Transcript

Title: Technology x Society Forum - A Socio-Technical Approach to Public Interest Technology
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PAUL LAVEY: Good afternoon, everyone. I'm Paul Lavey, the Research Events Officer at Swinburne Research. Thanks for joining us for today's webinar, A Socio-Technical Approach to Public Interest Technology, which is basically a co-production between Swinburne and La Trobe University.

So you'll shortly hear from Professor Lawrie Zion, who is the Associate Dean of Research and Industry Engagement for the School of Humanities and Social Sciences at La Trobe University. Associate Professor, Diane Sivasubramaniam, who is the Programme Leader for Public Interest Technology through the Social Innovation Research Institute at Swinburne, and Co-Programme Leader, Associate Professor Sam Wilson, who is also from the Social Innovation Research Institute at Swinburne. We're also pleased to welcome our guest speaker, Dr. Roba Abbas, who is a Senior Lecturer, Operations and Systems and Academic Programme Director with the Faculty of Business and Law at the University of Wollongong.

Before we start with today's proceedings though, I would like to acknowledge the traditional owners. I acknowledge that we are hosting this webinar from the lands of the Wurundjeri people of the Kulin Nation. We also acknowledge the Traditional Custodians of the various lands of which you all work today and the Aboriginal and Torres Strait Islander people participating in this webinar. We pay our respects to Elders past, present, and emerging and celebrate the diversity of Aboriginal peoples and their ongoing cultures and connections to the lands and waters.

Just some very basic housekeeping, so you probably all know the score so any questions, just pop that in the Q&A box. If you've got any comments, feel free to pop those in the comments box. But we'll focus on the Q&A box for questions. And also, if you have any concerns, if you've raised your hand and you do end up speaking in the recording and have any concerns about being in that recording just email me at the address here. And I can edit that out in the recording. And so at this point I will hand over to Sam with today's presentation, Sam over to you.

SAM WILSON: Thank you very much indeed, Paul. So hi, everyone. My name is Sam Wilson. And I'm an associate Professor of leadership in the Swinburne Business School, as well as the roles that Paul mentioned earlier with the Social Innovation Research Institute.

So before we start today I'd like to provide some general context about the forum and this webinar series, which is devoted to the topic of Public Interest Technology. So as many, or maybe most of you appreciate, Public Interest Technologies put people and society at the centre of our choices and strive to ensure that the benefits of our technologies are widely shared, as widely as possible.

However, it's really important to note that Public Interest Technology isn't just one thing. Moreover, it's not just about people who are experts in technology. Rather, it includes all of those who are responsible for adopting and implementing technologies. Particularly, those that are implemented in the public sphere.

The Technology x Society Forum provides a space for engagement between STEM and HASS academics. With an interest in the design, development, and application of public interest technologies. The goal of each forum is to generate opportunities for research, thought leadership, and social innovation by researchers at Swinburne and La Trobe and our partners. It's my pleasure now to pass on to Associate Professor Diane Sivasubramanian, who will introduce today's speaker Dr. Roba Abbas.

DIANE SIVASUBRAMANIAM: Thank you, Sam. And hello, everyone. So my name is Diane Sivasubramaniam, I'm an Associate Professor in the Department of Psychological Sciences at Swinburne University. As I mentioned, this webinar is part of our Technology x Society Forum, this is the third event of the Technology x Society Forum. And the forum is co-convened by Professor Lawrie Zion from La Trobe University, myself, and Associate Professor Sam Wilson.

And in today's event, we're very fortunate to be hearing from Dr. Roba Abbas. Roba Abbas is a Senior Lecturer in Operations and Systems and she's also Academic Programme Director with the Faculty of Business and Law at the University of Wollongong in Australia. She is a visiting Professor with the School for the Future of Innovation and Society at Arizona State University in the US. She is a co-editor of the IEEE transactions on Technology and Society and Former Associate Editor of the IEEE Technology and Society magazine.

Roba has a PhD in Location Based Services regulation and industry experience in web design and development. She primarily researches methodological approaches to complex sociotechnical systems design, emphasising transdisciplinarity, co-design, and the intersection of society, technology, ethics, and regulation. And in today's webinar, Roba will provide us with an introduction to sociotechnical theory and how it's applied to public interest technology.

So our webinar will begin today, with a presentation by Roba for about 20 minutes. And after her presentation, Roba will have a conversation with Lawrie Zion. Where Roba and Lawrie will delve a little further into the nature of the sociotechnical framework and how it can help us to develop Public Interest Technology. And then, for the final 10 to 15 minutes of our webinar today, we'll open this up to questions from the audience.

So as questions occur to you throughout today's webinar, we invite you to put your questions in the Q&A box, as Paul mentioned earlier. And we'll take your questions from there. So without further ado, I'm very pleased to hand you over to Dr. Roba Abbas.

ROBA ABBAS: Thank you so much Diane. I'll just quickly Share Screen. How's that? Is that OK?

PAUL LAVEY: Yep, that's coming through perfectly.

ROBA ABBAS: Excellent, thanks so much. Thank you so very much for that kind introduction Diane. And thank you for the invitation Sam, Diane, and Lawrie. And to Paul as well in the background, who's been helping us out. It's a pleasure to be here today at the Technology x Society Forum and to be delivering an introduction to the sociotechnical approach to Public Interest Technology.

I am joining today from Wollongong Australia. And as such, I'd like to begin by acknowledging the Traditional Custodians of our country and pay my respects to the Elders past and present. Before I begin my talk, I would also like to recognise my long-term collaborators Professor Katina Michael from Arizona State University, Professor Jeremy Pitt from Imperial College, London and Associate Professor Rob Nicholls from the University of New South Wales. This presentation will draw on some of our work over the years, in addition to recent work that's been published as part of three special issues-- editorials, in fact, on sociotechnical co-design and Public Interest Technology.

And these editorials, more specifically, were in collaboration with an international team in Katina Michael, Jeremy Pitt, Jason Sargent, Eusebio Scornavacca, Jumana Abu-Ghazelah, Salah Hamdoun, and Netra and Nalini Chhetri. And I'd also like to thank Matt Mischka for his contribution to some of the work that we've been engaged in as part of the American Association for the Advancement of Science work into Public Interest Technology. The intention of this short presentation is really to provide an introduction to the sociotechnical approach to research in view of its origins, foundational concepts, and also principles. So I'll be covering, briefly, the design aspect, which is central to the sociotechnical approach, in addition to the link to a Public Interest Technology framework followed by an overview of our future research trajectory.

Despite the emphasis on the sociotechnical approach has been the main intention here. I see this presentation on body of work as contributing to much more, to a broader discussion about how we see our world in view of our relationship with technology. Predominantly, a world in which we are observing both disruptive and incremental innovations and technologies and complex sociotechnical systems and structures that have the potential to, fundamentally, alter the way in which we interact with the world around us.

As such, there are many tensions whereby we're required to think really carefully about how we design and develop technology in the public interest. And how we can also simultaneously exploit technological and scientific advancements, whilst also thinking about the socioethical challenges that inevitably emerge as a result.

So as part of this broader discussion, perhaps we might question and be fascinated by technological progression and developments as we think about future modes of operation represented by the image on your screen. Simultaneously, we may still be trying to understand present modes of operation and present technologies that we're interacting with and the related socioethical and other implications. As we consider both present and future modes of operation, perhaps we are thinking about how we explore and interact with individual devices or individually with devices.

Or how we investigate future of work scenarios. And while we're thinking about the future from an organisational perspective, perhaps we may also even extend our attention to envisaging our future.

So futures that are about technological potential, as per the image I presented earlier. But also those that exist at the other end of the spectrum. So those that point to the undesirable futures in terms of how we may preemptively attempt to avoid such future scenarios.

And with that backdrop, we return, essentially, to our perceptions and our view of the world, of our sociotechnical context, in order to gain a better understanding of how our interactions with technology. And more specifically, a better understanding of our interactions with technology. And more specifically, how we may go about designing or redesigning systems with, as opposed to, for people and in the public interest.

So the question that I'm posing here to yours, how do we navigate this sociotechnical landscape? It's a very complex sociotechnical landscape. And one way to do so is through the sociotechnical approach.

If we look to existing scholarship around sociotechnical theory and the sociotechnical approach, it's quite difficult to encapsulate all of those learnings and lessons and literature in a 20-minute presentation. But I'll do my best to point to what the sociotechnical approach can refer to, which is essentially summarised on your screen. So we can think of sociotechnical as referring to a concept, essentially denoting an entity that is made up of both social and human elements. We can think of that as a theory, so built on a set of key assumptions and principles about what constitutes a sociotechnical system, the meaning of subsystems, dimensions, and so on. We can also think about it as that third point, as a set of principles for interacting with different types of systems, for instance, designing or redesigning work systems within an organisation setting.

Next, the sociotechnical approach could also signify a phased approach to systems' design and development. So this could involve the technical fields, such as computer science and systems engineering-based processes, for example, in addition to other disciplines. And there are a range of other references to sociotechnical in the literature if you were to look closely there.

In this presentation however, I'm referring predominantly to sociotechnical as a theory. So sociotechnical theory is not a new concept. It essentially emerged as an organisational theory in the 1950s at the Tavistock Institute in London as a means of thinking about and understanding work systems in the context, initially, of coal mining. And was then extended beyond this application area to the present day use of the theory.

And specifically at that time, the purpose was to think about work systems' design, redesign, and interventions, in terms of the interrelationships between the social and technical components within that particular work system or a given work system. And it has since morphed, particularly in its application around a range of disciplines and contexts, such as the information systems discipline, which is largely the disciplinary lens that I'm applying here. But our work has also progressed beyond consideration of the information systems discipline to encompass other disciplines.

Something that I'd like to note here is that at the time of its introduction, sociotechnical theory essentially challenged the dominant technological paradigm or technology-based paradigm of the time. And it presented a new way of thinking. And that's essentially what's on your screen. So the old paradigm was about the technological imperative, about technological determinism.

This new, at the time, sociotechnical paradigm or model was about joint optimization. So how we move away from that technological imperative to think about the social as part of this process. Instead of thinking about man as an extension of the machine, it's man as complementary to the machine. Instead of, as humans as being an expendable spare part, it's about them being a resource to be developed. And there are a range of other points that we can compare between the old paradigm and the new paradigm, things around innovation, ideas around commitment, and importantly, collaboration, which I'll pick up on in a moment.

In the interest of time, I will focus on a few main points. So the sociotechnical approach is built on the foundation of many concepts and several foundational principles, of which I'll review three as part of this presentation and very briefly. And I think these three will provide us with sufficient detail for the remainder of our discussion today.

The specific concepts that I'm referring to are the open systems basis, which defines systems, behaviours, and states. The second is about the notions of subsystems, namely three interacting dimensions, which I'll get to in a moment. And the third is about the core principles, which essentially if we were to divide them into two areas, it's around the way that the system components interact. And also, the idea of optimization. So let's look at each of these in a bit more detail.

The first is that the technical approach is built on general systems theory and open systems theory. And I've included a seminal study here for your reference. This systems or systems thinking foundation is important from the perspective of inheriting key assumptions about the behaviours and the nature of system components and this is really important. The idea of the system's goal, for example, and how we define inputs, processes and outputs within a context, such as the environmental context. So if I were to put it simply, it allows us to think about systems design and engineering efforts as being embedded within an evolving and complex environment and provides a necessary framing around systems complexity and conceptualization, which we'll talk about both of these elements as we go through this discussion.

The other two concepts I'd like to highlight are the ideas of a subsystem and the second idea of principles. So subsystems essentially point to the social, technical, and environmental subsystems, which in themselves comprise of other elements or interacting classes of variables. In terms of principles, this really talks to the notion of interactions between the systems' components as being determinants of their success, specifically, between those subsystems to how the social technical and environmental elements interact as pointing to system success.

And there's also this idea of a core principle, which is joint optimization, which is typically defined as the attainment through some kind of technical design of, essentially, a best fit or match between system components through evolving and iterative sociotechnical design processes that advocate for engagement. So on the current slide, you may have seen this before if you've read into the technical domain. It's quite a prominent representation of sociotechnical systems or a sociotechnical system where you can see the social system, the technical system, and interacting variable classes within a particular context. And this is in the context of a management information system.

There are other representations since this original work. And I will present one in our emergent framework in a moment. But prior to doing so, we're still talking at the theoretical level here. And we need some means in which we can move from theoretical underpinnings of sociotechnical theory through to the required methods and operationalization of the principles within the theory. And in summary, these are the major developments, that you can see on your slide, that allow us to progress from theory to method to operationalization in practise.

So these sociotechnical systems base the-- excuse me-- the general systems basis and open systems basis is our starting point. And this is followed by a derivative of our application over the open systems paradigm through the technical theory or approach. And then, we can move on to application. As I mentioned earlier, I'm primarily approaching this through an information systems perspective and in the field of human-computer interaction.

So that's our next progression and acknowledging that body of work. And that brings us to the idea of participation and co-design as being central to the achievement of the principles of sociotechnical theory. Specifically, as I mentioned earlier, the attainment of optimization or joint optimization, which is a concept that our team is revisiting at present in the context of current sociotechnical systems.

While participation and co-design are certainly popular topics in approaches at present, seminal sociotechnical work, flag the importance of intense collaboration through applied research projects. And we can note the emphasis here on the involvement of multiple disciplines, the focus on relationships, and the time involved in engaging individuals and people in such projects. And we similarly are having the same discussions presently.

And here's another early example advocating for human-centeredness for cooperation and for human requirements early on or as a precursor of any sociotechnical analysis. As opposed to, again, focusing primarily on the technical aspects or first on the technical aspects. The importance of planning and aligning these plans to human requirements is also a key point here.

And yet another example from that same text that emphasises social responsibility, decision-making, and ensuring systems of awarding and fulfilling at the conclusion of any design effort. The call for cooperation, participation, and co-design as a means of operationalizing sociotechnical theory has, in a way, been answered in a range of different ways through sociotechnical studies, such as through decision-based, decision-making processes, or design-based processes, dominant ones of which are presented on your screen. And our team has been working, for over 15 years now, on attempting to extend some of these models and applying them to present day contexts.

And here's a representative example of our work in a model for applying sociotechnical co-design in the context of engineering-based methodologies in the design and development of robotic capsules for endoscopy purposes, more specifically. And we're presently working on additional applications of these theories and methodologies. But I'll briefly illustrate the link, before I wrap up, between the technical approach and Public Interest Technology for the purposes of this forum.

So what does all of this mean in terms of our discussion on Public Interest Technology and all the things that Sam and Diane spoke about earlier? When we apply the sociotechnical approach to

Public Interest Technology, I think a foundational idea is that this requires careful planning and the conceptualization of a given sociotechnical system or ecosystem, in a way that points to some of these theoretical concepts that we spoke about and also appreciates the importance of stakeholder engagement and inclusion. I will identify three important points here in the application of the sociotechnical approach to Public Interest Technology, each of which have been highlighted in our recent special issue editorials that will be shown on screen.

So the first is that of sociotechnical co-design, which advocates for the engagement of diverse stakeholders and disciplines, both technical and non-technical in nature. The second pertains to how we perceive innovation and technology design and development. And that essentially requires a paradigm shift, yet again, from the techno-economic models that are dominant to models that promote social development and purpose-driven sociotechnical innovation.

And the third is a Public Interest Technology framework. So there is a requirement for an emergent framework that is sociotechnical in nature specific to Public Interest Technology. And one that allows us to conceptualise Public Interest Technology as an open sociotechnical ecosystem.

And this is the proposed Public Interest Technology framework that provides a high level view of the elements, the dimensions, the subsystems, and the flows within a complex sociotechnical ecosystem with the intention of enhancing our understanding of the elements, the distinct elements, within the ecosystem but also their relationships to one another. The purpose of this is to-- there are many purposes but one purpose is to inform operationalization through co-design, participation, and other human-centred approaches oriented, really, toward empowerment, human health and well being, and also environmental sustainability. Which we've explored in other work peripheral to this.

We recently presented this end-to-end framework as part of an American Association for the Advancement of Science scientific panel session. In the interest of time here, I cannot go into too much detail. But please reach out if you're interested in finding out more about that.

But a dominant idea here is that the sociotechnical approach provides us with a mechanism through which we can engage stakeholders in a manner that is human-centred, in a manner that's inclusive that focuses on empowerment but that also recognises the role of technology and technological progression. And with that and in closing, I think I'm spot on time here, our team is working on the extension of this framework, if we're to look at future research direction, and its application across a range of settings.

Importantly, we are asking many questions. So some examples are how the goal of the systems and frameworks should be defined, how we can enhance existing methodologies for engagement, that will be another area of interest. And further exploring each element within that particular framework. Importantly, we are trying to build on this work to gain a better understanding of how we consider design and development of technology in the public interest. And we're doing so within a complex and evolving sociotechnical ecosystem and that is--

LAWRIE ZION: Roba might have temporarily frozen or I'm temporarily frozen. I'm not sure if people can hear me. But I don't know how we can unfreeze Roba either. But Roba, thanks so much for a

really fantastic presentation. And I think you're back with us now. You temporarily froze, can you hear us OK?

ROBA ABBAS: I can hear very well. Is that OK?

LAWRIE ZION: Yeah, it's great. My name's Lawrie Zion. I'm going to be having a discussion now with Roba. But during that discussion, as indicated before, if you want to ask questions just go into that Q&A button at the bottom of the screen and type in any questions or comments there. And we'll pick some of these up as we go. But Roba, just to start, I guess that the trajectory that you've outlined seems to be getting researchers and industry from the point where the focus has been very much on the technology and the end user to the systems of innovation or more sociotechnology approaches, sorry, that take account of as you mentioned, the broader range of stakeholders and underlying drivers, such as the need to nurture or maintain democracy. How far down that track are we now?

ROBA ABBAS: That's an excellent question with many parts to it, Lawrie. I'll probably divide it into two just to manage it. Now, in terms of thinking about challenges, and I think you mentioned how far down the tracks of progress within this realm, first let's tackle the challenges bit.

So in our observations, I think the challenges tend to be around a range of things. I'll look at it mainly from an industry perspective, then a research perspective, and then maybe we can talk about the human-centred element. I think from an industry perspective, demonstrating the value of technical approaches as being opportunities for change and for positive social and technological outcomes, as opposed to a hindrance to existing design and development approaches is one of the primary challenges.

So existing systems design and development projects tend to be more technology-focused, as you suggested about the end user, and which is great that there are some user-centred studies, for example. But I think we need to progress beyond that. And as I said in my presentation, the technological focus is important from the perspective of capitalising on technological progression and thinking about industry technology advancements, for example, we cannot forget the social aspects. So I'd probably point to that.

So the technical approach is being an opportunity for change, rather than a hindrance, is being a challenge from an industry-based perspective. In terms of researchers, while there is-- or research in general --while there is progress, I would point probably to existing structures in academia around discipline-based faculties and schools. And the way that these are structured in a way that it's risky to move between disciplinary silos to incorporate a range of different perspectives that we have, for example, structures around career progression, frameworks, and so on in academia.

And we tend to stick to our disciplinary silos. So a challenge is how we move beyond those. And while there are schemes, for instance, available, we certainly have some of these in our global challenges scheme at the University of Wollongong that encourage multidisciplinary work, I think there's more opportunity to do more from that regard. So I'm not sure whether from a research perspective. It's about the tension between user-centred design and sociotechnical design as being

two distinct aspects or if it's more so the structures that exist that are not conducive, I guess, to multidisciplinary work and to more sociotechnical approaches.

Now to bring, maybe, those two aspects together across both academia and industry, user-centred design cannot be perceived as the same as co-design. They're two very distinct things. The latter of which requires additional time, additional resources, and engagement of a broader set of stakeholders, which is why it's challenging to, I guess, promote that kind of approach as being the preferred approach, because we are time poor, we are resource poor and engagement is quite difficult to achieve, in the proper sense of the term, in the ideal of co-design.

I think there was a second part to your question. It's about progress, I think. Is that right?

LAWRIE ZION: Yeah just where we're up to. And have developments or events like COVID had any role in potentially accelerating some of the conversations that are needed to underpin this general trend?

ROBA ABBAS: Oh great questions. So in terms of how far along are we, I think it's difficult to evaluate given that a lot of this is context-specific, so depending on what projects you're working on. So I can point to several projects I'm working on, each of which apply these approaches in a very different way and have their own trajectory, their own constraints, their own limitations. And we can draw out some insights from that.

But what our team have observed over the past few years, and maybe this is due to COVID, maybe it's just the nature of the setting, the research in this space, is that there has been a resurgence in sociotechnical research, which we're delighted about. COVID has in some way, I'm not sure whether it's accelerated the technical approaches or the need for sociotechnical approaches as such. But it has certainly highlighted, if I were to draw an example, such as the COVIDSafe app, for example, and the rollout in Australia, it's certainly highlighted the need for sociotechnical framings to avoid certain implementations or the impacts of certain implementations.

So I'm not sure whether it's encouraged additional support around methodologies as such, if that's a COVID-specific thing. But it has certainly provided us with practical examples of why we actually need Public Interest Technology, sociotechnical approaches. A more balanced, I guess, perspective around the design and development of these systems.

LAWRIE ZION: OK. How's the framework being used in specific disciplinary cases such as bringing together social scientists and engineers?

ROBA ABBAS: Oh that's a great question. So it's, again, context-specific being used in many different ways. Some concrete examples of how we've used the framework is first to articulate the system of interest and the opportunities for high level mapping of the sociotechnical system that provides us with, I guess, a solid foundation to enable agreement between, you mentioned, social scientists and engineers around a common goal for the system.

And that's a fabulous starting point, because there's usually discrepancies in goals. We usually have our different trajectories, our different paths that we're on based on our disciplinary areas. And it's

also provided an opportunity to think about a common understanding or a shared understanding about how to approach technology design and development efforts. So that's the first point.

Another thing that I think is quite useful, in terms of this framework, is it's given us an opportunity to gain a shared understanding of context. So the environmental context, the open nature of the system, the complex, tightly coupled, really dynamic nature of the system, the importance and value of considering the regulatory and other environments and contexts that will inevitably influence how we conceptualise the framework and how we define the system together. And one thing that I think is really important about this, while it is quite an abstract level framework, I think it's helpful from the perspective in that it allows you to isolate. So this is one application area, isolate the area or the areas of the sociotechnical systems that are candidates, really, for design or redesign centred around human values and requirements. And that's where that communal shared understanding comes from.

But I think, while I can draw on many more examples, one thing I would like to note, Lawrie, is that the intention is not just to focus here on common understandings between social scientists and engineers and have a boundary there, it's about a broader philosophy also, in addition to that, of stakeholder engagement where we think outside the academic institution setting, where we seek industry and public engagement, and we co-design around a shared vision for that sociotechnical system across industry, academia, government, and so on.

LAWRIE ZION: So who are the people that come part-- who do tend to participate in formulating and communicating that shared vision? I'm familiar with, in the case of journalists and public interest journalists, has been a concept that's bandied around for decades. It's come up again recently in Australia, because of the strains that the media has been placed under over the last decade or so.

But I guess there have also been a lot of debates about what's meant by public interest journalism. And you could, perhaps, look at that discussion as just one example, I guess, of what might happen in the broader context of bringing people from industry, the public, volunteers, all the stakeholders and brokering some sort of shared understanding or agreement. And what do those processes look like at the moment?

[INTERPOSING VOICES]

LAWRIE ZION: Yeah.

ROBA ABBAS: Sure, not a problem. So participation can take on many different forms, from a sociotechnical perspective at least. So concepts of participation of co-design and so on, they're quite interesting, Lawrie. But they're not consistently defined. So it's a very good question that you ask.

So in the past we've had to draw on seminal studies and extend those to consider what participation looks like across each of those stakeholder groups and how we define input. So you've got the stakeholder types or categories, you've then got input ranging, for instance, from observation right through to the ideal of co-design. So in some cases, we might not actually embark on a sociotechnical co-design effort. We could potentially just think about things in terms of observation-based processes or user-centred processes as the need calls for it. So that's one aspect to the whole participation discussion, the degrees of input.

We then have additional considerations regarding participation that you rightly pointed out. So stakeholder engagement, industry versus academia versus government and the public and so on. So how do we know who to choose? How do we know the methods of engagement, how can we translate then those, I guess, insights we derive from these participatory processes into practical outcomes? And importantly, how then do we revisit and employ iterative processes to confirm what we found and whether it's aligned to our original vision?

Then there's thinking about how we revert to that initial goal of the sociotechnical system and how we design a suitable system with people that promote social transformation and so on, as opposed to conforming to all paradigms. Back to your question of how those processes look like, they can come in many different forms. So I showed some examples, in the interest of time, glossed over them as a series of phases. There are other examples that are more principles-based approaches, others that focus, for instance, on design through compassionate approaches and so on.

What we've tried to do with this framework is set up at a broader level to define to what the system looks like. And then depending on the stakeholders that are required in a particular process, the method of engagement that we select the degrees of input-- you have a series of configurations that are then specific to a particular context. So while we can generalise to some degree about elements within a system, each context requires its own configuration around those elements that I spoke about.

LAWRIE ZION: We've got some questions coming now. And Matt, I'm going to read your question out, because it links to this discussion. I see this says, Matt, being able to be resourced with larger enterprises or public sector bodies. But what are less resource-intensive approaches to this type of co-design for bootstrap tech startups, do you have any examples in this context? Great question, Matt.

ROBA ABBAS: It's an excellent question, Matt. Thank you so much and Matt Mischka is a leading co-design expert in this space and through his work with ethics. And he's trying to do a lot of these operationalize, a lot of these sociotechnical, approaches and co-design approaches in practise. You're quite right.

And this is a part of that broader challenge, Matt, of funding around these particular projects. So we're met with the challenges of how we fund multi-disciplinary research. We're also thinking about smaller organisations not having enough resources time, effort, and energy to do these, I guess, practises.

But I can draw on some examples that we've used that haven't had a great deal of resources. So for example, in the app development space, where we focused on specific co-design workshops. But I do agree with you that this approach requires a lot more funding on the part of the government, in terms of funding startups.

But I think prior to doing so, we need to demonstrate the value of this approach before the funding comes in. But I see that as one of the major challenges. We have been able to get so far with minimal funding in a range of different project contexts. So one example is working on just that

shared understanding element rather than focusing on the development of blueprints or full-blown processes.

So that's a great starting point and we've been able to demonstrate from that particular example, that there is a requirement for these kind of processes to then allow us to, I guess, gain access to the resources that we need to further these processes. But I'm in complete agreement with you that larger organisations have the capacity to do this. But I think with these processes, as well, they're better suited to the smaller teams, the smaller communities. I think, such as what you're doing with your pilot studies, Matt and so on and other work that we've done around specific instances or individual instances of use rather than society-level systems that require more, I guess, resources and time.

LAWRIE ZION: Right. Thanks for that. I've got a question about the utility of the term Public Interest Technology. We've certainly seen a growth in activity across both academia and industry in the states. And it's starting here in Australia as well.

Do you feel it's a good form of shorthand for conveying the processes and outcomes that you've been examining in your work? Does it connect up, is it sticky enough? Do enough people latch onto it in a way that can connect people, especially in smaller enterprises, smaller universities.

ROBA ABBAS: Sorry, Lawrie, can you please clarify by the latter part of your question?

LAWRIE ZION: It's the concept of public interest tech, is it sticky enough? Like does it-- is it something that when people hear it, they get a general sense of what it means and that they can become associated with it? Is it a good way of framing, in shorthand, the processes that you've been talking about today?

ROBA ABBAS: Sure, thank you, Lawrie. I think, in a way, it is. I think when you combine the sociotechnical approach to Public Interest Technology, there's more of a connection as to a defined methodology, a defined process. As I said, the sociotechnical area has been around, at least in the information systems and organisational theory space, since the 1950s. So that's something that's tried, that's tested, that's established.

You're quite right that it's gaining traction here. But something that I think would be helpful in terms of making the term more sticky or using it-- I don't know whether using it as a shorthand is the approach that we should be following. But to make it certainly more visible is to think about it in a number of different ways. So thinking about Public Interest Technology, for example, as a philosophy. And that's a philosophy of design, of sociotechnical design but also thinking about it as an outcome.

And I think that's where a lot of the gains could be had or the benefits can be demonstrated, that the outcome is a Public Interest Technology that has some kind of value, some kind of utility. And that's something that I see is probably being beneficial from an industry perspective, more so than a research perspective. As I said earlier, these terms have been gaining traction, there's been this resurgence in terms of sociotechnical theories and studies.

The one area that I think it can be used as a shorthand, perhaps, is in terms of the high level system representation. So often, the elements of the sociotechnical ecosystem around Public Interest Technology as such, that certain elements of that system resonate across disciplinary boundaries. So that's something where I think people can connect to that particular framework. So people working in moral philosophy and ethics will look at the human values, technologists will appreciate the technological landscape, those at the intersection of technology and society might look at the information systems-based components and the connection between co-design processes and that processing element. So from that perspective, I think there's an opportunity to connect to the framework.

LAWRIE ZION: Let me just get back to talking about universities for a moment. We touched on it before. But it is-- what's the most instrumental approach universities can adopt to contribute in this space? Is that research-centred, is it curriculum, is it all of the above, because I think everyone listening to this today would be aware of the problems of extreme siloing.

But it seems to me that some of the themes we've discussed today, like finding common language, getting people to feel within an academic structure that they can be equal partners in developing programmes or research projects. Are there structures that seem to work in facilitating this in the States or elsewhere that we could learn from in Australia, do you think?

ROBA ABBAS: Certainly, another fabulous question, again with multiple elements to it. So we have spent quite some time as a team thinking about curriculum-based strategies and research-based strategies that might assist in promoting sociotechnical and certainly multi-disciplinary research. So if we look to examples, for instance, when my colleague Katina Michael leads at Arizona State University, they've formed structures around transdisciplinary schools, for example.

And that's their way of encouraging this to be incorporated into the curriculum. In terms of what we can do in Australia or at least in the Australian context, I might share one or two examples. So you spoke about the curriculum itself and then you said about research. And I see them as interconnected things but also diverse things. But curriculum-wise, I think it would be helpful to firstly, embed ethics, social and humanistic values in technical curricula beyond what's required for accreditation purposes and to be quite proactive in this endeavour.

I think that'll solve a lot of the issues that we have, certainly, at the moment or the challenges that we're facing. And I have mentioned this next point in many presentations and forums and we'll reiterate again, but based on my experience and those of colleagues in teaching in technical and engineering-based schools, often ethics, sociotechnical and socioethical considerations are afterthoughts. And one way we can convert this in our curriculum, or curriculum redesign, is to consider them as precursors and not as an afterthought.

And another related point is that we also need to demonstrate the value, as I said earlier, of these sociotechnical and public interest technology approaches in practise. So it is quite an, I would say, a relatively new concept in Australia. If we can demonstrate some value of their ability to, from a technical perspective, integrate an existing technical and other processes.

So I think about, Lawrie, in terms of my time in industry, there are technical systems and other development processes in place. And we can't immediately eradicate those. There's no need to, I think we need to be respectful of that and see how best to, I guess, integrate ethics, humanistic values, sociotechnical aspects within existing technical and other processes.

As to the research side, I did touch slightly on some of these themes. But I believe that we can promote research cultures that are supportive of this type of research at numerous levels. And I'll draw on some examples of these levels that I'm certainly working on at the moment.

The first is at the individual project level. So I think we have a responsibility in multi and interdisciplinary teams to have open and transparent communications between technical and non-technical project team members and multidisciplinary team members towards that common goal to then demonstrate value. Also at the institutional level, it's to facilitate some multidisciplinary engagement through some grant-based and other schemes. And I mentioned earlier, the University of Wollongong has a Global Challenges Programme, which is perfect for this endeavour.

But then again, for research-wise for large funding bodies it's to find a way to demonstrate, again that value of multi sociotechnical collaborations and projects. Rather than, trying to box us in or to make us adhere to, for instance, defined codes. But that's part of, I think, a much larger discussion a broader discussion.

LAWRIE ZION: Thanks for that, Roba. Sorry, I just didn't realise I put my mute button on. It happens once in every session. Just a reminder, if you've got questions just tap them into the Q&A button at the bottom of the screen. And Sam Wilson has also just asked a question about how pervasive the technical approach is becoming within engineering and IS.

ROBA ABBAS: Oh, that's an excellent question, Sam. I will answer it, again in talking to the information systems discipline first and then talking to engineering. The information systems discipline by nature is a sociotechnical discipline.

So if I revert to or refer back to that initial slide where I showed a concept is it a theory? Is it-- what is it? Within the information systems space, the foundation for information systems is that it is a sociotechnical discipline. So it's always-- there is that an underlying, I guess, foundation for everything we do in the discipline.

However, given that we're speaking about sociotechnical theory the information systems discipline has had an interesting relationship with the theory. So we've gone through phases in which the theory was quite-- was introduced in the 1950s. It took quite a while for it to gain traction. Towards the 80s, it was starting to become more prominent, in the 90s, you started to see more of those participatory approaches. Certainly, in the human-computer interaction fields.

And then, we focused, for recent years, on technological progression. And now, we seem to have gone to the other side of thinking about the dark side of tech and sociotechnical, Sam, fits in between those two extremes of the dark side and the shiny gadgetry, technological potential. It's all about the tech perspective.

And we are seeing over, I would say, the past three or four years, if I was to define it by time, an increased interest in sociotechnical. It's still too early to see whether it's about the theory itself. But it is in existence in a range of different realms, slightly a different flavour to what we're talking about here in terms of Public Interest Technology.

But for instance, the work of Steven Alter in Work Systems Frameworks that's been around. That's quite a popular framework for how we think about work systems from a sociotechnical perspective. You then have the design stream which is by Mumford and I alluded to one of those design processes on the screen. And that's been picked up on but tends to attract a lot of criticism due to some of the challenges we spoke about today relevant to operationalisation, I guess, of sociotechnical theories.

So that's the information system space. It's always there in one form or another. Theory-wise I think there's much more that can be done, in terms of extending sociotechnical theories from an information systems perspective and that's something of particular interest. In terms of Engineering, a little less.

So in-- if I draw on, for instance, teaching in engineering school, sociotechnical doesn't seem to feature as a specific theory within that realm. We do talk about ethics, so the ethical implications of specific engineering experiments or designs and so on. But it's not specifically a theory. As far as my understanding, that is taught, certainly not in my experience, perhaps in some schools there is. But if there are such examples it would be great to hear more about how they're executing that, because I think we can learn a lot from that particular-- I guess if it's built into their curriculum.

LAWRIE ZION: All right, thanks for that, Sam. Just a final question for me. We talked a bit about Public Interest Tech as a concept and how COVID might have accelerated some of the discussions around how people see decision-making to be in the public interest with things like vaccinations.

What about AI and what about AI researchers who-- and AI companies? Where very often now, we're seeing criticisms about the world that they seem to be creating. What's been the extent to which you feel that the framework that you've discussed today is actually getting into the bloodstream of people who create the technologies and the companies that make a lot of money out of them?

ROBA ABBAS: That's a fabulous question. I can certainly talk to research in that space. So we've been engaging in our Public Interest Technology colloquium recently in which we held two sessions, specifically about artificial intelligence in the public interest as a way of mapping some of the opportunities, some of the challenges. I'll be happy to share some of those.

But some of the outcomes there are, I guess aligned to the discussions that we're having here today, Lawrie. I'm not sure whether the technologists or the companies themselves are approaching this from a sociotechnical perspective. There's certainly traction in principles-based approaches. So responsible artificial intelligence and how we translate principles to practise. How we think about governance of AI for example, we're working in the context of the development of care platforms around AI.

We've also spoken about an AI in terms of responsibility of designers and other stakeholders. And I'll be happy to share some of the published work on that. I think there's a long way to go. Again, back to that how far down the track we are here. We are at least having discussions about principles and translating them to practise and that is not unrelated to some of these. I think what we're missing is a broader framework to encompass all of these discussions and to translate them in a meaningful fashion across disciplines, across sectors, thinking about it from one academic institution to the other, from one industry to the other.

And again, back to that point of a common set of understandings or a language that allows us to communicate properly in our sample in the chart to not talk past each other, to have that common understanding to allow us to actually progress these discussions. But I'm happy to share any of the AI related links if you're interested in that. It was part of a two-part discussion. Yeah, not a problem.

LAWRIE ZION: Yeah, we'd really appreciate that. OK, one final question from Matt. What role does future-casting, back-casting, and speculative design play in these approaches? And it might be worth just shedding light on how these terms have come into the vocabulary around sociotechnical design as well.

ROBA ABBAS: Sure, so I might draw on an example of some sociotechnical studies that we've done in the past. So we can draw on historical, I guess, some implementations. We can look to the past to allow us to think about how we inform our decisions around the future and how we think about these decisions and conceptualise them from a sociotechnical perspective. We can also look at speculative fiction, for example.

So I alluded to that in my introduction. But due to the time, I couldn't go into that in too much detail. Where I spoke about the techno-optimistic view and the intention of those initial images was to evoke, I guess, a sense around technological potential advancement and progression. And then, the last image I showed before returning to my initial one was about this dystopian view.

And when we think about speculative fiction, for example, these types of approaches in addition to the others that you mentioned, Matt and Lawrie, allow us to think about a range of different scenarios. And then, develop a sense of how we might design to those scenarios or mitigate risks around those scenarios. So some of the work that we're involved in, additionally, is about risk management. For example, how we design complex antifragile systems or systems that respond well to, I guess, threats or use-- turn vulnerability into gain rather than breaking when something occurs. And that's part of this discussion as well.

So how do we think about these risky situations? These particular approaches that Matt spoke about, I think, have a very important part to play. So we can learn historically from some of our mistakes.

And something that talks to that point, Matt, is when we think about information systems failures in general. I think, in excess, if I'm not mistaken someone can correct me here, in excess of 70% of information systems projects fail. I'll have to confirm that figure. But the last time I checked it was in excess of 70% and the reason is that we repeat the same mistakes. And I think through some of these approaches, we can look to the past to inform the future.

And then, use speculative fiction to map out the range of different scenarios that might eventuate. And then, preemptively look at addressing them through some of these frameworks and some of these approaches. Again, approaches that need to be participatory in nature, that need to engage individuals, empower individuals. So we can leverage off those really good cases or these use cases that we perceive to be positive whilst also mitigating risks around the undesirable consequences of those scenarios that are less so. Great question, Matt

LAWRIE ZION: Thanks, Roba, I feel like this discussion's just really warming up now. Unfortunately, we're running out of time. But thank you so much, fascinating presentation. Great-- really inspiring in terms of looking at our environments and our own universities and our relationships with the industry to think about what's possible through this framework and through this discussion. So thank you so much, Roba, and I'm going to hand it back now to Diane.

DIANE SIVASUBRAMANIAM: Thank you, Lawrie. And I'm just going to wrap up with just a quick thank you to everyone here. So first of all a huge thank you to Dr. Roba Abbas. It's been really exciting today to hear about a framework that helps us to more properly think through the design and the development and the implementation of Public Interest Technology. It's a framework that allows us to advance technology in a way that is human-centric and that really emphasises values in the development of technology.

I love the idea of the sociotechnical ecosystem where the social and technical and environmental components are working together for system success. To our audience, thank you very much for taking the time to be here. I have no doubt there will be many continued conversations after today's webinar.

There's a real growing interest in Australia in Public Interest Technology. But there aren't that many opportunities for academics interested in this to really learn about these practical, rigorous standards and frameworks for designing Public Interest Technology. So we hope you come away from this webinar today with a bit of a clearer understanding of the Public Interest Technology research agenda and a useful framework for the development of Public Interest Technology.

And I'd invite you to visit the website of the Public Interest Technology Programme in the Social Innovation Research Institute. We'd invite you to register your interest in the Technology x Society Forum. We'll be holding more events throughout the year. And we'd love you to join us to further some of these discussions.

So whether or not you register with us, please do keep an eye out for our events, which we'll be holding throughout the year. And we'll advertise those events through Swinburne and La Trobe. So thank you very much, everyone. I'm just going to hand back over to Paul to close us out.

PAUL LAVEY: Thanks, Diane. So basically what Diane said. So thank you, everyone. And we look forward to seeing you at the next session, stay tuned. Thanks, bye.

[END OF TRANSCRIPT]