Public Sector Future podcast

Detail: Episode 57

Colleen Elliott [host], Dr. Pramod Varma [guest]

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**OLIVIA NEAL:** Hello and welcome to Public Sector Future. As you'll know, this is a show for anyone who cares about using digital approaches in the public sector to deliver better outcomes and I’m your regular host, Olivia Neal. We're here today with our second episode looking at digital identity with guest host Colleen Elliott. We’re back with our guest host Colleen Elliott, and today Colleen is joined by Dr. Pramod Varma to discuss how digital identity was put in place in the largest country in the world.

***DR. PRAMOD VARMA:*** *Something this large, which almost everyone wrote off saying it’s not going to happen, 1.4 billion people digital identity, you’re not going to give it for the next five decades, it’s not going to happen, right? And we gave a billion people identity in six and a half years.*

**OLIVIA NEAL:** As the former Chief Architect for India's Aadhar Identity program, Dr. Varma shares his lessons from delivering for over a billion people, and how this fits into India's broader approach to Digital Public Infrastructure.

Over to you Colleen.

**COLLEEN ELLIOTT:** Hello Dr. Varma. Welcome to Public Sector Future.

**DR. PRAMOD VARMA:** Thank you, Colleen. Pleasure to be here.

**COLLEEN ELLIOTT:** So India is about a decade into their digital transformation. Why don’t you start by telling our audience how India got here and how they achieved this great feat?

**DR. PRAMOD VARMA:** A lot of serendipity,

But the journey started for India when the telecom revolution picked up, India was – as an economy was very closed until ‘91, ‘92, when India opened up our economy. So that was very key for us.

And our telecom regulator and the government had fantastic foresight at that time to make sure that we open up that sector, And we went from no one having a phone to a billion people having a phone in no time.

But even then, and that was much to do with what’s called physical infrastructure that was quasi-digital. Of course, you know, it laid the necessary foundation for the subsequent internet era to begin. That is when the seeds of what we subsequently know as India Stack or India’s Digital Public Infrastructure, DPI, journey began.

It’s important to realize, in 2009, internet was 15 years old by then, as we know. I mean, technology existed, but popular internet. And then cloud computing was picking up already. Smartphones were launched.

Even then, in 2009, India was struggling to bring formalization and financial inclusion to a billion people. We had in 2009, less than 17 percentage, 1-7 percentage of Indians had bank accounts, very, very low number, almost no one paying sales tax, very small percentage paying, you know, income tax. Very, very few people have access to financial products and so on, right?

At the same time, in 2009, India was also spending about 50 billion U.S. dollars as direct – into subsidy, what’s called direct subsidy, to, you know, pregnant women, pensioners, food security, farmers’ subsidy, and which subsequently became, you know, well-known during COVID. But India was beginning to lay that foundation then because nobody had bank account.

And this is also important because 9/11 in the U.S. created significant ripple effect in the financial industry to curtail terrorism funding.

And the interesting ripple effect of that, the stricter the financial sector got, the less people got in. It’s a very direct implication to inclusion. We just couldn’t open bank account because we tightened the noose on terrorism funding, the entire financial sector. And the more you tighten, the less people get it, as simple as that.

So we were in this, sort of cycle of no one having identity, no one having bank account, no one having financial access, but government spending lots of money.

And that was the beginning of the initial project called Aadhaar, which is our identity project, and but the best part, though, was the success of Aadhaar. And success breeds success, as they say, gave confidence to Indian Government, Indian policymakers to say, oh, something this large, which almost everyone wrote off saying it’s not going to happen, 1.4 billion people digital identity, you’re not going to give it for the next five decades, it’s not going to happen, right? And we gave a billion people identity in six and a half years, you know, so less than seven years.

So, it just brought belief in the system that a digital as a means to bring people to the formal sector is actually achievable in something, in a chaotic democracy like India, with the highly federal structures and so on.

And that will pave path to the new government under the leadership then. Aadhaar started with Dr. Manmohan Singh, who was Prime Minister earlier, previous regime, and the new regime was a complete political shift in 2014. But even then, the new prime minister was very clear, Prime Minister Modi was very clear that digital is the only lever we have to bring financial inclusion, health inclusion, education access

And that is when he launched Digital India Mission, which gave a very umbrella policy support for subsequent elements of what we call India Stack, which is DigiLocker as a credentialing infrastructure, e-sign as a digital signature infrastructure, and then UPI as a payment infrastructure layer, and then the data infrastructure. So we laid the payment, data, ID, signature all at one shot in one span of that eight years or so.

And that’s where we went from 17 percentage bank account to near 90-plus, under personal bank account, or nobody having an ID to a billion people having ID, all in that span of eight years. And it was very what’s called a nonlinear transformation. We compressed. And that was very interesting learning. Now we are on a roll.

**COLLEEN ELLIOTT:** It sounds like the digital foundations that were laid really came through identifying points of major friction that you are facing and delivering services to the public, and big societal changes, technology developments, mobile penetration, all of these things were like, factors in how India sort of forged its path to become a digital leader. That’s amazing.

So, the concept of India Stack, you kind of touched on it. What drove the decision to make these various components of India Stack population scale?

**DR. PRAMOD VARMA:** Couple of things. We need to unbundle here. One, 2G feature phone revolution gave rise to the need for further digitization, connectivity and so on. And Aadhaar gave everyone an identity, digitally verifiable identity. It meant we could now instantly open a bank account for anyone with no paperwork. And then we could also give SIM cards with no paperwork.

It’s very important to understand what are the core building blocks that will allow a paperless, presence-less, and a cashless way to provision services and access services, provision from the provider’s perspective, access from the citizen’s perspective, because every time I have to produce myself physically, it’s a cost. People have to give up their daily wages to go far and stand in line. And that is not affordable for most people. So how can you make it presence-less? That means people don’t have to be physically present. And other biometric identity gave a presence-less authentication capability.

Paperless was another key. We realized, unless we go paperless, the cost of paper overweighs the value companies can get out of the citizens because the citizens are micro. They will deposit $5 in a bank account. And a bank would say, you know what, it’s not a viable business. I can’t have a customer with $5, $2 bank balance. You know, it’s not even viable. You know, my cost is much more.

So how can we reduce paperwork in the system? And paperwork reduction necessitates two things: digital signature. A billion people should be able to digitally sign without paperwork and copies and all that thing.

Second, credentialing. Credentialing means if I show academic certificate, if I show a trade license, if I show that I’m a poor person, how do you believe that I am indeed saying correct thing? Today, it’s a very costly way to verify their eligibility, costly way to verify their claims. So at scale, when people make claims that I’m a poor person, how do you know that you’re a poor person? When people say, I am a degree holder, or I’m a high school degree holder, how do you know that you’re going to degree? Today, that cost of verification, or what you call a cost of trust is very high in the system. So if you digitally credentialize and digitally allow a signature, you can go paperless.

And then with UPI, we realized we are a heavy cash economy. We were extremely cash rich economy. Now we were only less than 30 million people out of 1.3 billion then population, only 30 million people, roughly about that used to do digital payments. and cost of cash is very high in the system.

So we unbundled these three core building blocks, one, identity for presence-less transactions, then digital signature and credentialing for paperless transaction, and UPI, unified payment for cashless transaction. And we went from 50 – 30 million people doing digital payments to today 500 million people doing digital payments. We just exploded.

But what was very key, and I’ll stop there, is a very important element, is that as architects of India Stack or India’s Digital Public Infrastructure, we were not building a solution; we were simply enabling the society to solve. Society means what? Marketplace, what we call bazaar, marketplace and civil society, as Indians call it, samaj, and we want the samaj and the bizarre to solve. If you want to solve, then you have to give them the tools to be able to solve.

And this was very key, especially given the scale and diversity of India. There is no single player who can solve our problems. So how do you get the marketplace to solve at a cost effective fashion, is by creating a playground and creating the building blocks thereof. And that’s how we were thinking, and that set the tone for the playbook subsequently.

**COLLEEN ELLIOTT:** So let’s jump onto Digital Public Infrastructure now. Could you just define for our audience what that term means and how it’s different from different approaches that are being taken to date?

**DR. PRAMOD VARMA:** Yeah, I think DPI calling is a hot topic today. I think India’s G20 presidency brought the idea of Digital Public Infrastructure to the fore.

So, traditionally, governments, when they take up digitization, they take up digitization as a fully vertical solution mindset. That means let me go solve agriculture problem. And for that, let me create some sort of strategy paper. Then let’s create, put out an RFP, then select a vendor, and we will implement the whole agriculture solution.

That is what digitization means, but the difficulty with digitization is fundamentally twofold. One, it means you’re first of all, as the government, there is one government sector who believes I can solve the entire agriculture problem through an RFP or digitization solution, right, and almost always false, it’s a falsehood. You know, it doesn’t work that way. And you know, it falls apart.

Second, you’re also assuming you know the solution. When you don’t know the future, when you can’t predict the future, you couldn’t have predict ChatGPT, literally. I mean, you couldn’t even predict two years. Our own AI experts couldn’t have predicted ChatGPT’s arrival, right?

So with such large transitions going on in the world, if you have no idea how the future is going to unfold in front of you, how do you know what solutions will work two years from now? This is the second problem.

And third is, if you think government alone cannot sustain, it’s too expensive, cannot do it all by government, then we must incentivize the market and the civil society to participate, which is the bulk of your society a

We were asking the question, if the entire world in the next 20 30 years is going digital, if the society is going to live in a digital realm mostly, why are we not thinking digital infrastructure? And what does it mean to think digital infrastructure? We are very much comfortable with the physical infrastructure as public goods, but we don’t think about digital infrastructure other than internet. Internet is the last known public good we built as human scale.

So India was pushing the internet thinking in the same principles of internet. How can we create a decentralized technology infrastructure by itself that is not opinionated? Internet is not opinionated, but it allows innovation, and through innovation we democratized knowledge. We democratized access through internet, and we live through that.

As India was asking the precisely same first principles question, if in the digital world, India is moving towards in the next 20 years, 30 years by the time India is 100 years old from Independence, Can we also create digital infrastructure on top of which market can innovate faster, cheaper? And when market innovates faster, cheaper, can we create inclusion as a side effect of innovation?

And that was very much the fundamental difference between DPI and digitization. Digitization is I know what to do, I will do it all by myself, and let me spend a billion dollars to do it all by myself. And digital infrastructure is that I don’t know what to do, but I do, I know the necessary conditions. Let me create the necessary impetus with which is called highway thinking or digital rails thinking, on top of it, so we can continuously evolve diverse solutions for the future, by the market, by whoever incentivized.

And if we have a vibrant marketplace innovating cheaper, faster, then we will have what India saw from 30 million people doing payments to 500 million doing payments. Government didn’t solve; market solved. But market solved on top of India’s infrastructure rails.

And that’s a fundamental shift into DPI thinking. I think it’s a best of market and best of public rails and private innovation, think of that way, beautifully coming together to create a massive exponential inclusion story and economic story.

**COLLEEN ELLIOTT:** So how do you think about interoperability and encouraging interoperability in this context of infrastructure thinking?

**DR. PRAMOD VARMA:** In fact, interoperability is not a natural muscle for marketplace. It will never be because if I were running a company, I would want to build as much moat as possible, to create walled gardens and keep as many customers in my garden.

This is where I think the DPI thinking as a sense of DPI thinking is to create interoperable building blocks. That spurs innovation. Three points, interoperable building block, not the whole solution, interoperable building block that allows rapid assembly of solutions by the marketplace. And if you can bring interoperability’s essence of it, because if you don’t interoperate, especially large countries like that, you will have extreme silos.

So what we are trying to do is to create the interoperable rails. And so interoperability is an essential DPI, and that cannot be outsourced to marketplace.

The only way to succeed DPI thinking and DPI adoption and DPI way of supercharging a digital economy in a hundred countries is by marketplace like Microsoft. No government alone can solve this. Indian government can’t give some source code or product to say, now you will somehow manage it.

Now, while a few countries might have the capability, capacity, some of them to do, we have I think 50 or 75 countries under 2 million population or something like that, you know.,

So cloud providers, solution providers, system integrators and consultants have a natural way that you can package the DPI elements, because much of the DPI building blocks, as part of the DPGA, Digital Public Goods Alliance, are coming into an open source regime.

So they’re all relying in one sense GitHub, you know, as Microsoft, open source repositories, lying around it, much of what India did, but can I or individuals or government go in every country and implement? Impossible.

So it is imperative, if you want to see an inclusive, vibrant digital economy around the world, if you truly believe that humanity deserves that, and every country deserves that, companies like Microsoft should put up your hand and say, I will step forward to package it and offer it in a consumable fashion.

Imagine if countries can subscribe some of these and get started in a span of three to six months instead of taking two, three year-long project of procurement, thinking through.

We must find a way to create packaged offering to the country, and only market will be incentivized to sustain that, because no other people will be naturally incentivized to sustain.

Without market being ready, we will have aspiration, but the reality won’t meet the aspiration. Many, many countries will say, I just can’t do it, just don’t have the might or the scale to do it.

**COLLEEN ELLIOTT:** So just turning back to digital ID and Aadhaar, so building DPI like Aadhaar is not without its challenges. So can you talk to us about one or two of the biggest challenges you faced in rolling out Aadhaar, and how did you overcome that?

**DR. PRAMOD VARMA:** Yeah, I think we faced three big problems. Challenge number one, political and bureaucratic acceptance. You’re only building one tiny Lego block called identity. And the value of that identity will be only unlocked when other people use identity, like a banking system starts using identity, or a food delivery system, or an agricultural system. None of those people were in our control.

Somebody else is building the house. And you have to tell them, your brick is very, very useful for that house. And it’s not natural in the government because a lot of times, governments work in silos.

Challenge number two, privacy challenge. The civil society and privacy as a matter, we didn’t have privacy. We just passed the privacy law. Congratulations to India. We just passed it, you know, and it’s fantastic. And this journey of privacy law started in 2012. And finally, we got through. Because as we digitized society, it was key. And as a biometric identity system for a billion people, there were genuinely a lot of questions asked about overreach, whether this data will be misused for surveillance, whether it will be used for crime problem. You know, all the while you develop the ID for something else, you solve it for something else, because now you have the data.

The history of independence India, Aadhaar debate, case against Aadhaar was the second longest in Supreme Court, by the way, India Supreme Court history. But we came out very successfully because of two biggest reasons: data minimalism, and very well-contained purpose. It took several years to get through that debate.

And the third was technological challenges, technological and rollout challenges. Technology and rollout sort of goes together. That means nobody before that had issued a unique type of identity to a billion people. So just technologically almost people gave up and said, most technology people said it is theoretically possible, but practically impossible and economically unviable technically, but we pulled it off.

Rollout means we have 22 official languages. Bangalore, where I’m from, speak about 109 languages. So we have several hundred languages.

So how do you do a technology rollout or set strategy with 150 people in the organization? That’s all we had, 150 people in the organization and 20 people in the technology team. We rolled out to a billion people.

So these were the three challenges: bureaucratic and political buy-in for identity as a means to change, transform their system. Second, you know, privacy as a challenge. And third, technological and implementation rollout challenges. But I think we managed to pull it off.

**COLLEEN ELLIOTT:** Was there anything that you had to do to overcome the technological challenges?

**DR. PRAMOD VARMA:** So there are many, many things. I think – first of all, we collaborated shamelessly, and Microsoft was part of that conversation. I reached out to everyone in every industry, whoever built any large system as a deep architect, to say, how would you solve it? How would you solve it? What are the ideas?

But that collaboration opened up a lot of interesting ideas, such as how do you use commodity computing architecture, instead of a special purpose computer. The Moore’s Law was going and computing was getting cheaper, faster, commoditizing, commoditizing, commoditizing.

So from the cloud architecture, I, you know, inspired by what Microsoft Azure pulled off using commodity hardware, we use commodity computing.

We played into extreme minimalism. Minimalism was very, very key for us. We played into ecosystem-driven architects. We had to really figure out how 600,000 villages and 100 million people every day to a billion people in seven years, less than seven years, it was an ecosystem play. And that also, we were inspired by Windows operating system. Look at the beautiful ecosystem you created.

So platform thinkers in the market, platform builders had already shown that scale, if you can leverage the ecosystem, you can scale. So we got ecosystem thinking, minimalism, thinking, commodity thinking.

So some of these were good, you know, learnings that went into the design, and the design holds good even now. We do 80 million authentications every day, and we have 1.37 billion people in the identity and so on. It’s a huge system, but it’s not that large.

And we use open source. So the entire system is built on open source and open APIs and commodity computing, everything that you can get cheap in one sense, and we assembled it well.

**COLLEEN ELLIOTT:** So if I was a public servant, starting my digital ID journey today, how would you advise me to get started?

**DR. PRAMOD VARMA:** Yeah, I think a few things, right? I think when you look at system like Aadhaar, don’t look at the features of Aadhaar. Look at the principles by which Aadhaar designed and Aadhaar scaled.

For example, we probably the only identity system in the world, which has only four attributes. We are so minimal that we have a (name and a gender, and address) and half the country doesn’t know date of birth, so we allow age. So it was such a simple design that it can’t go wrong with our design.

And second, that minimalism also helped for privacy and all the good stuff happened because if you don’t have data, what privacy can be valid, right? The more data you accumulate, the more questions come. And the more fiduciary responsibility you hold to protect the data.

Second, we applied an ecosystem strategy. That means how do you create a tiny organization that leverages what is abundant on the ground. We have a lot of village level entrepreneurs. We have all kinds of government bodies working. So we leveraged existing capability on the ground.

So it is a platform thinking, right, where you’re saying people are already there. How can we train them, incentivize them and leverage them? Because they can speak local language. They understand local cultural nuances. They trust each other. So why can’t we leverage it, rather than somebody barging into that village with some computer?

And third, we op-ex-ified everything. We bought no cap-ex. So we said we will give 40 rupees, which is half a dollar, half per dollar per whenever an Aadhaar is generated, we’ll give half a dollar to this ecosystem partner. Because the partner is given a technology fully packaged, secure technology. We said this ecosystem partner is trained and certified, who understand the local language and cultures. But the tech is given. They can’t do anything with our tech.

We completely flipped to incentivize, and the more you enroll faster, the faster you can actually earn. But we certified like a cookie cutter. We certified the entire system and packaged the software so that nobody can meddle with the security element of that part or process flow element of it. But the execution was completely using the local ecosystem, the amazing op-ex-ification we did. So some of these are good learning for them to learn, how to scale faster, cheaper, leveraging existing ecosystem.

**COLLEEN ELLIOTT:** So you’re currently the CTO for EkStep Foundation and cochair, as you mentioned, for the Global Center of Digital Public Infrastructure. What led to the start of these organizations, and what is the mission?

**DR. PRAMOD VARMA:** So EkStep itself was a mission that we started in 2015 that was to solve, we have 300 million children in the schooling system, 200 million in middle school and below. It’s huge, that’s they’re almost like a population of the largest country like U.S. It’s huge. our education needs significant push.

So EkStep Foundation was a philanthropic initiative to create education and skilling DPIs in the country, and we have done that successfully. Our efforts have led to 200 million children accessing one of the largest, world’s largest digital infrastructure called DIKSHA, where much of the code behind DIKSHA is a digital public good. It’s actually open sourced. And companies like Microsoft, Azure team and other teams are actually looking at packaging DIKSHA for many other countries right now as we speak. So very, very interesting things that is coming out of it because India has shown that and now other countries can also use it.

And what CDPI, Center for Digital Public Infrastructure, it’s a new creation, that happened only March of 2023 this year, literally, where I’m a cochair. This came again from discussion with World Bank, Bill and Melinda Gates Foundation, UNDP and so on, saying if DPI is going to be a way to solve digital economy and equity in the digital economy, it’s a way of thinking, we need to help many, many countries to be able to do so, so that they can create their own journey, and they can celebrate their own wins.

But what can we do to create design principles, design artifacts, open source DPGs, digital public goods, and the market readiness. Can we bring it all together, the knowledge, assets and the market readiness, bring it together to allow countries who want to take that journey to be able to take it faster and cheaper for them?

CDPI’s goal is to bring the ecosystem together, knowledge together, assets together, and it’s completely pro bono and philanthropy funded.

And again, I hope this inspires people to create their own journey for their own countries. But one thing is very clear, unless we come together and hold hands, it is just one government can’t solve, one small civil society can’t solve, one private company can’t solve. It’s a collective effort that we need to put together, so that every country can build the next 20, 30 years in a digital economy.

**COLLEEN ELLIOTT:** Thank you so much. This has been such a great comprehensive overview of what DPI is and how you applied it in the identity space and, what’s coming. So thank you very much for all the tips and tricks that you gave and all of your wisdom.

**DR. PRAMOD VARMA:** Thank you so much. Thank you for having me, and all the very best to all the listeners, and we look forward to collaborating with every one of you.

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**OLIVIA NEAL:** Thank you to our guest, Dr. Varma, and of course to our guest host, Colleen Elliott. And thank you to you for joining us today on Public Sector Future. If you haven't already, go and check out our previous episode on digital identity with Dr. Joseph Atick, Chairman of ID4 Africa. You can find that on our website, which is wwps.microsoft.com, or wherever you get your podcasts. Thank you, and see you next time.

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