don't think of AI as a zero sum game. I think the fact that China is progressing in AI doesn't mean the United States can't also progress. In other words ,there can be sort of economic benefits really globally. AI offers access to a whole portfolio of beneficial advances in areas like manufacturing, medicine, agriculture. So it's not as if there's only one winner in the AI game. If there’s an AI driven advance in, say, medicine, then I would expect that that's something that can be a benefit to people really all around the world.

And investments around the world in AI reflect that. You know, China obviously is being very engaged in AI, but it's not only China. It's not only the United States. Israel has a thriving AI sector. Russia of course is working on AI. There's significant effort in places like France and Germany, Japan, and Korea as well. So it's getting a lot of attention and I think it's partly because, it's largely because it can improve quality of life globally, and

that's something that doesn't accrue to any one country.

DEWS: Well that kind of answers the next question. But back to what Vladimir Putin said that you quoted earlier where he said to the students, whoever becomes the leader in this sphere will become the ruler of the world. It sounds like at least rhetorically speaking, Vladimir Putin maybe he thinks it is a zero sum game. So how do we reconcile Russia's vision of AI and China's vision of AI and the United States' leadership currently in AI?

VILLASENOR: Well I think economic strength is always an asset geopolitically speaking. And I think leaders all around the world including here in the United States, including in China, including in Russia, and elsewhere recognize that a key enabler of economic strength in the future is going to be AI. And also, AI does also tie to military strength. And so military strength obviously is also a key input to geopolitical positioning.

And so I think that any nation that aspires to be both economically and militarily strong, let's say, 10 years from now, AI needs to be a central feature of what the strategic plan, as it were. But I think, we can make an analogy, is technology a zero sum game? Just technology broadly. Well clearly it isn't, right? Technology has been enormously beneficial really across the whole world. And AI is obviously a sub area of technology but it shares with the broader category it's a part of, technology in general, this characteristic that it can benefit people really across national borders. And so I think that doesn't mean that there's no competition. And that doesn't mean that the United States should fail to invest. I think it's important the United States doesn't fall too far behind as other countries invest more. But I really do not think it's a zero sum game.

DEWS: I'm glad that you mentioned military strength because again thinking about Russia we see their military is very active. Obviously in Crimea and eastern Ukraine. But we've also seen Russia, and maybe this dovetails with Vladimir Putin's view of AI, of using cyber attacks and artificial intelligence to supplant traditional military strength in tanks and artillery and infantry. I mean, is Russia going to maybe focus more on AI and military than

it's going to focus on conventional military forces?

VILLASENOR: Well I don't know specifically what Russia's plans are, but I would expect that Russia like really I think probably almost all the major military powers of the world recognize that future strength in the military is not going to be how many tanks you have. And AI is going to be a critical part of that just because so many of the issues that will arise in any potential or actual military conflict will be mediated either directly or indirectly through the means of AI. And that involves information access, disinformation propagation, it involves knowledge of the battle space—however you define the battle space—and it involves the actual mechanics of any military action that any party might take. All those will be more effective if AI is a part of that. So I would imagine that Russia and the United States and China and any other power with a significant military investment is going to be or is already very focused on how AI can be used to modernize and make more effective for the coming decade their military.

DEWS: So John looking ahead, you optimistic or pessimistic about AI and geopolitics?

VILLASENOR: I'm actually quite optimistic generally about AI. I think there's an understandable temptation to focus on the challenges that AI raises which are certainly real and deserve attention. But the opportunity is just enormous to use AI in ways that are beneficial in a geopolitical context.

DEWS: So what are some of those opportunities?

VILLASENOR: There are lots of examples. AI is going to make it much easier to predict violent storms, which is going to in turn put the international community in a better place, better position to help protect people from those storms. It can be an important tool in combating climate change, which is an issue that we all share an interest in addressing. AI can help with drug development to reduce the impact and prevalence of disease. It can help increase agricultural yields, and it can help manage the complexities of the supply

chain for food, medicine, and other goods. All of these things have profoundly important geopolitical implications. AI certainly isn't magic and it can't do everything but the potential for benefits far outweigh the downsides.

DEWS: Well John, I want to thank you for sharing your time and expertise with us today.

VILLASENOR: Thank you very much for the opportunity to be here.

DEWS: You can learn more about John Villasenor and his research on our website, brookings.edu, where you will also find his recent piece on Tech Tank blog, “Artificial intelligence and the future of geopolitics.”

And now here's Jennifer Vey, senior fellow in the Metropolitan Policy Program and director of the Anne T. and Robert M. Bass Center for Transformative Placemaking.

VEY: Hi. I'm Jennifer Vey, senior fellow and director of the Anne T. and Robert M. Bass Center for Transformative Placemaking.

Columbia Gateway Business Park in Howard County Maryland is ideally situated off I-95 between Baltimore and Washington. Part of Jim Rouse’s original 1960s vision for the planned community of Columbia, this 920 acre site has served its purpose and its community well. After decades of growth and development, today the park is a hub where approximately 12,000 employees work across 300 companies in a wide range of industries from cybersecurity to medical devices to name just a few.

But in recent years, county leaders and park managers have begun to worry about the future of the sprawling auto-centric campus wondering, can Gateway continue to grow as a center of employment and innovation n a landscape where many firms and workers are looking for more dynamic and accessible urban environment? It's the right question at the right time. And they aren't alone in asking it. At its heart this question isn't just about Gateway, but about the evolving relationship between place and economy, the impacts it has had on people and communities, and how we create, grow, and sustain

concentrations of economic activity that work better for more people in more places, today and in the future. Indeed it's precisely this kind of inquiry that motivated the Brookings Metro Program to recently launch the Anne T. and Robert M. Bass Center for Transformative Placemaking.

So why this focus? And why now? First, while place has always matter to people and to economies, new technologies along with shifting demographics are changing the calculus. We need to better understand these trends and their impacts.

Second, we know these trends are having some positive effects on some communities. But they are also leaving too many people in places behind.

And so this brings me to the third reason we are launching the center. In an era of stark inequalities by income, by race, by geography, there is an urgent opportunity for local and regional leaders to harness market and demographic trends in ways that produce more inclusive economic outcomes. Investing in transformative placemaking is one key strategy for doing so.

So let me go back to talk about this relationship between place, people, and the economy, and who has benefited, or not, as it has evolved over time. Starting prior to the Civil War but accelerating rapidly in the decades after it, America's first cities grew from centers of commerce and trade to powerhouses of invention and industry, and hubs of cultural and civic life. Within these cities, the particular demands of small businesses and large manufacturers determined where and how they clustered, giving rise to bustling downtowns and busy industrial districts.

These were in many ways halcyon days for America's cities. But it wasn't to last for as the 20th century wore on the needs and preferences for place began to shift dramatically. The advent of the automobile together with new infrastructure, housing, and land use policies, provided people in firms with freedom to spread to greener and whiter suburban pastures. With people went jobs. While early suburbanites tended to commute to

urban centers increasing numbers of businesses began locating outside central cities, and retail strips, corporate campuses, and along highway corridors largely accessible only by car.

As the suburbs flourished, cities and towns, facing too the new pressures of globalization, struggled. Lower income city residents, particularly black residents, became isolated from suburbanizing jobs. And fiscal conditions spiral downward taking the quality of education and other city services with them.

But by the late 20th century and into the 2000s, some businesses and workers began to again value certain attributes of urban areas. Much of this renewed interest in activity was and continues to be concentrated in downtowns, along waterfronts, and in entertainment districts, buoyed by investments and amenities designed to attract highly skilled workers. The desire of these workers coupled with the growth of a more open, collaborative innovation economy has recently also led to the rise of innovation districts—enclaves within cities and some suburbs where research institutions, advanced industry firms, and startups cluster and connect.

In short, a hundred seventy five odd years of technological advancement, policy and investment decisions, and changing preferences have given us the patterns of concentration, dispersion, and racial and economic segregation that still characterize the American landscape. But of course these patterns aren't static. Today's digital revolution is continuing to alter the needs for place, causing a host of disruptive influences on how and where businesses locate across and within regions, and how and where people work, shop, and travel.

Meanwhile our demographic revolution is having its own impacts. With a diversifying population and changing household structures driving increased desire for more walkable, high amenity places.

The effects of these forces are very mixed however. For cities and other areas

suffering from years of job and population loss, these trends have brought a welcome revitalization of neighborhoods, growing concentrations of businesses and jobs, and higher tax bases. But these forces are also continuing to leave far too many places behind. Across the country, the digital economy is rewarding large global centers that are attracting innovative companies and educated workers. While many older industrial cities and Heartland communities, particularly small and mid-sized cities and rural towns, struggle to keep pace.

Many of these same winner-take-all trends are also playing out within regions. Indeed recent research by the Economic Innovation Group has shown the already prosperous areas within metros have been adding firms in jobs since the recovery, while economically distressed areas continue to face decline.

So this brings me to the third reason we are watching the Bass Center. New forces are creating an imperative to reimagine our approach to place and how communities invest in transformative placemaking that generates widespread economic benefits. This means making transformative place investments in rural communities like Newcastle, Wyoming, which is looking to reverse job and population loss by remaking its downtown main street and diversifying its economy through outdoor recreation tourism, locally grown entrepreneurship, and leveraging the perks of small-town living.

It means making transformative place making investments in culturally rich urban communities like the Bronzeville community in Chicago, whose existing economic assets, strong civic infrastructure, and central location are helping to drive new development, yet which continues to be challenged by the lasting effects of urban renewal, disinvestment, and discrimination that have stymied economic opportunity.

It means making transformative placemaking investments in growing economic districts like the downtown Chattanooga Innovation District where decades of waterfront redevelopment and high-speed internet infrastructure are driving rapid residential and job

growth, but which is facing the pressures of rising real estate values and the risk of social and economic exclusion.

And it means making transformative placemaking investments in suburban business parks like Columbia Gateway that are looking to reinvent themselves for a new era. Gateway leaders are hoping to do just that. A recent report suggests that a fully built out area should include nearly 2.3 million square feet of housing retail and amenities that help support a 24/7 urban lifestyle. Such development will require significant updates to covenants and zoning ordinances, however, which will take years to complete. In the meantime Howard County has invested in a new innovation center which will house among other things a business incubator and a community college satellite campus. Along with a cafe an event space. Park owners have also developed creative new office spaces and have been hosting lighter, quicker, cheaper activity such as food truck days. Transformation won't happen overnight, but it's a start.

For decades planners, community development groups, and other place-focused organizations and practitioners have been working in thousands of economic districts like those I've described. Yet their efforts have been constrained by outmoded policies, practices, and investment structures that hamper the scope and the scale of their impact.

The Bass Center hopes to help change this dynamic by gathering and disseminating knowledge, by documenting and designing model approaches to inclusive placemaking, and by facilitating systemic policy and investment reforms that enable placemaking innovations to scale within and across our communities. We hope you'll join us.

DEWS: “The Brookings Cafeteria” podcast is the product of an amazing team of colleagues, including audio engineer and producer Gaston Reboredo, with assistance from Mark Hoelscher. The producers are Brennan Hoban and Chris McKenna. Bill Finan, Director of the Brookings Institution Press, does the book interviews, and Jessica Pavone

and Eric Abalahin provide design and web support. Finally, my thanks to Camilla Ramirez and Emily Horne for their guidance and support.

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Until next time, I'm Fred Dews.