The Human Element: The Under-Theorized and Underutilized Component Vital to Fostering Blockchain Development

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THE HUMAN ELEMENT:
THE UNDER-THEORIZED AND UNDERUTILIZED COMPONENT VITAL TO FOSTERING BLOCKCHAIN DEVELOPMENT

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The following is a lightly edited transcription of Joshua Fairfield's oral remarks at the 2018 *Cleveland State Law Review* Symposium.

Blockchain is about one-third math and two-thirds game theory.[1] The math runs on silicon processors. The game theory runs on grey matter. Earlier in this symposium, the last panel essentially asked, "what's different about blockchain and its relationship to humans?" That will be our focus: What is the right relationship between technology and the community that builds it? And, why would we care?

Here are some comments that I have heard throughout the day: Susan Joseph said that "[o]nly part of this is a technological solution. It is about relationships as much as the technology supporting it."[2] Jeff Ward said that "the community can shape behavior through feedback on the chain."[3] Pat Berarducci: "This is the first year we're going to see ledgers that help groups achieve whatever goal the group of people want to accomplish."[4] Daniel Rice, who was designing hybrid human crypto communities building a safety net framework using human intervention, said that "building humans into the blockchain, making formal what has always been the case, blockchain technology is us."[5] Carla Reyes: "The developer community is of course providing what we call off chain governance for Bitcoin and Ethereum."[6]

Let's just let's just call a spade a spade: people are providing direct actual governance. The humans, again, are part of the technology.[7] You cannot separate them. Doing so would be disastrous.

When we say blockchain is about relationships, we are not *just* saying that these relationships—using peer-to-peer networks—are important to humans. It is not just about how blockchain technology is changing us, but also about how we get together

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[1] *See* S. Ari Mushell, *Bitcoin Mania: Will it Matter?*, 132 THE BANKING L.J. 1, 2 (2015) (discussing the relationship between Bitcoin and Game Theory).

[2] *See* Videotape: Cleveland State Law Review Symposium: Blockchain Law & Technology, CLEV. ST. L. REV. (forthcoming 2018).

[3] *Id.*

[4] *Id.*

[5] *Id.*

[6] *Id.*

[7] *See* Nathaniel Popper, *The People Leading the Blockchain Revolution*, N.Y. TIMES (June 27, 2018), https://www.nytimes.com/2018/06/27/business/dealbook/blockchain-stars.html.

33

and build this technology. This process is how we build it, and they themselves, are generated by a blockchain technology. Let me give you an example: Ethereum after The DAO darn near exploded.[8] The cryptocurrency community stepped in to save its bacon by intervening.[9] This community has real governance problems, but you cannot deny that this "fail-safe" is a critical part of the technology. In fact, the community saved Ethereum largely because humans ignore certain kinds of fatal computing vulnerabilities. Particularly, those that have to do with recursion.

To see the circularity, let's just think about what we have been talking about today. Human groups build consensus ledgers to help them raise money and coordinate group efforts to build more consensus ledgers that help them raise more money and coordinate group efforts to build consensus ledgers.[10] This is a recursive human-machine process. It is not purely about "hard technology." We have been emphasizing hard technology all day, but the human component has shown through since the very first panel and was further showcased in the last panel. And so, that is what I am trying to underscore here—the human element in generating the blockchain community is an under-theorized component in the blockchain world.

This all began with the first sentence: Bitcoin. That is what got everybody's attention. The second sentence: Blockchain. This technology should be considered as a rough record of truth, rather than a means of moving value. The third sentence seems to be, unanimously, the method of enabling different kinds of human relationships; peer-to-peer relationships and community relationships. If we are going to end up breaking into relationships, then we have to pay attention. There is this tendency to think that technology will emerge triumphant. That there is sort of a "tech-bro utopianism," epitomized by Mark Zuckerberg, and that when we have a physical problem, what we need is a technological—not a human—solution.[11]

The difficulty is that, breaking into the types of relationships, and forming the new kinds of relationships that we want to form, is not going to be a particularly easy task. The first relationship that this technology tried to break into was the relationship between banker and customer.[12] Thus far it has, in my opinion, not successfully done so. There are serious banking applications of blockchain technology and they all leave the banker intact, behind the banker's desk, because behind the banker's desk is the

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[8] *See* Joseph Adinolfi, *Digital Currency Ethereum Nose-Dives After $50 Million Hack*, MARKETWATCH (June 17, 2016), https://www.marketwatch.com/story/digital-currency-ethereum-nose-dives-after-40-million-hack-2016-06-17.

[9] *Id.*

[10] *See generally* Steven Norton, *CIO Explainer: What Is Blockchain?*, WALL ST. J. (Feb. 2, 2016), https://blogs.wsj.com/cio/2016/02/02/cio-explainer-what-is-blockchain/ (explaining blockchain and its relation to consensus ledgers).

[11] *See generally* Zeynap Tufekci, *The Machines Are Coming*, N.Y. TIMES (Apr. 15, 2015), https://www.nytimes.com/2015/04/19/opinion/sunday/the-machines-are-coming.html (discussing human reliance on technology to solve problems that used to be tasks for humans).

[12] *See* Nathaniel Popper, *Tech Thinks It Has a Fix for the Problems It Created: Blockchain*, N.Y. TIMES (Apr. 1, 2018), https://www.nytimes.com/2018/04/01/technology/blockchain-uses.html ("The first blockchain was created in 2009 as a new kind of database for the virtual currency Bitcoin, where all transactions could be stored without any banks or governments involved.").

back-server room which contains a node that connects to the blockchain.[13] This, in turn, connects that bank with a number of other banks so they can settle your checks in minutes, rather than in the typical three-day time frame.[14] And, make no mistake, this in itself is a serious advance in technology. Getting your money now, instead of in three days, is wonderful; however, we did not disrupt the relationship for bankers throughout this process. Pure technological innovation consistently fails to change human relationships.

Let's look at another example. In another panel, we talked about disintermediating Uber.[15] Uber is pretending that it has already disintermediated everything but let me explain another side. I had a lovely ride here, through Uber, with a gentleman. I clicked the button on an app, he came, we talked, then I was dropped off at my destination. It was just he and I—but actually, no it was not. There was an intermediary that skimmed off a good chunk of change.[16] And, as far as I can tell, Uber has been subsidizing themselves. They are subsidizing their ride to the grave. Uber is not really making a lot of money right now.[17]

But, the technology did not disintermediate the relationship with people in any serious way. Uber did not empower consumers in the way that we have been talking about wanting to empower people. I go to conference after conference in which people talk about building relationships, building communities, building new technology to change the world, to change how we interact largely with large institutions with massive asymmetric power and control. And then, I walk out and I see the investment. The "investment" is in back room deals for those institutions that have asymmetric power and control, who in turn, do not change anything.

"Protect consumers"—we have all heard that one. Except how in the world can we protect consumers? I had a vision at one point that I put into a short essay called "Bitcoin Bots and Smart Contracts."[18] I thought to myself, what if consumers could post smart contracts saying, "I would like to buy a new tablet because, on my current one, the letter 'J' doesn't work." Wouldn't it be great if I could fund a smart contract, put it out on some kind of exchange, attach my own terms and conditions to it, and then have a buyer want to come to me? For non-lawyers, that difference in formal arrangement will not make any sense. You may be thinking, "why does it matter whether I offer the contract terms rather than Amazon offers the contract terms?" But,

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[13] Norton, *supra* note 10.

[14] *Id.* ("Using this method, transactions could be approved automatically in seconds or minutes, significantly cutting costs and boosting efficiency.").

[15] *See* Videotape: Cleveland State Law Review Symposium: Blockchain Law & Technology, CLEV. ST. L. REV. (forthcoming 2018).

[16] *See* Heather Somerville, *True Price of an Uber Ride in Question as Investors Assess Firm's Value*, REUTERS BUS. NEWS (Aug. 23, 2017), https://www.reuters.com/article/us-uber-profitability/true-price-of-an-uber-ride-in-question-as-investors-assess-firms-value-idUSKCN1B3103 (addressing Uber's loss of income as of 2017 and the effect that subsidizing has had on the company).

[17] *Id.*

[18] Joshua A.T. Fairfield, *Smart Contracts, Bitcoin Bots, and Consumer Protection*, 71 WASH. & LEE L. REV. 35, 35 (2014).

it turns out that, what is at stake, is my ability to go to court at all.[19] Arbitration agreements have left American consumers completely out of courts.[20]

Then—I said to myself—well, let's protect consumers by letting *them* offer the contract terms, because if I offer a contract, you better believe it is not going to contain an arbitration agreement. Then, if the other party responds, they accepted my terms and then all is well. However, I hear Dave saying that his first hurdle to get through a class-action agreement involving Bitcoin exchanges, is to get through their arbitration agreements.[21] This just propagates things to the next level.

Presently, I have no reason to believe that a Bitcoin consumer, or any consumer for that matter, has better access to legal recourse for what has been done to them, than they currently have under an Amazon purchase contract.[22] Unless we do something.

Lastly, we have this tendency to talk about protecting consumers by commodifying data.[23] Today, I heard Pat Berarducci saying, "Consumer tokens! Consumer tokens are the answer. This is how we're going to change people's relationships with their suppliers. We're going to give the consumers the tokens. And that way they're going to get paid for what they do online."[24] The funny thing about commodifying an asset though, is that when you commodify an asset, you are packaging it for buying-and-selling on a basic exchange.[25] You are not protecting it. You are not making it reside with the person.

For example, there was an experiment conducted that compared people who donated blood with people who sold blood.[26] Do you want to know what happened to the blood supply when we started selling blood? It went down.[27] Why? Because people no longer thought of it as something they were doing out of the goodness of themselves.[28] Instead, they thought of it as a commodity.[29] Blood was literally devalued by being made into a commodity. It was worth less the moment it became a commodity.

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[19] *Id.* at 39.

[20] *See* NACA Legislative Unit, *Consumer Attorneys Report: Arbitration Clauses are Everywhere, Consequently Causing Consumer Claims to Disappear*, Nat'l Assoc. Of Consumer Advocates 1 (June 25, 2012).

[21] *See* Cleveland State Law Review Symposium: Blockchain Law & Technology, *supra* note 2.

[22] *See* Stacy-Ann Elvy, *Contracting in the Age of the Internet*, 44 Hofstra L. Rev. 839, 921 (2016).

[23] *See* Maria Bottis & George Bouchagiar, *Personal Data v. Big Data: Challenges of Commodification of Personal Data*, 8 Open J. Of Phil. 206, 209 (2018).

[24] *See* Cleveland State Law Review Symposium: Blockchain Law & Technology, *supra* note 2.

[25] *See* Margaret Jane Radin, *Market-Inalienability*, 100 Harv. L. Rev. 1849, 1907 (1987).

[26] *See* Carl Mellström & Magnus Johannesson, *Crowding out in Blood Donation: Was Titmuss Right?*, 6 J. Eur. Econ. Ass'n 845, 852–57 (2008).

[27] *Id.*

[28] *Id.* at 857.

[29] *Id.* at 858.

As another example: An Israeli daycare ran another experiment in which they wanted parents to come pick their kids up on time.[30] And so, the daycare commoditized the cost of picking up children.[31] They imposed a fine if parents picked up their kids late.[32] You know what the parents did in response? They thought, "Oh, I get to pay for extra babysitting time? Great, I'll do that." Whereas before, the teacher's time after school was non-commoditized and the parents were worried; the issue was, I need to get there so I do not impose a cost on this other human who has to stay here and watch my kid because I'm late. However, as soon as this concept was commoditized, the teacher's time was worth fifteen dollars an hour.[33] To the parents, they knew exactly how much it was going to cost and what it was worth. My point here is that if we keep on going the way we have, then this system will not work.

Pure technological innovation will not provide the disruption in relationships that drives many people to be a part of this technology. There is a strong chance that, in five years, the primary applications of blockchain technology will consist of the permission-chains between banks, hospitals, and other legacy power holders. Not a single application of serious widespread-use would empower consumers.

This is going to get even crazier. This is something that another speaker mentioned last night—we will eventually begin to create an intermediary "whack-a-mole." Essentially, he said let's imagine that this works, that people have sixty-five different kinds of tokens for sixty-five different kinds of services. Do you think that anybody is going to use this stuff? How is the consumer going to use the technology?

I have clients who refuse to put end-user license agreements on their mobile apps because they lose thirty-three percent of their potential consumersevery fifteen seconds it takes a person to download the application and get to using the application. In other words, if there is any interference at that point in the process, they lose their install base. Any friction causes consumers to abandon the technology.[34] You want to talk friction? There are thousands of different kinds of tokens and cryptocurrencies that one can use to run different kinds of services.[35] We are going to need intermediaries to manage all of these tokens to run the stuff in the first place.

Fortunately for us, blockchain technology is not just hard technology. My point being, pure technological innovation will not revolutionize human relationships. Sometimes, we forget there is a distinction between hard technology and soft technology, and blockchain technologies are right at the center of it. If you imagine money, it is just a consensual hallucination. It lets us exchange goods-and-services for bits of paper that nobody wants. Once the nuclear apocalypse comes and the orange rains start to fall, you are going to want that can of spam, not a twenty-dollar bill. It is a complete hallucination. A way of managing memory within a system of people.

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[30] *See* Uri Gneezy & Aldo Rustichini, *A Fine Is a Price*, 29 J. LEGAL STUD. 1, 4 (2000).

[31] *Id.* at 14.

[32] *Id.* at 4.

[33] *Id.* at 14.

[34] *See* Scott Wingo, *How Adopting a Zero-Friction Approach is the Key to Success*, BUSINESS.COM (July 19, 2018), https://www.business.com/articles/zero friction-approach.

[35] *See* Matthew Frankel, *How Many Cryptocurrencies Are There?*, THE MOTLEY FOOL (Mar. 16, 2009), https://www.fool.com/investing/2018/03/16/how-many-cryptocurrencies-are-there.aspx.

Now, we can do that with a ledger that memorizes each transaction and replaces the social technology of money.[36]

In essence, social (or soft) technology and hard technology are often equivalent and substitutes for each other. You can take a standard packet switching network (the hard technology) and compare it with the social-tech equivalent—the post office. Or, consider most forms of information transmission. The current form of social technology that we use to transmit information is called a conference.[37] It is often a highly inefficient method of information transfer.[38] This equivalence between hard technology and social technology means that we often miss the social innovations that are possible with blockchain technology. We also miss the extensions of game theory that we could use to make blockchain technology help us be better groups, to help us have better relationships. All of this means that we cannot neglect the social technological aspects of blockchain in our attempt to create peer-to-peer relationships.

I want to speak to the lawyers in the room because lawyers have a big part to play in this process. There is a whole field focusing on social technology and its role in helping humans form groups, and make patterns within those groups, that lean toward human thriving. Some of those fields—game theorists, economists, behavioral economists, psychologists, historians, linguists, cultural anthropologists—often do not have representatives at these conferences. We presently do not have them as part of our development, but we should. I worked for several years with the Office of Director of National Intelligence running experiments in virtual worlds trying to figure out how these communities worked and whether or not bad guys were doing bad things in those communities. Those teams were required, as a matter of federal funding law, to contain experts from cultural anthropology, from law, from a number of other sciences, from people who had completely different ways of looking at the problem.[39] Some were computer scientists, some were lawyers. Many were cultural anthropologists and others.

Dan was sitting up here, talking a bit about debugging smart contracts.[40] There's a reason we do not have good debugging software. In fact, there is a reason why it is essentially impossible to have software that debugs computer programs—it is called the halting problem. If you follow Gödel's incompleteness theorems, then you know that you cannot ever be completely sure that a program is going to stop.[41] That is the

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[36] *See* Sarah Ceraldi, *Can Cryptocurrency Revolutionize the Rituals of Money?*, SAPIENS (Aug. 3, 2018), https://www.sapiens.org/technology/cryptocurrency-money-ritual.

[37] *See* Michael Jackson, *Most Conferences Are a Waste of Time, Money, and Effort*, LINKEDIN (July 17, 2015), https://www.linkedin.com/pulse/most-conferences-waste-time-money-effort-the-other-michael-jackson.

[38] *Id.; see also The Cost of Ineffective Meetings*, EUREKA CONFERENCING (May 24, 2017), https://blog.teleconference.com.au/conference-call blog/the_cost_of_ineffective_meetings.

[39] *See* Cleveland State Law Review Symposium: Blockchain Law & Technology, *supra* note 2.

[40] *Id.*; *see also* Kai Sedgwick, *25% of All Smart Contracts Contain Critical Bugs*, BITCOIN NEWS (Aug. 29, 2018), https://news.bitcoin.com/25-of-all-smart-contracts-contain-critical-bugs/.

[41] *See* Rohit Tripathy, *Fixing Smart Contracts—Here Comes Blockchain Contracts*, MEDIUM (Jan. 2, 2018), https://medium.com/ranchimall/fixing-smart-contracts-here-comes-blockchain-contracts-ca0243ef506f.

basic problem and that is what we have seen in many of these debacles with blockchain technology. The computer does not stop—it continues to cycle and siphon off a third of the Ether in the Dow before somebody is able to put a stop to it. Or, trading algorithms that go nuts and buy up half the market before some human can tell the dumb thing to stop. This is not a role that we need to perform as humans just for right now, rather, this is a role that we will always have to play. It is simply not possible for computers to catch the halting problem. Humans will always be a part of it. The technology cannot exist without us.

The major problem then, is that social technologists, psychologists, historians, linguists, and cultural anthropologists are not on the development teams that are building this stuff. Therefore, we keep making mistakes with the kinds of human communities we organize. We are doing a great job on the hard technology, but we keep making mistakes with respect to the human communities that develop the technology.

The one set of social technologists that have been permitted to be in the room from the beginning of the conversation are lawyers.[42] Mostly because you cannot kick us out. We have our hands on the levers of power. We can threaten regulation that would get us a seat at the table.[43] But here is the interesting thing: lawyers have approached blockchain from a defensive posture. That means that the only social technologists who routinely get a seat at the table have not been using their skills as builders of social technology. Let me be clear ladies and gentlemen, law is nothing other than social-technology run on a series of grey matter nodes. It is simply behavioral rules, only observable to the degree that they actually bind (or do not bind) human behavior. For example, how do I know that there is a speed limit? Only if, and when, humans slow down. If humans do not slow down, then there are no consequences. There is not, functionally, a speed limit—such a thing does not exist. However, these social technologists—lawyers—who do get a seat at the table, have largely used their power to try to regulate, channel, and fend this off.

We should not be using the social-technologist power to assist bringing in a new form of human arrangements willy nilly. Rather, we should be using that power to make sure that this new form of human arrangements is targeted at human thriving, at making us better off as a species no matter what.

We cannot forget that blockchain development is a recursive and reflexive process. Humans get together using social technologies like PowerPoint, conferences, firms, and investment money to develop technology that changes the rules for all the organizational relationships that you create. What this is going to do in the end is change our groups if we do this right. And what that means is that it is going to change us. It is going to change how we interact with each other, how we trust each other,

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[42] *See* Randolph A. Kahn, *Why Blockchain Is More Important to Lawyers Than They Probably Understand*, ABA Bus. L. Today (Jan. 15, 2018), https://businesslawtoday.org/2018/01/why-blockchain-is-more-important-to-lawyers-than-they-probably-understand/.

[43] *See, e.g.*, Ohio S.B. 220, 132nd Gen. Assemb., Reg. Sess. (2017); *see also* Andrew J. Tobias, *Ohio Legislature Passes Blockchain Legislation*, Cleveland.com (Jun. 28, 2018), https://www.cleveland.com/open/index.ssf/2018/06/ohio_legislature_passes_blockc.html. (explaining Ohio's "safe-harbor" law and its recognition of blockchain technology); Yuka Hayashi, *CFPB Wants to Help Launch New Fintech Products*, Wall St. J. (Jul. 18, 2018), https://www.wsj.com/articles/cfpb-wants-to-help-launch-new-fintech-products-1531953587?mod=ITP_businessandfinance_7&tesla=y.

how we make money, how we talk to each other, how we go to work, how we organize, and how we prove that something is true. That is not going to just be a difference in how we do things—it's going to be a difference in who we are. We are social animals, and this is a social technology. There is every reason, therefore, for us to be as careful about this as we possibly can.

As a final point, I saved my reason for why diversity is absolutely critical to the development of blockchain technology. At the very end of this all, we are provided a clear reason for the calls for radical inclusion in the blockchain space. We are going to have to test the physical components of this technology across a range of social relationships and social contexts. One community, the Ethereum community, saved their blockchain.[44] There are lots of other communities that are dedicated to defrauding as many people as they can get their hands on.[45]

We are going to have to test this tech in sub-Saharan Africa, where it has one set of affordances and needs. We are going to have to test it in China, where I think it might be a plausible alternative to the most terrifying thing I have ever heard of—the Chinese Social Credit Score system.[46] If you haven't read of that, a "good citizenship score" is now being rolled out in China.[47] When you, for example, disagree with the judge, your caller ID on your phone will now identify you to people that you call as a non-cooperative person with the State.[48]

As a behavioral economist, I can tell you that game theory does not always translate across culture. The reason is rooted in the belief that we do not think that a person would compromise one of these chains within the block because it would be against their best interests. This relies on a cultural understanding of what your best interests are. Do not think that this social technology is going to run the same on different routers. We are going to have to test it on a range of human experiences, or we will not debug it, because that is ultimately our role. Our role will be to debug the technology that helps us organize ourselves to build.

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[44] *See* Matthew Leising, *The Ether Thief*, BLOOMBERG (Jun. 13, 2017), https://www.bloomberg.com/features/2017-the-ether-thief/; Jordan Pearson, *Why Ethereum Succeeded Where Bitcoin Failed*, VICE (Jul. 16, 2016), https://motherboard.vice.com/en_us/article/ezpa3p/why-ethereum-succeeded-where-bitcoin-failed-hard-fork-DAO.

[45] *See* Vivek Wadhwa, *R.I.P., Bitcoin. It's Time to Move on*, WASH. POST (Jan. 19, 2016), https://www.washingtonpost.com/news/innovations/wp/2016/01/19/r-i-p-bitcoin-its-time-to-move-on/?utm_term=.1dc0904c8969.

[46] *See* Jack Karsten & Darrell M. West, *China's Social Credit System Spreads to More Daily Transactions*, BROOKINGS (Jun. 18, 2018), https://www.brookings.edu/blog/techtank/2018/06/18/chinas-social-credit-system-spreads-to-more-daily-transactions/.

[47] *See* Audrey Murrell, *Pushing the Ethical Boundaries of Big Data: A Look at China's Social Credit Scoring System*, FORBES (Jul. 31, 2018), https://www.forbes.com/sites/audreymurrell/2018/07/31/pushing-the-ethical-boundaries-of-big-data-a-look-at-chinas-social-credit-scoring-system/#366243a525e5.

[48] *See* Jennifer Pak, *How Does China's Social Credit System Work?*, MARKETPLACE (Feb. 13, 2018), https://www.marketplace.org/2018/02/13/world/qa-china-s-social-credit-system.