Responsible IoT after techno-solutionism

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The ThingsCon report The State of Responsible IoT is an annual collection of essays by experts from the ThingsCon community. With the Riot Report 2018 we want to investigate the current state of responsible IoT. In this report we explore observations, questions, concerns and hopes from practitioners and researchers alike. The authors share the challenges and opportunities they perceive right now for the development of an IoT that serves us all, based on their experiences in the field. The report presents a variety of differing opinions and experiences across the technological, regional, social, philosophical domains the IoT touches upon. You can read all essays as a Medium publication and learn more at thingscon.com.

In the first two weeks of July 2018, the world was captivated by news coverage of a rescue mission for a team of young footballers in Thailand who had been stranded in a cave. Towards the end of their ordeal and the news spectacle, Elon Musk, the CEO of Tesla and SpaceX announced that his team had built a minisub using cutting-edge space technology to aid the rescue mission. They had tested it in a pristine swimming pool in LA and then Musk flew to deliver it in the murky waters outside the cave where the boys were stuck. While Musk had been busy building hype for the minisub, a team of local and international experts and volunteers had already started getting the boys out.[25]

While often not attracting the same broad media coverage, stories of such failed techno-solutionism, the belief that technological innovations in their own right can solve complex societal challenges, abound. Across regions, hackathons, pitch contests, and design competitions are positioned as ideal to help cultivate a mindset of entrepreneurial agility and innovation thinking in turn portrayed as crucial to facilitate societal and economic change ([26] Irani 2015, [27] Lindtner 2015, [28] 2017).With taglines such as "Design for Good," "AI for Good," "HCI for Good," civic hacking, and so on, they garner investment from foundations, government, and corporations eager to signal social responsibility. Common to these events is the gathering of technologists, engineers, and designers charged with the task to create solutions for the disadvantaged, often without their close involvement. The proposed solutions are often more attuned to investors' interests in value accumulation than to the realities they promise to intervene in.

All of these projects represent a much broader and by now several decades old approach of designing technology "for good", for "development" (also often referred to as ICT4D), and for others[29], [30], [31]. While often well-meaning and motivated by commitments to designing technology that serves rather than undermines humanity and economic opportunity, research has shown for decades now the continuous failures of such techno-solutionist ideals and projects centered around designing or developing for others[32], [33], [34].

In this short article, we explore an alternative view of what counts as responsible technology innovation and responsible IoT in particular. Specifically, we tell a story of IoT innovation that starts from a position of designing with and within rather than for, and from an attitude of partnership rather than a rhetoric of "do good" or "feel good". We urge for the importance to locate responsibility not only in the technical product (e.g. a product or service that serves low-income populations or that enables a more equitable life for minorities), but also within the social and intercultural processes of design and production.

In the spring of 2018, two of us traveled to Accra, Ghana, where we met Kamal Yakub, the CEO of two Ghana-based companies, Farmable[35] and Trotro Tractor[36]. When we met Kamal, he was preparing for a trip to Shenzhen in the South of China to solidify a deal with a Chinese company, ThinkRace, to design a new tracking product with elderly travellers in mind. Two months earlier, Kamal's team had found ThinkRace online and reached out to them. The engineering and design team took their prototypes, got on a plane to Shenzhen and worked with ThinkRace for three weeks to turn their prototypes, tested in the fields and with farmers in Ghana, into a product.

Farmable is a crowd farming platform that connects small holder cattle farmers in Ghana with a global market. The company's suites of IoT devices helps farmers track cattle, monitor their health and connect with potential buyers. Buyers can invest in cows, and also follow their progress till they are ready "for harvest". Trotro Tractor targets small holder farmers and allows them to rent tractors through a sharing model, thereby reducing their equipment cost and increasing their farm productivity. The IoT devices designed by the company provide real time data that connects farmers to the nearest and available tractor, cutting down wait times, in largely rural areas where internet access is quite low.

We followed Kamal to Shenzhen and joined his visit with his Chinese counterpart, ThinkRace's CEO Rick Tang. What struck us about the interactions between Kamal and Rick, and what we heard from their team member's prior interactions, was that they were enacted and articulated as mutual learning from one another, as a form

of partnership and co-dependence even, with each side gaining and contributing equally. They were both equally invested, even if the type of investment differed. While Kamal was invested in creating low-cost IoT devices for farmers in Ghana, Rick was invested in positioning his company as a trustworthy and ethical Chinese company serving an international market. Both businessmen were also upfront about and openly discussed the necessity and importance of making money to sustain and advance their respective companies. In techno-solutionist discourse, making money is often de-emphasized as it is rendered to signal a lack of creativity, or greed, or in some cases as not representing a hacker or maker ethic. Truly innovative products, so the story often goes, emerge from creative play and tinkering rather than economic interests or concerns.

For Kamal, who had participated in a myriad of pitch competitions and start-up events and gatherings over the last years, this partnership was different. After one of his meetings with another company, he remarked that "doing this here is different than in Silicon Valley because in Silicon Valley there are no social problems attached to the technology. [...] Yes, of course, I do this for money, I'm a businessman... but I also need to solve problems... In Shenzhen, when you are here, you just think of innovation. You think about how you can build it. It's not about hype, it's about implementing change." Rick put it another way "talk is cheap — put some money and some hope on it". Both men felt energized by their collaboration and saw a mutually beneficial opportunity to learn and craft new futures for their companies and the people that worked in them.

The story of Kamal and Rick makes visible the limitations and consequences of more typical portrayals of responsible technology as emerging from designing for others less privileged. This 'othering' of people in need "out there"[^5] undermines and reduces their agency to recipients of aid. Once a project is constructed as aid for a presumed disadvantaged other, it runs the risk of exacerbating the asymmetry between the giver's desires and the intended recipients. It also risks undermining the build-up of trust and recognition of mutual dependencies as we saw in Kamal and Rick's partnership.

Technological designs and systems framed as *for development* are often legitimized in the name of objectivity and what Donna Haraway calls the god trick; i.e. claiming one's own partial view of the world as objective and universally applicable[10].We argue that responsible IoT can fall into this trap, when tools, techniques, and devices conceived in elite IT laboratories are framed as universally applicable and beneficial. This language of universality masks the corporate and financial interests of already powerful tech companies invested in expanding their business and reach to the very places being construed elsewhere as in need of aid.

Our aim is not to naively celebrate Kamal or Rick as somewhat more "authentic" innovators or "native" entrepreneurs. On the contrary, our goal is to work against such overly simplistic stories of success and against the imagery of the hero/savior (as the Musk story we opened with suggests). Let's tell other stories and shift our orientation from techno-solutionism to mutual accountability and co-dependencies — or as feminist scholar Sara Ahmed (2010)[9] put it: "Orientations matter. To say that orientations matter affects how we think 'matter'. Orientations might shape how matter 'matters.'" This means also orienting towards the continuous exclusions and discriminations along gender, class, and racial lines that lurk underneath a myriad of seemingly successful and mutually beneficial partnerships.

Rather than constructing responsibility for or on behalf of an 'other' out there, one path might be to interrogate for whom we are claiming responsibility and to listen and work with those already finding solutions in the places we want to help, rather than defaulting to doing things for them, usually without their input. Rather than starting from the technology, in this case IoT, responsibility could start from a place where we take seriously the aspirations and commitments to futures and worlds that are otherwise, as enacted partially by Kamal and Rick.

Our argument, simply put, is that responsible IoT is when their design and production starts from a place of mutual care, respect, and equality. We are inspired by a long lineage of feminist technoscience scholarship that provides techniques and methods for imagining and implementing technology (e.g. among others Anna Tsing, Shaowen Bardzell, Lisa Nakamura, Lucy Suchman). Their work has long shown how exclusions along the lines of gender, race, and class persist despite and perhaps even because of well-meaning "do good" initiatives in IT industry and research communities. Our approach begins with an understanding that responsibility in technology innovation starts from a commitment by the technology designer, engineer and/or researcher to remain accountable for the actions and values taken. It also includes accounting for one's partial view, rather than claiming objective expertise and universal knowledge.

The tools for IoT may have 'democratized' to some extent but the socioeconomic systems behind them have not. We therefore need to start being critical at the onset of more pervasive IoT rather than after the fact when more harm than good has taken place.Ultimately, responsible IoT may not need advanced technological solutions but commitments to accountability and responsibility.

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Silvia Lindtner is an assistant professor at the University of Michigan in the School of Information, with a courtesy appointment in the Penny W. Stamps School of Art and Design. Lindtner's research and teaching interests include innovation and technology entrepreneurship, making and hacking cultures, shifts in digital work, labor, and industry. This work unfolds through a deep engagement with issues of gender, inequality, and enactments of masculinity in engineering, politics of design, contemporary political economy, and processes of economization. Lindtner draws from ten years of multi-sited ethnographic research on China's shifting role in global tech production, including research in urban China, Europe, the United States, Taiwan, and Africa. Her research has been awarded support from the US National Science Foundation, IMLS, Intel Labs, Google Anita Borg, and the Chinese National Natural Science Foundation. Together with Professor Anna Greenspan and David Li, Lindtner co-founded the Research Initiative Hacked Matter, dedicated to critically investigating processes of technology innovation, urban redesign, and maker-manufacturing cultures in China.