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Microchipping People Is a "Bad Idea"

Interview with Andreas Sjöström

Andreas Sjöström, vice president and chief technology officer at Sogeti and Capgemini Scandinavia, is convinced that microchip implants are a "dead end." Microchip implants are tiny integrated circuits embedded in tags or transponders that can be injected into the subdermal layer of the skin allowing for non-Line-of-Sight (nLoS) communications with external reader devices (1). Despite the enthusiasm around near field communications (NFC) implants, Sjöström is certain research and investment in these technologies will quickly fade due to the simple fact that "an implant doesn't add any value." Why should we take Sjöström's opinion on implants seriously? He has one and he has taken it for a good test drive (2).

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On January 6, 2016, Sjöström made history by boarding a Scandinavian Airlines plane from Stockholm to Paris using an NFC chip embedded in his hand in lieu of a boarding pass (3) (Figure 1). While Sjöström's experiment, in partnership with Scandinavian Airlines, was ostensibly successful, it only cemented his conviction that implantable NFC chips are not the future of innovation. Instead, he argues quite succinctly that NFC chips are a solution in search of a problem, have limited utility, are less efficient than alternatives, and pose significant health risks (4). In March 2018, Dr. Katina Michael, professor at Arizona State University's School for the Future of Innovation in Society and School of Computing, Informatics, and Decision Systems Engineering, had an in-depth discussion with Sjöström about his experiment, the future of chipping, and ethics in innovation. This interview, abridged and presented below, was conducted in three parts: via a written questionnaire, during a question and answer session at Engineers Australia in March 2018 (5), and a one-on-one Skype interview. Questions and responses have been abridged and

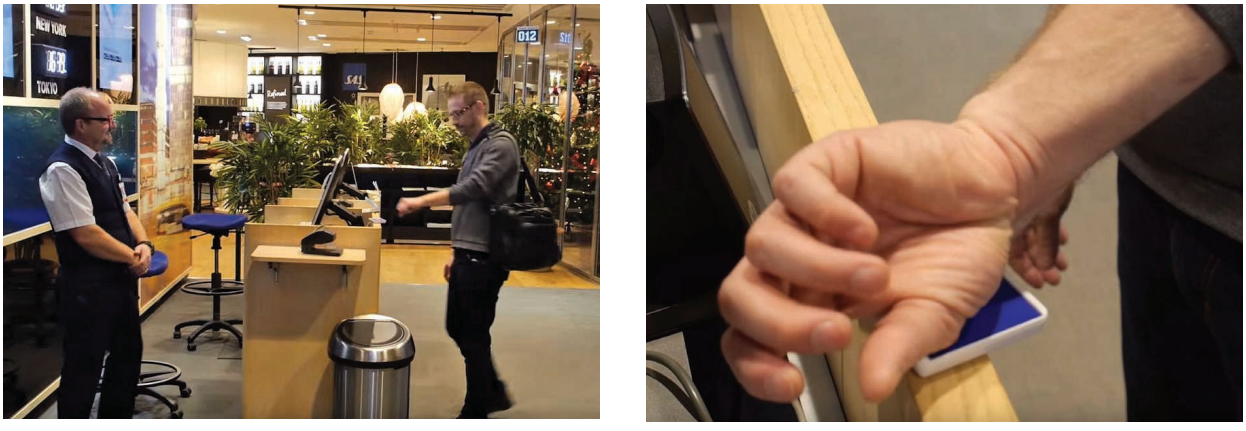

FIGURE 1. Andreas Sjöström passing through airport security using an NFC chip embedded in his hand in lieu of a boarding pass on January 6, 2016.

edited for readability by Rebecca Monteleone.

The Interview

KM: What was the motivation or inspiration for you to actually conduct this experiment?

AS: I think that there are couple of driving forces generally at play today in society and in the tech world. The digitization rate at which we as individuals engage with each other digitally can include the new tech — the wearable tech that we wear and (through which we) accept data about how we move and live. When you extend it into algorithms and digital ecosystems, these tech can help you lead a better life, a healthier life, connecting seamlessly with your friends and family.

And next to that you have technology impacting and improving people's lives from a medical perspective. Now, there are different tech streams at play, and I think about augmentation and the area in between physical and digital also in terms of our bodies; it is an interesting area to experiment and learn about. If it improves your life, would you embed technology? And you Katina have already made that argument with the heart pacemaker. The pacemaker argument — of course, if this tech would help you live on, would you embed it? Yes, you would. If tech would improve your ability to connect faster or add any relevant value, would you embed it? Yes, I think you would. Would you be concerned about integrity and security? Yes, you should be; just as you should with your phone as well.

So, I think the reason why I got a microchip implant is that I wanted to explore what are the relevant scenarios and what are the irrelevant scenarios? What works today and what doesn't work today, while maintaining a focus on the bigger picture. Of course, going into this conversation and similar conversations, it is important to note that most countries have already signed treaties like the International Covenant on Civil and Political Rights, and there's this prohibition on medical and scientific experimentation without consent (6). The short answer, I want to be part of the positive side of the tech community addressing the potential opportunity to improve people's lives. This was the key driving force for me in this experiment.

KM: Were you always going to limit your experiment to a few months?

AS: No, I was open to continue until I quickly concluded that it doesn't work very well.

KM: Why is an implanted chip just *not* worth it?

AS: It doesn't work very well. It's impractical. Backend systems are not standardized. There are easier ways to authenticate than with implants. This is just a novel idea.

KM: Could this become a mainstream practice?

AS: No, I don't think so. Simply because an implant doesn't add any value. We're just seeing tech enthusiasts jump on this currently, and since there's no rational reason to do it, it won't take off.

KM: What have reactions to the experiment been?

AS: The types of reactions I have received online I would say I can capture into three categories. One is typically from the IT industry and from the tech community (7). The LinkedIn geeks, the LinkedIn nerds that are cheering on that the findings are exciting and innovative. And acting, you know, like this is a positive question.

I was open to continue until I quickly concluded that it doesn't work very well.

And then we have the other type of comments, which I think is like 90% of the reactions online from Facebook and YouTube accounts, have been negative and concerned, and primarily involve integrity and security. And kind of linking this into all sorts of theories that you can dismiss like the "Illuminati," or technologically nonrelevant theories like "now you will be monitored or controlled by the government." Clear misunderstandings of radiofrequency identification (RFID) or NFC technology per se. But I think in general, the security or integrity concerns are the type of concerns that whatever solutions from a tech perspective we build, we need to take into serious consideration from all sorts of dimensions: so that we have full control, we have markup, and that data is managed by the user herself. We already do it with our mobile phones.

The third type of category of response, which I would say made up about 10%–15% of the reactions, have been of a pseudo-Christian or religious nature, linking this experiment to the last book of the Bible, the Book of Revelation, Chapter 13, where you have this prophecy which — if you believe it — is about Satan and the Beast, and the Beast and Satan forcing humanity to take on the Mark of the Beast on your right hand or on your forehead, and if you don't do that and worship Satan, you won't be able to buy and

FIGURE 2. Embedding of the NFC chip.

sell goods. So then you have this kind of idea that now this is the Mark of the Beast because of course I can use, theoretically at the very least, NFC chips to buy and sell stuff. And I was made into being the spokesperson for Satan, and actually I received death threats from groups of people after having conducted and posted the experiment.

KM: Andreas, you are the first person from a recognized organization to come out and say "(NFC) implants don't work." Why have you decided to actually tell it as it is, when you are a Vice President of a corporation that specializes in digital and digital is its lifeblood in terms of evolution of technology and innovation? Why has it taken this long for a professional from industry to say something?

AS: I don't know. I think that the community, the biohackers, the enthusiasts, they so much want it to happen. They are more interested than even the scientists, or even students of empirical data who don't care. If I can after the 15th try get the copier to read the NFC chip then "of course it works and this is the future." So I am disregarding that two minutes it took (Figure 2). For me as a Vice President and CTO of this company and you will find this of any serious organization of this sort, if we test something and try something and it doesn't work, then we won't pursue it further. Obviously.

KM: Is the main problem with the implant the lack of interoperability between service applications? Or it is a security or privacy issue for you? Or simply failure of the implant to do what it is supposed to do?

AS: Interoperability, practicality, hygiene… and simply because there are so many other smart ways to authenticate myself that don't require a large needle and a chip.

KM: For me, I refuse to put an implant in myself.

AS: I think that in principle, it is the cost-benefit. So what is the cost of the technology? And what is the benefit? And is it worth anything to me? Has it enough worth to me to bear the cost of carrying an implant? And you're saying that it has to be on the level that it is life sustaining or if it is a matter of life or death then I will adopt. That's kind of how we go about things every day, with making that analysis with everything that we do and we choose whether or not it is worth it, whatever it is. And I think this is going to be the same with implantable technology and I think that it is good that we are past the NFC and RFID implant technology, and we are starting to talk about how this technology should be, and what would be that technology and how would we integrate this technology, and what kind of scenarios and what kinds of use cases. If I put a sensor that is in my bloodstream and that sensor tells me things about my diet, and the way I live my life, that if we scientifically looked at it, could prolong my life by five or ten years, would that be interesting? If I eat healthier, and if I have this chip that I can share with my doctor, or whomever, is that worth anything or not? I think most people would agree that if I could have a warning three days before the stroke, then I do not have to go through that. Then would you do that? And maybe you would not but then I think many would do that.

KM: So, moving beyond just NFC implants, do you believe in the "fast-tracked" experimental methodology for consumer electronics? That is, "experiment now" and "ask questions later"? What are some of the advantages and disadvantages to this approach?

AS: If a perfect innovation methodology exists, please let me know. Most organizations we work with are open to rapid and agile experimentation alongside the traditional waterfall and stringently controlled R&D processes. Friction occurs sometimes here since successful corporations have now fine-tuned (their) operations engine to be efficient, rationally managed, governed by routines and rules, striving for calculated outcomes, and its planning is seldom month-by-month-quarter-by-quarter. Innovation labs, on the contrary, are tasked to first believe that current "as is" operations won't fuel growth very much longer: bold ideas, agile

processes, unpredictable results, failing fast, experiments… driven by a long-term vision, way beyond the horizon. It's not either or, it's both, and it's important to manage where each idea belongs.

KM: You know, wearing is different to bearing. In what way should implants be treated differently to wearables in design, development, and deployment?

AS: I've spent a lot of time recently studying and learning about deep learning and neural networks and AI. And the 23 principles of Asilomar [8] that Elon Musk and Stephen Hawking, et cetera have signed and also IEEE's version to ethically align design — the 260 pages on how to design AI [9]. So what I was thinking in context — do we need a separate conference defining 18 principles or 18 articles, I don't know, when it comes to this question? Probably. Because as I said, I think the two things that need to happen at the same time are finding out and experimenting. Of course when you see the concerns raised by just these simple NFC/RFID experiments, integrity, security etc. We need to find a way to secure the process, the management, the governance. I think it is inevitable — yes the train is leaving — I think it is inevitable that we are integrating biology with digital and technology. I don't think it's in the near future, not in five years, maybe not even ten years, but it's down the line. These questions need principles that we agree on that go beyond the current legislation, regulations, and declarations. I don't think that's enough.

KM: Are you more referring to principles of implementation, principles of design, or principles of sort of human values —

AS: I would say principles of design. Not just near the implementations but actually in the charters or the initiatives. How should we define the purpose of this project? What are the characteristics it needs to adhere to? I think right now we're talking a lot about design-thinking and design-driven development and so I don't think it's by coincidence that we're talking about ethically-aligned design.

KM: As I understand it, you still have your implant, nearly 18 months (as of February 2018) after the experiment. What is your approach for removal for yours and when will you decide to do it?

AS: I already met with a hand surgeon and I asked him if he would assist me in removing the chip, and he said it wouldn't be a problem. As you may know, in Stockholm this biohacking community is actually quite active. I really don't know why, but it's active. So, this wasn't the first request. So he just looked at me and shook his head and said, "you tech nerd." And, so I asked to have it recorded. And I will make sure that he makes it a little more bloody than it needs to be, so I can discourage other fellow human beings from doing this experiment, because NFC chips and RFID chips, I think it's nothing more than the card that you place in the spoke of a bike — which, sure makes some noise, but with no relevant purpose.

— Interview Ends—

Comments and Conclusions

Andreas Sjöström is not the only person who has adopted an implant for identification and then declared it not only a "bad idea" but also a "dead end". When the Food and Drug Administration (FDA)-approved VeriChip Personal Health Record (PHR) implantable was commercialized in 2004, medical doctor John Halamka, then with Beth Israel-Deaconess Medical Center in Boston, MA, was an early adopter of the transponder implant. As a Chief Information Officer (CIO) who was also an M.D., Halamka was eager to realize the benefits of an electronic health record. But later in 2006, together with several security experts, he proved there were major security flaws (i.e., namely cloning) with the VeriChip device [10]. Initially he noted: "that the device does not generate harmful heat, is safe for MRIs and from MRI magnets, and cannot be deactivated by a magnetic field or trigger." He said that he had not experienced any problems with the implant and wanted to investigate the technology as the Center's CIO for medical, ethical, privacy, and IT implications of implanted radiofrequency identification, so that patients could make an informed choice [11]. Although Halamka chose not to remove the device, he did note in an interview with *Healthcare IT News* that it was not a very practical solution given the implant required a minor surgical procedure. He noted: "It's easy to insert but challenging to remove. I have no plan to have mine removed" [12].

In 2009, Dr Halamka said that implantable RFID chips will never be widely accepted by the public. Others have removed their RFID implant transponders or tags successfully with seemingly few issues [13], but this is dependent on where the implant has been injected in the body (fibrous tissue can interconnect with the implant), and the type of material in which the implant has been encased (e.g., biobond material) to stop it from moving from the site of implantation [14]. Unfortunately, "removal processes" for DIY chip implantees are unavailable from current resellers on the market, and the consumer is encouraged to find their own manner of removal

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through a general practitioner (GP) or body modification shop. Some of these are purportedly "partners" though no official lists exist. This is a serious challenge that should not be dismissed. In 2007 the American Veterinary Medical Association (AVMA) noted with respect to dogs and cats that "removal of the chip is a more invasive procedure and not without potential complications" [15]. It is a great pity that early warnings from global research and advisory companies like Gartner were not heeded sooner [16]. And although we now have the so-named "cryptobionic implants" on the market that offer encryption, none of this changes the issue of the implant procedure itself. Recent academic studies that report microchip implants as "insertables" confuse the issue at hand. We could speak of insertable headphones in the ears, of removable dentures in the mouth, even of contact lenses that can be autonomously put on and taken off by the user themselves, but we cannot say this with implants that require incisions or injections [17]. Even intrauterine devices (IUDs) cannot be mistaken for insertables, they require a third party to remove them: "you can't do it yourself" [18]. The IUD is "inserted" in the uterus, yes, but it simply does not "pop out" like a tampon.

There is also a distinction to be made between Sojeti's chief technology officer's proclamations of RFID/NFC implants being a "bad idea" and Dr Halamka's "not a very practical solution" and a technology that will "never be widely accepted by the public." Professor Halamka, now with Harvard Medical School International Healthcare Innovation recently criticized the Australian Medical Heath Record system implementation for relying on outdated technology [19]. His stance is one that implies that organizations will not go forward with implantables for digital transformation because there is no economic value in it and the technology itself should not be used for authentication. Sjöström on the other hand not only believes it is a "dead end" but that it is also a "bad idea"; that the perceived benefits are far outweighed by all the unintended consequences of uberveillance, security, and health implications [20].

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