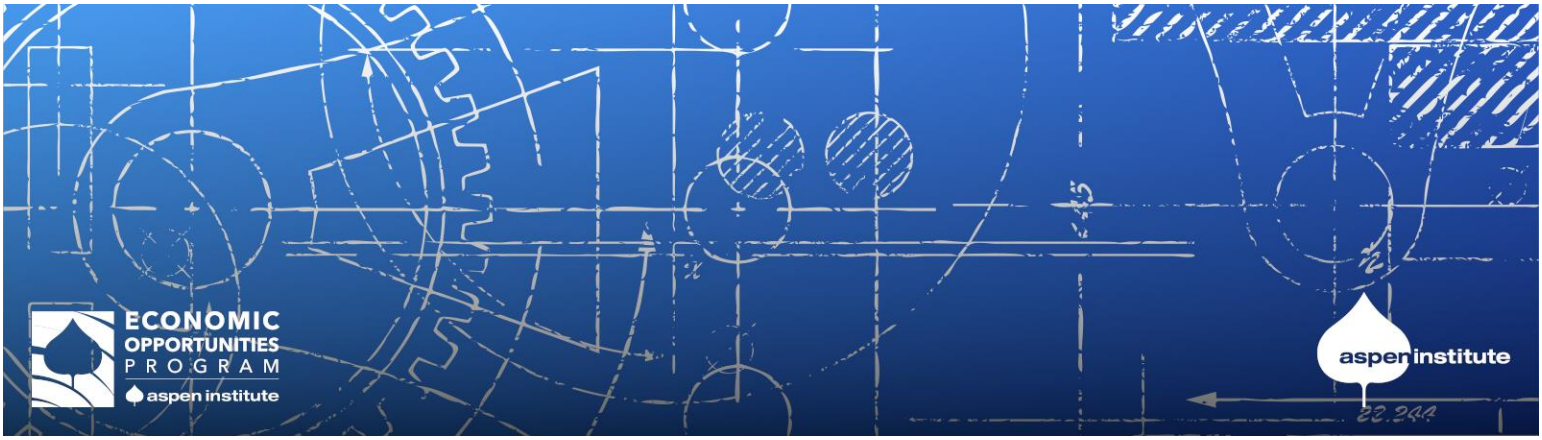

For Better or Worse: Designing Jobs During Technological Change – Transcript

Hosted by the Aspen Institute Economic Opportunities Program

Wednesday, July 27, 2022

Description

Increased global competition in recent decades has unleashed a new wave of technological advancement, and a new wave of predictions of technological displacement and job loss. But job destruction is not a foregone conclusion of technological advancement; in complex systems outcomes are hard to predict. Technology can replace workers or make work less fulfilling, but it can also be used to complement workers' skills and improve wages, safety, and employee engagement. Choices about developing and deploying technology and designing new jobs all make a difference.

Employers, workers, government, philanthropy and others can play an active role in shaping how technology is used, how jobs are designed, and what the future of work will be. How does technology affect job design? What can employers and businesses do to invest in technology and their workforce to improve business performance and increase employee retention and engagement? How can workers be engaged to help shape operations and how technology is developed and used? What can we learn from human-centered design?

This is the first conversation in our three-part series, The Job Quality Choice: Opportunities and Challenges in Job Design.

Speakers

Ben Armstrong

Executive Director, Work of the Future Initiative, MIT

Ben Armstrong is the executive director of MIT's Work of the Future Initiative and a research scientist at the MIT Industrial Performance Center. His research and teaching examine how workers, firms, and regions adapt to technological change. In his work, Ben has collaborated with governments, nonprofit organizations, and firms to understand how scholarship and education can be useful to practitioners and policymakers. Previously, he worked for Google Inc. and served on the board of an open-source hardware nonprofit. Ben received his doctorate from MIT.

Lisa Dewey-Mattia

Director, Office of Continuous Improvement, Port Authority of New York and New Jersey

Lisa Dewey-Mattia is the director of the Port Authority of New York and New Jersey's Office of Continuous Improvement, a team that applies lean and design thinking to transform processes to meet internal and external customer needs. In her twelve years with the agency, she has managed efforts across multiple disciplines, from exploring new technology for the PATH train system to logistics planning for World Trade Center Redevelopment. Lisa has a bachelor's degree from Brown University and a master's degree in urban planning from Rutgers University's Bloustein School, and she holds a professional license from the American Institute of Certified Planners. She lives with her husband and two young daughters in the beautiful community of Maplewood, New Jersey.

Becky Lee

Director, IDEO San Francisco

Becky is a director in IDEO's Learning practice. Her portfolio is focused on access to transformative learning and meaningful work. She partners with leaders of colleges, training programs, and Fortune 500 companies to think creatively about talent and workforce development.

Becky brings expert facilitation, storytelling, and systems thinking to design challenges at the intersection of learning and work. Most recently, she collaborated with Opportunity@Work to design tools, services, and experiences that advance economic mobility for people without four-year degrees. She has also partnered with the Ford Foundation to elevate the voices of non-salaried workers at corporate organizations. In earlier work, Becky explored taught design thinking to professors and laid the foundation for California's first online community college.

Prior to IDEO, she helped launch mobile TV ratings at Nielsen and taught English as a second language as a Fulbright fellow in Brazil. She earned degrees in English and psychology from Cornell University, where she researched adult attachment in the "Love Lab."

Moderator

Danielle Abril

Tech at Work Writer, The Washington Post

Danielle Abril covers technology and its impact on workers across industries for The Washington Post. Before joining The Post, she covered Big Tech companies at Fortune including Google and Facebook. She previously was a reporter and editor for more than 10 years in Dallas.

About

Opportunity in America

Opportunity in America, an event series hosted by the Economic Opportunities Program, considers the changing landscape of economic opportunity in the US and implications for individuals, families, and communities across the country. The series highlights the ways in which issues of race, gender, and place exacerbate our economic divides, and ideas and innovations with potential to address these challenges and broaden access to quality opportunity.

We are grateful to Prudential Financial, Walmart, the Surdna Foundation, the W. K. Kellogg Foundation, Bloomberg, and the Mastercard Center for Inclusive Growth for their support of this series.

Economic Opportunities Program

The Aspen Institute Economic Opportunities Program advances strategies, policies, and ideas to help low- and moderate-income people thrive in a changing economy. Follow us on social media and join our mailing list to stay up-to-date on publications, blog posts, events, and other announcements.

Transcript

Matt Helmer (00:00:03)

Good afternoon. I'm Matt Helmer, an associate director at the Aspen Institute Economic Opportunities Program. It's my pleasure to welcome you to today's conversation, "For Better or Worse: Designing Jobs During Technological Change". This event is part of the Economic Opportunity Program's ongoing "Opportunity in America" discussion series, in which we explore the issues affecting economic opportunity in the US, the implications for workers, the implications for businesses as well as communities across the country, and really explore ideas for change. We're grateful to Prudential Financial, Walmart, the Surdna Foundation, the W.K. Kellogg Foundation, Bloomberg, and the MasterCard Center for Inclusive Growth for their support of the Opportunity in America series, and a special thank you to our colleagues at JPMorgan Chase for their support of our work on job design and for their support of this event today, as well as for future conversations in this job design series.

Today's discussion is really the first event in a miniseries we're hosting called "The Job Quality Choice: Opportunities and Challenges in Job Design." High quality jobs that provide a good standard of living, the opportunity to grow and advance in a workplace that is safe, promotes inclusion and equity, and meaningfully engages workers and respects their voice and contributions are no accident. Designing quality jobs, as many of you know, takes a lot of intention and commitment. And that's a commitment to valuing workers' experiences, to valuing their wellbeing and voices, and to really also recognizing that those experiences and those voices are an integral part of a business' success. At the same time, on the flip side of that coin, low quality jobs that lack these characteristics are no mistakes either. There are undoubtedly constraints and barriers that employers face, but behind all of these jobs, whether low quality or high quality, are a set of design choices. These choices obviously include things like pay and compensation and benefits, as well as how the work is structured and how job tasks and responsibilities are designed, but really job design is a lot more than that. It includes choices around training and advancement, recognition, mentorship and supervision, choices around how we make sure workplaces are safe and equitable, choices around scheduling, worker autonomy, worker voice, as well as employee ownership and profit sharing, and so much more than that.

I think a lot of us know, though, today too many jobs in our economy have been designed with little consideration for the workers in them, which we know tend to be women, people of color, and immigrants, that typically feel the brunt of working in low quality jobs. Today over a third of jobs pay less than $15 an hour, making it very difficult for people to meet even some of the most basic needs around food and housing and other things such as that. Many of these jobs are also characterized by other poor working conditions that fail to provide workers with dignity and stability.

In this series, we're exploring some of the choices that lead to high quality and low quality jobs, the different factors that affect job design, the barriers and challenges we face in designing quality jobs, and ultimately how we can get to a place where we make different choices, so that we can create more quality jobs so that workers and businesses can succeed together. In future conversations in this series, over the coming months, we're going to be looking at design choices around work-based learning as well as employee ownership, but in our first conversation today, we're going to be looking at technology and, more specifically, how is technology affecting work and different strategies, design strategies, that we can use that can support positive outcomes for workers and businesses alike.

Over the last decade or so, we've heard a lot about automation and prediction of very large scale job loss. By and large, that hasn't come true, at least not yet, but we see examples of technology affecting work in our daily lives, right? We see self-checkout lanes at stores; there's ride sharing services that we use; the Zoom call like we're on today; there's always new apps and computer software and the algorithms behind them that are affecting work. All these technological changes are affecting how we consume, how we travel, how we communicate, and how we work. Those changes can be positive or negative for workers, but as we're exploring in this series, and in this particular conversation today, those changes are choices that we make. Some of the questions we're looking at today, that we have a wonderful panel that's going to help us explore and answer is, how does technology affect job design? What can employers and businesses do to invest in technology and their workforce to improve business performance together? How do we value workers' voice in this process? How can workers be engaged to help shape operations and how technology is developed and used in the workplace? And what can we learn from human-centered design that might give us some sense of how to approach some of these challenging issues?

I'm going to introduce our wonderful panel here in just a second. Just a few house cleaning issues to go over, as it relates to the technology that you all are using today. All attendees are muted. We welcome your questions. Please use the Q&A button at the bottom of your screen to submit questions. We also encourage you to use the chat to share your perspective, your ideas, your resources, your experiences related to today's topic. We appreciate your feedback, so please stay on the line at the end of the webinar to complete a quick survey.

We're really glad to have so many people joining us today. Thank you to many of you who submitted questions in advance. We'll try to weave those into the conversation as we go. We also encourage you to tweet about this conversation. Our hashtag is #talkopportunity. If you have technical issues that come up during the webinar, please message us in the chat or email us at EOP.program@aspeninstitute.org. We are recording this event, and it will be shared via email and posted on our website. Closed captions are available for this discussion. Please click the "CC" button at the bottom of your screen to activate them.

Now it's my great pleasure to welcome and introduce our panel and moderator. You can find more information on them in your materials and on our website. First, we have Ben Armstrong, executive director at the Future of Work Initiative, research scientist, and interim executive director of the Industrial Performance Center at MIT. We have Lisa Dewey-Mattia, head of continuous improvement at the Port Authority of New York and New Jersey. And we have Becky Lee, director in IDEO's Learning Practice.

We're so excited to have Danielle Abril to moderate today's conversation. I'm sure many of you have seen or read her work. Danielle is tech at work writer for the Washington Post, where she focuses on how technology is affecting workers. Before joining the Post, she covered big tech companies at Fortune, including Google and Facebook, and she previously was a reporter and editor for more than 10 years in Dallas, so she's a perfect person to be guiding today's conversation, and we're so grateful to have her here. Danielle, thank you for being here, and I'll turn it over to you.

Danielle Abril (00:07:19)

Wonderful. Well, that was a great introduction. I really appreciate it, Matt, thank you so much. Thanks to everyone also for joining us today. Just to give you a quick background on exactly what I do and how I can help frame this conversation, basically a lot of my job involves talking to workers, employers, business leaders, and so far, most of them agree, the pandemic really accelerated the adoption and roll out of new technologies, and that ultimately changed how people work, and it changed how people live, and it changed their expectations for work and what we should expect moving forward. Everything from Walmart making big tech investments to bring additional tech and data analytics that will help their workers be more efficient and also help shoppers have more convenience at the stores, to frontline workers getting more communication and collaboration tools from Microsoft, and office workers, of course, more than ever are using online collaboration tools that have all sorts of situations tied to that.

Then, the future of the workplace, according to a lot of leaders, could include tools like smart classes or holograms, AI powered robots. A lot of those we're already seeing, but perhaps even more coming. It also has a lot of big implications, implications to data privacy, employee monitoring, and even inclusion in some cases.

As an expert once told me, tech can be used to enable great things or it can cause big issues. I think that's a great way to turn to our trusty panel here to help us dive into some of these topics and understand this a little bit more thoroughly. Ben, I'd really like to start with you. First of all, if you could just tell us a little bit about yourself, your work at MIT, and give us a sense of some of these big picture ideas, new workplace technologies and their implications.

Ben Armstrong (00:09:23)

Thanks Danielle. I lead a group at MIT focused on automation and its consequences for the workforce. In the context of job design, we're really focused on how new technologies shape the demand for skills, so it's not as much about benefits or flexibility in work hours, but a question of when you adopt a new piece of equipment or you buy a new software system, does that lead you to hire more skilled workers, so more engineers, or let's say more workers without a college degree, and how do the wages change for those workers.

What I really like about how you framed the conversation, Danielle, and also how Matt did, is that this is a choice. It's not just that the market tells you, here's the technology you need to buy, and here are the workers who can operate it.

There's a choice when you buy a robot, for example, whether you add a technician who can program a low code or no code robot that might have lower barriers to entry versus a caged industrial robot that really demands more engineering skills. For employers, and also for technology developers, there's a choice in how you design the technology, how you integrate it into your firm, that affects the types of workers who will benefit, who will win, or who will lose as a result of that technology.

Matt mentioned that there have been these fears of a robot apocalypse or automation leading to the displacement of lots of workers. We haven't seen that. One of the reasons we haven't seen that is because automation and new technology adoption's really hard, that when firms try to adopt new technologies they often fail, or they end up using those technologies for a much more limited purpose than they initially intended.

I study manufacturing. Fewer than 10% of manufacturers have a robot, despite all the conversation about robotic automation on the factory floor, and only about a third of those manufacturers use specialized software at all. That's pretty consistent with overall numbers across industries. While big firms are talking about the metaverse and all these very advanced applications of machine learning and artificial intelligence, the vast majority of firms are focused on much more basic technological challenges. In my work, I argue that those technological challenges that are much more fundamental are the ones affecting the majority of the workforce.

Danielle Abril (00:11:37)

Sorry, I'm going to stay with you real quick, Ben, just to clarify that last statement. When you talk about like more fundamental challenges and the technologies or the technological issues, can you just clarify exactly what you're referring to there?

Ben Armstrong (00:11:50)

Yeah, so let's contrast a lot of the air time for AI machine learning and the metaverse versus the number of employees who are actually affected by these technologies in their day to day work. At the moment, the share of companies that have adopted any of these technologies at scale is extremely low, and the applications of these technologies that might affect the two thirds of workers without a college degree aren't clear yet. Even just CNC milling technology, which is 40 years old, more than 40 years old, that's much more relevant to a lot of the middle skilled workforce, for example, than these more advanced technologies that get so much play in the media. Just to say what I focus on are those technologies that might be two or three generations old for engineers but are still playing themselves out in the majority of the workforce.

Danielle Abril (00:12:42)

Got it. That makes a lot of sense. Okay, great. I'm going to move to Lisa. Lisa, I understand the Port Authority of New York and New Jersey is one of the largest in the country, but can you familiarize us a little bit with some of the different types of work and jobs at the Authority and a little bit about your role and why these questions around new tech and job design are critical to the Authority?

Lisa Dewey-Mattia (00:13:06)

Of course. Thank you, Danielle. As Danielle and Matt mentioned, I lead the Office of Continuous Improvement at the Port Authority of New York and New Jersey. I'll start with the question of what is the Port Authority?

The Port Authority is a bi-state agency that's charged with managing and maintaining the critical infrastructure to our region's trade and transportation network. That includes the five regional airports, including Newark, LaGuardia, and JFK, the New York-New Jersey Seaport, the PATH Rail Transit System that connects New York and New Jersey and the six tunnels and bridges that connect the two states, as well as the Port Authority Bus Terminal and the World Trade Center site. In addition to those assets, we

manage a roughly $30 billion capital plan that encompasses redevelopment at all three of those major airports. Simply put, our mission is to get people and goods where they need to be, and to do this in a way that delivers world class 21st century infrastructure and experiences.

On the workforce front, we have roughly 7,500 port authority employees. About 70% are represented unionized staff and 30% are non-rep, but we have tens of thousands of employees that are contract employees or work for vendors at our facilities, so a big sphere of influence. As for my role, as I mentioned, I lead a team that's focused on continuous improvement. What we do is collaborate with partner departments, be that folks that manage those assets or the staff functions that support them like HR procurement and finance, to drive improvements for internal and external customers. We do that using human-centered design and LEAN. Just going back to what Ben mentioned, we really are focused on the basics. We're not focused on the big, new emerging technology, but how do we automate basic work processes and use our employees' experience to drive those?

Why are the questions around technological development and job design critical to us? The Port Authority is a 101-year-old organization. We have a critical mission, and we must evolve in order to meet that mission. That clearly involves evolving technology and staff and how they work together. As for the role for CI and my team, the Office of Continuous Improvement, continuous improvement is really about elevating the voices of the workers and the customers to understand the challenges and then solve for them. That clearly includes technological advancement.

Danielle Abril (00:15:33)

Got it. Okay, that makes a lot of sense. Becky, turning to you, tell us a little bit about your work, how IDEO works in this space and why you think today's discussion and this work is so important.

Becky Lee (00:15:46)

Sure. Thanks, Danielle. My name is Becky and I'm a portfolio director at IDEO, a global design firm. In short, we use design and creativity to solve complex problems. What started off as product innovation and things that you can hold in your hand has really expanded to using design to shift larger systems and help organizations make strategic choices about who they are, what they stand for, the value they create out in the world, especially for their employees.

My background is in learning and education, and so particularly designing products, services, experiences for adult learners, helping to bridge the gap between learning and earning, and making meaningful careers more accessible for more people. As much as I believe in the transformative power of learning, through my work in that space, especially with workforce development and leaning into corporate learning and development, seeing how skills alone can only go so far without investment from companies on the other side, so the burden can't just be on an individual to learn more or do more or try harder. We also have to think about shifting our systems of education and of work, so to teach more industry relevant skills in more accessible ways to make hiring and career development processes more inclusive, and to think about the quality of jobs that people are getting hired into and the ways that these technologies affect them.

Danielle Abril (00:17:19)

Got it. Great. Well, I think that was a great introduction. Thank you guys so much for explaining so eloquently what you do and why this is important. I'm going to switch over to the choice. Matt talked a lot about technology is a choice and how we use it is a choice, so let's dive in a little bit there. Lisa, I'm

going to start with you. Tell me how you're approaching and thinking about technological advancement and its impact on your workforce and your customers and how that's evolved over time.

Lisa Dewey-Mattia (00:17:52)

Sure. As I mentioned, my team's charge is to really understand employee and customer challenges and then to form teams that are comprised of the employees that own the processes in order to improve them. This includes scoping projects and problems all the way through implementation. Obviously, many of the solutions that the teams come up with involve automation or other tech deployments or advancements, but the key factor to the model, regardless of whether it's a technological advancement or not, is that it's the employees who own the processes that are guiding the improvements throughout the entire process from, again, identification all the way through implementation, and so you're designing with the users, even designing the scope of the problem with the users, as opposed to for the users. The byproducts of this are that solutions actually address the problems, that you're building the buy-in throughout and you're actually achieving that impact, and that you're empowering and engaging employees by doing this, so the multiplying effect.

That's all pretty basic information, but I'll provide a little bit of context to a project and how we applied that. We worked with our colleagues at PATH, the CX team, the customer experience teams, the operation and maintenance staff, to develop a customer experience feedback loop. Historically, customer complaints were coming in through social media platforms, through public shaming, and the team developed a very simple technology solution, a QR code that employees could scan. A basic form populates into a list, some pretty basic workflow. Again, technology's very simple, but the real power was working with that ops and maintenance staff to really figure out what are the processes behind the scenes that enable them to get the information that they need to act on it in order to achieve an exceptional customer experience?

This sounds really simple, but when you peel back the onion for the process, it's actually pretty complex, right? We have staff from various units and divisions, different specialties for if there's an issue with a train versus a coffee spill. We also have contract staff, janitorial staff. Really working through the how do you get the information that's needed to the right person, so they're able to address it in an effective way? That's where the power comes in. The power and impact came from building the process, as opposed to, again, going back to what Ben said in his intro, that basic technology. This really makes what was a negative experience, where again it's very public, something that may be relatively minor because it's out on social media to an actionable, positive experience, where people want to have the information that they need to do their jobs, and getting it to them effectively is actually a way of empowering them. It's technology and measurement with data as an enabler versus an oversight.

Danielle Abril (00:20:54)

Got it. In terms of evolution, is it fair to say it just moves faster? There's a feedback loop happening. It's much more effective in that sense. Is that fair?

Lisa Dewey-Mattia (00:21:06)

Exactly, right. It's more effective there's feedback to the customer. It's quicker, and it's also done in a more productive manner.

Danielle Abril (00:21:18)

Got it. Okay, I'm going to move on to Becky, because obviously I'm sure she has a lot of thoughts about this specific topic. Obviously, a key theme of today's discussion is around choice and how we use these technologies. Some of those choices can help support workers and job design and others can make it worse, much worse. What opportunities do you think technology creates for workers and firms? What are the potential downsides there? And what do you think are some of the drivers of which path firms take as they implement new tech?

Becky Lee (00:21:54)

Yeah, it definitely-

Danielle Abril (00:21:58)

That's a lot. Sorry.

Becky Lee (00:21:58)

That's okay. It definitely is a choice, and I'm really glad we're having that conversation. I think, the way I think about it is that companies and leadership are designers, designing for customers and also designing for employees every day. That includes making choices about product offerings, but also about wages, about technology, benefits, learning and development, and even culture. These advancements in technology do often go hand in hand with narratives around job loss, but as Ben alluded to, often it's more of a job shift, so not necessarily that there are less jobs for humans, but different ones, ones that require different skills both to use those new technologies and to be a part of designing and developing them. Transitioning this workforce and filling this gap isn't only about skills. I think these jobs often come with different identities, as well, and it's not always easy for someone in a particular role to see themselves in a totally new role, a tech role, where they might not see a lot of women or people of color or people of the same backgrounds as them.

To me, that's a real opportunity for companies to invest in and think creatively about learning and development and career paths for workers, both in terms of technical training to actually use these new technologies or of the evolution of older technologies, as well as upskilling, mentorship, internal mobility programs to expand who's designing and developing these technologies, as well. That feels like opportunities for learning and growth are a really essential part of designing good jobs and mitigating these big, scary transitions. It also really meets a core human need while benefiting a business and building a more resilient and dynamic workforce, which feels just especially important when thinking about implementing new technologies or making big technological shifts.

In terms of drivers of how the impact technology might have, I think it's really less about technology inherently being bad or good, but more about how it's used and in service of what? Technology is really reflective of an organization's culture and values, so it can amplify problems that already exist, from racial or gender bias to data tracking and invasions of privacy. If your company really values compliance and cost-cutting, technology will help you do that better and faster. If your company values learning and employee experience, it can also be used to help workers build new skills, have more agency and problem solving, like Lisa shared, or simply make their work easier and better.

Danielle Abril (00:24:48)

Got it. Okay. Ben, this kind of bleeds actually into the question that I was going to ask you. Becky's statements of it can help or hurt an organization, depending on how they use it, and it can help or hurt the workers as a result. Can you give us some examples of different approaches you've seen firms take as they deploy technology? What has driven those firms to take those approaches, and the lessons and outcomes that resulted for workers and the firm?

Ben Armstrong (00:25:22)

Sure, yeah. I want to think about this in two parts. I think the first response is to some of Becky's comments and the second to Lisa's. Becky, I really thought it was interesting, the points about identity and a worker's feeling of ownership in their role or empowerment or disempowerment. I think that's really interesting, and also this idea that technology's what we make of it. It's not deterministic. I agree with that.

I think there's also... Engineers bear some responsibility in this process, in part because there's certain technology trajectories or types of software design or hardware design that have optimized for... Let's go back to the robotics example. Robots have been designed for productivity, not flexibility, and that's not because of what robotic automation could do. It could be flexible in principle, but a lot of the investment has been focused on let's make these machines excellent for repeatable routine tasks, to improve productivity over what a human could do.

Those design objectives on the technology side, of course, influence all of the decisions that an employer might be able to make down the road because that's the technology that's available. I think it's a yes/and to Becky's statement, that yes, the technology is what you make of it, but there's also the menu of technologies might be limited, depending on where we've chosen to make progress versus where we've taken a pass on some potential tech. Now, part of that's maybe the market's fault, so we can bring the market in, too, but there's engineering investments to be made on more worker friendly technology designs. I think that's piece one.

Then, for Lisa, I had this question. Similar to the process improvements that you've made using what seemed like automation software, maybe robotic process automation, I wonder if you ever thought of it. It sounds like you've taken a bottom-up approach, where you've empowered the people who own these routine processes and really asked them for their advice on how to automate various parts of their job. In my experience, when you ask someone to do that, they pick the parts of their job that they really don't like, and then they automate it. Then they really like the automation because they've automated a part of their job that they didn't want to do anyway.

I've studied this in a hospital system, where the hospital system chose this bottom-up approach, asking employees, who do routine tasks, what to automate. Then they were a little bit disappointed, at least senior managers were disappointed at the end, because they felt like they left a lot of potential improvements on the table, because the workers were never going to identify certain tasks that they liked owning, but still could have been automated and really made either cost-cutting improvements or improvements in overall productivity. I'm wondering if you saw any of that, Lisa, from your colleagues, the trade-offs of bottom-up approach and how you thought about those trade-offs.

Lisa Dewey-Mattia (00:28:23)

Sure. I mean, I think you have to do... You have to tackle it through multiple angles. I mean, there's also sort of that top-down, like we need to transform this area, that's equally important. Also, in a public

agency, we have a lot of enterprise systems that need to be evolved and changed. I think this may be in between the two, which is, when we need to do that, how do we approach those procurements in a way that obviously follows our very ethical and important procurement processes but also empowers people in that process. It's not necessarily things they want to do, but it's important. It's critical to the operations of the organization. How do we make sure that it's done efficiently and may or may not be things that they desire to be, as individuals, to be "automated" or changed? I think it's multi-pronged, and it needs to be.

Danielle Abril (00:29:23)

Great answer. Ben, did you have more you wanted to add on that?

Ben Armstrong (00:29:28)

No, I'll wait until the next question.

Danielle Abril (00:29:31)

Okay. Okay, great. I just want to mention that we are seeing your questions come in, and I hope that this next group of questions will help answer some of the questions that are coming in, or at least one that I'm seeing come in from James Wall, but we are going to move on to design strategies that help support good worker and business outcomes.

Becky, let's start with you here. Worker voice and input is an important part of what we're talking about. Why is centering workers in this conversation important? And can you give us some examples from your work that shows exactly how to do that?

Becky Lee (00:30:11)

Yeah, for sure. I think, in addition to the ethical value of engaging people who are most impacted by a given change or new technology, a lot of the solutions to some of these challenges around technology implementation live with those closest to the challenge, especially when workers are end users. Part of the challenge is figuring out how to have workers use technology in the right ways, to the right ends. Frontline workers are often living through the pain points of these different processes every day, and there are probably pieces of that, that they would like to automate or to apply technology to, to help solve their own problems, in service of solving customer problems, as well. We found a lot of inspiration in the hacks and real-time solutions that people come up with in their day-to-day, as pointing to different ways that technology could improve their experience as well as the customer experience.

I think, to Ben's point, there are trade-offs, and somebody at a leadership level might have access to different information or things that a frontline worker might not have access to, and frontline workers also have access to a different level of information than leadership might. I think a design approach can be helpful here, because design doesn't necessarily claim to know the answer, but helps test and prototype different directions in lower stakes ways, so you could try on, what if this was automated? Or try on, what if we applied technology here? Then build evidence to support either direction, based on how it actually goes. In that way, it doesn't say, leaders are right, or workers are always right, but how can we bring the best of what everybody knows and the expertise that everybody has at the table to a process that helps us get to what a better solution might be?

For example, an organization that we were working with, I was trying to improve their customer onboarding experience, went through really great lengths to redesign that experience, designing new interactions, creating new intake forms, even have those forms translated into Spanish to make them more accessible, because that was a real strategic priority at the leadership level, but it was the frontline staff who knew that their regional customer base actually spoke Portuguese, and because they were engaged in that process, they were able to spot that miss before it happened and before that new onboarding was implemented at scale. Really having both of those lenses and points and view at the table can be super valuable. In that way, the role of leadership isn't to have all the answers, which is very stressful and a lot of pressure, but to enable the best solutions to surface from wherever they might be, even if it's in unexpected places.

Danielle Abril (00:33:14)

Some good words of advice there, super helpful. Lisa, I want to turn to you. I know you've actually worked with IDEO, and I want to hear more about the worker voice listening lab. Can you describe that project, how you engaged workers, the challenges, what you learned from that? And help other employers think about how they implement this technological change that you guys did.

Lisa Dewey-Mattia (00:33:41)

Of course. I think Becky's comments are a great context setting for sharing a bit more about this specific project. With the project that you referenced, the OCI team and Newark Terminal B worked with IDEO and the Ford Foundation. The design challenge was to listen to workers at the facility, Terminal B at Newark, to drive operational improvement and enable exceptional customer experience. How do we do this? This is another bottom-up example, to use Ben's term from earlier. With IDEO's guidance and structure, the Port Authority formed a co-design council that was comprised of operations staff at Terminal B.

The project team launched a three-week design sprint, where they started with identifying the two critical challenges that they faced every day in order to do their work. Those were access to information, so there were multiple siloed systems that included information regarding flights or baggage. Many of them are OnPrem in the operations center. This resulted in countless emails, texts, phone calls to follow up on and resolve any operational or maintenance need.

The second was mobility. Terminal B is a million square foot facility. Again, many of the core systems that have the data that are needed are in that ops center. They can't be accessed remotely, and so this creates this constant workplace commuting to and from the office, being the ops center, and the terminal where they're interacting with customers or resolving maintenance issues.

Based on these two needs, the team developed three concepts to low fidelity prototype or test. The first was a one stop data shop. This was a mobile accessible hub where that real-time flight information, gate information, baggage belt info, was available to them at the terminal away from that control center. The second was a maintenance tracker, so an easy way to capture maintenance issues, track them throughout resolution. The third was a team roster. The intent here was that there'd be contact information for all the stakeholders, that exists in that complicated ecosystem of an airline terminal, so the airlines, janitorial staff, other government agencies, TSA, CBP.

Then, taking those three concepts, the co-design council, with IDEO's support, tested each of these solutions in a live operating environment. Immediately, it became clear that the team roster was not effective. It didn't solve for the root causes, which were really about stakeholder coordination, and so the lesson learned is listen to staff, and embrace failure. When things aren't working, move along.

The other two concepts proved to be really valuable in supporting the operations staff and having the information they needed when they needed it. I think this is a great example, and those were two concepts that were developed. Now the team is looking to build out, is working on building out permanent solutions.

If we think about what we learned and what the benefits are, they're operational, right? Those are obvious, but they're also organizational, right? One of the things that really resonated was that, after we did this design sprint, the co-design council members really felt so empowered and eager to replicate this prototyping concept for their future work. Really, this is a way of building that continuous improvement capacity and really shifting mindsets towards bias towards action and embracing experimentation, which is fundamentally critical to evolving as an organization.

Danielle Abril (00:37:20)

Okay, that's super interesting stuff there. I hope that other people can learn from what you guys were doing. Excuse me. Ben, can you tell us, what are some practices and strategies you've seen firms use that can help unleash tech in ways that augment workers' skills and abilities? And is there a different framework of thinking about how firms make these decisions, that focuses more on the social implications and consequences?

Ben Armstrong (00:37:51)

Yes. I'm also going to just refer... I see one of the questions that is directly related to this, from Steve Richardson, about the role of customers here, not just workers and employers, but there this boundary condition that whatever an employer does needs to satisfy their customers, needs to meet the consumer demand in some way. I think that's really important as a boundary condition. If we think about the status quo, a lot of the status quo deployments in technology... I'll use just manufacturing as an example that we can imagine that manufacturers, for the last 20 years, have been focused on meeting customer demands for price. They can't really increase prices too dramatically of the goods they produce, so they're trying to make incremental improvements, incremental and continuous improvements, to their processes, so they can continue to compete on price while also retaining workers of various skill levels. A lot of the technology investments, as a result of that focus on customer demand, have been very incremental. How can we make a marginal investment in new technology that can maybe shave a few pennies off of what we can deliver, increase our margin a little bit?

The exception to that rule has been manufacturers that supply the Department of Defense. The reason why these defense contractors, some not all, can pull this off is because they get these higher margin contracts with the Department of Defense. They give them some room to invest the new capital in equipment and new technology, that then changes their demand for workers. They can invest in new training to accommodate those new pieces of equipment. There's a different... The Department of Defense is a different type of customer that allows a different type of technology investment.

It's a little bit of a tangent, but I do think customers are important to consider here. The framework that we use to think about the social implications, we just call it positive sum automation. There's a zero sum automation model, where you think of an automation technology as in comparison to a worker. Your question, if you're a company and you're evaluating a piece of software or evaluating a new machine, is how can this machine perform compared to a human worker doing this task? Is it higher quality? How much am I going to pay the machine to operate it per hour versus a worker? Of course, machines don't take bathroom breaks, which is what companies often cite when they talk about their love for their new equipment. That is what I think of as a zero sum framework, because what you're gaining in efficiency from the machine, you're losing in flexibility and learning of your human worker.

The positive sum automation framework that we're working in is trying to understand how we can improve productivity while also increasing flexibility. That requires you not to think of human versus machine, but the machine as a tool for human teams to do their work better.

Now, this is sometimes hard to imagine because you're like, okay, is the person going to be guiding the robot to perform this task? Probably not, but the model... I'll just use one firm in Ohio as an example. This firm is very open to new technologies. They were an early acquirer of new robotic automation, CNC automation on their factory floor. They have about 20 employees. Over the last, I think, five or six years, they've tripled their productivity, their output per employee, so they've had dramatic growth. What they've done is they didn't just go from hiring technicians to hiring engineers. They trained their technicians differently to operate this new machinery. It went from one technician to one machine, to one technician to three machines, and those technicians learned how to use the machinery more flexibly.

What I was surprised by, in talking to and learning about this firm, is that it wasn't like they brought in a technician and just taught that technician how to program in various languages, so they could operate automated machinery and automate the automation. It was that they learned the traditional machining and technician skills first, and then they learned the automation skills. The idea of how you can be flexible as a human and what your advantage is, is that you know everything from the basics up to the most advanced skills, whereas the machine might only be able to do tasks within a very limited band. That was an interesting technique that I've seen from this traditional manufacturer that now adopts a lot of new technologies.

Danielle Abril (00:42:20)

Is there a benefit to that? I mean, you kind of mentioned it, obviously, having the human be able to do more than the machine, but in terms of training the human worker to do so much versus the machine just automates one. That seems like a lot of investment, too, in the training.

Ben Armstrong (00:42:38)

Yeah.

Danielle Abril (00:42:38)

Can you explain? It seems like it would be maybe a shortcut to just teach the person how to handle the automation.

Ben Armstrong (00:42:47)

Yeah. I've been struggling with that, too, because every time they've explained this... We've talked to this company over and over again, trying to really get at what's making them tick. How is this dramatic growth happening? How they explain it is that to just learn the programming and just learn how to structure the automation is an engineering task. You don't necessarily understand why you're machining a part in a certain way or why you're going through this process in the first place, so learning those fundamentals... This is my interpretation of what they're saying. Learning those fundamentals allows a technician, who's on a factory floor, to decide, oh, now I can redeploy my robot to this other machine because that's going to help me gain more productivity. Whereas if you just knew how to program the robot, you didn't understand how that robot fit into this broader production process, you might not have known how to... that doing that switch would be beneficial.

I'll contrast this with another strategy that some startups use, which is instead of hiring entry level technicians, more skilled, let's say, machinists, and then engineers, they just hire all engineers. They're just having engineers do more of the production tasks, as well, because they figure, if we're very capital intensive, our engineers can, if they understand the process, can just program all of these automations, so we don't need the same technician skills. That's an alternative approach. I think it has real productivity benefits, just the benefits that are generated by that engineering intensive process aren't really shared with the majority of workers that aren't highly educated, like engineers are.

Danielle Abril (00:44:22)

It kind of reminds me of younger years in school of memorizing something versus learning something, right? Memorizing is like I'm going to do the thing and that's all I can do. Learning something, you can actually apply it to other things and probably be a lot more effective. Yeah, that makes a lot of sense. Got it.

Ben, I want to stay with you. I'm going to move on to our next topic. We're going to talk about practice and policy takeaways. And I do want to leave some time for some of the questions that are coming in that I know we haven't gotten to yet. Let's continue, Ben. A lot of people are struggling with these issues in their local and regional labor markets. What can we say about the future of work and technology now? And how can those at the regional or local level prepare for the future?

Ben Armstrong (00:45:17)

I think the big takeaway from this that I... is that there's a growing gap between high wage regions. Most of big cities that we're familiar with, places like Boston, New York, Seattle, San Francisco, even Chicago, if we're going to pick a Midwestern city, they're becoming high. The wages are growing much faster than the wages of rural and smaller cities are growing. That gap between high wage and low wage regions is growing, and so, too, is the technology gap among employers. If you look at, for example, the jobs demanding digital skills across geographies, there's a far lower demand for digital skills in rural areas and lower wage metropolitan areas than in these big metropolises. Why does that matter? It's because jobs requiring digital skills typically pay more.

The job opportunities, the job trajectories, in rural America are just worse, from a wage standpoint, than job opportunities in more densely populated regions. This is a big problem. Some of the rural and smaller metropolitan areas that are doing well, places like Ames, Iowa; Columbus, Indiana; Tulsa, Oklahoma, in some respects, where I've seen them really excel is in diversification, that they've found industries that aren't just their historical strengths but industries that are adjacent to those historical strengths. They've been able to invest in those areas, so that a welder who might have been in the oil and gas sector could then become a welder in the aerospace sector and apply their skills in those adjacent industries.

Danielle Abril (00:46:55)

Lisa, give us another example to walk away with that highlights how you're approaching technology, job design, and worker voice. If you can, just talk a little bit about what employers and businesses or those who partner with them can do to build that into their practice and organizational capacity and culture.

Lisa Dewey-Mattia (00:47:16)

Of course. I've talked about two customer-facing efforts and two bottom-up projects. This is more of an employee-focused internal process and a bit more top-down.

I think we all recognize that efficient back office processes are really the key to a healthy organization. We worked on a project that may be less exciting than the other two that I mentioned, but had to do with insurance risk reviews. This is the process of reviewing insurance requirements that need to go into contracts to ensure that we're protecting ourselves as an organization.

These reviews were taking up to 90 days. Procurement staff or a department that was looking to execute a contract or a lease might require it to do business, and they were putting this response into sort of a void, right? No idea where it was in the process, whose court it was in, what issues may exist.

This was causing delays in issuing contracts, in proceeding with work, going back to what Ben mentioned earlier, probably not something that folks were jumping up and down saying, "We need to fix this," although the customers, in this case internal customers, were really dissatisfied with the process. What the team did was an iterative, employee-driven development of a tracking and management tool.

I think Eric Cooper put in the chat a question about low code software, and we've seen a lot of success in the apps that are in the Microsoft Suite and using them both as non technologists, and then, in some cases, getting some support from our internal tech department. This is one of those.

What the team did was define the problem, understand from the customer's perspective what information they needed visible, and iteratively built the tool with the employees who did the work, do the work, again another example of designing with the user and not for the user. While this was a bit more top-down, really it was effective in ensuring that this tracking tool, which is really tracking people's work, it's tracking from the folks who were doing the risk reviews, but because they were involved in the development, they actually see it as a benefit. It enables them to do things efficiently. They no longer have to search through their emails in order to find all of the related documents. They know where things are in the process. Again, another example of things not being seen as an oversight tool, but instead something that enables them to do their jobs. The employees have embraced this tool and approach, and then the customers', again internal customers in this case, satisfaction doubled shortly after deploying the tool in the new process.

It's just another example of using this user-based approach. You asked some additional questions about building capacity as an organization. If we take a step back, and we think about all of the examples that I shared, there's certainly common factors for success.

The first and foremost is sponsorship. At the Port Authority, we've had incredible sponsorship for change and employee enablement, both for our prior executive director and over the past five years, Rick Cotton, our executive director, and other senior leaders who really believe in process improvements, care about this, are asking questions. There's visible support for enabling the voice of our customers and our workforce, and that's critical. It's fundamental to being able to do this sort of work, especially in our environment.

I'd say, on a related front, we are thankful to have a devoted and embedded team. Again, this comes back to sponsorship, and I will say a team of absolute all-stars. My colleagues on the OCI team are incredible. Similarly, the folks we work with across the organization, folks that have a desire, there's an interest, there's expertise. It's been historically a career organization. Folks stay here for 30 years. They move around. They know what they're doing. They want to improve. It's really about creating the processes and the support that enable and empower employees.

Danielle Abril (00:51:38)

Becky, I want to give you the last word here before we move to audience questions. What are some thoughts you want to leave our audience with regarding job design, technology, and the worker experience?

Becky Lee (00:51:51)

Sure. I think, in this conversation you can tell it's not easy to navigate all of these different choices about implementing new technologies, the right ways to engage workers, how best to invest in upskilling. I think that's part of why it was so interesting to go through this worker voice lab and bring together multiple companies, a non-competitive space to experiment with senior sponsorship, and why it's exciting to have folks like Lisa sharing what it's really like to grapple with these questions as a large-scale organization. I think that question that came up a little bit around what about customers? I think it's starting to become more normal in the corporate world to bring approaches like LEAN or human-centered design to think about things from the lens of a customer, but there's something interesting here about also thinking about employees as customers to design for.

They are the recipients of this work experience and these processes and these tools that a company and its leaders make decisions about. There's also something interesting about thinking about employees and frontline workers as designers themselves, enabling them to better design for the customers who they are most proximate to and have the most insight into their needs. In the lab, we really saw that creating this container for design and thinking about who your end user is, whether it's a colleague or a customer, creating a space of permission to fail, tangibility to experiment without making different assumptions or big investments, can be a powerful starting point to help companies start to navigate these really complex questions while also breaking down hierarchy by centering around the experience instead of who is right, and creating a vehicle to engage workers in that problem solving.

We always think about design starting with people and human needs and listening to those most proximate to a given challenge. For companies, that often means your employees, and especially frontline workers. The more engaged workers are in how and why technology is implemented and to what ends, the more they can help spot gaps and unintended consequences and breaking points.

That means making sure that their input is valued and heard and acted upon, and also that they feel safe and confident showing up in these ways that might feel outside of their day-to-day responsibilities. Listening is a first step on the journey to navigating these questions, but I would start there.

Danielle Abril (00:54:40)

That's a great ender thought, although we are not done. I would like to burn through as many of these audience questions as we can. Some of these are pretty open-ended, so I'm just going to ask the question and then allow whichever panelist wants to take a first crack at it to go at it, and if anybody would like to add on, we can go from there.

I think there's a couple in here that are specific to specific panelists, but otherwise feel free to just chime in if you have an answer for any of these questions. I'm going to start with, how can we ensure technology enhances equity rather than reinforces biases that may exist within platforms? Anybody want to take that one?

Ben Armstrong (00:55:30)

Where are you looking, Danielle? I didn't see that one. Sorry.

Danielle Abril (00:55:32)

Ah, so I'm getting sent some questions.

Ben Armstrong (00:55:35)

Oh, you have the master. You have the better list, okay. I was all, you know, studying this other list. Just to shout-out a colleague of mine, one of the things, two philosophy grad students at MIT who have since graduated but are still working in this area, developed something. They called it the ethical computing platform or ethical computing protocol, which is really designed to address these questions or at least identify where there's risks of bias in potential, in algorithms or other new technologies. They developed this as part of their own philosophy work, and then they've deployed it across engineering classes at MIT. Now we're starting to work with employers and technology companies to see if this can work in industry as well. Of course, it's designed for the classroom, but we think that the protocol, which is really just a systematic way of thinking through how your technology might affect different stakeholders and where it might introduce bias or accentuate bias that's already out there in the world, and then writing that down and essentially saying, "Here is where we might run into trouble if we make this design choice." That's the goal.

Of course, there are risks of doing this in industry, because you might open yourself to liability, or you might just be a little too aware of the weaknesses of your product, but our hope is that we might be able to deploy this with willing industry partners and help prevent some of these cases of bias that lead to poor outcomes for everyone, for shareholders, as well as workers and consumers.

Danielle Abril (00:57:12)

Got it. Lisa, did you want to add something there?

Lisa Dewey-Mattia (00:57:14)

Yeah. I'll add to that from a different lens, the non-technology, more the process angle. One thing that I think my colleague, Megan Maxwell, is on and she was raising earlier just this week was we, like I spoke about, we use LEAN and human-centered design, and there's many... Those that are familiar with LEAN, you think about waste in a process. One thing we want to try and build out is how do you integrate DNI and also sustainability in other important lenses as you're doing that analysis of a process inefficiency or where there may be weakness, so that as you build that improved process, which will eventually be automated with some technology, or there may be a technology that's deployed, that you're doing so in a way that's equitable, inclusive, and advances the goal, so just another way of thinking about it.

Becky Lee (00:58:08)

Yeah, and just to build on that, I think there's a couple of different points at which that question comes up. One is when you're identifying the problem that you're trying to solve, from whose perspective, and who is even a part of shaping that scope? Then there's also just the value of smaller scale prototyping

and testing, and making sure that you're doing that with an inclusive set of users and participants, so that people are a part of not only spotting what works and what doesn't before you're implementing at a large scale, but also are able to contribute and direct and shape the way that a particular design decision is made.

Danielle Abril (00:58:53)

All good advice here. I'm going to move on to the next one. What role can unions and collective bargaining play in the process of designing jobs during technological change? Did I stump you?

Ben Armstrong (00:59:12)

I'm happy to jump in quickly. I actually just responded to one of the Q&A questions in the chat on this, where one of the real opportunities for lower wage workers, as a result of automation, is to incorporate more incentives into their pay, so that once you have more data, if you're a high performer, you could get more bonuses, just like if you're a high performer as a salesperson, you could get more commission, so more pay for performance, I think, is an opportunity to really share the benefits of automation with workers, who might not have otherwise seen them. The challenge is that this isn't very popular among unions. One of the... This is a tough trade-off, and there are some unions like the UAW that have made explicit the rules or the structure of how companies like GM can integrate new technology onto the factory floor and how that might affect the union occupations. I think that one opportunity for unions, which is easier said than done is if there could be more flexibility around incentive-based pay, I think there could be more upside for lower wage workers from automation.

Danielle Abril (01:00:23)

Real quick, sorry to push back on that. Ben, I'm curious how you view that in terms of getting more data. Obviously, you can have more incentives if you have better data, but then you have the question of everybody's really worried about employee monitoring and this churn situation, where it's quantity over quality or the Amazon fears of I can't take my bathroom break because I've got to move so many packages.

Ben Armstrong (01:00:53)

Yeah.

Danielle Abril (01:00:54)

Yeah, how do you view that?

Ben Armstrong (01:00:58)

No, I think there's a real trade-off between data collection for control versus data collection for empowerment or entrepreneurship. I mean, I think there's the same problem with Uber, but it's spun a little bit of a different way. You have more data as an Uber driver to... At different points in time, the trajectory of the app have allowed you to optimize and be a little bit more creative, a little bit more entrepreneurial. I would love to see more opportunities for workers to become more creative and to use other skills if their tasks are routine. I really like what Becky said in terms of designing for workers and

treating workers as designers, and that takes some type of additional technology or data to empower them.

At the same time, you're right, that I think that the same data could be used for social control. I think what companies like Amazon have found and are finding is that that leads to really high churn, really high turnover, and that's costly to companies, when you're losing your workforce every year and you have to retrain. It's like there is certainly a trade-off, and there's also incentives, I think, not to use the data for social control, like it could be, but there's that potential, to be sure.

Danielle Abril (01:02:12)

All right. Let's move onto the next question. How do we move upstream to the engineering phase to bridge the tech design gap between being too process-focused instead of people-focused?

Becky Lee (01:02:33)

I'll just offer. I also saw another question around doing this kind of design process when sometimes the tech is coming from an external partner. I think there's a similar gap in its being designed all the way over here. Decisions are being made all the way over here, and then the implementation happens, and the users are all the way over here. I think there's something about more interdisciplinary processes, where engineers are at the table a little bit later than they might usually be, and users are at the table a little bit earlier than they might usually be, so creating more proximity between the people who are making some of the design and code decisions with the people who will be end users, continuing that narrative that it's, if you want your technology to be used in the right ways, in service of the right goals, you want to be able to have access to those users earlier on. Everybody wants things to be used better and more appropriately.

Danielle Abril (01:03:40)

Okay. The next question is somewhat related. I know, Lisa, you actually gave us some examples earlier about this. I think this is asking for just a little bit more from anyone, but can we drill down into some concrete human-centered design practices and why more employers do or don't use them?

Lisa Dewey-Mattia (01:04:09)

I mean, I'll kick us off. I think I gave those. The three examples that I spoke about really are all about human-centered design. That's fundamental to the work that our team does and our approach to tackling problem solving.

I think there's also a capacity building component, right? Becky's spoken to that. That's her area of expertise. You have to balance those things out. You need a bit of both in order to really get that organizational cultural shift.

Becky Lee (01:04:40)

I think where sometimes the barrier comes up, it can be easy to say, "We will ask people questions in the beginning." I think sometimes the harder part is, okay, great, we got that input, but now, later on, we're making decisions, we're evolving, and how do you continue including people in a process once the

train is moving? That can be part of the tension, or just something that you need to be planful about and really consider not just having one point of interaction and one point of input, but figuring out vehicles or interactions or rituals or ways for people to give continuous feedback to have decision-making power farther along in the design process, as well. It's, of course, easier said than done, but I think knowing that it's not one single moment to include people in a process can help plan for ways to allow that input to happen over time.

Lisa Dewey-Mattia (01:05:48)

I'll just add briefly to that, that I think there's initial overlay, as from a government organization standpoint, which is the procurement process, which can complicate that, right? Again, solid reasons why we need to do things a certain way, but there are ways of creatively involving worker voices throughout the process. I think we're starting to see that. Who's on the committee? How do you develop a scope so that it's iterative? How do you engage with a firm without really knowing what the end result is? I think there's a lot of opportunity to explore there, but an interesting, additional way of thinking about it.

Danielle Abril (01:06:27)

This next question is specific to Ben. Can Ben talk about what we know so far about the impact of tech and automation on wages?

Ben Armstrong (01:06:40)

Sure. This question has been studied across many countries now, and it's studied in a couple ways. One is this overall trajectory in the United States, but also in Western Europe, which is typically considered the polarization of the labor market, where wages and job opportunities have gone up for college educated workers, and they've been mostly flat for workers in the middle of the education distribution, the skill distribution, and at the lower end. There's been more lower end job opportunities than more higher end job opportunities, which is why we think of it as a polarization, and the middle has really suffered. That trend, that polarization, has been associated with automation, the idea that automation has decreased demand for middle wage jobs, like jobs in manufacturing. The challenge is that, at the same time that all this automation's been happening, so too has been the rise of Japan, China, South Korea, as manufacturing competitors, and that trade competition's also decreased manufacturing jobs.

Story one is polarization of the labor market decline or hollowing out of middle income jobs, and that is sometimes associated with technological progress, but at the firm level, there's a much different story, so story two is that, when firms in manufacturing in particular adopt new technologies, they end up hiring more people. Typically, the most advanced technology manufacturing firms are also the firms that are becoming more productive and hiring more people. At this point, there's a choice. There's some firms that hire more people, and they increase wages. Then there are some firms that hire more people, and they change the distribution of skills. You could change the distribution of skills, such that I'm going to adopt technologies and hire more engineers, and those engineers will be paid more, but my production workers' wages won't change. Then there are other firms that won't necessarily change the composition of workers. They'll keep having a lot of production workers, but the wages overall will go up. The wages story, at the firm level, is kind of a mixed bag depending on choices that the firm makes, but overall the higher tech companies are employing more people.

Danielle Abril (01:08:51)

Super helpful. Great. Can anyone speak to the technological change in hospitality and goods services and its impact on workers? Does anybody know anything in that realm? Not anybody's specialty.

Ben Armstrong (01:09:15)

If anyone out there in the audience works on this, there's actually... I've been looking for good data on customer service automation in particular, so reactions to interactive voice response and chatbots. I have some intuitions about what workers like and don't like, similarly to self-checkout in retail, but I don't know of good data on it right now. If anyone's interested in talking more, I'd love to. I'd be curious,

Danielle Abril (01:09:38)

Ben, what's your intuitions here?

Ben Armstrong (01:09:40)

My intuition was that self-check, just similar to that question of customer versus employee... When Becky said you need to design for the employee, I thought that's exactly what self-checkout didn't do is they didn't design for what the employee might have thought would be most productive. They instead designed for what they thought the customer would want, and it ended up being a lose-lose, at least... I'm a Trader Joe's shopper, so I actually... They don't use any self-checkout, and they end up being more profitable and more productive. Actually, I don't think there's any data, if you just look at firm productivity, that self-checkout is better, but it'd be helpful to know at a more granular level.

Becky Lee (01:10:18)

Yeah, I think it's not a specific example, but there's an interesting analogy in the world of education in terms of teachers and students and education becoming more direct to students enabled by technology without really rethinking what is the role of a teacher or asking, thinking about the capabilities that might be needed for a teacher to be able to deliver learning in new ways. I think there's, similar to the example, Ben, that you just gave around point of sale and checkout, there's just a question of remembering that the employees and the staff in that space are delivering your experience. Leaving them out of the equation is going to create some kind of break in that experience. It doesn't mean there aren't new roles to play or new activities or interactions to enable, but that that role needs to be considered in the process.

Danielle Abril (01:11:19)

I know we just talked about education. We just talked about retail. One of our attendees asked, can they talk about how some of these ideas apply outside of manufacturing, tech, and logistics? I know we just gave two examples of two other industries, but if there are other industries you can think of or ways to apply these ideas to other industries, I think that would help some other people here.

Becky Lee (01:11:53)

Yeah, just to draw a couple of dots, I think it's... A lot of what we're talking about, I think, is broadly applicable. In your introduction, Danielle, you... and even Matt talked about how technology is being applied to every industry in every way, whether it's health care or retail, the way that we shop, the way that we search for information, and our traditional paths of going to a person or going to a store or a physical location are being rerouted. I don't have specific examples in other industries, but I do think that the same way there's that analogy with education and teachers and students, the delivery of an experience through technology most often is going to change the roles that are involved.

Whether it's bypassing a nurse practitioner or changing that role, there's something important to think about, about the identity of the people who are in those roles, the activities that they're being asked to do, what new capabilities they're being asked to build, and how that change can also make their job, which we've learned is essential in all of these different industries, easier, better, or offer them new opportunities that are valuable, as well.

Lisa Dewey-Mattia (01:13:20)

I'll just build off of that and stress that I think it's almost irrelevant, the industry, and actually all of these things are applicable. The project that we did with IDEO and the Ford Foundation, we actually had... There were two other partners involved in that. One was an airline and one was a healthcare provider. One of the things that was so clear in all of those inter-organizational shares was that it didn't matter whether they were picking up the phone from a patient who was calling about a doctor's appointment, or if it was a customer, an employee at terminal B. It was the same challenges and the same concepts of solutions. I think human-centered design and how it's applied to technology is relevant across all industries.

Danielle Abril (01:14:03)

I see that Matt has come back on screen, and that is my cue that we are out of time, so I'm going to pass it back to Matt.

Matt Helmer (01:14:10)

Yeah. I'm so sad we're out of the time, as I'm sure others are. I took a lot of notes and learned so much from that conversation. Thank you again to Becky, Ben, Lisa, and Danielle. Great job, really rich information, and gave us a lot to think about.

Please stay tuned for some information on our next conversation coming up on September 14th. As I mentioned earlier, we're going to continue this conversation on job design and look at something that intersects with the topic we talked about today and look at work-based learning and skills development in the workplace.

Thanks very much to Maureen Conway for her vision, leadership, and support in this work, and to all of our colleagues: Yoorie Chang, Colleen Cunningham, Amanda Fins, Adrienne Lee, Tony Mastria, Victoria Prince, Martena Reed, Shelly Steward, and Sinin Young. We couldn't do this without you. Many thanks to everyone who joined us today, everyone on social media, who's been tweeting about today's event using #talkopportunity. It's great to see how this conversation resonated with you there and on the chat. Thanks again just for joining us.

Please take a moment to respond to our quick survey, which will open on your web browser when you leave the webinar. You can also send us an email at eop.program@aspeninstitute.org and let us know what you think. We'd love to hear from you. We hope to see you again here shortly. Thanks so much.