A Discussion on Automation with Watts Humphrey Award Winner Rajendra Prasad

featuring Rajendra Prasad as Interviewed by Mike Konrad

Welcome to the SEI Podcast Series, a production of the Carnegie Mellon University Software Engineering Institute. The SEI is a federally funded research and development center sponsored by the U.S. Department of Defense. A transcript of today's podcast is posted on the SEI website at sei.cmu.edu/podcasts.

Mike Konrad: This is Mike Konrad, principal researcher with the Software Engineering Institute. Today, I have the great pleasure of welcoming and speaking with Rajendra Prasad, global automation lead at Accenture. He is also the 2020 IEEE Computer Society SEI Watts Humphrey Software Quality Award winner. This interview is actually the second of two interviews. The first is available as an SEI webcast on the SEI YouTube channel, in which the IEEE Computer Society President Forrest Shull interviewed Rajendra Prasad about winning the award and about the technical content of the work.

In this interview though, we look a little more at the journey that Rajendra Prasad took, his motivations, his speed bumps along his journey. Hopefully we will get a better insight into his maturation and his inspiration these past few years that has led him to this work that was recognized with this award. With that, welcome Rajendra.

Rajendra Prasad: Mike, thank you very much. It is a great pleasure and honor to be speaking to you. It's been a while since we met, you know the conferences that we used to attend in the past on Software Engineering Process Group, SEPG Conference it is popularly known as. It has been very, very nice to see you and also talk to you about this. I also want to thank SEI and IEEE for recognizing me for the effort that we put in as a team in driving the automation innovation at large scale within the organization. In Accenture, automation is the core DNA of how we do our technology and technology work with all of our clients that we work with in our organization. Thank you very much for having me in this conversation. I am looking forward to meeting you very soon in person.

Mike: That would be nice. So, I will begin RP [Rajendra Prasad] with maybe you could tell us a little bit about what it was that you saw organizations doing over your career that would benefit from some more directed guidance towards intelligent automation? What is intelligent automation?

Rajendra: Thank you. Thank you for that question. It is a great question. In my career, as you know that when we met, the process and process discipline and CMMI [Capability Maturity Model Integration] and the transformation of enterprises through process maturity journey, that acted as a foundational element for my automation and automation career that I have been within Accenture for the last six to eight years now on the journey that we have been driving, process implementation for a couple of years and then building on top of it, automation. When we talk about automation, when I talk to most of the IT leaders, CIOs within the field, one of the questions that I ask them is, *Can you please define or scope your automation definition?* That is the starting point because everyone has a different perspective of what automation means starting from robotic process automation (RPA) and AI [artificial intelligence], analytics, data-driven automation. All of this combined with the traditional legacy application-development software engineering where we used to write scripts in mainframe days, we used to write web scripts as well as macros. All of that qualifies as an automation. So, fast forwarding to where we are today, when we look at the technology transformation and the technology journey and where we are today, automation has taken on a very integral part of the enterprise's transformation.

Let me talk about, when an organization thinks about repeatable tasks, where they can save capacity for it. They look at infusing very small script-based automation. I call it a foundational element of automation. From there on, you start building and defining your processes in a very mature way, so that you can actually start driving automation, [and] capture the data that comes out of driving processes and automation-driven processes, which acts as a foundation for data-driven, data-based, data-infused, data intelligence to drive your automation from there on. In fact, when you move the data to AI, AI is nothing but UI [user interface] for data. So AI is the UI of data. When an enterprise on automation aspects are underpinned on data, then they have started using, as we call it, CMMI, right? Quantitative process management and quantitative project management. It's similar to that. Intelligent automation starts because you are now driving your automation using the data. That is kind of a long answer for a short question that you asked. Data-driven, data-based automation is what I call intelligent automation.

Mike: So, thank you, RP. So, process is certainly a focus. When I listened to your conversation with Forrest, one of the phrases you made, which I really loved, was, *Optimize, eradicate, and then automate*. Maybe you could tell us a little bit about that. How did you come up with that phrase?

Rajendra: As you know, we all come from the process background. Process for me is like discipline, doing things in a disciplined [way] is what process enablement, process industrialization means. When I talk to the leaders on automation, I tell them one very important thing. *Don't automate an inefficient process, because by automating, you've just made your inefficient process run more efficiently. Your inefficiency is now running more efficiently*. We don't want to get there. So, what is the fastest step? The fastest step in automation is optimize your process. Get the process right. Once you get that—be it Six Sigma, be it Lean principles, be it process discipline…CMMI will act as a very, very important process discipline to get your processes right. Once you do that, then you may want to address eradication, eliminating the waste; Lean process talks all about that. Then automate. You go through that optimize, eradicate, and automate as a continuous journey. In Accenture, we implement automation using this framework across all of the projects that we do: optimize, eradicate, and automate.

Mike: Excellent. Another theme that came from your earlier interview was business led, technology enabled, the holistic view. And when you spoke in terms of measures in a dashboard, you spoke of the importance of it being understandable, useful to senior executives. They are the source of resources and sponsorship for the work, the assignment of responsibility and accountability. So, business led, the holism, could you speak a little more to...I know why that's important, I know you know why that's important. But is that harder for a large organization than a small organization? Maybe we can get at what I am wondering about that way.

Rajendra: I think it is an excellent question because as we know, as Dr. Deming says, *In God we trust. All the rest, bring data.* It's very, very important for me, and quantitative, data-driven is the foundation for intelligent automation, as I said. So, one very important aspect that we implemented within the projects that we run automation is, *What is the business value that you want to accomplish when you implement this automation? Is it cost efficiency? Is it speed to market? Is it product quality? What is at stake?* Automation has investment. You need investment dollars to try it. And like any other process, philosophy, process enablement, management, commitment, and management decision-making, enablement is very important for success of the program. What we have done is we have built what we call as a value wallet, value enablement, return on investment on all of the automation implementation you do, and measure that quantitatively. In the larger organizations, they may need a lot more measures in aggregating to a metric to drive the implementation. In smaller organizations, you may have fewer measures and metrics to drive that. But at the end of the day, for every enterprise, you need one North Star that you can drive towards to get to that goal. That's the quantity-based measurement criteria that we establish for all the engagements to measure the ROI and investment of automation, so that it is aligned to business needs. It is not an automation for the sake of automation.

Mike: Small organizations both have an advantage and disadvantage. The advantage is there are fewer stakeholders to get agreement among and alignment among about what the business is and how they should run and what are the important processes maybe that should be automated. But they have a disadvantage in where maybe they haven't given as much thought to, as a concept, what makes the business run, what is the machinery of the business. They have fewer resources, and you already addressed the question on that last time. But anyway, any further thoughts on that?

Rajendra: You are absolutely right. There is a kind of what I call a big degree of variability in the way we approach in the larger enterprises and smaller enterprises. And in a larger enterprise, decomposing enterprise constructs in a way that it is a manageable entity where it can provide required dashboards and performance indicators for that entity leadership is equal to a smaller enterprise business. You are absolutely right in terms of availability of resources, thinking strategically for a long-term vision, how much they can put in investment dollars right now vs., *Let me see the benefits and then increase the investment*. All of these challenges need to be thought through.

There are many techniques that you can apply. For example, we want to run a quick quality function deployment, QFD, as a quality house technique to kind of prioritize them. You can do some techniques and run a design-thinking session. You know, again, I tend towards process-based solution to an automation that needs to be arrived at, but all of these tools and techniques absolutely work in terms of identifying prioritization needs for a smaller organization. In fact, in a smaller organization, it is important to get what needs to be done right, so that your investment dollars don't go to waste. I don't have the luxury of additional dollars that you can play around with. Whereas in large enterprises, that may be less of a challenge. So, it's important not to jump to the solution, but also the discipline of identifying what needs to be done is very, very critical for smaller organizations.

Mike: Thank you. One of the other themes from that interview was change management, which of course, is so critical to any kind of change to the assets, infrastructure, the culture of the organization. You want those things aligned, and certainly the components of a change-management system help with that, and you mentioned I know rewards and recognition. You mentioned a career path for automation. You mentioned the importance of getting everyone involved as best you can, so that they run the process. They even own the process. They help make the decisions of the process. That seems to come from an understanding that knowledge is kind of diffused in an organization, and while the leadership, as you mentioned, has concerns about long-term health and viability of the organization and what businesses it should be in, there is knowledge in almost every person. Where they see their job through their filter and have some sense of whether they've done it right or wrong, which maybe an observer might not appreciate.

Therefore, they might see the impacts of poor instructions or requirements or poor guidance or a poorly written service-level agreement. They may experience those, and somebody more remote, including, sorry to say, executive management might not necessarily appreciate that or perceive that. So, getting everyone involved, I thought, was a valuable lesson.

Mike: Could you speak to where you learn these lessons? I mean, obviously, the process improvement worldwide globally has certainly fed some of that. But you come up with some of your own particular insights or just nice, succinct phrases like the *optimize, eradicate, and then automate is one, be holistic, business led*. Could you speak a little more about your personal background or your personal career that has led you to those kinds of insights? Or if I want to advise one of my children, here RP is this great person, he has developed these insights about how organizations work. What should I tell them to do, I guess is another way to put it?

Rajendra: That's a tough question though. Like, you know, in terms of change principles, I have come up with a framework that I use for organizations to coach them on process implementation, as well as automation as an initiative. I call it the *4S model.*

Mike: Yes. I was going to get to that.

Rajendra: Yes, I use that as a simple, seamless, scalable, and sustainable model. Yes, that's my 4S to drive implementation. Let me just go through one step by step on…

Mike: Yes, please.

Rajendra: As an example, why [does it have to] be simple? You know, the technology, as you can see, Mike, continues to evolve, change. If you go to Google and search *automation tools*, you will find tons of tools. And you need to…a tool can't just help you to drive automation. So, and even in the enterprises, you already will have a lot of tooling. How do we make sure that whatever we select as a tool or an asset or an accelerator is simple and easy to use within the organization?

Mike: Yes.

Rajendra: Then, once you get the tooling, also we all know that enterprises are running. I use this analogy of a running train. How do you move your initiative, which is an automation program, into a running train? It has to be seamless. It has to go plug into the existing train. You should be able to move into, add another coach to the running train so that we can run the automation along with the existing thing. That's the seamless part. That is where all the API-based architectures that you need to bring for software development and asset creation seamlessly integrating into the ~~xxxxx~~core systems. So, making a simple and seamless integration are the two critical aspects, from the architecture and tooling, ~~xxxxxx~~and automation. Once you

do that, most of the ingredients as to whether we should do a big-bang implementation in the enterprise or we do entities within the enterprise or how do we scale in the organization? That is where the talent part in our resourcing-availability, institutionalization aspect. How do we scale the entire automation program and the techniques related to talent, availability, capacity and commitment, management, insights? All of that comes there. Then finally, once you have implemented a simple, seamless, scalable automation in place, how do you sustain that? It's not just a onetime activity, but I'm constantly driving innovation, looking at the driving vision for my automation. In three years, what will happen? How do you bring new techniques into it? You know, how do you keep running through the simple, seamless, scalable, and sustainable model to manage your change using all of the change tools? Communications, leadership commitment, measurement-based development, motivational aspects, all of that, so that's the way we drive automation: 4S model.

Mike: Actually, that's where I was leading to. So, you beat me to it. That's exactly what I wanted to discuss, your 4S model.

Rajendra: Thank you.

Mike: Was it a 3S model at one point in time or a 5S model? And how did you get down to four attributes of implementing a business-led automation program in an organization?

Rajendra: It is very interesting that you ask that question. I was talking to one of…I was in a conference in St. Louis. I was in the airport. I was talking to one of my colleagues saying that the way we explain the architecture, the API integration, talent creation, and then a continuous sustainability part of it and maybe it is just 4S. And then I was in St. Louis, it is five S's, I just came up with that in the airport thinking through that. This is how we should structure to communicate this, and that's a little bit of a history of how I found that and, you know, thinking while I was doing that.

Mike: Well, I had to see it twice. But the second time I went, *That's brilliant*. I love how it fits together. It's a great narrative for how to approach some kind of systematic business-led change, simple, seamless, scaling. You don't want just a point solution. You want the whole enterprise…and sustain. And that's…you pointed out, that's where you reap a lot of the benefits of automation. So, you see, I've done my homework.

Rajendra: Thank you very much. That's really, really critical. I think that's the power of this simple implementation part of the automation, and we continue to do that. That's where the talent creation, all of that comes in place.

Mike: How has automation changed over the past three decades or two decades, 25 years?

Rajendra: As I said, my first automated script, I think I did write in COBOL programming. We had to expand all the copybooks within the COBOL modules using REXX macros. And then boom, we submitted the ACL, and it expands all the copybooks. That's my first automation that I did, and I think if you look at from there to C, C++, Java, you know, the API, Python programming languages that came through all this. I think the fundamental premise of automation is, you know, like any other process discipline. The technology has changed. You have a lot more tools in your hand. AI and data make a huge difference. You can do predictive models, you can do recommendation engines, you can do cluster-based analysis. All of the statistical models, the open-source availability of different technology, fuels the acceleration of adoption. So the tooling and technology is the easiest part. But the difficult part is to make sure that you are doing the right automation, looking at the right business lens, and not doing automation for the sake of automating. Those are the critical things.

Mike: Right. Very good. Yes, also, you have something called, I forget what it's called, design thinking or design meeting? Could you describe that? I thought that that was innovative. I like that idea. Could you tell us about that?

Rajendra: Yes, we use that design thinking to identify prioritization of automation ideas. So, you get the people into a room, and you give them a problem statement, and they write down all the solutions to it. You put them on a…this is our pre-pandemic world. We've been through pandemic. We also have worked out a digital way of virtual design-thinking sessions, where you can use the Post-It slips of the writer, prioritization, rank them. And that's a very important tool because, one, it gets the buy-in. Because you run a design-thinking session with participants to say, *What should be automated?* As opposed to saying, *Go and automate this.*

Mike: Excellent.

Rajendra: It just gives you buy-in from the people who are part of the design-thinking session.

Mike: So, yes, and that's why I think it fits in so nicely with the other parts of the program that you developed, I guess mostly or entirely at Accenture. You now are able to share this with us, and so that's what makes this so delightful.

Rajendra: Thank you.

Mike: So, RP, one of the things that's in your thinking and that you've mentioned more than once I believe, is automation-first mindset, and I'm going to add to that, but in service to the business. I think you've touched on that already quite a bit. But I just love that phrase, *automation-first mindset*. Could you speak to, how do I know if I have the automation-first mindset?

Rajendra: Okay. This is good. I learned this from CMMI, to be very, very frank. The term *institutionalization*, the only way we can get institutionalization is, Watts [Humphrey] used to tell us, everyone in the enterprise to say that this is how we do the work within our organization. That is the maturity indicator in the process maturity framework. I took that and say, how do I say everyone in the organization, first thing they need to think about is, OK, *Is this something that I can complete by using automation? Is this a task that I need to do myself? Or can I free up my capacity? Can I do something more valuable?* That's the thinking. When you get to that kind of thinking at Level 4 and Level 5 in CMMI, the institutionalization, the generic practices of CMMI are taken into account. Similarly, my view is, when everyone in the organization starts thinking automation is the first thing that I need to think before I do anything, that automation-first mindset can build institutionalization foundation, thereby fueling and accelerating the benefits that can be generated from automation.

Mike: I think it's an excellent point. I think the automation-first mindset is also kind of like a muscle, a mental muscle. I really liked the way you framed your answer around thinking about what are the things you're doing in the course of your work that maybe tend to be somewhat repetitive, maybe a little error prone? Unless you're giving it your full, undivided attention, uninterrupted attention, which we know is kind of a fictitious work environment in some ways. But it's that kind of thinking about the nature of your work on a regular basis that I think is important to many things, and in service to the business, in service to your own career goals, in service to automation. Those things can work together as opposed to being tradeoffs or work against each other. My career goals, and I know this feeds into your point about developing talent, to have a better understanding and maybe a broader role in guiding the changes, guiding others to measure the impact of automation and thinking in terms of automation.

So, that broader thinking, I think, comes from thinking about that very question you mentioned. What's routine about my business that I may not even recognize as routine? It's a little error prone. I loved a phrase that I've heard you say, which is, *To free the talent capacity to drive the next wave of business transformation*. So, I'm just going to directly pivot to that because we're running out of time. So, I'd just like you to speak to that because I think that is really what's key here. There should be, I think, more focus at all levels of the organization about what makes your organization a differentiator, what makes it unique? And in your interview with Forrest Shull, you touched on those things, and we're not going to retouch on all those things. I recommend everyone go listen to that interview. But there's something that is unique, and it's in the minds of the people in the organization, and that's their unwritten thoughts and understandings of how the business runs. Could you speak a little bit to that please?

Rajendra: Absolutely. I think this is one of the foundational elements of what we…how you approach automation. As Watts always says, *If you do not know where you are on a map, a map*

won't help you. So, that is very, very critical. So, every enterprise, when they approach automation, you need to start benchmarking and baselining where you are with respect to the automation journey. Take time to perform a simple assessment or measurement of your current automation status. Then you look at what you need to do to get to the next maturity level or next milestone in the journey. And is that in the right alignment with your business expectations? Then you look for the funds and the dollars, the investment dollars required to try that. Then build a very critical project plan to drive the automation. Level 2 of CMMI, very important: plan the execution, plan the implementation, and plan the plan, and then drive, implement, put up a governance structure. Revisit your milestone when as you get closer to it through database, data analysis and that's how you drive the journey data-driven automation.

Mike: And the talent.

Rajendra: And the talent.

Mike: Talent is key in all those steps you mentioned, baselining the current process, looking where to eradicate…

Rajendra: Yes, on the talent part, I keep talking to many other people, and I have the best job in my company. I'm the most visible resource. I love what I'm doing mainly because I'm impacting every engagement, every project, every work that we do because of the horizontal and innovation nature of the work that we do. And we created what we call an automation university, wherein we take the people, graduate them through automation primes, automation architects, automation coaches, who can help engagements to drive the implementation automation. So, the talent piece is very important, and this is the most brilliant career option I have ever chosen because I have the best job.

Mike: Well, I hope what you've learned is not just helpful to Accenture and other organizations helped by Accenture but also to those who are watching or listening to this podcast. RP, it's been a great pleasure to see you again and to speak with you about your work. And my, you have done a lot, and I'm so impressed. Thank you for your time.

Rajendra: Mike, thank you very much. I'm looking forward to seeing you very soon in person. Thank you.

Mike: You know, one more thing, actually. Let me asked you one more question. It just occurred to me, I wanted to know a little more about an anecdote with Watts. You know, you're named after him. I mean, your award is named after him, and it's been at the SEI for 25 years. It's jointly hosted by both the SEI and the IEEE Computer Society. It's one of those few joint awards, and, so, it has to get approval by both the SEI and the IEEE Computer Society, which I don't know if everyone appreciates. So, you had to run through two hurdles there. But you knew

Watts, at least a little bit. And I know you certainly were in some presentations with him. And obviously, the quote about, *If you don't know where you are, a map won't help*, and the reference to Demings's quote about, *In God we trust, all others bring data*. Could you give us something about how you view Watts and how he inspired you? And then we'll end it.

Rajendra: He is my biggest inspiration. I think I attended my first SEPG conference in Boston in 2000, if I remember that correctly, and that was my first time speaking in the SEPG Conference on process implementation on Level 2 on the software quality assurance. And that's the first time I met Watts, and I've read all his books. I've read PSP [Personal Software Process], TSP [Team Software Process], CMMI [Capability Maturity Model Integration]. I have learned so much from him, and that you can see that the underlying process discipline and process change management, quantitative process management, and me being a CBA IPI [CMM-Based Assessment for Internal Process Improvement] leader, I delivered the SCAMPI [Standard CMMI Appraisal Method for Process Improvement], trying to lead assessments as best I can, most of the process discipline that I learned from Watts, CMMI, and that's what I built automation and automation culture and career management on top of that.

Mike: Excellent. Thank you. And now to our audience, on the SEI website, we have more about RP's award, including a technical report. We have a link to the SEI YouTube channel and Forrest Shoal's interview with RP. I think those are great resources, and I'm happy the community has them. I'm happy I have them.

Rajendra: Thank you.

Thanks for joining us. This episode is available where you download podcasts, including SoundCloud, Stitcher, TuneIn Radio, Google Podcasts, and Apple Podcasts. It is also available on the SEI website at sei.cmu.edu/podcasts and the SEI's YouTube channel. This copyrighted work is made available through the Software Engineering Institute, a federally funded research and development center sponsored by the U.S. Department of Defense. For more information about the SEI and this work, please visit www.sei.cmu.edu. As always, if you have any questions, please don't hesitate to email us at info@sei.cmu.edu. Thank you.