THE WEIGHTLESS MARKETPLACE

Coming to Terms with Innovative Payment Systems, Digital Currencies and Online Labor Markets

David Bollier, Rapporteur

THE ASPEN INSTITUTE

Communications and Society Program
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Washington, D.C.
2014

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Published in the United States of America in 2014
by The Aspen Institute

Printed in the United States of America

ISBN: 0-89843-600-1

14/003

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This report is written from the perspective of an informed observer at the Aspen Institute Roundtable on Information Technology. Unless attributed to a particular person, none of the comments or ideas contained in this report should be taken as embodying the views or carrying the endorsement of any specific participant at the Roundtable.

Foreword

The digital age has fundamentally changed the way commerce operates. Due to the rapid proliferation of the World Wide Web, mobile telephones, tablets and large, connected databases, consumers have more power in the market than ever before. Throughout the world, the relationship between consumer and producer is more fluid and transactions are more transparent. "The crowd" is solving problems, funding companies, designing products and creating new channels of marketing. By piercing the constraints of the traditional market, furthermore, Big Data is facilitating the production of innovative products and creating a demand for new services.

All of these factors have significantly reduced friction in commerce by facilitating more direct contact between buyer and seller, removing geographical barriers, improving competition and lowering the cost of doing business. Commerce not only has the ability to be targeted and instantaneous, it has essentially become "weightless."

Among the more interesting developments adding to this weightlessness is the way people pay for their goods and services—increasingly by mobile devices, with the prospect of alternative currencies lurking in the foreground. These alternatives to traditional commerce offer businesses and consumers many opportunities for extending the reach of markets, offering greater credit and meeting other needs of the market.

At the same time the implications of these trends and developments hold many perils for businesses, consumers and governments. As is the nature of commerce, there will be winners and losers. How much anonymity can a consumer expect with mobile payments, on the one hand, and alternative currencies on the other? How does a business prepare quickly enough for the disruptions ahead? More difficult, how do governments, whose controls over currencies and trade within their borders are an essence of sovereignty, keep up with the rapid pace of innovation? How can a "weightless marketplace" provide new opportunities for communities in need?

These and other policy questions were addressed by the Aspen Institute Communications and Society Program during a three-day dialogue in Aspen, Colorado in August of 2013. A knowledgeable

group of leaders, innovators and entrepreneurs assembled for the 22nd annual Aspen Institute Roundtable on Information Technology, with the task of developing a more sophisticated, timely understanding of the latest technology innovations affecting commerce, and particularly payments.

Rapporteur David Bollier details the results of that wide-ranging dialogue in the following report. In describing the changing nature of commerce, Bollier explores new trends in retail commerce and labor markets, both nationally and overseas. He offers a glimpse of the cutting-edge production methods that are changing the commerce paradigm, as described by Michael Chui of the McKinsey Global Institute. He describes the legacy, as well as innovative new payment systems emerging in the global market, as related to the group by Jack Stephenson of JPMorgan Chase and Eric Dunn of Intuit. As players transact in the new world of commerce, they will want to consider consumer data policies and alternative currencies, again related by participants in the Roundtable.

Bollier then examines ideal environments for innovation in payment systems. Incumbent payment systems are well established and have created an inhospitable environment for upstarts in the field. Due to these entrenched systems, John Clippinger of MIT's ID3 noted, innovations will come increasingly from underdeveloped countries that don't have legacy models. Along these lines, the report then turns to the impact that new, innovative technologies and services are having on low-wage work, particularly in emerging markets. As digital platforms bring the work to people, are they lifting them out of poverty, or exploiting cheap labor?

Bollier concludes the report by investigating the proper role for government in the regulation of commerce. Public policy needs to be rethought and updated so that it can address serious concerns on competition, privacy, consumer protection and social inclusion, without smothering important innovation. Governments always struggle to keep up with technological innovation. The new and exciting realities of the "weightless marketplace" are no exception, causing foreseeable tensions with existing regulatory schemes.

Acknowledgements

We would like to thank our senior sponsor McKinsey & Company for its leadership in developing this Roundtable, as well as our other attending sponsors of the 2013 Aspen Institute Communications and Society Program for making this and our other conferences possible: Deloitte Center for the Edge and Markle Foundation, *Senior Corporate Partners;* Cisco Systems, Inc., *Corporate Partner*; PCIA, *Corporate Associate*; and John Kunzweiler, *Individual Associate.*

I also want to acknowledge and thank David Bollier, our talented rapporteur, for his excellent synthesis of the discussions and debates that transpired during the Roundtable as well as our participants, listed in the Appendix, for their contributions to these important issues. Finally, I want to thank Ian Smalley, Project Manager, and Rachel Pohl, Program Associate, for their help in producing the Conference and this report, along with the Communications and Society Program's Assistant Director Patricia Kelly, who oversaw its editing and publication.

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March 2014

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Coming to Terms with Innovative Payment Systems, Digital Currencies and Online Labor Markets

By David Bollier

The structure and character of commerce has changed dramatically since the arrival of the World Wide Web and various digital technologies, particularly mobile phones and large, interconnected databases. Consumers now have much greater market power and choice. Markets can more easily scale, often globally. Co-production and fluid producer/consumer interactions are routine. Transactions themselves have become far cheaper and more easily consummated.

…commerce has not only gone digital and electronic, it is fast becoming "weightless."

Twenty years since the popularization of the Web, one could say commerce has not only gone digital and electronic, it is fast becoming "weightless." The barriers to competition posed by geography, lack of information, transaction costs and other factors are steadily falling as more and more commerce moves to Internet and mobile platforms. The explosion of Big Data is making it easier and cheaper for both consumers and sellers to connect with each other in the marketplace. For better or worse, the "friction" of conventional commerce is dissipating, unleashing both great innovation and social dislocation. New types of products, services and labor are materializing, often to great acclaim, even as old forms of government oversight and public policy are revealed as too slow and inept, and as certain segments of the population, unable to participate, are left behind.

Such developments point to some long-term, structural changes in commerce that deserve deeper exploration. To get a better understanding of emerging trends, the 22nd annual Aspen Institute Roundtable on Information Technology invited twenty-three technology experts,

electronic payment and commerce executives, policy advocates, venture capital investors, policy experts and foundation officials, to share and debate the latest trends for three days in Aspen, Colorado. The goal was to develop a more sophisticated, timely understanding of the latest technology innovations affecting commerce.

…the "friction" of conventional commerce is dissipating, unleashing both great innovation and social dislocation.

A particular focus was the existing state of market payment systems and the innovative alternatives that are cropping up. The conference also addressed the growing importance of Big Data in commercial transactions; the rise of "small data," which is data controlled and shared directly by individuals; the challenge of developing trustworthy privacy protection systems; the implications of new currency systems such as Bitcoin; and the special challenges facing developing countries, as well as the attractive opportunities.

Naturally, many of the transformations in commerce, particularly innovative payment systems, have significant public policy implications. So the conference also spent some time exploring the appropriate roles for government in guiding the development of new technologies and markets. How can valuable new sorts of innovation be encouraged while also assuring competition, citizen privacy, consumer protection and social inclusion?

The conference took place from July 14 to 17, 2013, in Aspen, Colorado. Charles M. Firestone, Executive Director of the Aspen Institute Communications and Society Program, moderated. This report is an interpretive synthesis of the highlights of those conversations.

The Changing Nature of Commerce

Charlie Firestone of the Aspen Institute opened the first set of discussions by showing a short video produced by the *New York Times* on how retail stores are using Big Data and tracking technologies to moni-

tor consumers as they shop. "Attention, Shoppers: Store Is Tracking Your Cell,"[1] described how Nordstrom, the department store chain, began testing a technology that lets it "track customers' movements by following the Wi-Fi signals from their smartphones." The company wanted to learn how many consumers entered its stores, how many were repeat visitors, in which areas of the store they spent their time, and so forth. Reporters Stefanie Clifford and Quentin Hardy wrote:

> Nordstrom's experiment is part of a movement by retailers to gather data about in-store shoppers' behavior and moods, using video surveillance and signals from their cellphones and apps to learn information as varied as their sex, how many minutes they spend in the candy aisle and how long they look at merchandise before buying it.
>
> All sorts of retailers—including national chains, like Family Dollar, Cabela's and Mothercare, a British company, and specialty stores like Benetton and Warby Parker—are testing these technologies and using them to decide on matters like changing store layouts and offering customized coupons.

At the store entrance, Nordstrom put up a notice informing shoppers of the tracking, which some reported as "creepy" and objectionable. The complaints were one reason that Nordstrom discontinued the Wi-Fi monitoring, according to the *Times*. But brick and mortar retailers are likely to continue experiments in this vein because online retailers, with greater access to detailed data about customers, are gaining a competitive advantage that will only grow in the years ahead.

New Trends in Retail Commerce and Labor Markets

Michael Chui, Principal at the McKinsey Global Institute in San Francisco, gave a quick overview of salient trends in online commerce. The standard paradigm of commerce, said Chui, is one in which "manufacturers design and produce products, which are then pushed to people through marketing, primarily advertising. And then buyers—mostly consumers around the world who show up in stores—pay

the prices set by the seller through formal payment systems established by financial institutions."

This classic template of commerce has been transformed by the rise of Internet platforms that not only let consumers do comparison shopping, but which vastly enlarge the scale of markets through website "stores." According to the research firm Forrester, annual e-commerce revenues in the U.S. are now estimated to be nearly $200 billion—a total of 9 percent of retail sales, up from 5 percent five years ago. As e-commerce becomes ubiquitous, moreover, it is blurring the channels by which customers and sellers can interact to transact a retail sale. Darrell Rigby, writing in the *Harvard Business Review*, calls it "omnichannel retailing"—the "websites, physical stores, kiosks, direct mail and catalogs, call centers, social media, mobile devices, gaming consoles, televisions, networked appliances, home services and more" that are vehicles for seller/buyer interaction. "Retailers will find [in the future] that the digital and physical arenas complement each other instead of competing, thereby increasing sales and lowering costs," writes Rigby.[2]

…technology is allowing customers to express far more customized demands….

As such trends have proliferated, China went from nearly no e-commerce to the second-largest e-commerce market in 2011 (the year with the most recent accurate statistics), said Michel Chui. "It is probably the largest e-commerce market in the world right now [2013]. Interestingly, the vast majority of sales in China e-commerce come through marketplace platforms, such as Alibaba, that are like eBay and Amazon, as opposed to manufacturers themselves selling goods directly."

A significant trend is how technology is allowing customers to express far more customized demands, such as NIKEiD shoes, for which people can choose special colors and design images. Some 200 stock-keeping units (SKUs) of Boeing products are now printed through 3D printers, which are expanding the potential range of affordable customized products.

Manufacturers are also inviting consumers to participate in the R&D process through "open innovation" platforms. Open design and manufacturing are a burgeoning new production process that has many non-traditional participants. One example of this is InnoCentive, a Massachusetts-based open innovation company that invites people to solve research and development problems in such domains as engineering, computer science, math and chemistry.

All of these changes mean that in many markets "the seller population is changing," said Michael Chui. Individuals and smaller organizations can more easily enter markets and grow. Entrepreneur Caterina Fake, Founder and Chief Executive Officer of Findery, a social mobile application, and co-founder of Flickr, the photo sharing website, noted how consumers can often enter into production directly as "manufacturers." That's essentially what the websites Etsy, Kickstarter and MakerBot have enabled—a trend that is making many commercial ecosystems more diversified and competitive.

…consumers can often enter into production directly as "manufacturers"…a trend that is making many commercial ecosystems more diversified and competitive.

Another trend is for companies to lease or rent access to certain products and services rather than to sell them. For example, it is now possible to rent units of thrust on aircraft rather than a jet engine itself. On-demand taxi services such as Lyft and Uber are making it more attractive to procure transportation via mobile phones on an as-needed basis, than to buy and own an automobile.

This trend has affected labor markets, too, as labor brokers devise new ways to "rent out" specialized consulting expertise. The challenge in this field, explained John Kunzweiler, Chief Executive Officer of M Squared Consulting, Inc., a provider of project consultants to larger enterprises, is to define the work so that it can be done properly. "A clear definition of the work is critical to having a happy outcome, and defining the work is really tough. You're hiring somebody who shows

up and you hope can execute a project under a contract." InnoCentive, a successful market platform for R&D projects, avoids this problem through "enterprise crowdsourcing." People are invited to discover and self-select project offerings that are suitable for their talents.

Now that digital technologies allow huge amounts of work to be performed through cross-border transactions, "knowledge process outsourcing," or KPO, has become very important, said Leila Janah, Founder and Chief Executive Officer of Samasource, a nonprofit working at the less-skilled end of the labor market. Samasource connects large companies with people living in poverty willing to do "microwork"—small, computer-based tasks such as photo-tagging and image identification. Defining work at this less-skilled end of the labor market is not as difficult as it is for sophisticated work projects.

The commoditization of smaller and smaller elements of a good or service—made possible by digital systems—means that a person is increasingly "buying access to something or a service, or some part of the supply chain," said Esther Dyson, Chairman of EDventure Holdings, which invests in and nurtures startup companies, with a recent focus on health, human capital and aerospace. "A lot of such transactions depend upon trust, because there is no way for a buyer to verify things independently; they are part of what's being sold."

In some instances, however, technology is enabling direct verification of performance. In advertising, for example, it is now possible to measure the performance of ads, which means that companies can sell guaranteed performance, not just estimates or vague expectations. The common denominator in so many transactions is the renting rather than the sale of something—creative works, jet engine propulsion, labor of all varieties, computational power—in small, discrete units of time or other measure.

"Everything can now be arbitraged!" exclaimed Peter Vessenes, Chairman and Executive Director of Bitcoin Foundation. "It is a really interesting question who benefits, and who doesn't, from marketizing all these transactions that previously had a lot more friction."

Consumers may be one loser, suggested Marc Rotenberg, President and Executive Director of the Electronic Privacy Information Center in Washington, D.C. "In traditional commerce, when someone purchased something, they possessed it. There was a transfer of an item

from seller to buyer. Now, even though that is still happening, one of the more remarkable developments is how many things consumers purchase that they don't actually possess—music, ebooks, video and more. It's out there in somebody's cloud, and you may have rights to download it on certain devices and use it. But you may not own it." However, Shane Green, Co-Founder and Chief Executive Officer of Personal Inc., pointed out that the same model can also be used to empower individuals as they become the "owner" of their own data and can "lease" limited access rights to companies they trust.

The Weightless Marketplace: New Methods of Payment

A second session of the conference focused on the innovations in new methods of payment, especially through mobile phones and the Internet. The idea of a "weightless marketplace" is an apt metaphor because the technical barriers and expenses of market transactions are decreasing radically. As payment systems become easier, cheaper and seemingly invisible, they are reducing the "friction" that has historically been associated with transactions. But it is not entirely clear how the simmering competition among payment systems for e-commerce will shake out, particularly for mobile phone transactions ("m-commerce").

Jack Stephenson, Managing Director of Mobile, E-Commerce and Payments for JPMorgan Chase, offered a broad overview of the current state of payments systems. Currently, there are five main ways to pay for things: cash; checks and bank notes; credit cards; bank transfer payment systems; and ACH-style wire systems for financial transactions (Automated Clearing House). Two salient features affect the viability and longevity of payment systems, said Stephenson: their ability to meet the needs of both consumers and merchants in what he called "two-sided markets;" and the role of network effects in deterring new entrants into the field.

In terms of two-sided markets, the needs and interests of merchants are often the critical factor in the success of a payment system. For consumers, there are some "basic laws about payments" that affect a system's success, said Stephenson. It must work quickly and easily among minimally trained people. It has to be widely accepted. It must be trusted by both consumers and merchants. For merchants, the system must work without complications because they do not want

to discourage sales through long check-out lines. This means that a minimum-wage clerk with few skills must be able to easily learn how to use the system.

Merchants want any payment system to facilitate sales by lowering the costs of transactions, after all. They are also eager to obtain their money from transactions quickly and with few hassles. There is a great virtue to legacy systems, said Stephenson, because sellers and their customers are comfortable with them, and they have become deeply integrated into the "ingrained business processes" of companies. "Basically, payments systems are like plumbing," said Stephenson. "It's an ugly back-end system. You want it to be invisible, frictionless and seamless. You don't want to have to think about it. That's the way we prefer payments to work."

Citing a recent article that he co-authored on the topic,[3] Stephenson said, "While more than 200 new payment systems were launched between 1993 and 2000, only one has emerged as a standout success—PayPal, with some 86 million accounts in more than 55 countries." He noted that while some new entrants are still in business, more than 190 of them have failed.

Still, payment system innovators persist. Several major factors are driving what Gartner, the consulting firm, calls the "democratization of money." These include 1) individual access to *massive, high-speed flows of information* that help people understand and define the value of goods and services quickly; 2) the proliferation of *mobile computing* such as smartphones, feature phones, tablets and notebook computers, which enable context-aware computing; 3) the rise of *the cloud*, which enables individuals to "transact directly with multiple counterparties around the world, without having to use financial intermediaries;" and 4) *social commons* of highly specialized communities of interest (Craigslist, Facebook, Groupon, Pinterest), all of which are amenable to crowdsourcing of opinion, peer influence and "carrot mob" sales at particular times and places.[4]

To be sure, network effects discourage innovation in this space, much as the dominance of the "Wintel" standard (Windows software/Intel chip) and the Federal Express overnight-delivery model have deterred competition. "It takes a long, long, long time to get enough users onboard to be able to make a system work," said Stephenson.

"But at some point, you may hit a tipping point when you attract enough people," as the Diners Club and American Express Cards did in the 1950s and 1960s, he said. These payment systems addressed very specific problems (after hours business entertaining) and they took a long time to build a sufficiently large network of participating merchants and customers. Because such systems tend to achieve a lock-in, said Stephenson, "it's extraordinarily difficult to break in with a new system, even if you're providing greater value to the consumer." Stephenson recalls how when he first started in the business in the early 1980s, there were about 280 different payment networks, 30 ACHs and 180 ATMs (automated teller machines) in the U.S. Now those numbers have been "massively consolidated," he said.

Credit Cards vs. Mobile Payment Systems

Even though existing payment systems are deeply entrenched and familiar, there are a number of new types of systems emerging, especially for mobile phones and devices. The big question is whether these upstarts can compete successfully with incumbent payment systems, especially credit cards.

"What's interesting to me about mobile payment systems is that so many of them are actually working," said Eric Dunn, Senior Vice President for Payments & Commerce Network Solutions for Intuit Corporation. There are new systems that let people scan checks with their smartphones and send those images to their bank to make deposits. There are bank bill-pay systems that let people pay bills via their phones. Online vendors like Amazon accept mobile phone payments (using credit cards). Mobile peer-to-peer payments, such as PayPal payments, are another option.

Finally, there are new card swipe devices such as Intuit's GoPayment dongle and the Square, which can be attached to phones to make credit card purchases. Stephenson said that these systems "are basically solving the same problem that PayPal solved—to make it incredibly easy for a person to accept a credit card."

But even with such innovation, there are complaints about too much friction in the new systems. They can be either technically complicated, not that convenient or costly in terms of transaction fees paid

to third parties. "People don't want to sit and type sixteen-digit credit card numbers over and over and over again with their thumbs," said Stephenson of JPMorgan Chase. "People don't want to have 85 different [digital] wallets." Such impediments will discourage consumers from completing transactions, which shows up in the digital shopping cart "abandonment rate" statistics.

While Apple has seemingly solved the convenience issue through its iPhone and iTunes store, the company charges a hefty surcharge for such transactions. Shane Green, Co-Founder and Chief Executive Officer of Personal, finds it "incredibly easy" to make purchases via these systems, "but I'm paying a 30 percent upcharge every time a I buy something, which I would not necessarily have to pay if I paid directly to the seller. That's coming out of the prices that sellers are having to pay to Apple; I'm not seeing [those savings] as a consumer."

Green sees "a lot of artificial" in consumer transactions that is simply about various players "protecting their market turf." Green believes that a variety of payment startup companies could reduce transaction fees to a tenth of what credit card companies currently charge. But of course, any newcomers must make their alternative systems highly convenient for consumers and merchants alike. "When you solve the convenience problem, as Apple has in its ecosystem, it's radical how fast the consumer will go towards it," Green said.

Of course, credit cards are the default standard for easy, ubiquitous, trusted electronic payments. They also let consumers easily consolidate their diverse purchases into a single bill.

But some merchants are not especially happy about the 2 percent transaction fee ("200 basis points") that they incur, on average, to accept credit cards. (The basis points may vary somewhat depending upon a merchant's particular agreement with its so-called acquirer.) The issuing banks receive much of the transaction fees because they take the trouble to find the credit card user; underwrite his credit risk; give him a 30-day float on the money used in purchases; and promote higher merchant sales (because consumers are more inclined to buy something with a card versus cash).

To try to reduce the fees paid for credit card usage, a consortium of large national merchants are starting to organize and flex their muscles. Approximately one-third of U.S. retailers, including Walmart, Best

Buy, Dunkin Donuts, CVS and 7-Eleven, have started their own network, MCX or Merchant Commerce Exchange. The goal is to develop "a customer-focused, versatile, seamlessly integrated mobile-commerce platform."[5] MCX is trying to develop a mobile phone, non-card payment system whose fees would be closer to 5 cents per transaction (using MCX) rather than 23 cents (the Durbin-regulated cost of a debit transaction, which in turn is far lower than the cost of a typical credit card transaction).

Vijay Sondhi, Head of Corporate Strategy for Visa Inc., noted that now that one vendor, Amazon, controls 25 percent of e-commerce, and another vendor, Walmart, controls a vast swath of retail sales worldwide, large merchants are trying to use their clout to reduce credit card fees. Sondhi predicts: "As we move to instant payments and 1-Click checkouts, the user's affinity to a card network or a bank changes. The customer's affinity with the merchant may increase. People say, 'I'm an Amazon customer,' and their relationship with their bank has changed from the pre e-commerce era." This trend is accelerating among the under-35-year-old segment of consumers, said Sondhi, because of their different view of banks. "So the shift is moving towards more empowered merchants and consumers," he said, "and it's going to require the networks and banks to adapt our roles appropriately."

"…the shift is moving towards more empowered merchants and consumers…and it's going to require the networks and banks to adapt our roles appropriately." – ***Vijay Sondhi***

Credit card companies are in fact attempting to make their cards easier to use with mobile devices. Besides the mobile card-swiping devices mentioned above, Stephenson notes that JPMorgan Chase has invested in a mobile payments platform, GoPago, that enables "go-ahead ordering" and fast, hassle-free transactions: "I can order my breakfast, walk in and a person whom I've never met will say, 'Welcome back, Jack,' and hand me my order. I will walk out and never take out any cash. To me, that is a really magical, seamless experience. I think that's what we're going to see in the future."

But Esther Dyson, Chairman of EDventure Holdings, cautioned that while such payment schemes may work in the U.S., they may not in places like Russia where people do not trust large, integrated systems. "It's hard to see this system spreading everywhere," said Dyson, because of "this trust thing." "You may worry that you will get billed for a lot of things that you never did—as sometimes happens on credit cards right now when you get billed for $6.79, which is "too little money to get really upset about and too much trouble to spend five hours on the phone resolving," said Dyson.

Eric Dunn of Intuit offered a hypothesis to explain why there can be so much interest and innovation in mobile payment systems yet so little progress in perfecting friction-free mobile phone transactions. "The high-end market players who own the networks are attempting to define a consumer mobile device + point-of-sale transaction as a card transaction," said Dunn. "Once that happens, you have a complicated rules environment, the NFC [near-field communication] protocol and secure elements, and so forth. I think this is why we haven't seen a broad adoption of what transaction people [merchants and consumers] want to do, which is to buy something at a retail outlet."

Yet even with this inertia favoring the established system, Dunn noted that venture capital money is investing in mobile payment systems because "there's a belief that if I, as a consumer, have a mobile, broadband-connected supercomputer, and I'm buying something from a merchant who has a broadband-connected supercomputer, it ought to be possible for these two devices to negotiate a simple payment transaction in a way that is more modern, and does not necessarily rely on established card networks, which are expensive in the U.S. compared to elsewhere in the world."

Dunn's hypothesis helps explain the current impasse. On the other hand, the situation is quite dynamic as the four factors cited by Gartner—digital information flows, the cloud (including the rise of "personal clouds"), mobile telephony and social commons—continue to develop and cross-synergize each other. This gives many observers confidence that one or more of the networked-based, mobile-friendly schemes now under development could scale rapidly in the near future.

Who "Owns" the Customer?

Walter Isaacson, President and Chief Executive Officer of the Aspen Institute, wondered why is it not possible to develop "an 'EZ Pass' that would allow us to make micropayments on the Internet?" People should be able to make relatively small purchases via a Web browser or mobile phone with anonymity, avoiding all personal, credit and administrative data associated with most electronic transactions. "Everything has gotten more friction," he complained, citing PayPal, Bitcoin and other payment systems. "It just demands so much more of me. I keep looking for ways to simplify this, as Steve Jobs would have said. This kind of system would also transform media because they could sell their newspapers or blogs for 25 cents or a dollar, without having to give up a whole lot to a payment-transaction company…."

The answer to Isaacson's question seems to be that most payment system companies are quite eager to "own the customer." They want to establish ongoing relationships that will yield rich personal data about consumers and future purchases. Paul Moreton, Senior Business Director for Digital Commerce at Capital One, noted that there is a struggle among card issuers, merchants and the customers themselves over "who owns the customer."

In one respect, "no one owns the customer," said Moreton, because neither the credit card company nor the vendor "owns" a customer who shops at Walmart using a Capital One credit card. But in other respects, most players have a keen interest in "owning" as much of the loyalty, personal data and future purchases of consumers as possible. Not surprising, this "prize" accounts for the aggressive marketing, technology design, lobbying over regulation and other strategic maneuvering to secure market advantages. Innovative new payment systems generally fail to get traction, said Vijay Sondhi of Visa Inc., because of "turf battles over who owns what."

The persistence of the "own the customer" mentality, said Shane Green, is reinforced by the design of enterprise IT systems. It locks in that approach because there is a whole infrastructure and set of power relationships designed to "control the customer." "If you look at CRM [Customer Relationship Management] and everything about it," said Green, "there is all this 'rocket science' going against the customer. It's not focused one bit on empowering the customer in the same way with a set of their own data to use."

Green believes that "the customer should own the customer"—meaning, individuals should be able to control and use a complete set of their "small data," which is something they are uniquely advantaged to do as long as they have the right tools and incentives. "I just think this is not a concept that has ever really existed before. So it's hard for people to get out of the worldview where a company owns the customer, and to enable a new model. But an empowered customer can actually have a much better interaction with the companies that they want to do business with. Data shared *by* the customer can help personalize and streamline every step of a transaction—turning just about everything into a 1-Click experience. It can be highly advantageous to companies who can't really compete with Amazon, Apple, Google or Facebook when it comes to removing friction and exploiting user data. By collaborating with their customers in this new way, most any company, but especially data-oriented startups, should be able to provide an experience as good or better than these large digital incumbents."

One example of customers owning their own data—and deploying it to serve their interests—is the "Blue Button." This web-based system, implemented by the U.S. Departments of Defense, Health and Human Services and Veterans Affairs, lets individuals access and share their online medical records easily and securely.

As a general proposition, however, empowering individuals to control their own data is not so easy. Many people simply do not know enough about the importance of data to care. Caterina Fake, Founder and Chief Executive Officer of Findery, told of her experience in founding Hunch, which sought to allow consumers to own their own data and help them "personalize their experience everywhere they went." But with popular images of data analytics as part of a total surveillance and control system, as conjured by the film *Minority Report*, Fake discovered that people are reluctant to fill out complete profiles or actively manage their digital identities. "We have a very difficult time getting consumers interested in owning their data," she reported.

Large businesses, for their part, are not necessarily happy to see consumers managing their data. As Green explained, companies often see this idea as depriving them of consumer and market data. He has found it far more disarming to explain that individuals simply want *a copy* of all of their data, "not that you have to delete yours. I think

it is now getting super-easy to go to a company and say, 'You should be giving copies of data back to consumers. And if you do, not only will you make their lives better and more convenient, they might just reward you by sharing data that you've never been able to collect on your own.'"

Zoë Baird Budinger, President of the Markle Foundation, urged that we identify a meaningful role for individuals in controlling their data. We should not regard them as an afterthought "at the end of the system," she said, but "as an integral part of the system who also reaps benefits from it. We need to pay attention to what individuals get out of the system."

Shane Green believes that the most effective strategy is to show people some "immediate value" that they might get from their data. "If you ask someone to just put all their data somewhere in the hope that it might be useful to them in the future, it will either terrify them or they won't find it interesting. You have to find something that they already relate to—something that is a 'pain point' for them, like registering for sites, 1-Click checkouts and filling out forms of all kinds."

Another incentive for people to manage their data, said Peter Vessenes of the Bitcoin Foundation, is the prospect of finding other people who are similar to them. "You want to be able to use your data to find the one other person who has exactly my interests but I didn't know about." This is one motivation behind the Personal Genome Project backed by investor Esther Dyson. "My entire genome is up online. My mission is to get people to understand that this stuff isn't scary; it's useful. There are a lot of people who are willing to share, especially people who are sick, because they understand it can be helpful. The message about what data is being used for is tremendously important."

Still, noted Vessenes, "there is a lot of vulnerability" that goes along with such disclosures of data. Extreme care must be taken to protect identity and privacy, he said. Unfortunately, the systems for assuring such protection have not really been perfected.

A deep undercurrent to these discussions is the importance of *trust* in devising long-term solutions. Trust develops when "people's understanding of a business and its actual business practices are in close

alignment. The more that people participate in managing their digital identities and data, the higher the degree of trust, and the more successful the business will be over time."

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Robert Pepper, Vice President of Global Technology Policy at Cisco, agreed: there must be "an alignment of incentives" so that companies can acquire data they want while enabling consumers to benefit as well. Moreover, the use of personal data should not merely be legal, said Pepper; it shouldn't "feel creepy." At present, however, many of the largest data-collecting and analytics companies try to get as close as possible to that line—or as Google Chief Executive Officer Eric Schmidt once told a reporter: "The Google policy on a lot of things is to get right up to the creepy line and not cross it."[6]

One patch of common ground between businesses and consumers, said Shane Green, is the act of filling out forms: "Companies want their forms filled out completely, accurately and as often as possible, and consumers don't want to spend time filling out forms; they want it to happen automatically for them."

Jack Stephenson believes that traditional financial institutions are going to have an advantage in dealing with consumers: "A big piece of these transactions is trust, and the fact that everybody has a card. There is a sort of ubiquity acceptance." But banks and card-issuers also face a significant impediment: they may not be able to *use* the data. As one participant noted, the only rights that they have is to use aggregated and anonymized data.

The Future of Bitcoin

Some people believe that the future will belong to an "un-branded," open source currency. The leading candidate for this is Bitcoin, a form of digital cash invented by an anonymous programmer (or group of programmers) in 2011. The currency, in the form of standard digital "coins" with unique identifying numbers, is released into circulation as individual computers randomly discover key numbers that solve elaborate computational problems. This "mining" of Bitcoins generates a Bitcoin for the lucky "miner."

About fifty Bitcoins are released into circulation every ten minutes. There are currently about 11 million Bitcoins issued, which is about half of the expected total coinage of 21 million Bitcoins, due to be completed in the year 2040. The market valuation of the existing universe of Bitcoins, in U.S. dollars, is about $1 billion.[7] All transactions made with Bitcoins are recorded as a coin circulates from user to user.

Harkening back to Walter Isaacson's concern—an EZ Pass system for Internet purchases—Marc Rotenberg, President and Executive Director of the Electronic Privacy Information Center, asked whatever happened to the Internet vision set forth by cryptographer David Chaum—a world of "authentication without identification," in his memorable phrase? Chaum's idea was that people could make online purchases and sellers would get paid, but there would be no digital trail to identify buyers or sellers. "Is that dream dead, or is there some future in it?" asked Rotenberg. More to the point, is Bitcoin a practical answer to this vision of authentication without identification?

Peter Vessenes clarified that Bitcoin transactions are "private but not anonymous." In other words, while Bitcoin transactions do not record details about the buyer, seller and the transaction itself, each Bitcoin contains unique codes identifying the previous parties to a transaction, and how much money was exchanged. With some sleuthing, it is technically possible to track the history of a specific Bitcoin and possibly identify someone.

If Bitcoins are not totally anonymous, they do enable quick, cheap and instantaneous transactions, even for large sums of money, said Vessenes: "On my phone, I have open source software that can send a million dollars anywhere in the world, instantly…. And it works now. It doesn't need Visa; it doesn't need a bank. Nobody needs to sign up

with any company on either side of the transaction. It's a money-over-IP [Internet Protocol] protocol, so you don't need these large, multi-billion-dollar infrastructures any more." Vessenes hastened to add that "it's not as if there is no value to be added in the supply chain" by tech innovations that could make Bitcoin transactions easier and more customized. But for now, the basic electronic payment infrastructure is in place.

Vessenes cited three reasons for Bitcoin's effectiveness and rapid growth. First, the open source protocol behind the currency has confounded regulators, who do not know how to deal with it or control it. "Regulation kills this kind of innovation," said Vessenes. "Bitcoin's open source protocol sort of went all the way around that." Second, Bitcoin provided a way to encourage users to "buy into the system" because the early users would see the value of their Bitcoins appreciate in value over time.

Finally, despite some arcane challenges to acquiring and using Bitcoins, they are eminently easy to use once a person learns how to use the "digital wallet." "I bought sushi for my team in San Francisco with Bitcoin recently," said Vessenes. "A 65-year-old Korean woman flipped around her laptop and showed me a QR code. I paid, she saw the Bitcoin come across the network, and she said, 'You're good.' Some people are willing to do a lot of work to use Bitcoin because they don't have to pay transaction fees or deal with the payment companies. They hate all that stuff."

Several participants noted that the U.S. Government will ultimately come down on Bitcoin because it facilitates illicit transactions, money-laundering and terrorist activity, not to mention tax evasion. And in fact, federal prosecutors in San Francisco in October 2013 indicted a man said to be the founder of Silk Road, a website that was alleged to do about $1.2 billion in illicit transactions. The FBI seized about 26,000 Bitcoins worth about U.S. $3.6 million.[8] Such episodes underscore why there is regulation of payment services businesses, and why there is a Financial Action Task Force to harmonize the different types of regulation of payment services around the world.

Michael Barrett, a former PayPal executive who is now President of the FIDO Alliance, an open standards consortium that is reimagining authentication for mobile devices and the Internet, pointed out that

this is why there is no EZ Pass-style currency for the Internet: it would allow money-laundering. Even if the notional EZ Pass digital wallet could only transmit $25 or $50, criminals would find a way to "chop a million dollars up into smaller units and move it by hand. Regulators have a legitimate interest in this space," said Barrett, "and to the extent that we try to create mechanisms that don't give them the ability to have some level of oversight, they will break it [the currency or payment system]."

Vessenes agreed that it's generally a good thing to stamp out money-laundering, which is bad and evil. On the other hand, there is now technology that can move value to anywhere in the world, at any time, using just 100 bytes of data, he said. In any case, Bitcoin is "way less anonymous than cash" [because of the permanent global ledger of transactions in each Bitcoin].

…there is now technology that can move value to anywhere in the world, at any time, using just 100 bytes of data. – ***Peter Vessenes***

Rotenberg noted that the 9/11 attacks made it far less attractive to try to invent a payment system that severed the user's actual identity from the payment to a merchant: "All of the tracking of financial transactions accelerated dramatically after 9/11 because of the perception, rightly or wrongly, that terrorism is enabled through money-laundering and financial transactions that could otherwise be monitored."

It was pointed out by one participant that Bitcoin may resemble Napster in that the incumbent industry—record labels—initially ridiculed Napster as a joke that would be quickly quashed by copyright laws. But in the end, Napster pointed the way to a fundamentally different way of distributing music online, which later manifested itself as iTunes. Today, Bitcoin suggests a different way of making payments that may in time provide a cheap, functional vehicle for anonymous transactions.

The more serious problem with Bitcoin, it was pointed out, is its threat to the political and economic sovereignty of nation-states. That

is why China has made it difficult for all card networks to do business in China while building its own network, China UnionPay, which has about two billion cards and $2 trillion of payment volume. Any new payment systems trying to get traction will need to be compatible with the monetary and fiscal policies of sovereign nations. Regulation of some sort is likely if not inevitable.

Any new payment systems trying to get traction will need to be compatible with the monetary and fiscal policies of sovereign nations.

For now, it is clear that we are in a period of flux, and perhaps even an inflection point. Stephenson predicted, "Things are going to change a lot faster than people expect, and in ways that we can't predict." He warned that managing the "forces of change and acceleration" could be difficult, however, because "our institutions and regulations are decades behind in many cases."

The Environment for Innovation in Payment Systems

To get a richer sense of what is needed to foster innovation in payment systems, Eric Dunn, Senior Vice President for Payments & Commerce Network Solutions for Intuit Corporation, gave a brief talk about how the environment for innovation in payment systems has changed over the past fifty years—and what challenges must be met in the years ahead.

Dunn started by noting that the environment for innovation in payments is much more hospitable today than it was in the 1950s, when the Diners Club and American Express cards were first introduced. Computing is far more powerful, pervasive and networked today, and so is the connectivity of data systems. Consumers no longer have simple relationships to one or two banks and financial companies; they are likely to have ten or twenty separate financial relationships via credit cards, bank accounts, investment vehicles and so forth. "This is a significant difference in the environment today, and it is an important lever for innovators," said Dunn. "Consumers are prepared to have multiple financial relationships and to take on new payment tools."

Innovation in payment systems is more sophisticated today, too, because there is a deeper understanding of "network effects platforms," said Dunn. "Investors understand that while it can cost a lot to get through the 'chicken and egg' phase of development, if they can emerge on the other side, as perhaps Visa has done, they can be in a strong position to capitalize on network effects dynamics." Despite the more receptive environment for innovation, Dunn said that the "core plumbing" of most of today's payment systems is static; it was invented forty to fifty years ago and is not undergoing much change.

Dunn shared a chart showing the dollar volume of transactions for each of the major payment systems:

	Transaction volume in U.S. ***(in trillions of dollars)***	**Number of transactions** ***(in billions)***	**Average transaction amount**	**Cost** ***(as percent of transaction amount)***
Cash	$1.5T	75B	$10	--
Checking	$48T	25B	$2,000	.05
ACH network ***(bank-to-bank)***	$35T	17B	$2,000	.05-.10
Card networks ***(credit/debit)***	$5T	100B	$50	.200

Figure 1: Dollar volume of transactions for each of the major payment systems.

There once was a broad migration from cash to checking, from both of them to credit cards, and then a lesser migration from checking to ACH payments. But these four systems are the dominant payment systems in the U.S. today.

"Moving to alternatives is pretty difficult," said Dunn, notwithstanding the appeal of alternatives. He cited an Iowa-based startup called Dwolla that is trying to reinvent payments based on first principles. It does "direct-connect deals with banks to move money reliably from one bank to another in real time, with free transactions up to $10, and 25 cents for transactions beyond that. They've made some progress, but they have a very tough row to hoe," he said.

People tend to love credit cards, but sellers object to their cost—200 basis points per transaction. Some entrepreneurs are trying to leverage the check system by letting people email checks to each other and

allowing the scanning of them for payment (e.g., Chase QuickDeposit), but Dunn regards these types of innovations as "kind of a hack. I'm not sure there's a lot of potential there." Similarly, mobile platforms have devised some innovative ways to make payments, but Dunn considers mobile payments "more a delivery mechanism than a fundamental platform for money movement" because the mobile platforms simply function as "proxies for cards."

Wire payments amount to only 200 million transactions—a very small volume in the grand scheme of things—but they represent hundreds of trillions of value because brokerage houses use wire payments to settle their accounts. "Wire is not really a tool for innovators in alternative payments," said Dunn, "because while the variable costs of wires at volume are as low as $.50, banks treat wires as a premium offering and attach high fees ($15 and up) to both origination and receipt."

There have been some notable innovations in core payment systems outside of the U.S. Europe has a sophisticated, efficient and low-cost credit transfer system for outbound, bank-to-bank payments, said Dunn, which has eclipsed the need for a check system. The United Kingdom decreed five years ago that its banks must supplement its ACH payments with something called Faster Pay, which is a real-time transfer of funds from any bank account to any other bank account.

In general, electronic payments in the U.S. tend to revolve around cards. But some people question the wisdom of this structure, said Dunn, pointing to the inefficiencies of pushing $8 trillion of transaction volume through a system that charges 200 basis points, or about $160 billion in interchange costs.

Dunn argued that "a lot of transaction volume would benefit from a real-time infrastructure for payments. That doesn't mean we don't love the card—I love the card, and it is a $500 million business—but should we have to choose between the badness of batch payments or the high cost of the card? Or alternatively, between the goodness of real-time payments or the goodness of low-cost payments, instead of something that could combine them? This seems like an important policy objective for regulators like the Federal Reserve."

Dunn noted that the Federal Reserve has played this role historically—first, in 1915, by stepping up to handle processing costs so that checks could be cleared "at par" (without a fee taken out of the transac-

tion amount); and second, in the 1970s, by co-creating with U.S. banks the Automated Clearinghouse (ACH). More recently, the Fed has tried to reduce banks' settlement times from two days to one day, but large banks have rejected such plans.

Several conference participants objected that the comparative data on the four payment systems is misleading because they represent "apples and oranges and kiwi fruit" in one chart. Vijay Sondhi, Head of Corporate Strategy for Visa, noted that debit cards are much cheaper to use than before—around 20 basis points—because the money is immediately withdrawn from a person's bank account. And credit cards are "a totally different beast" from the other forms of payment, he said, because they have so many other value-added benefits folded into them: a consumer's greater willingness to buy with a card (compared to cash), the trust in the system (because of safeguards against fraud, complaints against a seller, lost-card protection, etc.), and other benefits.

Sondhi also pointed out that there has been innovation relating to card payments, such as card networks opening themselves to innovative apps through open APIs, which "has allowed for massive innovation." Sondhi argued that "the core network works, and everyone's quite happy with it." He conceded that "some larger merchants complain about the discount rate, but most of them are pretty happy to have those customers show up and make large purchases."

An often-overlooked fact is that there are considerable "hidden costs associated with using cash," said Paul Moreton, of Capital One. These include the cost of handling and moving cash, hiring a Brinks truck to off-load cash from a store, the inconveniences of customers carrying around cash. Michael Chui of the McKinsey Global Institute cited statistics showing that if cash payments could be "electronified," there could be a 0.5 percent to 0.8 percent lift in GDP in Europe.

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While there has been innovation "around the edges" of the core payment systems, Jack Stephenson of JPMorgan Chase pointed out

that there have been only two payment networks over the past thirty years that have attracted more than 20 million active customers—the Discover card and PayPal. It will be interesting to see if MCX, the new payment alternative being developed by a consortium of merchants (mentioned earlier), will succeed.

Historically, mobile payment platforms have not proven competitive on cost grounds. Paul Moreton noted that mobile payment networks using prepaid cards, such as one run by Nokia, are "incredibly expensive"—on the order of 50,000 basis points instead of the 200 basis points of cards. Such models are not likely to expand to physical commerce for, say, buying a pair of socks or the like. Similarly, the fees charged for premium SMS [short message service, or text messaging] are "rapacious and wrong," said Peter Vessenes of Bitcoin Foundation.

The Challenge of Innovating Within Legacy Systems

The emergence of networked innovation poses particular challenges for large enterprises with legacy systems, said Vijay Sondhi, Head of Corporate Strategy for Visa. "When you step through the turnstile at many corporate offices, you enter a kind of *Get Smart* world [a television spy spoof from 1965-1969]. It's as if you go back forty years. You are limited in the use of social networking. Evernote is blocked. Dropbox is dropped. Google Docs is blocked. It's all blocked. The system was architected for security, reliability and trust, but it wasn't designed for usability and the new expectations of free…. The legal departments often think social networking is dangerous," said Sondhi. One wag at his office advised people to BYOD—"Bring Your Own Device."

Legacy systems can amount to "a horrible little island surrounded by this wonderful infrastructure around your Android or iPhone," said Sondhi. "But you're locked in. Then you go downstairs to Starbucks for lunch, and suddenly you're paying with your phone. At some point we are going to need to bring these [networking capacities] into the places where we work."

John Clippinger, Co-Founder and Executive Director of a nonprofit tech startup, ID3—the Institute for Data-Driven Design—predicted that "there is a new kind of architecture that is coming out that is more distributed. And so innovations in consumer-to-consumer (C2C) and

business-to-consumer (B2C) commerce are actually going to find their way into enterprise computing. That's where the major disruption is going to be."

"…innovations in consumer-to-consumer (C2C) and business-to-consumer (B2C) commerce are actually going to find their way into enterprise computing. That's where the major disruption is going to be." *– John Clippinger*

Clippinger noted that a central challenge in devising such an architecture is to provide digital identities, security and online authentication in more dynamic, flexible ways. "If you can control your data, and share your data and expertise in appropriate ways, then you can then aggregate demand to do co-production in far more efficient, social ways. You can create a whole new kind of infrastructure that will dramatically disrupt the enterprise models that currently exist. And if you make access to these infrastructures virtually free, which is what people expect, you will be able to build to scale very quickly. I think this is going to happen faster than a lot of people realize."

Shane Green, Co-Founder and Chief Executive Officer of Personal, a mobile and web data vault and private network for managing personal data, agreed that "the biggest legacy issue holding a lot of companies back is enterprise information technology—the idea that you have to manage all of that data yourself." Picking up on the joke about BYOD, Green said, "Bring Your Own Data. I think it's inevitable that people will show up with a complete set of their own data and a personal cloud, which they can then plug into any trusted third-party system, including of a new employer."

The point is that individuals are going to become "the centerpoint and integrator of data," said Green. He cited Fitbit—digital devices that gather individual health and fitness data—as part of a larger trend, the Quantified Self movement. "Personal analytics is a huge, fundamental part of the 'personal cloud,' and there are brands and companies that want to collaborate with those individuals." Green disdains

such terms as "data exhaust" and "data crumbs" because he said they trivialize the significance of data to the people who generate them. If it's *your* data, it's valuable and important. Green, like most working on user-centric data approaches, prefers to call this distinct segment of the data universe "small data."

Innovation in Emerging Countries

In thinking about innovation from the edges, emerging countries are serving as important incubators for experimentation, if only because they are often "greenfields" with few legacy business models or regulatory systems. Or, they may exhibit historical or cultural factors that simply are not present in industrialized countries of the global North.

In recent years, a great deal of attention has focused on Kenya and the success of the M-Pesa, a mobile money introduced there in 2007 that now has 23 million users. Transaction volume of the M-Pesa is now estimated at 25 percent of that country's GDP. It has been pointed out that the M-Pesa took root in some unusual circumstances. It was a time of great civil strife in Kenya; banks were the targets of civil unrest and people needed safe, reliable ways to store and transfer money. The dominance of Kenya's mobile telephony by a single carrier and its massive network of 80,000 agents across the country also helped diffuse the M-Pesa rapidly.

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"I sent M-Pesa money once," said Leila Janah, Founder and Chief Executive Officer of Samasource, a nonprofit that acts as a broker for microwork in the developing world. "It was really a liberating feeling. I sent $300 and it cost a few cents to make the transaction happen." But Janah said that that transaction was intra-Kenya; cross-border transactions remain extremely expensive.

This is an area that deserves much greater innovation, said Janah, because of the huge costs of transmitting money, which is especially onerous for poorer people. "Remittances generated about $500 million worldwide last year," she said. "The average fee is 12 percent. The World Bank just issued a call to action to try to bring that down to 5 percent, which is still exorbitant."

Overall, the volume of mobile money transactions is surprisingly large, according to the trade association for mobile operators, Groupe Speciale Mobile Association (GSMA). "In 2012, more than 30 million people undertook over 200 million mobile phone transactions, totaling nearly $5 billion," said Panthea Lee, Co-Founder and Principal of Reboot, a social enterprise that works on issues of governance and global development.

Although GSMA is tracking some 200 deployments of mobile payment systems, only a dozen or so of these systems are reaching more than one million customers. Many innovators want to emulate Kenya's remarkable success with the M-Pesa, but there are many complicated factors in making these systems work in other circumstances, said Lee. In general, she sees "a lot of potential for mobile money," but believes that that will require mobile providers, banks, partnerships and regulators to coordinate more closely.

There is one distinct advantage to launching innovative payment systems in developing countries: no one "owns the customer" and thus no legacy systems to displace. As Vijay Sondhi of Visa pointed out, there are fewer power bases. People do not have bank accounts or FICO [credit] scores. But everyone has feature phones. Because there is no "terror of legacy [systems]," the place to innovate is in poorer countries, not in the U.S., he said. And in fact, two-thirds of Visa's growth today occurs outside of the U.S., he said.

The U.S. cultural outlook and tech industry mindset may blind American innovators to different ways of imagining payment systems. For example, in Russia there is a company called Qiwi that operates "reverse ATMs," in which you stuff your cash into a kiosk machine and pay your bills—and then receive a prepaid Visa card that you can spend. The system is welcome in a society in which many people are paid with wads of cash. In China, there is a system of "payout delivery," in which customers can try on new clothes that they have ordered,

which a delivery person has brought to them. "The delivery person waits while you try on your clothes, and if they don't fit, you just give them back," said Sondhi.

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Social trust and personal respect can affect how people use remittance systems, noted Panthea Lee of Reboot. A remittance system launched in Afghanistan to receive remittances from the global diaspora of Afghan people failed because no one trusted it. For reasons of social familiarity and comfort, many people persist in using check-cashing shops to send or receive money even though it is more expensive than banks. Poorer people who need to send and receive remittances do not feel socially at ease in starchy banks; check-cashing shops are more casual, welcoming community-based social centers.

The Need for Better Authentication for Internet Transactions

One of the most vexing problems in innovating "on top of" the existing "rails" of network payment systems, is the problem of authentication. The past several years have seen many significant data breaches in which "full dumps" of password data were posted on the Internet, leading to the victimization of many people.

The proliferation of usernames and passwords has made people exasperated by the number of usernames and passwords they must use, which in turn can make them careless. This problem is made worse by the inability of people (such as spouses) to share unique, complex passwords for every site and app in their lives in an easy, seamless way. There are some "drop-dead simple solutions" available today that will create your passwords for you and log you in automatically, said Shane Green of Personal, but people are not being incentivized or pushed to use these solutions, or penalized for not using them. For example, banks and credit cards could threaten not to reimburse customers for losses

if they were caused by an intruder who obtained their password from another site or guessed it because it was commonly used or too simple.

The basic problem is that more secure forms of authentication tend to be off-putting to consumers and thus discourage commercial activity. "Yes, you can improve security," said Michael Barrett, President of the FIDO Alliance, "but you will do it at the cost of increasing 'friction' in the experience. That's the issue with all of these solutions—they are all just moving along a one-dimensional line of increasing friction."

Another barrier to better authentication is the jealousy that various players show toward "their" customers. No one wants to let a competitor become the preferred security provider. Vijay Sondhi of Visa explained: "Authentication is the gateway to the power position. If you are the security gateway to everything, you become the first person who touches the consumer. That's why 'Connect with Facebook' is something that Facebook was really smart to develop. That's why Google is trying to make Gmail ID the gateway for connecting to the world." "One of the most remarkable, untold stories about Internet privacy," said Marc Rotenberg of EPIC, "is how Facebook gives everything that you give to your friends, to all of their business partners. In my mind, that's the worst model of authentication because it's not necessary and doesn't serve any real purpose."

"Authentication is the gateway to the power position. If you are the security gateway to everything, you become the first person who touches the consumer." – ***Vijay Sondhi***

But becoming the "authentication gateway" or "identity provider" is especially important to many corporations because it can be the path by which to acquire people's personal data. That data may well be more valuable than transactions themselves, and the relationships may evolve into a valuable gateway in its own right for future transactions.

Sondhi added that there are now all sorts of "passive authentication" systems that can enhance the reliability of identifying an individual.

The number of apps on a person's smartphone can actually authenticate a person, for example. And less reliable modes of authentication can be augmented by "step-up mechanisms" that increase the reliability of authentication and thereby mitigate risks. The calibration of authentication is dynamic and improvable.

To experts in the field, authentication is not an "on/off" toggle but a continuum that goes from "easy to use but insecure" to "harder to use and highly secure." The question facing any authenticating service is typically "how much pain" does it wish to inflict on its end-users for the sake of security.

One growing alternative is biometric authentication, which relies upon people's fingerprints, eyeball irises or even idiosyncratic personal gestures. There is currently a Silicon Valley startup that is developing an authentication system that assesses how people hold their smartphones as a way to uniquely identify them. The new iPhone 5S offers the option of using a fingerprint as the turnkey for opening the iPhone, and the government of India has recently instituted a fingerprint technology as the basis for issuing universal IDs to all of its citizens. But many people are understandably nervous about providing biometric data to centralized corporate or governmental repositories. The future of biometric authentication over the next five years may also be impeded by a protracted standards war.

A far more secure strategy would be to develop distributed forms of *behavioral authentication* based on your personal data, said John Clippinger of ID3, the Boston nonprofit that is building a new "social stack" of protocols for the Internet. Clippinger said that ID3 is working on a system that would provide users with "a core identity that is biometrically linked to you and based in the cloud. It could be accessed through a single log-on and key that would give you, and only you, access to other anonymous authentication protocols for what we call 'personas,' which would be your particular identities used in your various commercial and personal relationships. For each persona, you could specify the types of information you're willing to share, which would be reflected in a digital certificate. So you would share only information appropriate to a given relationship. Different types of information could be subject to different levels of authentication."

What makes such a system superior to many others is that it is context-aware and distributed, said Clippinger. It is entirely possible to get beyond the current tradeoffs in authentication (i.e., reliable authentication = difficulty of use), he argued, but it will require that we use more sophisticated software techniques, distributed systems and new regulatory models.

As a technical and social matter, identity-authentication could become democratized….

Clippinger agreed with the earlier point that "whoever is the identity provider acts as the control point." But a radically different option to centralized control is now possible, he said. ID3 is working on a plan that would empower individuals, and self-organized groups of individuals, to authenticate themselves and each other—"a disruptive solution that will let you be self-sovereign." In other words, large institutions such as the government, banks and credit bureaus would not be the only ones capable of reliably authenticating a person.

As a technical and social matter, identity-authentication could become democratized—and in the process, new sorts of digital institutions based on reliable authentication of people could emerge. Clippinger said that ID3 is building new digital platforms that would let individuals set up their own bank and data accounts and self-configure their own personalized cloud-based systems. The premise is that the individual is the "natural aggregation point" for controlling data. This vision is becoming more feasible as new network infrastructures and sophisticated distributed authentication techniques become feasible. Because of the inertia of regulatory systems and opposition by incumbents, however, it is more likely that such systems will emerge first in smaller, more innovative countries or in "greenfields" such as Africa, where the technology could leapfrog over the barriers that plague more advanced market economies.

Shane Green of Personal agreed that the most promising trends appear to favor giving the individual control over personal information. Individuals can then manage their own trusted relationships and

data-sharing with affiliated partners. "That's where things are going," he said, "because people don't want to be locked into a single technology or environment. *This* is how the 'EZ Pass' described by Walter [Isaacson] will materialize."

The Impact of New Technologies on Commerce and Low-Wage Work

As the Internet and digital technologies transform labor markets on a global scale, they are changing the very nature of work and scrambling old, familiar categories for thinking about—and regulating—work. Leila Janah, Founder and Chief Executive Officer of Samasource, a nonprofit that brings small, computer-based tasks to low-income people in developing countries, gave an overview of how technologies are changing the structure of labor markets and inventing new genres of work. She focused on four major categories of commerce and work: casual work, online work marketplaces, marketplaces for goods and services and collaborative consumption.

The proliferation of new sorts of work matter because there is an immense need for new jobs for people around the world. According to research by Accenture, some 700 million new jobs will need to be created by 2020 (in a global workforce of three billion people) to employ all of the young people entering the workforce by then. Over 400 million of these new jobs must be in Asia, said Janah.

…some 700 million new jobs will need to be created by 2020 (in a global workforce of three billion people) to employ all of the young people entering the workforce by then.

According to Jim Clifton's 2011 book, *The Coming Jobs War*, "More than anything else, what people want around the world is a good job." Will the new technologies help meet this need? The flexibility of digital platforms in bringing work *to* people, wherever they may live, suggests some positive possibilities. Janah reports that her nonprofit,

Samasource, "has moved over 14,000 people out of poverty in nine countries," thanks to more than $5 million in contracts with companies like eBay and Walmart.com and grants from the Google, Cisco, Rockefeller and Ford Foundations.

A lot of the work that Samasource helps broker involves piecemeal "image-tagging" so that images—"the dark matter on the Internet"—can be more easily identified and retrieved on digital platforms. Samasource once sent a set of shipping containers with computers to a poor village in northern Uganda, and soon about seventy people were doing image-tagging and other small task-work jobs for large U.S. companies. The foundation world calls this kind of work "impact sourcing."

Often, this sort of work is mediated through online marketplaces. One of the more prominent such brokers for casual, piecemeal work is Amazon's Mechanical Turk. This site invites people to perform certain small-scale, granular tasks on for a few cents apiece, sometimes in the guise of a game. The tasks might involve matching a photo to appropriate keywords, or sending email solicitations to a targeted group of potential customers.

According to *The Economist*, the world's biggest employer is the U.S. Department of Defense, with 3.2 million employees. But the second-largest "employer" is the online labor marketplace oDesk, which has over three million registered contractors.[9] Elance, another large online marketplace, had 2.5 million registered users in 2012, who earned $730 million through Elance. Half of them report freelancing as their main source of income. American users have the highest amount of earnings on the site, followed by users in India and Pakistan. The site hosts more than 500,000 active businesses, said Janah. Another marketplace, TaskRabbit, lets people hire other people to do every day errands and tasks for them. The company has about 12,000 registered "rabbits" that provide local services in nine cities. The most popular service is assembling IKEA furniture.

The hosts of such online work marketplaces tend to be quite bullish about the future of their enterprises. Gary Swart, the Chief Executive Officer of oDesk, a broker of online work projects, calls his initiative "the Work 3.0 Movement." While he concedes that traditional jobs are declining and going abroad, said Janah, Swart argues that we should

adapt to the new reality that people will increasingly work as independent contractors as part of a large, contingent labor force. This is seen as a positive development because geography is no longer a constraint to hiring labor.

To date, oDesk has had an impressive impact. It serves 2.8 million workers globally, and paid out over $400 million in 2012. It has posted 3.6 million jobs since it was founded in 2005, and brokered 35 million hours of work. While the site may be seen as a way to outsource work to poor countries, Americans are the third-largest pool of workers using oDesk. Workers on oDesk also tend to increase their work hours rapidly—by almost 60 percent in their first year, and by around 190 percent over three years. People also tend to increase their incomes much faster via oDesk jobs than they do as part of a traditional workforce. Because oDesk can tap workers in countries such a Kenya, which often have high literacy rates, some workers there are doing "content writing" for blogs and other online venues at a competitive advantage over U.S.-based workers.

Another booming category of work is associated with "collaborative consumption," websites that let people share, or rent out, their cars, apartments and other property to strangers on a piecemeal basis. Rachel Botsman and Roo Rogers survey this varied form of e-commerce in their 2010 book, *What's Mine is Yours: The Rise of Collaborative Consumption.* Perhaps the most famous collaborative consumption website is Airbnb, an e-commerce website that has booked over ten million nights in people's home in 192 countries. Since its launch in 2008, more than four million people have used it. In San Francisco, the average Airbnb host rents out his or her home for 58 nights a year, and makes $9,600.

Digital Sweatshops or Economic Emancipation?

The big question about casual digital work and online labor marketplaces is how we should assess their social impact. Are they lifting people out of poverty or are they simply exploiting people? Janah used to believe that digital outsourcing was problematic, but after visiting with the people who do the work, she has a more complicated reaction: "For a poor person in Uganda, tagging images is their greatest joy. I kid you not." Janah told the story of a Muslim woman in Calcutta who

had finished high school and spoke great English, and got a job with Samasource tagging images for Getty Images. Now she is the proud, primary breadwinner for her family.

Janah added that such workers probably need "some kind of representation," whether labor unions or other forms, to help them protect their interests. But even though workers are doing piecemeal labor, she said, these jobs offer a lot of marginalized, low-income people opportunities to learn skills and become part of the mainstream economy.

The big question about casual digital work and online labor marketplaces…are they lifting people out of poverty or are they simply exploiting people?

A lot of people who have succeeded through small businesses on eBay, for example, are ex-convicts, disabled people, single mothers and elderly people who have been able to start businesses and earn money in ways that would otherwise have been impossible. On such online platforms, too, there is greater transparency than in most sweatshops; people can learn what the going market rates are for their labor, services and goods, and in some instances, use this knowledge to look out for their own interests and demand accountability.

Entrepreneur Caterina Fake noted that both eBay and Etsy, an online crafts marketplace, are used by "a lot of disenfranchised people," especially women who are restricted to their homes because of financial reasons or social restrictions such as having to wear burqas. "These platforms create opportunities for them and an equal playing field," she said, adding that there are still gender biases at play online. For example, a woman with a name like Pat or Chris who puts a photo of a male to identify herself can increase her sales by 29 percent, she said. Fake added that there is a lot of sharing of knowledge and know-how among people on such sites. On Etsy, there are over 7,000 "street teams," or self-organized groups of people, who trade tips about merchandising, customer service and other business practices.

Unlike day laborer jobs where unskilled men are picked up from the street to perform menial jobs, the online work marketplaces allow a

worker to develop a reputation that could help him or her gain future employment. The important point is that these people are entering the economy and getting new opportunities to improve themselves, said Esther Dyson, the investor and entrepreneur: "They can get a reputation. They learn about work. They get paid. They get work skills."

Transparency is a two-way street: Many online work marketplaces let workers rate employers and complain if they are cheating them. Customers of Uber and Lyft, the app-driven livery services, may rate the service of drivers—but drivers can also rate customers and their courtesy and behavior. By bringing new transparency to certain types of market dealings, online work marketplaces can help eliminate "leakage," or corruption, which in countries like India, represent a massive drain on economic performance. When police officers in Afghanistan began to be paid via mobile money, it amounted to a 30 percent raise in their pay overnight because they were finally getting the full amount of money owed to them.

By bringing new transparency to certain types of market dealings, online work marketplaces can help eliminate "leakage," or corruption…a massive drain on economic performance.

Systems of transparency are now institutionalized through a number of "supply chain monitoring tools," said Janah. An example is Labor Link, a mobile platform that "gives companies real-time data from their supply chain or field operations, and gives workers and farmers a voice to report on conditions in their workplace or community."[10] GoodGuide is a consumer platform that lets people scan a product bar code to learn if it is associated with slave labor, environmental abuses or other ethically dubious practices.[11] There are also a number of new e-commerce platforms, such as Zady, that feature ethically made goods.[12] The Fair Wage Guide, developed by the company World of Good lets consumers calculate a fair wage based on the cost of living in various countries, and in rural and urban locations.[13]

There are also a number of crowdfunding moneys—Kiva, GlobalGiving, Samahope—that channel funds toward needs that governments in developing countries often cannot or will not fund. There are even ways to make direct cash transfers for philanthropic purposes. Through a new website called GiveDirectly, people can make recurring donations via Google Wallet.

Does Digital Work Need to be Regulated?

Because the new forms of work deviate so greatly from traditional forms, it is not surprising that existing regulatory systems and legal protections are poorly suited to address abuses. For example, should digital outsourcing work performed by children in developing countries be considered child labor? Should minimum wage laws apply? Does labor that is compensated with airline miles or points in a game count as "work?"

Then there is the question of who exactly is the employer—the online platform (such as oDesk or Mechanical Turk) that acts as a market broker, or the person who is directly hiring someone? And should such employers be responsible for paying benefits for work? Janah says that some online labor marketplaces have decided not to offer training or other support lest governments regard them legally as employers. The situation gets even murkier: "If you have a group of workers who work together in the same office building, and whose work is all mediated through oDesk, should they be regulated as employees under formal employment law, or should they be regarded as contractors? Government hasn't kept pace with the new forms of work," said Janah.

For Paul Moreton of Capital One, the discontinuities of wages around the world is causing new stresses: "We have a minimum wage that artificially raises what people would work for, as well as labor unions that artificially raise what people would be willing to take. Is that maintainable when you go to a global workforce? Does this mean that the U.S. needs to move downward [in wages] in order to get to that level playing field?" "This seems like a very tough problem," said Peter Vessenes of the Bitcoin Foundation. "We have all these 'baked-in' costs in the U.S. that push up against a global labor force." Such gaps are likely to fuel social unrest, both agreed.

And yet, Leila Janah believes that pitting one nation's citizens against another is not the answer: "The average American might say, 'Oh, you're ruining America with this global marketplace.' Well, I think what we're doing is promoting a global meritocracy." Janah rejects the argument that "American jobs are somehow more worthwhile than jobs in other places."

But there remains the question: Are the new digitally mediated forms of work providing "good jobs?" According to a Gallup survey cited by author Jim Clifton, a "good job" is a stable, reliable income from 30 hours of work or more each week. By this standard, none of the online work marketplaces offer "good jobs."

Leila Janah closed by noting that the various e-commerce and fast-expanding work marketplaces raise questions that we do not really have the answers for: "We haven't thought about how we make the next generation of people successful on these platforms. How do we regulate this work? How do we incentivize companies to be inclusive and responsible? How do we prevent entire communities of people from being left completely behind? What's the role for government and other institutions in addressing these questions?"

What Role for Government?

In the end, solving many of the problems cited in the conference and developing effective solutions requires government in one role or another. Most conference participants agreed that this is a significant problem unto itself. Society needs to re-think the proper role of government so that larger collective concerns can be addressed—privacy, consumer protection, social inclusion, competition—without stifling valuable innovation that addresses needs more cheaply, effectively and efficiently.

The complaints against government are familiar. Perhaps the biggest issues are the time, complexity and inconsistency of regulation, resulting in systems that are static, incumbent-oriented and hostile to innovation. A number of conference participants noted that government agencies overseeing financial services in the U.S. tend to use highly specific and prescriptive mandates ("input-based") rather than general performance metrics that allow regulated enterprise to choose how best to meet specified goals ("output-based"). "U.S. regulators have radically strayed into the 'how it should be done' space," said Michael Barrett of the FIDO Alliance.

Because of the rapid pace of technological change, it is common for government regulation to be based on the assumptions of old technological or business paradigms, said Jack Stephenson of JPMorgan Chase. "With the exception of PayPal, I would say that a lot of the problems with the current payment systems are based on forms of commerce that used to exist. We've kind of tried to adapt them to this new world." But successful adaptations are often very difficult because there are multiple layers of government—state, federal and international—and legitimate challenges in interpreting regulations and complying in conscientious ways.

Jack Stephenson told the story of the difficulties of obtaining a "money transmittal license" (MTL) when the bank acquired a stake in a payment company, GoPago. (An MTL is needed to transmit money across state lines in the U.S.) "The regulators wanted an MTL for five states, and I had to fill out something like seventy pages of forms, and every state had a different form. And I had to get physically fingerprinted five different times. And this was for only five states!" The process aimed to address legitimate goals—protecting consumers from fraud and the bankruptcy of companies—but the process is not friendly to startups or innovators. Moreover, said Eric Dunn of Intuit Corporation, "there is mission-creep in MTLs" that adds unwarranted layers of process and regulation.

…the new realities of e-commerce are causing serious tensions with old regulatory schemes.

Crudely put, the new realities of e-commerce are causing serious tensions with old regulatory schemes. In some countries, mobile telephone regulators are expanding into regulating mobile currencies, arguably an issue that bank regulators should be dealing with. If regulators are not "competing" with each other, sometimes they are zealously focused on patrolling specific geographic boundaries or payment systems even though such categories may make less sense and actively impede commerce and innovation.

This led many participants to agree that governments themselves need to rethink how they regulate. "The business of governments is

governance," said John Clippinger of ID3, "and the way that governments do governance is totally antiquated. We really need fundamental innovations in governance." Besides dealing with some of the complaints mentioned above, governance needs to allow greater international harmonization; prevent the capture of policy by incumbent players; and foster innovation and competition, he said. Right now, companies tend to engage in "governance arbitrage" among different jurisdictions, which often results in a "race to the bottom" in terms of social and ethical performance.

"The business of governments is governance and the way that governments do governance is totally antiquated. We really need fundamental innovations in governance." – ***John Clippinger***

Instead of framing regulatory schemes by sectoral interests that may have existed in the nineteenth or twentieth centuries, said Clippinger, we need new sorts of regulatory structures that appreciate the value of innovation in digital sectors today. Clippinger suggested that governments develop a new regime of regulation based on "open APIs," which could allow them to specify performance goals and collect real-time performance data from companies while allowing companies to use innovative, data-verified ways to meet goals.

Another idea that has great promise, he said, is the "safe harbor provisions" in federal law that allow companies to engage in innovative experimentation within certain performance parameters. "This is a higher-level notion of how government can regulate," said Clippinger. "The idea is to use 'meta-rules' and 'safety nets' to oversee the behavior of companies instead of getting into the micro-decisions. This also allows you to start running experiments to see where the failure points are, to build real innovations on top of those findings." Clippinger added that regulators might also begin to experiment with "zero-knowledge proofs," which are mathematical systems to "prove something without having the other party reveal it. So a regulator could make a query and get an answer without having to get access to the underlying (confidential or private) data."

Regulators in the United Kingdom are attempting to develop regulatory frameworks that allow the evolution of better technological models, said Michael Barrett of the FIDO Alliance. "The UK government has set up experiments that see how a new approach can actually work in practice. This seems to be a much more fruitful approach—to iterate into what the best solution looks like." The virtue of such approaches is that they would begin to take seriously the idea of commerce as a dynamic social ecosystem, one that needs to be seen holistically and regulated with an awareness of networked relationships.

Despite the criticism of conventional regulation, participants agreed that government has many important roles to play. These include government as:

- convenor of interested parties to forge new policies;
- direct provider or operator of services;
- regulator to ensure basic safety and soundness of market activity;
- referee or overseer of market behavior;
- customer or "anchor tenant" to stimulate demand for innovative technologies or services;
- standard-setter for minimal social or technical performance;
- guarantor and trust-builder in the marketplace; and
- authenticator of identity.

While some industry players recoil at government interventions that they consider unnecessary or intrusive, others pointed out that government has a leadership role to play, especially in spurring innovation. "There has been a complete stagnation in innovation within core finance services infrastructure," said Michael Barrett. While other countries have managed to develop instantaneous or one-day settlement times for ACH transfers, the U.S. remains stuck in a two-day settlement system.

Just as the Federal Reserve in decades past helped American banks move to a system of check-clearing and ACH transfers, so it could serve a useful leadership role today in improving the payment system. Other countries like the UK and Nordic countries have innovated around payment systems, including person-to-person transfers. Why not the U.S.?

Eric Dunn of Intuit Corporation believes it should be a priority for the Fed to "rethink the public/private partnership that is the ACH so that it could include an explicit public policy goal of improving our payment system." Organizations such as the National Association of Clearinghouses, now NACHA, which dominates a lot of the governance and rulemaking over such things, should be prodded to embrace a larger public policy agenda. Jack Stephenson of JPMorgan Chase identified several other important goals that ought to be encouraged: easy cross-border payments; a peer-to-peer architecture with open APIs [application protocol interfaces] to allow innovation to evolve on top of the system in customized ways; and a set of intermediaries to assure that the whole system is "safe, sound and protected."

Vijay Sondhi of Visa replied, "The system you described for consumer payments already exists. It's Visa. It's MasterCard. It's real-time settlement." Sondhi stressed that we need to distinguish between different payment markets because consumer, business and government payments are very different markets with different transactional needs and different technical requirements.

Conclusion

The basic story of e-commerce and electronic payment systems today is a story of great ferment fueled by open networks and digital innovation—a familiar drama being played out in many sectors of the economy, government and culture. It is hard to argue with the efficiencies and conveniences that new open platform systems are providing. But neither does that mean that incumbent players welcome the disruptions that radical innovations such as Bitcoin and M-Pesa are bringing to mainstream commerce. Government regulators are charged to act as proxies for certain collective social and economic interests that markets may not be able to deliver—yet regulators (and legislators, for that matter) are themselves challenged in making sense of the confusing menagerie of tech innovations, business models and social practices. Governance itself is in desperate need of innovation.

There are some provocative proposals, such as the ones offered by Clippinger and Green, to develop new sorts of network-native systems of tech design that would embed governance into the systems themselves. This could enhance citizens' ability to act on their own

interests, reduce the need for cumbersome command-and-control regulation and improve business compliance. But would the hosts of legacy systems and government embrace such a radical transformation in governance? The truth is that there are few graceful ways to navigate a paradigm shift, and most are not ushered in by choice. Large, powerful incumbents usually do not welcome disruptions of existing infrastructure, investments and business practices. Smaller players may be buoyed by the power of open networks and digital innovation, but still hamstrung by their smaller size and the barriers of incumbent systems.

The challenge ahead…may be in finding ways to overcome the tendencies of inertia and stasis, and to show leadership in the face of great ongoing tumult….

The challenge ahead, then, may be in finding ways to overcome the tendencies of inertia and stasis, and to show leadership in the face of great ongoing tumult, much of it only partially understood. It is an open question from whence this leadership will emerge—government, incumbent players, new tech startups, foreign greenfields—and how the new paradigm(s) will manifest themselves. But there is little question that the drama of e-commerce, payment systems, labor marketplaces and related sectors has not yet played out.

Endnotes

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APPENDIX

The Twenty-Second Annual Aspen Institute Roundtable on Information Technology

THE WEIGHTLESS MARKETPLACE

Coming to Terms with Innovative Payment Systems, Digital Currencies and Online Labor Markets

Aspen, Colorado • July 14 - 17, 2013

Roundtable Participants

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PCIA

Michael Barrett
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Note: Titles and affiliations are as of the date of the conference.

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About the Author

David Bollier is an author, activist, blogger and independent scholar who has served as rapporteur for Aspen Institute Communications and Society conferences for more than twenty-five years.

Bollier's primary focus is on the commons as a new paradigm of economics, politics and culture. He has pursued this work for more than ten years, first as founding editor of Onthecommons.org (2002-2010), and now with variety of international and domestic partners. He is Co-Founder and Principal of the Commons Strategies Group, an international consulting project that works with the global policy activists, and co-director of the Commons Law Project, a collaboration with international human rights scholar Professor Burns H. Weston.

In 2002, Bollier co-founded Public Knowledge, a Washington advocacy organization for the public's stake in the Internet, telecom and copyright policy. He collaborated with television producer/writer Norman Lear from 1985 to 2010 in a variety of non-television related public affairs and political projects. He has also been Senior Fellow at the Norman Lear Center at the USC Annenberg School for Communication and Journalism since 2002, and rapporteur for the Aspen Institute Communications and Society Program for more than twenty-five years.

Bollier has written twelve books, including the forthcoming anthology, *The Wealth of the Commons: A World Beyond Market and State* (co-edited with Silke Helfrich) and the forthcoming *Green Governance: Ecological Survival, Human Rights and the Law of the Commons* (co-authored with Burns Weston). Bollier's previous books include *Silent Theft: The Private Plunder of Our Common Wealth* (2002), *Brand Name Bullies: The Quest to Own and Control Culture* (2005) and *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* (2009).

Bollier blogs at Bollier.org, and lives in Amherst, Massachusetts, with his wife Ellen.

Previous Publications from the Aspen Institute Roundtable on Information Technology

Power-Curve Society: The Future of Innovation, Opportunity and Social Equity in the Emerging Networked Economy (2012)

David Bollier, rapporteur

Power-Curve Society, written by David Bollier, examines how technological innovation is restructuring productivity and the social and economic impact resulting from these changes. It addresses the growing concern about the technological displacement of jobs, stagnant middle class income, and wealth disparities in an emerging "winner-take-all" economy. It also examines cutting-edge innovations in personal data ecosystems that could potentially unlock a revolutionary wave of individual economic empowerment. *Power-Curve Society* is the Report of the Twenty-First Annual Roundtable on Information Technology, a dialogue convened by the Communications and Society Program. 2013, 61 pages, ISBN Paper 0-89843-582-X, $12 per copy, free download at www.aspeninstitute.org.

The Future of Work: What It Means for Individuals, Businesses, Markets and Governments (2010)

David Bollier, rapporteur

New digital technologies and trends are challenging conventional notions of work and organization. As the velocity of change increases, institutions and individuals must adapt. Yet many structures, including those in education, government, business and the economy, often remain rooted in the past. The report captures the insights of the Nineteenth Annual Aspen Institute Roundtable on Information Technology, where business leaders, technologists, international politicians, academics and innovators explored how global structures and institutions are being confronted by the 21st century realities of distributed knowledge, crowdsourcing, open platforms and networked environments. The report shares the solutions these leaders proposed

for preserving individual well-being and defining a future world of work that benefits everyone involved. 2011, 60 pages, ISBN Paper 0-89843-543-9, $12 per copy, free download at www.aspeninstitute.org.

The Promise and Peril of Big Data (2009)

David Bollier, rapporteur

Ever-rising floods of data are being generated by mobile networking, cloud computing and other new technologies. At the same time, continued innovations use advanced correlation techniques to analyze them, and the process and payoff can be both encouraging and alarming. The Eighteenth Annual Roundtable on Information Technology sought to understand the implications of the emergence of "Big Data" and new techniques of inferential analysis. Roundtable participants explored ways these inferential technologies can positively affect medicine, business and government, and they examined the social perils they pose. The report of the 2009 Roundtable, written by David Bollier, summarizes the insights of the Roundtable and concludes with its analysis of the financial sector from the perspective of Big Data, particularly how massive transparency, common reporting languages and open source analytics might greatly relieve the problems of systemic risk. 2010, 56 pages, ISBN Paper 0-89843-516-1, $12 per copy, Free download at www.aspeninstitute.org.

Identity in the Age of Cloud Computing: The next-generation Internet's impact on business, governance and social-interaction (2008)

J.D. Lasica, rapporteur

The Seventeenth Annual Roundtable on Information Technology brought together 28 leaders and experts from the ICT, financial, government, academic, and public policy sectors to better understand the implications of cloud computing and, where appropriate, to suggest policies for the betterment of society. Participants discussed the migration of information, software and identity into the Cloud and explored the transformative possibilities of this new computing paradigm for culture, business and personal interaction. The report of the roundtable, written by J.D. Lasica, offers insights from the roundtable and includes a set of policy recommendations and advice for the new presidential administration. 2009, 98 pages, ISBN Paper 0-89843-505-6, $12 per copy.

Beyond the Edge: Decentralized Co-creation of Value (2007)

David Bollier, rapporteur

The 2007 Roundtable convened 27 leaders to analyze the current and future social and economic impacts the co-creation of knowledge across networks made possible with new communications and information technologies. While collaborative engagement encourages increased productivity and creativity, it can also lead to mass chaos from the co-creation process. The roundtable participants discussed what separates successes from failures in the new collaborative era by reviewing business and organizational models and the implications of new models. 2007, 64 pages, ISBN Paper 0-89843-481-5, $12.00 per copy.

The Mobile Generation: Global Transformations at the Cellular Level (2006)

J.D. Lasica, rapporteur

The 2006 Roundtable examined the profound changes ahead as a result of the convergence of wireless technologies and the Internet. The Roundtable addressed the technological and behavioral changes already taking place in the United States and other parts of the world as a result of widespread and innovative uses of wireless devices; the trends in these behaviors, especially with the younger generation; and what this could mean for life values in the coming decade. The Roundtable tackled new economic and business models for communications entities, social and political ramifications, and the implications for leaders in all parts of the world. 66 pages, ISBN Paper 0-89843-466-1, $12.00 per copy.

When Push Comes to Pull: The New Economy and Culture of Networking Technology (2005)

David Bollier, rapporteur

The author considers how communications, economics, business, cultural, and social institutions are changing from mass production to an individualized "pull" model. *When Push Comes to Pull* describes the coexistence of both push (top down or hierarchical) and pull (bottom up or networked) models—how they interact, evolve, and overlay each other in the networked information economy. The report explores the application of "pull" to the worlds of business and economics; the content and intellectual property industries; the emergence of an economy of the commons; and personal

and social dynamics, including leadership in a pull world. It also touches on the application of the pull model to learning systems; the military, in the form of network-centric warfare; and the provision of government services. 78 pages, ISBN Paper 0-89843-443-2, $12.00 per copy.

Information Technology and the New Global Economy: Tensions, Opportunities, and the Role of Public Policy (2004)

David Bollier, rapporteur

This report provides context and insight into the unfolding of new economic realities arising from the information revolution—how the world's players will live, learn, innovate, offer, consume, thrive, and die in the new global economic landscape. *Information Technology and the New Global Economy* draws a portrait of a changing global economy by describing new business models for the networked environment, exploring topics of innovation and specialization. Among the more creative concepts propounded at the Roundtable was an analysis of the world's economy in terms of video game theory that suggests that if developing countries are not incorporated into the world economic community in some acceptable way—if they cannot make economic progress—they could become disrupters to the entire economic or communications system. The report also explores issues of outsourcing and insourcing in the context of digital technologies moving work to the worker instead of vice versa. Participants concentrated on developments in India and China, taking note of some of the vulnerabilities in each of those countries as well as the likely impact of their rapid development on the broader global economy. 57 pages, ISBN Paper: 0-89843-427-0, $12.00 per copy.

People / Networks / Power: Communications Technologies and the New International Politics (2003)

David Bollier, rapporteur

This report explores the sweeping implications of information technology for national sovereignty, formal and informal diplomacy, and international politics. Bollier describes the special challenges and new rules facing governments and nongovernmental organizations in projecting their messages globally. The author further explores the rela-

tionships between the soft power of persuasion and the more traditional hard power of the military and discusses how governments will have to pay close attention to newly burgeoning social communities in order to prosper. 68 pages, ISBN Paper: 0-89843-396-7, $12.00 per copy.

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The Program's Executive Director is Charles M. Firestone. He has served in this capacity since 1989 and also as Executive Vice President of the Aspen Institute. Prior to joining the Aspen Institute, Mr. Firestone was a communications attorney and law professor who has argued cases before the United States Supreme Court. He is a former director of the UCLA Communications Law Program, first president of the Los Angeles Board of Telecommunications Commissioners, and an appellate attorney for the U.S. Federal Communications Commission.