
The Internet of Everything: Data, Networks & Opportunities

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Thank you to the U.S. Chamber of Commerce and its Center for Advanced Technology & Innovation for inviting me to kick off today's program on the Internet of Everything. The U.S. Chamber is truly the Washington presence for those large, medium, and small engines of prosperity, American businesses, which innovate every day to bring new products, improved services, and better outcomes to their customers. The result is a dynamic economy that promises - and delivers - increased prosperity and opportunity.

I know this optimistic view isn't in favor in some quarters. But even if optimism is out of fashion, it remains true that today the average American can enjoy one of the richest lives in all of history. On every metric of well-being, humankind has had an incredible past 200 years. Up until 1800, the worldwide average person daily consumption was approximately \$3 modern-day dollars.² But starting in the early to mid-1800s, something changed: As Alfred North

¹ The views expressed in these remarks are my own and do not necessarily reflect the views of the Federal Trade Commission or any other Commission. I would like to thank my attorney advisor Neil Chilson for his contributions to this speech.

² DEIRDRE N. McCLOSKEY, *BOURGEOIS DIGNITY: WHY ECONOMICS CAN'T EXPLAIN THE MODERN WORLD* 1-2, (2011). 86.5CN62.349 0 430-H.9t0fTm [(O ET /Te0TT,Box <<>>Bmnas2< scn /CS0 CSs2< SCN09s66 430-H)d (F./630-H /

Whitehead said, and I am paraphrasing, around that time people invented invent³ Today, average daily consumption is nearly \$33 dollars, and in developed countries⁴ over \$100. Of course, this growth isn't uniform across the world, but the overwhelming majority of the world's population is far better off today than were its ancestors 200 years ago. What economist Don Boudreaux calls the Hockey Stick of Human Prosperity⁵ is a direct result of free market institutions that incentivize and reward innovation and meaningful work, as well as societal attitudes that respect and value entrepreneurship and business⁵

The massive benefits of the Internet of Everything

We're here today to talk about one technology that – if we preserve those institutions and societal attitudes just mentioned – has the potential to greatly extend the upward trajectory of the hockey stick of human prosperity. That technology is, of course, the Internet, connected to and connecting everything. This "Internet of Everything" promises substantial benefits to consumers in every economic situation and to businesses of all sizes

Several organizations have attempted to estimate the potential benefits of the Internet of Everything. A recent study by McKinsey Global Institute gives perspective. That study estimates that IoT will have an economic impact of between \$3.9 trillion and \$11.1 trillion dollars *per year* by 2025⁶. Even the low end estimate is approximately the size of the German economy today⁷.

³ MATT RIDLEY, THE RT

Even though consumer applications will not be the largest slice of the benefits of the Internet of Everything, these applications remain significant in absolute economic terms and in their impact on individual lives. McKinsey estimates a benefit of \$170 billion to 1.6 trillion annually by 2025 just from IoT applications dedicated to monitoring and improving wellness.¹² Conservative estimates indicate that IoT applications could reduce the cost of care for chronic disease by 10 to 15 percent.¹³ This includes savings from avoiding crises - such as a heart attack triggered by not complying with a regimen - that are not only expensive, but also emotionally and physically distressing to patients.

These benefits will be spread across the globe. Experts anticipate that emerging economies will be able to “leapfrog” to IoT solutions (similar to their leapfrog to wireless communications) as they build out infrastructure in the near future. One estimate suggests that emerging economies will receive an average of \$100 billion to \$1 trillion in benefits by 2025.

making it easier to match supply and demand, allowing more fluid and just arrangements.

This innovation cannot be unnerving or unsettling. By its very nature, innovation *changes* things. Change is uncomfortable. That is why, as long as there has been innovation, there have been detractors and doomsayers. William Petty, the economist and doctor, said, “When a new invention is first propounded, in the beginning every man objects and the poor inventor runs the gauntlet of all petulant wits.”¹⁶ And he was talking in 1679! Pessimism about innovation sells newspapers and books also has a surprising intellectual caché. “The man who despairs when others hope is admired by a large class of persons as a sage,” said John Stuart Mill.¹⁷

But if the past 200 years of innovation have any lesson, it is this: society has repeatedly and quickly integrated and greatly benefited from innovation. The somber doom “sages” – from the Luddites in 19th century England to critics of credit card technology in the 1970s – have been wrong about the general effects of innovation. The many benefits have far outweighed the few costs. I am quite optimistic that the disruption of the Internet of Everything will continue the trend and greatly promote our prosperity.

Preserving an environment of innovation in Internet of Everything

Although I am optimistic about history repeating itself here, history doesn’t happen on its own. There are things we can do to help maximize the benefits of IoT to consumers. In particular, as a regulator, there are four principles or actions I believe will help preserve an environment of innovation for the Internet of Everything.

¹⁶ See Matt Ridley, “Neophobia v. Innovation,” CATO Unbound, (Oct. 13, 2010) (quoting William Petty, *A Treatise of Taxes and Contributions* 53 (1662)), <http://www.cato-unbound.org/2010/10/13/matt-ridley/neopns>

Tell the story of innovation The first thing we can do is promote an accurate understanding of the dramatic benefits innovation even in the face of constant skepticism. Psychologists tell us that people are often pessimistic about society overall even though they are generally optimistic about their own prospects. For many reasons, media and politics often feed this pessimism. But the truth is that we live in remarkable times, the beneficiaries of a 200+ year period of innovation that shows no signs of stopping. I am proud to use opportunities like this one to spread knowledge about this grand history, in which many of the Chamber's members have played a role.

Apply regulatory humility. This history, discussed only briefly above, has different lessons for different constituents. For regulators, it counsels the second of my four principles: approach new technologies and new business models with regulatory humility. Regulatory humility is my name for recognizing the inherent limitations of regulation and acting according to those limits.¹⁸ As Hayek's work shows, regulators face a fundamental knowledge problem that limits the effective reach of regulation. A regulator must acquire knowledge about the present state and future trends of the industry being regulated. The more prescriptive the regulation, and the more complex the industry, the more detailed knowledge the regulator must collect. But, regulators simply cannot gather all the information relevant to every problem. Such information is widely distributed and therefore very expensive to collect. Even when a regulator manages to collect information, it quickly becomes out of date as a regulated industry continues to evolve.¹⁹ Obsolete data is a particular concern for regulators of fast-moving technological fields like the Internet of Things.

This knowledge problem means that centralized problem solving cannot make full use of the available knowledge about a problem. Therefore, centralized regulation generally offers

generally preserved our resources for clearly harmful violations. I believe this self-restraint has been important to the FTC's success in stopping consumer harms without disrupting innovation.

Focusing on real, rather than speculative consumer, is crucial to maximizing the hon. Span]TJ

Nomi might help its clients understand how long the average customer spends in the men's department or a checkout line. Nomi's technology aggregates this data by receiving and storing hashed versions of the publicly broadcast MAC addresses of consumer smartphones. As a third party contractor collecting no personally identifiable information, Nomi had no legal obligation to offer consumers the ability to opt out. Yet, since the service started, Nomi offered all consumers a global opt out on its website, which it honored. The problem was that Nomi's privacy policy also pledged to allow consumers to opt out of any retailer using Nomi's technology. However, none of Nomi's retail clients offered consumers the opportunity to opt out. Thus, Nomi's privacy policy was partly inaccurate.

The majority of Commissioners supported a complaint ~~alleged~~ that Nomi's inaccurate privacy policy was deceptive and a settlement that imposed a 20-year compliance order on the company.²⁷

I dissented from the complaint and settlement in this case.²⁸ The evidence suggested that there was no consumer harm. Consumers who wanted to opt out used the functioning global opt out, and thus Nomi's partially inaccurate statement likely harmed no consumers. By bringing this case, the majority applied a de facto strict liability approach to a young company that had actually tried to offer privacy protections above and beyond its legal obligation.

As the U.S. Chamber's helpful comments on the Nomi settlement pointed out, the FTC shouldn't have brought a costly enforcement action against a startup company that did not harm consumers. I share your concern that the FTC's action "may dissuade [small businesses]

²⁷ In the Matter of Nomi Technologies, Inc., ~~FT~~ File No. 1323251, Compl. (Apr. 23, 2015), available at <https://www.ftc.gov/system/files/documents/cases/150902nomitechcomp.pdf> (Sept. 3, 2015), available at 419(v)3964 04Td 04T

voluntary adoption of consumer privacy practices and stifle entrepreneurship and innovation in technology.²⁹ Indeed, this decision discourages companies from doing any more than the bare minimum on privacy. I believe such disincentives will ultimately leave consumers worse off.

Use Appropriate Tools. The final way that regulators can spur innovation in the IoT is to use appropriate tools to solve issues that do emerge. The tools an agency uses can make a large difference in the agency's effectiveness. For fast changing technologies like IoT, agencies need tools that are nimble, transparent, and incremental.

Often, we equate regulation with large, APA-style rulemakings. Such rulemaking sets out rules, often industry wide in scope, to prevent future harms. For the reasons discussed above, including the knowledge problem, regulators struggle to construct effective rules and to update such rules in a timely manner. And such prescriptive *ex ante* regulations can hinder innovation. For example, if an innovative new project or service does not easily fit in a particular statutory or regulatory box, the innovator may be uncertain about how to comply with the law. Such legal uncertainty exacerbates the already risky effort to develop something new, which discourages innovation.

A good example of a nimble, transparent, and incremental regulatory tool is the FTC's case-by-case enforcement process, which is quite different than APA rulemaking.³⁰ Although the Commission does have rulemaking authority, the vast majority of our actions are *ex post* case-by-case enforcement of our general Section 5 authority. This incremental approach, which we have been using for nearly 100 years, has significant benefits. Consistent with Hayek's thesis about the knowledge problem, addressing only a specific case at hand requires far less

²⁹ In the Matter of Nomi Technologies, Inc., ET File No. 1323251, Comments of U.S. Chamber of Commerce, at 1 (May 22, 2015) available at <https://www.ftc.gov/policy/publiccomments/2015/05/22/comment00005>

³⁰ See Maureen K. Ohlhausen, *The FCC's Knowledge Problem: How to Protect Consumers Online* 67 FED. COMM. L.J. 203, 212-213 (2015), available at http://www.fclj.org/wp-content/uploads/2015/09/67.2.2_Ohlhausen.pdf

information than, for example, an industry-wide rulemaking to address similar issues. This reduces the knowledge problem. Furthermore, this *ex post* enforcement requires particular facts on the ground and a specifically alleged harm, and it generally only directly applies to the party

Different industries in the IoT space are adopting privacy and data security principles through self-regulatory efforts. For example, in November of last year, the Auto Alliance and