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Consumers’ Research is an independent educational organization whose mission is to increase the knowledge and understanding of issues, policies, products, and services of concern to consumers and to promote the freedom to act on that knowledge and understanding.

Consumers’ Research believes that the cost, quality, availability, and variety of goods and services used or desired by American consumers—from both the private and public sectors—are improved by greater consumer knowledge and freedom.

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Taking a Clear Look at Contact Lenses

In August 1968, Consumers’ Research touched upon the dangers of wearing contact lenses for long periods of time. At that point, modern contacts had been around for nearly two decades and had gained mass appeal, but were far different from the lenses that consumers are familiar with today. Most contacts were made of a hard, rigid plastic that did not permit the passing of oxygen to the cornea, posing serious danger to wearers. It was not until 1971 that the first FDA-approved soft contact lenses, similar to those on the market today, became available in the United States.

The 1968 issue of our magazine warned consumers that these hard plastic lenses could scratch the cornea of the eye, and the scratch would go unnoticed if the lens were left in for too long. An untreated corneal scratch can lead to a vision-impairing scar or even the loss of an eye, and we suggested that lenses only be worn for ten to twelve hours at a time. Warnings against over-wearing contacts are still prevalent in 2016, but the proposed time restrictions have changed drastically.

Nearly fifty years since that original article, massive advancements have been made to contact lenses. In the years following the 1971 release of soft contact lenses that offered significantly more comfortable and easier insertion, popularity exploded. In 1998, the first hydrogel contacts hit the market, and they are still the most popular type of lens, currently worn by the more than 30 million contact wearers in the United States. These new lenses were found to have such high oxygen permeability that they became approved for extended wear. Instead of the ten to twelve hours that CR originally suggested in 1968, developments in medicine and technology now allow for some types of contact lenses to be safely worn for up to a month.

Credit Card Security

In the July 1969 issue of our magazine, we published a piece advising consumers on how to keep track of their credit cards. We offered an anecdote about a subscriber, which read as follows: “He reports that he visits his public library once a year, unloads his wallet, and makes a record of all of his credit cards on the Xerox copier. He runs off two copies, one for home reference, and one for the safe deposit box, all for an expenditure of 20 cents. Seems like a good idea, and well worth the cost.”

According to the Federal Reserve, about half of American families owned a credit card in 1969. That being said, the most commonly held type of card at that time seems archaic compared to what consumers know today. For starters, cards in 1969 did not have magnetic strips that enabled payment information to be captured in a simple swipe. The raised numbers and text on the front of the card had to be physically imprinted on paper upon transaction, as magnetic strip readers were not used until the 1970s. Furthermore, credit cards were typically distributed by retail firms (as opposed to banks) and could only be used in those firms’ stores. While these store-specific cards still exist at large retailers, credit cards issued by banks that allowed for revolving credit and usage at various locations – the cards we are accustomed to today – were only owned by 16% of American families before 1970.

Today, credit card usage is at an all-time high, and the security measures surrounding their protection have far surpassed using a photocopier at the local library. The mere idea of making photocopies of your credit cards – let alone storing them in a safe deposit box – seems ridiculous. Banks now have entire departments dedicated to detecting credit fraud, and the usage of cards is monitored around the clock. With advancements in security and technology, transaction history is now logged nearly instantaneously. Secure payments can be made electronically through the Internet or smartphone apps, and the implementation of EMV-enabled cards has the potential to slash credit fraud numbers across the board. It is exponentially easier to detect illegal activity due to the protocols currently in place, and banks are diligent at notifying and refunding consumers when their accounts are compromised.
No room for the Middle Class

New York’s attempt to regulate Airbnb would rob residents of financial opportunity (editorial)

Kyle Burgess

The New York State Legislature recently passed a bill subjecting residents to fines upwards of $7,500 for listing whole-apartment rentals on Airbnb. Though laws forbidding short-term rentals have been on the books since 2011, these additions—celebrated by powerful hotel groups—will dish out expensive punishments and restrict financial opportunity, all for renting out private property. To put these fees into perspective, in the state of New York a class A misdemeanor is punishable by fines of not more than $1,000. Some examples of class A misdemeanors in NY include crimes such as assault in the third degree, endangering the welfare of a child, and inciting to riot. Committing a misdemeanor may also result in up to a year of jail time, depending on the infraction and sentencing, but it’s bizarre to think you could commit a crime that harms people and receive a lesser penalty than you would for simply renting out your property.

Though I’m not a New Yorker, I can sympathize with the way many must feel at the prospect of this bill’s passage. I fall into the same class of person who would be stifled by these regulations: an average citizen with some unused space, who will no longer be able to freely rent out my home. I joined Airbnb as a host in 2012 and the arrangement worked perfectly. Without Airbnb, I had an unused room in my apartment that would just sit empty when I occasionally traveled for weeks at a time. Renting out the room was especially helpful during the holidays. Guests wished to visit nearby family but wanted their own space, while I wanted cash for gifts and planned to spend time out of town with my own family. Airbnb’s review system let me see feedback about the person I was allowing into my home and insured potential property damage up to $1 million. In the end, it was a low-effort, consistent source of alternative income. The property was insured, the taxes were paid and documented, and I felt secure—it was a modest middle class victory.

By the next year, I started renting out a West Virginia farm I own with some friends. This has become our most reliable source of income, helping us pay down our mortgage and giving us some financial leeway to expand our operations. All this was made possible by better utilizing property we already owned. A couple of years later, as the director of operations for Consumers’ Research, I have established a small business account with Airbnb. This has been a convenient and economic way to book frequent conference and meeting trips—on average, we save $200-$300 per person, per trip. If we book ten trips for just two employees through Airbnb, we are already cutting expenses by the thousands. That makes a big difference for a small non-profit with a limited budget.

With New York’s new regulations, consumers, businesses, and homeowners alike no longer have the liberty to take full advantage of their underutilized assets as I did. For example, residents will now have to be present in order to rent out what is categorized as “Class A” housing (permanent residences). This includes “tenements, flat houses, maisonette apartments, apartment houses, apartment hotels, bachelor apartments, studio apartments, duplex apartments, kitchenette apartments, garden-type maisonette dwelling projects, and all other multiple dwellings except Class B multiple dwellings.” In Brooklyn and Manhattan alone, roughly half the commercial properties are Class A. Therefore, if someone wanted to rent out their apartment while they left town for a few weeks, they’re out of luck—and so are their would-be guests.

Contrary to criticism that Airbnb rental markets are dominated by a few power brokers, Airbnb’s Head of Global Public Policy has stated that “almost 90 percent of [Airbnb] hosts have only one listing and it’s the home they live in.” Instead of painting the Airbnb market as a thorn in the hotel industry’s side, and a loss of hotel tax revenue, city councils and state legislatures should see it as a potentially greater source of tax revenue. With a clear-cut tax code, the fifty largest cities in the U.S. could net revenues in the ballpark of $200 million. With a growing market cap and the advantage of a three-star listing, Airbnb is bound to grow, rake in even more tax revenue, and attract tourism that cities would not have been able to accommodate otherwise.

Wealthier homeowners have been able to profit from their properties for years. Summer homes in the Hamptons or the south of France, rented for nightly, weekly, or monthly rates, are easily rented out by those property owners who can afford the sizable fees of property management. Airbnb has made it simple and economical for those traditionally precluded from the short-term rental economy to participate in transactions. Over 16,000 Airbnb hosts have stated that their supplemental rental income has helped them stave off eviction or foreclosure. Laws like the one passed by New York’s Assembly and Senate deny this opportunity to the middle class, and permit only the select few to profit from their unused property.

Signing this bill into law is signing away economic opportunity for the middle class.

A version of this article was originally published in The Federalist.
Fluoride, Too Much of a Good Thing?

We have all heard that it is possible to have too much of a good thing. While this may not be true about chocolate or our favorite TV show (at least that’s what we’d like to think!), it is especially true about fluoride. Fluoride, a natural mineral, has been associated with tooth decay prevention, particularly if consumed from an early age. However, consuming too much of it may result in negative consequences for both children and adults.

You might be asking yourself, “Where do I even get fluoride?” Well, you probably consume it every day without even realizing it. You can find it in toothpaste, mouthwash, drinking water, and many processed foods. While small quantities of fluoride are often naturally present in water sources, the U.S. Public Health Service has been adding fluoride to potable water since the 1950s in order to help Americans achieve healthier smiles. However, this increases the average American’s daily fluoride intake without them really being aware how much they are consuming. Moreover, education around how much one should consume is lacking.

Fluoride has many benefits. Whether you get it as a treatment at the dentist or in your daily oral hygiene regimen, you are fighting off plaque and reducing the frequency of cavities. It keeps your teeth healthy for longer and saves you time and money at the dentist. However, it is important not to overdo it. By brushing too much with fluoride toothpaste and otherwise consuming excessive fluoride, you might actually get the opposite of the pearly white smile you’re looking for and permanently harm your teeth in the process.

Dental fluorosis, particularly common in adolescents, is a typical result of getting too much fluoride. Fluorosis causes tooth discoloration marked by white or brown spots or streaks and can alter tooth structure by creating pits that are noticeable to the naked eye. Fluorosis most often occurs in children ages eight and under, and it affects their “adult” set of teeth, which are growing under the gums. According to the Centers for Disease Control and Prevention (CDC), between the years 1999 and 2004, “41% of American adolescents [had] some form of fluorosis – an increase of over 400% from the rates found 60 years [prior].” It is important that parents are aware of dental fluorosis, its implications, and the importance of monitoring the fluoride intake of their children. The severity of cases range from mild to severe, and the damage done to the enamel is permanent. However, depending on its severity, there is treatment available for tooth discoloration. Options include micro-abrasion for mild cases and composite bonding for extreme cases.

There are different implications for adults that consume too much fluoride. For example, some studies show a connection between excessive fluoride consumption and health risks related to vital organs such as kidneys and the brain. Since kidneys excrete fluoride and other substances, it is possible for fluoride to build up over time, particularly in older people, increasing the risk of skeletal fluorosis, which affects bones and joints. Additionally, over 300 studies, including one by the Harvard Review, consider fluoride a neurotoxin – a chemical that damages the brain, especially while it is still developing. The National Research Council has stated that fluoride could potentially contribute to dementia as well.

In addition to the risk of fluorosis and damage to vital organs, if children or adults ingest too much fluoride it can be toxic. This is why the FDA mandated a poison control label on toothpaste. Symptoms of fluoride toxicity include headaches, nausea, vomiting, and abdominal pain.

What can you do to prevent negative consequences from excessive fluoride intake? First, understand the intake that is appropriate for you based on your gender and age. The American Dental Association (ADA) has accessible guidelines for all age groups available at http://www.ada.org/en/public-programs/advocating-for-the-public/flouride-and-flouridation/flouride-clinical-guidelines. The more aware you are, the more you can protect your and your family’s dental health. Second, understand where your water comes from and how much fluoride it contains. If it contains above recommended amounts of fluoride, you can take steps, such as buying bottled water or using a filter, to reduce your fluoride intake. Third, eat fresh foods and reduce or limit your consumption of processed foods. Food prepared with fluoridated water increases your fluoride consumption. By educating yourself and understanding more about the advantages and disadvantages of fluoride, it is possible to get the right amount to limit adverse effects and help keep teeth healthy and pearly white.
As the world continues to move away from traditional forms of communication, such as landline telephones, wireless technology is more popular than ever. According to a survey conducted by the Centers for Disease Control (CDC), nearly half of all American households now only use cell phones rather than landlines. Wireless networks offer consumers increasing amounts of freedom, making the transition away from conventional networks an easy choice for many. As mobile adoption rates climb and different means of communication and methods of information sharing continue to emerge, the scarcity of the radio airwaves on which wireless networks operate has become a focal point of this expansive technological environment. Concern about how radio airwaves are divided into different clusters, called frequency bands, is not new. These bands are shared throughout many different industries, between many individuals and companies, and by unlicensed and licensed users alike. High-frequency bands are believed to have potentially revolutionary applications, including the development of 5G – the next generation of wireless connectivity.

**Licensing**

Licensing different bands of radio airwaves, also known as spectrum, provides an effective way to prevent signals sent through these airwaves from interfering with one another, ensuring signal clarity and quality. Spectrum is typically divided between two different types of stakeholders: licensed providers and unlicensed users.

There are chief differences among licensed and unlicensed transmitters. Unlicensed transmitters operate on lower-band frequencies (around 3 GHz) and are often everyday objects that can be found within a few feet of consumers at any given time. Cordless telephones, garage door openers, baby monitors, and other similar products all function using this type of transmitter, with perhaps the most common unlicensed transmitter being Wi-Fi-enabled devices. Meanwhile, licensed users are those who pay a fee to operate in certain bands of spectrum and broadcast transmissions, such as television service providers.

**Consumer and Economic Benefits of 5G**

President and CEO of the Consumer Technology Association (CTA) Gary Shapiro states, “These new bands will be capable of delivering data at much higher speeds than what’s currently available under 4G and LTE, improving the abilities of consumers to truly capitalize on the transformative power of wireless.” According to CTIA-The Wireless Association, an industry trade group representing the wireless communications sector, consumers will greatly benefit from the adoption of a 5G network – speeds will be more than ten times faster than current 4G networks, signals will be five times more responsive, and there will be 100 times as many wireless devices connected to the network than there are today.

The fifth generation of wireless connectivity is projected to facilitate advancements across a myriad of technological fields, not limited to wireless broadband. Improvements in areas such as robotics, drone technology, medical equipment, and virtual and augmented reality have the potential to progress rapidly, thanks to the high-speed, high-capacity promise of the 5G network.

5G may also be the key to unlocking the Internet of Things (IoT), which is a network of physical devices, vehicles, buildings, and other items embedded with electronic software that allows them to exchange data. Its potential applications include energy conservation through efficient power usage, smart shopping systems and intelligent transportation, among others. A study from Gartner predicts that by 2020, the Internet of Things will consist of between 20 and 30 billion devices, and a report completed by McKinsey Global Institute, estimates that IoT can have an economic impact of between $3.7 and $11.1 trillion by the year 2025.

**FCC Ruling**

On July 14, 2016, the Federal Communications Commission (FCC) unanimously voted to release a new block of high-frequency radio airwaves for the development of the 5G network, making the United States the first nation to reserve spectrum for such purposes.
High-band spectrum, also known as millimeter-wave spectrum, is defined as any band of airwaves above 24 GHz. As a result of this ruling, a new range of nearly 11 GHz (3.85 GHz licensed, and 7 GHz unlicensed) of high-frequency airwaves above 24 GHz will be available for use by licensed and unlicensed transmitters, wireless carriers, telecommunications companies, satellite operators, and the United States government.

The FCC has not previously undertaken an expansion in spectrum of this scale. The 3.85 GHz of licensed spectrum made available in the 28-39 GHz range is more than four times the amount of flexible-use spectrum the FCC had ever licensed. In the 64-71 GHz band, the Commission released 7 GHz of unlicensed spectrum, which doubled the amount previously available. This addition completed a contiguous 14 GHz band of unlicensed spectrum, equaling 15 times more than all unlicensed Wi-Fi spectrum available in lower bands.

In addition to releasing new high-band airwaves, the vote instituted technical rules intended to avoid unnecessary regulatory constraints. The ruling also left the door open for future spectrum expansion and put in place guidelines that will make it easier for old telephone networks to transition to wireless-based networks. Lastly, the decision created guiding principles to finalize the Commission’s regulatory strategy.

The United States is the global leader in 4G, and the decision by the FCC creates opportunities for public and private sector 5G development capabilities while fostering market competition. Licensees are required to submit a statement with their application that includes their intended approach to security and how it will impact the new 5G environment. Today, spectrum blocks are typically available in increments of 5 to 10 MHz. The new millimeter-wave spectrum will be available in blocks upwards of 200 MHz, offering carriers the chance to handle much larger traffic volume and provide higher resolution.

When asked about the Commission’s ruling, FCC Chairman Tom Wheeler stated, “I do believe that this is one of the – if not the – most important decisions this agency will make this year. By becoming the first nation to identify high-band spectrum, the United States is ushering in the 5G era of high-capacity, high-speed, low-latency wireless networks.” Industry experts have stated that the adoption of a 5G wireless network could facilitate unseen connection speeds and create opportunities for innovation and the development of seemingly limitless technologies.

**Drawbacks and Opposition**

Smaller-band spectrum – such as the 3.5 GHz band smartphones operate on – is capable of carrying a signal for miles, while high-band spectrum can only carry a signal for a matter of meters. Because of this, wireless carriers will be tasked with placing thousands of small signal boosters throughout their regions to optimize communication. This process has the potential to prove both expensive and isolating. Because of high-band spectrum’s limited range, opponents of the FCC’s ruling believe that rural communities are being left behind as the regulation supporting 5G advances. The Executive Director of the New America Foundation’s Open Technology Institute, Michael Calabrese, voiced his criticism of the decision stating, “The FCC’s order is extremely shortsighted. Because the big carriers will use these bands only in city centers and high-traffic indoor venues, exclusive and indefinite licenses over large geographic areas is a recipe for leaving these millimeter bands vacant in more than 95 percent of the country and millions of venues.”

Although the vote was a unanimous 5-0 decision, FCC Commissioner Michael O’Reilly dissented in part by disagreeing with some of the regulations proposed, particularly those which require licensees to provide their proposed cybersecurity standards. Commissioner O’Reilly stated, “Cybersecurity is an important issue and Congress has assigned authority to oversee it to other agencies. Therefore, I do no support its inclusion in this item, voluntary or not.”

**Looking Forward**

The FCC’s ruling to foster 5G growth puts the United States at the head of the race for global wireless dominance. Globally, 5G testing is in its infancy, but the future is on the horizon. 2016 and 2017 will see major and widespread trials, while 2018 is targeted for early deployment of 5G services.

Although experts do not all agree on the proposed distribution strategy of this new spectrum, the development of 5G-enabled technology is sure to promote innovation, and the network’s capabilities are expected to be profound. It is clear that consumers and various industries stand to benefit from a 5G platform that can enable exciting services and usher in the future of connectivity.
What the **Fiduciary Rule** Means for Your Retirement Savings

On April 7th, the U.S. Department of Labor issued a final rule addressing conflicts of interest for retirement-account advice that will change how millions of Americans save. This fiduciary standard is a shift from the current rule, which requires recommendations to simply be “suitable,” which critics argue has allowed advisors to charge excessive fees and give misleading advice. Now, the rule will require financial advisors to act solely in the best interest of their clients without regard to personal compensation. This rule is more than six years in the making and is a key part of the Obama administration’s “middle-class economics” initiative. Though the change could save investors financial losses resulting from advice based on misaligned incentives, more regulation may mean less choice and higher fees for consumers.

The rule comes into effect in April 2017 and allows for a transitional period through January 1, 2018. It encompasses recommendations for products that involve compensation, such as IRAs and employer-sponsored plans, but excludes educational information and general correspondence about such products. This change has extraordinarily wide-ranging effects. The Department of Labor estimates that the rules will affect 21 million retirement plans and IRAs and 2,800 firms. According to the Investment Company Institute, 60% of U.S. households have retirement plans through 401(k)-type plans or IRAs, with a total of $7.3 trillion in IRAs and $6.7 trillion in employer-sponsored plans.

**Best Interest Contract**

The rule creates a “Best Interest Contract” that allows advisory firms to continue to receive most common forms of compensation as long as they meet a set of requirements. According to the Department of Labor fact sheet on the rule, “financial institution and advisers must adhere to basic standards of impartial conduct, including giving prudent advice that is in the customer’s best interest, avoiding making misleading statements, and receiving no more than reasonable compensation.” This language provides a framework for disclosure of conflicting interests as well as accountability for recommendations.

**Costs of Conflicting Interests**

According to the White House Council of Economic Advisers, conflicts of interest in retirement-account advice lead to an average of 1% lower annual returns on retirement savings and $17 billion of losses for American families every year. The Department of Labor especially aims to protect investors when they roll over their savings from an employer-sponsored plan to an IRA. These rules intend to reduce the often exorbitant fees for rollovers. Brokers are currently free to charge upwards of 5% upfront when rolling a 401(k) over to an IRA, and this drain on investors is magnified by missed compound growth moving forward. In addition to these fees, investors will be protected from biased recommendations during rollovers, as advisers have financial incentives to aggressively market their own products whether or not those products are the best options for their clients.

By committing firms to put their clients’ best interests first, the Administration argues that the playing field will be leveled for financial advisors, as many are already doing right by their clients. These advisors will be judged solely on the quality of their advice, rather than on the size of the commissions they earn. Additionally, the new rules ensure that financial advisers are held accountable if they provide advice against their clients’ best interest. Firms are required to provide written disclosures of potential conflicts of interest. If an investor feels that they have been wronged, they now have legal grounds to sue for breach of contract.

**Less Choice and Higher Fees**

As a result of the requirement for “reasonable compensation,” a change from commissions for selling products to proportional compensation based on the account size is likely. These restrictions put pressure on advisers to recommend lower-cost products such as index funds that track the market and to de-emphasize riskier offerings like variable annuities, commodity pools, and real estate investment trusts. These firms will have to recuperate lost commission-based revenue by charging higher annual fees. For investors with smaller account balances, the annual fees may actually be more costly.
over time than commission-based compensation. Also, servicing accounts under $50,000 may no longer be economical for many brokerages due to compliance costs, convoluted paperwork, and the risk of litigation, meaning that small investors may be left to fend for themselves. This decrease in accessibility to advice is a cost in itself.

In order to comply with the new rules, financial institutions will have to produce an estimated 86 million written disclosures and notices in the first year alone. The costs of compliance are subject to debate. According to a survey by SIFMA and Deloitte, start-up costs would be $4.7 billion and on-going costs are estimated to be $1.1 billion, which is almost double that of the Department of Labor estimates. As SIFMA Chief Executive Kenneth Bentsen argues, “The department woefully underestimated the cost, and that will have to be passed on to the client.” Many smaller firms may be unable to afford the compliance costs, reducing choice and access to advice for individual investors.

Despite the noble intentions of the Department of Labor to protect the average investor, the regulation may ultimately have unintended consequences that negatively impact those it is intended to benefit. Though the increased transparency and legal accountability of financial advisors serves to protect consumers from predatory recommendations and rollover fees resulting from conflicts of interest, compliance with the new rules comes at a cost. The government’s regulation of rollovers from 401(k)-type plans into IRAs will keep many more people in these investments even though it may not be best for each individual. Under the threat of litigation for poor advice, brokers will recommend less risky investments that earn smaller returns for investors. In order to recover the costs for compliance and lost revenue from commissions, firms will have to charge high annual fees. By getting involved in how individuals save for retirement, the federal government may constrain consumer choice and incite higher fees, resulting in a net loss for consumers.
A Market Approach to Wastewater

John Meyer

Wastewater treatment is commonly considered an environmental problem, but it is also a resource issue — one that represents an opportunity for innovative solutions, not just in many developing countries, but also in parts of the United States where water is scarce. Generally, this problem is addressed only from a regulatory angle — but regulation is not the only constructive approach to wastewater. There are market-based ways to deal with wastewater that address the environmental problems, while finding opportunities that generate wealth, especially in the use of wastewater for energy.

Nuclear plant cooling with wastewater

A notable example of the use of wastewater in energy production is the Palo Verde Nuclear Generating Station in Arizona, which uses partially treated wastewater for its large-scale coolant needs. In 2010, the cities of Phoenix, Glendale, Mesa, Scottsdale and Tempe, along with the utility company Arizona Public Service and the Salt River Project, reached a 40-year comprehensive water contract expanding the existing arrangement, to provide cooling water essential to power production at Palo Verde Nuclear Generating Station, the nation’s largest energy producer. The agreement is a “win-win”, as it also offered revenue for the maintenance and technological enhancement of a key wastewater treatment plant with the capacity to treat more than 200 million gallons of raw sewage every day, provided that Palo Verde makes a $30 million payment, in four annual installments of $7.5 million.

The agreement provides an annual allotment of up to 26 billion gallons of treated effluent to Palo Verde. Because of its desert location, Palo Verde is the only nuclear power plant in the world currently using treated effluent. This is piped from the 91st Avenue Wastewater Treatment Plant in Phoenix to Palo Verde, where it is further treated and recycled to meet the nuclear energy plant’s cooling needs. The wastewater will be purchased according to a negotiated fee structure from the Arizona Municipal Water Users Association’s Sub-Regional Operating Group (SROG). It is initially priced at approximately $58 per acre-foot, which will be adjusted annually to reach approximately $300 per acre-foot in 2026. Thereafter, the price adjustments will be tied to a basket of three water-and power-related indices that are part of the Consumer Price Index. SROG is responsible for the ownership and operation of the 91st Avenue Wastewater Treatment Plant, which delivers treated effluent to Palo Verde. The City of Phoenix oversees the wastewater plant’s daily operations.

This water agreement offers a number of benefits: it provides cooling water for a reliable source of power for Arizona; establishes fair rates for treated effluent; enables the creation of much-needed revenue and jobs for each SROG member city; fosters the highly productive use of treated effluent, which is a resource that grows as the population expands; and generates revenue for the maintenance and technological upgrading of the 91st Avenue Wastewater Treatment Plant. While this is an especially mutually advantageous and profitable agreement, treated effluent is likely to become a valuable resource not only in arid areas like the Southwestern United States, but all across the country.

Use of wastewater in fracking

As the cost of recycling wastewater falls, it could prove to be the most effective way to mitigate many of the water-related environmental concerns surrounding hydraulic fracturing (fracking). Fracking is an industrial process that requires large amounts of fresh water. Estimates vary widely, from 1.6 million gallons up to 5 million gallons per oil well.

Common methods for disposing of water used in fracking include treatment and discharge to surface waters, deep well injection, storage in open-air pits and use on roads for ice or dust control. Various technologies also exist to clean the flowback water that is a byproduct of the initial fracturing process well enough that it can be reused to drill other wells; however, the level of cleaning needed to reuse this water for fracking may be significantly less than completely restoring it to natural levels of purity. Oil and gas companies are under mounting pressure to address numerous water-related environmental concerns. These include the heavy use of fresh water resources, which are scarce, especially in dry areas; the potential migration of contaminants from deep injection wells to nearby aquifers; and even increased truck traffic to transport water from well sites to treatment or disposal sites, resulting in increased emissions, road damage and noise pollution.

Because open-air storage, use on roads, or other purposes not requiring treatment causes environmental concerns, deep well injection and cleaning and reuse are the two most viable options for recycling waste water from fracking. Deep well injection has been the most cost-effective option, but it does nothing to deal with the fresh water availability issue, which is both an environmental issue and a cost issue, particularly in arid areas. Furthermore, disposal wells have been linked to increased frequency of earthquakes in areas such as Oklahoma.
Anaerobic digesters can generate biogas to be used for energy and improved sanitation. Recycling flowback water avoids all these environmental concerns, including that of fresh water scarcity. Recycling can also be used for produced water (or water brine), which comes out of the wellbore along with oil and/or gas and flows continuously over the life of the well, offering further conservation possibilities. It is currently more expensive than deep well injection, but costs are coming down and new entrants, such as Ecosphere Technologies and OriginClear, claim they can compete on price with deep well injection, though this is yet to be proven. Even if it is not yet true, increased recycling of flowback water may become a necessary cost of doing business.

**Power generation from wastewater processes**

The most promising and potentially profitable strategy for wastewater management is to utilize it in algae biomass production. Earlier processes for separating energy dense lipids from algae were too energy-intensive to be either cost-competitive or cleaner alternatives to fossil fuels. The breakthrough innovation that makes the new generation of plants cost-effective and profitable is that they combine the production of various products (fuel, clean water, and fertilizer) and often combine several utilities, thus allowing such hybrid facilities to generate revenue in an efficient, resourceful, and eco-friendly manner.

Anaerobic digesters can generate biogas to be used for power generation and heating. A large-scale example of the use of this process is at the Newtown Creek Wastewater Treatment Plant in New York, which has a 310 million gallon per day processing capacity. In December 2013, New York City announced a two-fold public-private initiative to reduce the amount of organic waste sent to landfills, as well as to produce a reliable source of clean energy and improve air quality. Under this initiative, Waste Management delivers pre-processed organic food waste to the Newtown Creek Wastewater Treatment Plant where it is added to wastewater sludge to increase the production of biogas. Then, in a first-of-its kind project, a for-profit power company, National Grid, converts the biogas by-product into pipeline quality renewable natural gas for residential and commercial use. Together, the two parts of this project can produce enough pollution-free energy to heat nearly 5,200 New York City homes, harnessing a significant portion of the 1.3 billion gallons of wastewater generated in New York each day, at no cost to those paying for New York City water.

**Outside advanced countries, using wastewater as a resource is even more important**

Among the most urgent concerns for the future is the availability of enough water for a human population projected to reach 9.6 billion people by 2050. It is well-recognized that access to clean water and good sanitation is a crucial element in fighting poverty and promoting economic development. However, global consumption patterns show increased demand, and the waste that pollutes water supplies remains an unmitigated hazard in most underdeveloped countries. For example, an estimated 70 percent of drinking water in India is contaminated by sewage. The United Nations estimates that, if current water consumption trends continue, 1.8 billion people will experience water shortages as soon as 2025. Among solutions with great potential are the development and deployment of technologies that use wastewater as a resource, which can generate incentives for industries and municipalities to treat waste that is otherwise discharged into vital waterways.

If done effectively, wastewater management can combine economic growth and environmental protection. The World Bank estimates that the return on investment in infrastructure for sanitation can be as much as fivefold, while poor sanitation can cost a country up to seven percent of annual GDP in increased healthcare expenses and reduced labor productivity costs. Strategies for water management will be more effective if they include recognition of the resource potential of wastewater in creating opportunities for sustainable economic development and growth. Wastewater treatment is needed to mitigate the hazards of agricultural, industrial, and municipal by-products. However, investors are wary of water infrastructure projects that often have high upfront costs and long development periods, so multi-billion dollar wastewater treatment facilities remain concentrated in developed economies and advanced regions in developing countries. A U.N. study articulates this disparity; on average, high-income countries treat 70 percent of wastewater (North America treats 75 percent), while low-income countries treat only 8 percent of wastewater. Because of actual or projected water scarcity, some of the more prosperous governments in drier areas invest in technologies for desalination and water purification, but these approaches have only limited effect and do not address water pollution more directly.

Despite public health experts’ recognition of the urgency of water sanitation issues, dirty water is not effectively controlled by policies and regulations alone. Market-based approaches recognize problems and exploit opportunities for solutions that generate wealth, which is why there are excellent prospects for the development of wastewater resources for energy, both in the United States and abroad.

While this broader approach may seem far from consumer concerns, it can reduce the costs of wastewater treatment and provide offsetting revenue, thereby reducing power costs. If a market approach is used more broadly, it may relieve some of the pressure on water resources in dry areas, in the U.S. as well as abroad.
Soda Tax, Not So Sweet

Deane Hinton

The city of Philadelphia made history on June 16 when the city council approved a measure to tax sweetened drinks, colloquially known as a “soda tax,” becoming the third U.S. city to enact such a rule. The measure, which won’t take effect until 2017, will tax distributors $1.5 per ounce on all sugary or artificially sweetened drinks. This works out to $1.02 per 12 pack and $1.02 per 2-liter bottle.

This is not the first time a major U.S. city has tried to go after the sale of sweetened beverages, but it is only the third time one has been successful. Chicago has been taxing sodas at a rate of 3% for years. In 2014, Berkeley, California, was the first city to pass a per ounce tax on sugary drinks. Prior to the passage of the Berkeley tax, similar measures had been brought up forty times in cities across the country, only to be defeated each time.

Most famously, former New York City mayor Michael Bloomberg championed a proposal that would have banned the sale of large sized sodas in the city. The measure failed when New York’s supreme court ruled that the city’s board of health lacked the authority to issue such a ban. Polls showed that 57 percent of New Yorkers were opposed to the rule, as they did not believe the city should decide what size sodas should be available.

Due to the rarity of soda taxes, it is hard to know how they affect soda consumption. There was a decline in soda consumption in Berkeley after the tax, but consumption was already declining, so economists have had trouble quantifying the effect of the tax. The best data comes from Mexico, which started taxing sodas at the beginning of 2014 at a rate of one peso (about five cents) per liter (or approximately 10 percent of the pre-tax price). The tax was levied on distributors, but it was consumers that bore the burden, as the price of drinks rose proportionally to the tax. Economic data showed that in the year after the tax went into effect, soda consumption declined by approximately six percent for the year, and that the rate of decline was accelerating.

Mexico levied this tax as an effort to combat a growing obesity rate that may have been partially fueled by soda consumption – the country was the largest consumer of soda on a per capita basis in 2011. Health advocates have long championed the idea of taxing sweetened drinks as a measure to improve public health, arguing that soda consumption has played a part in the increasing growth rates of diabetes and obesity.

Many of the proposed taxes on sweetened drinks that failed to pass would have ultimately funded public health initiatives, but one of the major distinctions of the Philadelphia measure is that it was not passed as a public health initiative. Rather, the mayor and the city council argued that taxing sweetened drinks was being done as a way for the city to fund a universal prekindergarten program, as the tax is expected to generate over $91 million per year.

While there may be some advantages to a soda tax, there are also disadvantages. One of the most prominent arguments against implementing a soda tax is that it is a regressive tax, meaning that it will have a greater effect on those with lower income. Studies have shown that 32 percent of people with an annual household income of less than $25,000 consume soda, as opposed to the 16.1 percent of people making over $75,000. Furthermore, the tax is flat, meaning that it does not scale based on levels of income. Those who make less will pay more, as a percentage of their income, than those who have make more. The regressive nature of these taxes has caused numerous progressive politicians and economists to oppose them.

There are other potential unintended consequences that could negate some of the effect of the tax, or further pass the burden on to lower-income Philadelphians. For example, wealthier residents might simply buy soda outside of the city to avoid extra costs or out of spite for an unpopular tax. Another argument, made by the American Beverage Association as well as labor unions, is that these taxes will reduce consumption and in turn, jobs will be lost as bottling plants produce and ship less soda. Another argument is that the tax may not be passed onto consumers, but rather absorbed by vendors who do not alter their price for fear of losing business to stores outside of Philadelphia. In this case, prices would not go up for consumers and consequently would not affect their behavior. There is also the philosophical question of whether government should or should not influence consumer behavior through taxes.

It will be interesting to see if Philadelphia is a sign of things to come, or merely a flash in the pan. We may know soon, as other cities such as San Francisco and Denver will be voting on whether to levy similar taxes later this year.
3D Printing and its Potential Applications

David Weissman

3D printing is an up-and-coming technology that has caught the interest of a wide variety of people and has numerous applications. There are commercial applications, such as the efficient production of prototypes and mockups of small products. There are also personal use applications, such as the ability to reproduce a part for an appliance that would otherwise be impossible or not cost-effective to buy from the manufacturer.

There are many other use cases of 3D printing. One is the printing of prosthetic hands, arms, and other limbs. A U.S.-based group called e-NABLE has been very involved in printing prosthetic limbs, both for users domestically and for charity purposes abroad. 3D printing can be used to make parts from recycled e-waste or to fabricate better and cheaper wind turbines for generating energy.

Other charitable applications abound: as a panelist at Public Knowledge’s 3D printing industry event 3D/DC, held in April, Bo Pollett, the D.C. ambassador for Tikkun Olam (a group which organizes 3D printing events to help the disabled), told the story of a small boy in South America who couldn’t walk (and thus couldn’t play soccer, a prominent social activity in that area). The components for an electric wheelchair were 3D printed for the boy, so he could then play soccer and participate in his community.

3D printing has the potential to bridge the “workforce skills gap,” as it could bring more manufacturing jobs. However, as Diego Tamburini, manufacturing industry strategist at Autodesk, observed at the 3D/DC event, jobs utilizing these technologies will require more advanced skills than traditional manufacturing. Workers will need computer and possibly design skills in addition to the technical knowledge required to run the machines.

Tamburini said that he didn’t believe 3D printing would totally supplant traditional manufacturing – for large numbers of items, traditional methods are quicker and more cost-effective. However, smaller parts and smaller batches of items will be practical candidates for 3D printing.

Drivers of Adoption

Adoption rates of 3D printing are still fairly low, but they are expected to increase in the next few years. Supply chain and logistics trade association MHI conducted a study in conjunction with consulting firm Deloitte on what industry professionals think about the adoption of 3D printing. They found that 48 percent of respondents think that they will adopt 3D printing in the next six to 10 years, compared with the current adoption rate of only 14 percent.

Michael Gravier, an associate professor of marketing and global supply chain management at Bryant University, said, “the technology itself is fascinating, yet the implications for all this technology are only just beginning to be understood. 3D printing is a game changer for manufacturing but its real impact on supply chains will take years to play out.”

Adoption of new technology in manufacturing and logistics is not necessarily an indicator that it will be adopted en masse by consumers, but it does show a growing interest in and acceptance of this new technology. Mass adoption by companies could also mean lower prices for the devices across the board.

There are a few drivers of interest in 3D printing. One is its public perception as a new, interesting technology. At the 3D/DC seminar, Adam Schaeffer, who works at the 3D printing center at Washington D.C.’s Martin Luther King, Jr. Memorial Library, said that he regularly sees teenagers and seniors, who would normally not interact with each other, show equal curiosity about 3D printing. This is a technology that garners interest across multiple demographics.

Another driver is the gradual decline in prices that comes with adoption of a new technology. Personal computers initially cost thousands of dollars, offering a level of capability we would scoff at today – but within a few years, costs started going down and performance started going up.

Prices for 3D printers have already started to decrease and will continue to go down. According to a report released...
by marketing research firm IBISWorld, the price of 3D printing machines are expected to fall 6.4% in 2016.

There are multiple reasons why costs are starting to decrease, including the decreasing costs of raw materials used as well as increasing competition. Procurement research analyst Agimaa Kruchkin pointed to the technological innovation in the industry as a major factor, saying: “Most importantly, the constant innovation and improvement in 3D printers have consistently slashed manufacturing costs.”

Two manufacturers, Stratasys Ltd. and 3D Systems, Inc., have for a few years exerted considerable control over the market (with over 55 percent market share between them). Recently, however, a host of new companies has entered the scene, increasing competition and functioning as a driver for lower prices. In 2015, there were around 100 3D printing suppliers: 70 manufacturers and about 30 retailers and distributors with more expected to enter the space in coming years.

Obstacles to Adoption

As with any rising technology, however, there are obstacles to adoption. Costs will still inhibit the ubiquity of the technology for a few years, even though they are going down in price. There is also the concern that printers will get more specialized, and thus the prices won’t go down as quickly as predicted. This could occur if there isn’t adoption of more generalized printers by the general public.

Public perception can be a double-edged sword when it comes to adoption – while many people will show passionate interest in a new technology, others will be disinterested or possibly even hostile. People outside of larger cities might not be as interested as quickly in the technical aspects, though fabrication of hard to get parts should pique the interest of people in rural areas.

Areas with limited access to the Internet represent a roadblock to adoption, since web access is needed to download digital plans to use with the printers. 3D/DC panelist Becky Button, a 15-year-old “maker” (the term for individuals who use printers as hobbyists or for other purposes) recounted an anecdote from her school; the library had a 3D printer under a plastic case for months and it was not used, because no one knew how to use it. Some may also be apprehensive of expensive technology, as people who aren’t knowledgeable about this technology don’t want to break anything and possibly be liable.

Another panelist at 3D/DC, Joseph Williams, Executive Director of Technology at Perris Union High School in Perris, California, asserted that by the time students hit high school, they have lost a lot of creativity due to the educational system. According to Williams, it doesn’t help that teachers often know even less about the technology than their students do. So, he said, younger kids will be the better bet to learn and experiment with 3D printing, and teachers will have to be learning along with their students at all levels.

The Potential Legal Issues with 3D Printing

In his book Permissionless Innovation, Adam Thierer of the Mercatus Center at George Mason University writes, “Prosthetics are medical devices in a traditional regulatory sense, but few people are asking the FDA for permission to create new 3-D-printed limbs. Instead, they are just going ahead and engaging in this sort of life-enriching innovation.”

3D printing is unlike other areas of innovation, which are contentious due to the traditional regulation of their sector – drones and self-driving cars come to mind. The Federal Aviation Administration has a significant say and stake in the drone space due to the potential impact on traditional aviation, and the U.S. Department of Transportation’s National Highway Traffic Safety Administration, and numerous states’ Departments of Motor Vehicles have similar involvement in regulating self-driving cars. 3D printing potentially faces regulation when it comes to application or the product produced, rather than the devices themselves, and as with many new technologies there is the question of which agency “owns” the issue.

The media and politicians alike have expressed much concern over the potential availability of 3D-printed guns and there have been attempts to ban or restrict them at multiple levels of government, both in the United States and abroad. For example, Rep. Steve Israel (D-NY) put forward H.R. 2699, the Undetectable Firearms Modernization Act of 2015. That bill has been in committee since July 2015.

There are also intellectual property concerns: Thierer asks, “what is the future of intellectual property when products can be so easily replicated by not just companies but average citizens?”

According to Giulio Coraggio, a partner at law firm DLA Piper, there are three central legal issues inherent in the technology. The first is that 3D printing could be seen as the “new piracy.” He writes that as with the piracy of movies and music, we could see a black market for cloned items made on 3D printers. He points out that to reproduce an object you need just two things: a 3D printer, and a digital schematic of the product. He also points to the possibility of multiple levels of copyright infringement: the creation of the 3D CAD file might be considered an
infringement on design rights, the dissemination of that file could be considered a “contributory infringement” of those IP rights. Creating and disseminating or offering the physical 3D-printed replica could be considered an infringement as well, with possible exceptions for private, non-commercial, or educational uses Coraggio notes.

The second main legal issue has to do with who is liable for items produced on a 3D printer. For example, if someone uses a printer to manufacture an illegal item such as drugs or a gun (which is then used to harm someone), or a product that malfunctions and harms the user or someone else; in that case, Coraggio writes:

“Product liability regulations refer to the manufacturer as entity liable for damages arising through the usage of products. But in a 3D printing scenario when the customer is the actual manufacturer we will have a number of different players: the owner of the printer, the manufacturer/supplier of the printer and the person that actually created and/or used an untested product.”

The third potential issue, according to Coraggio, has to do with privacy. Coraggio asserts that a CAD or a replica could contain personal information. Using the example of a doctor that 3D prints an exact replica of a patient’s organ to verify whether there may be issues during surgery, Coraggio points out the following potential questions regarding liability:

• Does the hospital have to acquire privacy consent?
• What happens to the 3D printed organ after the surgery?
• Will it be used for research, and might information about the patient (for example, the disease that affected him or her) be made available to third parties?

Moving Forward

3D printing is a technology with a lot of potential for improving the lives of consumers. It can enable consumers to produce small devices or parts for themselves, saving time and money. It may also give smaller vendors or businesses the option to produce parts in house, driving down costs for products. There are still hurdles to overcome — the general public should become more familiar with this technology, and the potential roadblocks around copyright and other legal issues must eventually be overcome.
Take FDA Salt Guidelines with a Grain of Salt

John C. Meyer

On June 1, 2016, the U.S. Food and Drug Administration (FDA) issued draft “voluntary” guidelines for the food industry to reduce the salt content of processed foods. Since processed foods account for an estimated 75 percent of dietary salt intake, if these guidelines are followed, they would have a considerable effect on how much salt Americans consume. The current federal health recommendation for salt consumption is 2,300 milligrams (mg) per day, while the average dietary salt intake is estimated at 3,400 mg per day. The FDA seeks a reduction in salt in these foods in two steps, the first to be completed in two years and the second in 10 years. These steps are intended to reduce the average salt intake to 3,000 mg in two years, and to the federal guideline of 2,300 mg in 10 years. The voluntary nature of the guidelines does mitigate their impact on the food industry and on consumers; however, if compliance is considered inadequate, mandatory guidelines may follow.

The trend of scientific evidence is against the theory that less salt is good

The government is moving just as the medical and scientific basis for its action has come into question. As Consumers’ Research reported last September, recent scientific research on dietary salt is trending away from the simple conclusion that less salt is good. In February 2015, the Federal Dietary Guidelines Advisory Committee reviewed its salt intake recommendations and, while retaining the 2,300 mg daily limit for the general population, it recommended eliminating the lower 1,500 mg limit for African-Americans and for those over 50 years old.

Recent research indicates that, not only are the dietary salt guidelines too low, but also that overly low salt intake may actually be harmful. The most significant evidence of this change is the PURE study published in the August 2014 New England Journal of Medicine. This was a massive international research study with over 100,000 participants, which found, among other conclusions, that those who comply with the 2,300 mg (2.3 grams) recommended limit actually experience more heart trouble. This study reached the following conclusion as to the desirable level of salt intake:

“In conclusion, we investigated the association of estimated sodium and potassium excretion with the risk of death and cardiovascular events in a large, international, prospective cohort study. An estimated sodium intake between 3 g per day and 6 g per day was associated with a lower risk of death and cardiovascular events than either a higher or lower estimated level of sodium intake.”

The study also concluded that salt intakes of above 7,000 mg or below 3,000 mg are associated with greater risk of cardiovascular illness, whether resulting in death or not, and with greater overall risk of death. For the participants who already had hypertension when enrolled in the study, the risks increased with a salt intake above 6,000 mg.

As a possible explanation for the negative health effects of low salt intake, the researchers pointed to studies suggesting that low salt may stimulate the production of renin, a hormone that may have harmful effects on blood vessels. The PURE study received no food industry funding; it was funded by a large number of governmental, health research, university, and pharmaceutical company sources.

Even before the conclusion of the study, there had been growing doubt regarding the health value of dietary salt restrictions. In 2013, the Institute of Medicine had published a review of the evidence of a correlation between salt consumption and health. This review concluded that there was insufficient proof that following the government recommended limit of 2,300 mg of salt per day improved health outcomes.

The government fails to consider recent science

Despite the growing evidence that the conventional wisdom on salt restriction is not supported by scientific evidence, the governmental and medical establishments continue to hold firmly to the salt restriction doctrine. In a June press conference on the new salt guidelines, Dr. Tom Frieden, director of the Centers for Disease Control and Prevention stated:
“There is a direct dose-response relationship between sodium and blood pressure. Reducing sodium intake reduces both blood pressure and cardiovascular disease.”

While this theory is widely held, it has never been proven, and, as discussed above, the evidence is starting to show that the relationship is not so simple.

There are many things that are likely to be good for consumers,’ but for reasons of expense and/or the freedom of the citizen, government does not mandate them. Here, a voluntary mandate is proposed for something that may be expensive, may make food less tasty, and may be counterproductive to good health. The single hardest thing to understand about this new mandate is why it was initiated just when the scientific evidence for it has weakened, if not reversed, the scientific and medical basis for dietary salt restriction.

These guidelines cover a wide variety of foods, including bread, cereal, cold cuts, and snacks. Because they are voluntary and phased in over time, it is likely that compliance costs will initially be minimized, as the easier reductions are made first and those companies that face difficulty have the option of not complying. Currently, there are considerable differences in the amount of salt in the same product. For example, a slice of white bread may range from 80 to 230 mg of salt, and three ounces of turkey deli meat vary from 450 to 1,050 mg. Thus, it is clear that a fair amount of salt reduction could be accomplished fairly easily. A more subjective question (that is outside the scope of this article) is whether the lower-salt versions taste as good, and because of that, whether consumers will want to buy them over the higher-sodium versions.

Are the new FDA guidelines actually bad for consumer health?

The larger question is whether these draft guidelines are good for consumer health. If the PURE study is right that the optimum range of salt intake is 3,000 to 6,000 mg per day, then the American average salt intake of 3,400 mg is already in the lower portion of the optimum range. Accordingly, no further government action to reduce salt intake is needed, and any significant success in further reduction of average salt intake may, on balance, actually be harmful.

Since the FDA guidelines are only a draft proposal, not scheduled to be finalized for up to a year, there is still time for them to be modified in light of the uncertainty discussed herein. Given the changing scientific trends and the ambiguity of the evidence for restriction of dietary salt, a more prudent course of action may be to enhance disclosure of salt content in food, and defer any further push for the 2,300 mg dietary standard, until more research has been done to resolve the question of whether lower average salt intake is valuable for health.

In the short term, these draft guidelines are unlikely to affect consumers significantly, although they may open the door for more stringent regulation. But the most significant question consumers should be asking, is whether the government salt restriction orthodoxy is good for their health. That decision is something each consumer has to make. It would seem that, unless one is under a doctor’s care for hypertension or heart disease and instructed to reduce salt, or unless one consumes far more than the average, one can take the advice to reduce salt with a grain of salt.
Bitcoin holders were stunned recently when Bitfinex, the highest volume non-Chinese bitcoin exchange, abruptly halted trading and announced that it had fallen victim to a hack in which user funds were stolen. This theft, amounting to nearly 120,000 bitcoin (approximately $70 million), is one of the largest heists in the currency's short history and the largest since the notorious implosion of Mt. Gox over two years ago. This breach is an utter failure of custodial protection and a violation of consumer trust. It is also a watershed moment for all leading exchanges and wallets in the digital currency space that had over the past two years managed to gain the trust of a steadily increasing number of consumers while avoiding, for the most part, highly restrictive regulatory action.

While it remains unclear precisely how this hack was executed, its success seems to contradict what we've been told and taught about the security virtues of multi-signature transactions. This is a much more concerning development than simply discovering that Bitfinex had implemented bad security protocols, as was the case with Mt. Gox. We expect and hope that the investigation will reveal that this is not a vulnerability that affects all accounts secured by multiple signatures, but it is too early to tell at this point.

There is also evidence that Bitfinex changed its protocols for securing consumer funds as a result of a settlement with the U.S. Commodity Futures Trading Commission (CFTC). The $75,000 judgment from the CFTC presented Bitfinex with the choice of migrating from a hot/cold wallet setup (in which a portion of bitcoins are kept in inaccessible wallets) to unique accounts for each customer, or go through the arduous process of registering as a Swap Execution Facility (SEF). Bitfinex chose not to pursue obtaining SEF status, which may have opened the exchange up to the potential of this attack. If this is the case, it may be the first example of an analog regulation being applied to a digital currency company that had the net effect of making that company's digital assets more vulnerable.

Less than one month prior to this incident, Consumers’ Research convened a group of experts with backgrounds in consumer protection policy, regulation, and technology systems for a three-day workshop to begin the process of establishing digital currency industry principles and standards for how to best serve and protect consumers. Some members of the community with whom we engaged prior to the event, believing that significant consumer protection problems were a thing of bitcoin’s past, questioned whether digital currencies even needed more consumer protection.

In the wake of this latest heist, protecting consumers must again be at the forefront of the digital currency community’s efforts. Everything from first principles to specific implementation methods needs to be on the table.

A vocal section of the Bitcoin community is arguing that the only model for consumer protection in a digital currency ecosystem is caveat emptor, or “buyer beware.” Their argument follows from the belief that, since bitcoin is secured with theoretically un-crackable cryptography, consumers can protect their digital assets by memorizing or securing their private keys without depending on third parties.

Both consumer expectations and government regulations exist as impediments to this model. Consumers in developed nations are accustomed, thankfully, to high levels of protection in their financial services. For the most part, consumers do not bear the financial losses from corporate security lapses. When tens of millions of credit card details are stolen from a retailer, consumers don’t fear that they will bear responsibility for a thief using their credit cards to make purchases.

As much as libertarian purists would like to return to an era of unregulated markets, it is simply unrealistic to ask consumers to begin storing their hashed private keys securely. If that is the consumer protection model the Bitcoin community continues to advocate, it will forever be a small community of highly technical users.

The Bitcoin and blockchain communities have spent the past few years asking regulators to allow room for these technologies to grow and mature. If we’re making that ask, we need to take consumer protection seriously. A guaranteed method for attracting the attention of legislators and regulators is responding to hacks like these by saying that consumers are at fault for misplacing their trust.
The community needs security standards, set by its leaders, which account for these realities of the regulatory and cultural environment. Once those tough security standards exist and entities adopt them, consumers will then have sufficient information to make informed decisions regarding where to place their trust. This is the only way to foster growth and fulfill the promise of this technology.

Consumers’ Research will be engaging with the digital currency community over the next few months to ensure that the set of guiding principles and best practices we are developing alongside regulators, policymakers, and industry experts meets this challenge.
In recent years, smartphone attachments and accessories have become a pervasive trend. There are a myriad of different devices that either amplify the functions of a smartphone or add new features. For example, phone cases that double as chargers increase the battery life of mobile phones, while protecting or personalizing them. Other accessories include portable speakers, camera lenses, and more utilitarian accessories, such as mounts for the dashboard of a car and cases that double as card wallets. One such useful device is the Xistera, a multi-tool that clips onto an iPhone 5 and functions as a lens adapter, stand/tripod mount, stylus, and even a bottle opener.

The market for all of these attachments generates a lot of business. According to Future Market Insights, mobile phone accessories totaled $62 billion in 2015. Phone cases and headphones have led sales, but power banks and portable chargers are predicted to become a larger part of the market. According to Statista data, sales of smartphones themselves are still on a general upward trend, but global sales to end users actually saw a small slowdown in early 2015; sales fell from 367.33 million units in the fourth quarter of 2014 to 336.06 million in the first quarter of 2015. By December 2015, however, they were back to a higher level than in 2014: 403.12 million devices.

The domestic market for smartphone attachments is more competitive than that of smartphones, which is dominated by five major companies, namely Apple and Samsung. Attachments, by contrast, are marketed by hundreds of different companies. Smartphone manufacturers themselves are usually not major players. Apple did introduce its own phone charging case to compete with the popular Mophie – however, it is debatable which has better name recognition in the phone charging market. Also, consumers may perceive that introducing its own charging case is recognition by Apple that its device’s battery life – already a sore point among many users – is inadequate.

One of the most intriguing aspects of mobile accessories is their potential to disrupt the sales of traditional devices. The effect of smartphones themselves on the sales of compact digital cameras has been well documented. According to data marketing research firm IDC provided to the Milwaukee Journal Sentinel, sales of digital cameras fell 30% in 2013 alone. Compact digital cameras are not alone; long considered too high-end to be affected by the smartphone camera phenomenon, makers of DSLRs and other high-quality cameras are now feeling the pinch.

According to The Wall Street Journal, Lens maker Tamron saw a 22% decline in the number of interchangeable camera lenses sold in the first three quarters of 2013, compared to one year earlier. Tamron general manager Tsugio Tsuchiya said in an interview with the newspaper, “Smartphones pose a threat not just to compact cameras but entry-level DSLRs as well.” Christopher Chute, a digital-imaging research director at IDC, also told The Wall Street Journal that he believes that some consumers are choosing to spend their money on smartphones and tablets rather than a stand-alone (single function) high-end camera. He also said that consumers are evaluating gadgets based on software and Internet integration, rather than the hardware specifics that are a big part of a high-end camera’s appeal.

Smartphones don’t need many additional bells and whistles to overwhelm the market share of compact digital cameras – they are smaller, offer comparable if not equivalent picture quality, and have many other features besides built-in cameras (including photo editing apps). When it comes to DSLR disruption, however, that’s where smartphone attachments really come into their own. There’s the $79.99 Olloclip 4-in-1 lens, which simply clips onto the iPhone itself and gives users the option of four different photo lenses. Further upmarket is the $279 iPro Lens System, which is a lens integrated into a case for the iPhone, and which MacWorld.com called “the best glass for DSLR-quality results.” Tripod mounts for smartphones are also available.

There are attachments that do not simply add new features, but which amplify the smartphone’s communicatory abilities. These “communications attachments” include the Beartooth and Thuraya Satsleeve devices. The Beartooth is a device that allows off-grid communication when using a smartphone – enabling its users to be connected when in a remote area without service, or in an area where the network is overloaded (such as a concert or large sporting event). At $249 for two units (the pre-order price, regular retail will be $399), the Beartooth
may be high cost for what seems, at first glance, to be the smartphone version of a two-way radio. However, the device not only enables users to talk off the grid, but text as well as use GPS-enabled maps.

Ellie Van Dyke, the marketing director for Beartooth, tells Consumers’ Research that she is confident about the disruptive ability of the device. She said, “Beartooth will disrupt the market of off-grid communication devices. Beartooth gives consumers a simple and high-quality experience that’s lacking in today’s two-way comms.”

According to Van Dyke, the drawbacks of traditional handheld radios are many. She said they are often cumbersome and difficult to use, with many channel settings, radio protocols, and button sequences. Beartooth, she said, has the benefit of additional features such as higher-quality voice communication, mesh networking, voice and text encryption, and what she described as “frequency hopping spread spectrum,” which allows for an “almost unlimited number of ‘virtual’ channels.” Theoretically, this means users would not experience the problem of interference on their channel and would only communicate with the people they want to. This also means the Beartooth would be limited in communicating with outside parties such as emergency personnel – which does not seem to be the intended purpose of the device. Since it is sold in pairs, it is meant for communication among set groups of users.

Another communication attachment is the Thuraya Satsleeve. This is a satellite phone adapter for the Android or iPhone that typically retails in the $500 to $600 range. Unlike the premium the Beartooth commands over traditional two-way radios, conventional satellite phones often retail for hundreds of dollars more than the Satsleeve.

Thuraya’s director of products, Rashid Baba, stated in a trade magazine produced by Satellite Evolution Group that the company will achieve disruption by emulating companies like SpaceX and Google. Baba said that the priority of many satellite communications companies has been to focus on factors such as durability and targeting their products to the mining, energy, and defense customers that many people perceive as the primary market for satellite phones. He further stated, “Thuraya’s ultimate aim is to challenge – and possibly change – that old perception by putting more focus on introducing more consumer-friendly elements into our product development. Consumer-friendly products would include those like the Satsleeve smartphone satellite device.

The smartphone camera and its complementary attachments have measurably disrupted the digital camera market. As the technical capability of attachments (and the smartphone itself) increases, there’s no doubt new devices will come on the market with the potential to disrupt existing technologies. ◄