



FEATURE

## How to begin regulating a digital reality world

Businesses and governments should guide augmented reality development

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THE DELOITTE CENTER FOR GOVERNMENT INSIGHTS AND THE DELOITTE CENTER FOR INTEGRATED RESEARCH

Augmented reality is rapidly bringing the physical and digital worlds closer. While this can create value for businesses, it also means new challenges such as who owns augmented spaces that government and businesses need to work together to regulate.

IMAGINE YOU ARE walking down the street, looking for a restaurant. You slip on your augmented reality (AR) glasses to see reviews in real time as you stroll. At a crosswalk, you glance up at a billboard and notice that it is an animated ad for the laundry detergent that you just put on your shopping list. Flipping up the glasses, you see that the physical billboard is a car ad. The detergent ad was just for you, digitally overlaid in the augmented experience.

On the next block, you see a promising Thai restaurant. It is inexpensive, quiet, and has good reviews. But then, on the wall next to the entrance, you notice some graffiti complaining about food poisoning. “I wonder why they don’t clean that off the wall,” you think, but a quick flip up of the glasses again reveals that, while the wall is real, the graffiti only exists in the digital world. The restaurant cannot erase it—in fact, it may not even be able to see it.

These new situations may seem like science fiction, but they are very real and are happening today. AR use is increasingly moving from fringe innovators and gamers to the mainstream, with more than 1 billion users predicted by 2020.<sup>1</sup> With such rapid growth, the industry is still feeling its way around how current rules apply in these new, virtual scenarios.<sup>2</sup> Physical objects and digital information can increasingly coexist, interact, and complement each other through the layering of content, applications, and technical infrastructure over real-world locations. In other words, AR merges the physical and digital worlds visually, defining a new space called the **spatial Web**, or **Web 3.0**.

For businesses, this opens new avenues for products, services, advertising, and a wide variety

of other experiences from gaming to learning to the creation of user communities that generate their own content. It carries the potential to create value in myriad ways; in fact, we are already seeing multiple real-life examples. Rather than sifting through massive maintenance manuals, workers can use AR to see the relevant specs for the part they are looking at—with some current use cases demonstrating efficiency gains as high as 34 percent.<sup>3</sup> Customs agents can see detailed information about shipping containers to determine if any pose a smuggling risk and should be inspected.<sup>4</sup> First responders arriving at the scene of a car crash can see information about the emergency, and even determine where to cut that particular model of the car to extract the injured.<sup>5</sup>

For AR to expand and continue to achieve its potential, both businesses and governments must address questions about how current regulations apply to the spatial Web—and whether additional, new regulations are needed. Individuals must know the rules of the road for AR; businesses must know how they can monetize it; and governments must know how they can protect citizens and businesses without stifling innovation. To do so will require the cooperation of businesses using AR and of the governments regulating it.

## With new opportunities come real challenges

Despite the multitude of opportunities, some real risks and regulatory challenges exist.

## CHALLENGES FOR PROPERTY AND SPEECH RIGHTS

As the digital and physical worlds converge, tension between property and free speech rights is emerging, already leading to several legal disputes. Depicting a physical space differently,<sup>6</sup> damaging public property,<sup>7</sup> and trespassing and creating nuisances on a private property<sup>8</sup>—these all have led to legal battles between AR developers and relevant parties. For example, thousands of players in Milwaukee flocked outside to play a mobile AR game, and in the process damaged a park.<sup>9</sup> Further, residents of the nearby area complained of littering, traffic congestion, and late-night activity.<sup>10</sup> That prompted Milwaukee County to pass an ordinance requiring AR developers to take permits if the games include park locations. However, Candy Lab, the developer of an AR-based poker game, sued the county arguing that this violated its right to freedom of speech.<sup>11</sup> The federal district court judge ruled in favor of the company, and the county agreed to a permanent injunction against enforcement of the original ordinance.

However, this ruling does not provide a single permanent solution for all such disputes.<sup>12</sup> It was decided on the basis of freedom of speech, and so has limited scope, especially as it relates to advertising or business-to-business applications.<sup>13</sup> While this case and other early precedents around AR may clarify small corners of the larger issue of owning augmented spaces, future AR solutions will undoubtedly raise many new ethical challenges around intellectual property, privacy, and safety, which will demand broader solutions.<sup>14</sup>

## QUESTIONS ABOUT PRIVACY AND COPYRIGHT

As AR environments become more widely adopted, more data will be collected and recorded about individuals and surroundings. This could create many privacy issues around who owns the data, how it should be stored securely, and who has the right to access it. And further, do individuals have the right to decline being recorded while AR mounted glasses are scanning the surroundings?

Copyright issues are also coming into play. Much of the value of AR comes from its ability to contextualize information through the overlay of text, images, and other artifacts—potentially infringing on a copyright owner's exclusive rights to reproduction and alteration. In one example, an app developer created an experience where the image of a famous movie villain was virtually replaced by the face of a public figure.<sup>15</sup> Nothing was altered on the movie poster itself, but it raised many questions, including concerns about how much of the original poster was reproduced within the app, whether there was any commercial intent, and if the application complied with fair use. Further, issues may arise about how this capability could be used with respect to private citizens—an issue that regulators in many countries are still working to get a full handle on, even in the primarily Web-based form it takes today.<sup>16</sup>

## THREAT TO REPUTATION

In a recent consumer survey, 85 percent of respondents said they read online reviews and 57 percent said they prefer to use businesses with four or more stars—making poor reviews on the Web a legitimate worry for businesses today.<sup>17</sup> With AR, this becomes even more challenging. Unlike Web-based comments that must be sought out, with AR, these comments could be revealed automatically, without an intentional search by the user. In other words, a business could find itself “tagged” in a virtual, augmented space, having comments written directly on walls where negative reviews of the business would populate for the patron instantly. The immediacy and physical presence of those comments in AR are likely to give them much greater weight in the eyes of a viewer.<sup>18</sup> The outsized impact of these AR comments could tempt those with more malicious intent as well. Already, online comments can be a haven for those seeking revenge or competitive advantage against a person or business. This could potentially evolve still further, tempting some to post fictitious negative reviews with the aim of forcing a business to pay to have them removed.<sup>19</sup>

## RISKS TO REVENUE STREAMS

The blending of physical and digital space in AR can offer new opportunities for advertising and monetization. For example, a business could reap the benefits of an augmented experience within its location, working closely with a third-party AR designer to add curated content to a physical space. These AR experiences could serve as an enticement to visit—enhancing an existing location or making a new experience for frequent visitors—bringing new customers to a store or encouraging old customers to return more frequently.

But such a symbiotic relationship between physical spaces and AR experience can quickly turn into a parasitic one. For example, iconic landmarks or company logos could be used as augmented markers and modified to meet the needs or desires of someone outside the organization. At best this could lead to a third-party overlaying its advertising over existing physical advertising, actively taking away ROI from an ad placement; at worst it could turn cultural landmarks into crowded digital advertising boards. Imagine the Eiffel Tower or the Louvre covered in hundreds of ads or logos for a race car. In such cases, the owners of the physical location reap little benefit from augmented experiences and may even experience harm.

## Technology safeguards: What is possible today?

As we've seen, AR may have any number of unintended consequences on property values and environmental damage to reputation and revenue damage. So how can a business ensure that its customers only get the desired experience, augmented or otherwise? And how can they protect themselves from unwanted experiences visible in the spatial Web?

## GEOFENCING: THE PROS AND CONS

Perhaps the most obvious solution is simply technological, finding a way to assign “rights” to owners of physical locations so they can control the

augmented experience that is displayed within the property owner's locale. Like the current system of domain names on today's Web, this strategy would allow the business owner to control digital content displayed within the physical walls of their business through geofencing technology.

## CURRENT APPROACHES: GPS OR IP ADDRESSES

While this geofenced approach seems like a reasonable and quick solution to the problem, there are technological and practical challenges. Practically, how do you control physical spaces that change in three dimensions as you move around within a given location? How do you manage multiple owners, such as different owners of floors in an office building? Or even space that changes with time, such as different uses of an event space by time of day? Questions such as these demonstrate the enormous complexity surrounding what at first seems like a simple solution.

Even if you solve those challenges, technical issues exist as well. Unlike the Web, where a single protocol controls most of the experience that is presented to users, controls on a physical space will be more complex. Layered content, native applications, and other yet unforeseen technologies will be difficult to restrict using traditional Web technologies and protocols. For example, applications could use recognizable landmarks as markers, allowing them to launch an experience regardless of where a device is located. Thus, rather than relying on location data, an app could recognize the image of, say, the Eiffel Tower and launch content related to Paris, effectively bypassing any geofencing protocols.

More complex solutions seek to blend geofencing of locations with a “handshake protocol”—the process that sends information back and forth between two devices to establish a connection. In this blended approach, when a device wishes to use an app, it would not only validate the device and any user credentials, but also check the reported location of a device against the rights of the AR application provider. Similar solutions are already being trialed in New Jersey for gambling applications to ensure

that digital gamblers are legally located within the physical boundaries of the state. This strategy uses a variety of checks, including GPS location finding and Wi-Fi network positioning, to ensure users' locations.<sup>20</sup> While a significant advancement, this approach is not fool-proof and could fall victim to spoofing depending on the exact method of verifying location.

## EVOLVING APPROACHES: DIGITAL ADDRESSES FOR PHYSICAL SPACES

Other solutions take a different approach, attempting to apply a rigorous, uncopyable categorization scheme to physical space, much like IP addresses on today's Web. In this scenario, a storefront could be identified by a unique number, potentially allowing it to prevent competitors' experiences from launching there. Apartments above the store would have different identifying numbers, allowing another set of experiences to launch. These categorized 3D spaces could help to regulate who can publish where and the types of AR that can live within each space.

Protocols are already beginning to emerge using a combination of geopositioning and blockchain technologies. Organizations such as Verses have recruited Web protocol veterans and have begun teaming with geo-blockchain organizations to map the globe and put a framework around 3D space and time protocols.<sup>21</sup> This framework will theoretically allow partitioning of real-world environments and allocating permissions to augmented content. However, this too is no silver bullet, with the challenges of uniquely identifying every physical space being quite significant.

It's clear that technology can and should play a role, but these capabilities are still developing and can't solve the problem alone.

## Regulating as AR technology evolves

While the emerging challenges are clear, in the early days of any technology, it's important for

regulators and businesses to work together in order to strike the right balance between encouraging innovation and protecting against negative consequences and externalities. As with the emergence and ongoing innovation of current Web capabilities, augmented technologies will likely be widely unregulated at the outset, as they are today, and then begin to self-regulate over time. By looking at positive and negative lessons learned from transformative technologies such as social media, we can attempt to avoid past pitfalls. Our previous work on *The future of regulation* looked at many similar complex cases, and found a few key themes to help regulators successfully manage emerging AR technologies.

## REVIEW AND UNDERSTAND EXISTING REGULATIONS

Before developing new regulations, both businesses and government should thoroughly review current applicable laws, regulations, and rules. In some cases, existing regulations may already adequately protect against the largest threats from a new technology. In other cases, new technology may change the underlying dynamics such that new rules are necessary—such as when the proliferation of small drones forced amendments to the existing “model aircraft” regulation that had previously governed their use.<sup>22</sup> For a technology such as AR, government will likely need to have a comprehensive review of various existing policies. Some of the policies that will likely need review and potential reconsideration include property laws, privacy regulations, and copyright and intellectual property rights.<sup>23</sup>

## TAKE AN ADAPTIVE APPROACH TO REGULATION

Like other emerging technologies, AR is advancing rapidly in ways we can't always predict. Hence, using an adaptive approach will help regulators respond to changes in the technology. This approach relies on an iterative process of feedback loops, where outcomes can contribute to revisions of that regulation to help make it more effective.



These feedback loops allow regulators to assess policies against set benchmarks, which then can be used as input for revisions. Regulators and businesses can use many tools to get such feedback, including setting up policy labs, creating regulatory sandboxes, crowdsourcing policymaking, and providing representation to industry in the governance process via self-regulatory and private standard-setting bodies. For example, the National Highway Traffic Safety Administration (NHTSA) took an iterative approach to crafting policies for autonomous vehicles, which allowed technology and auto companies to test new regulations and respond, ultimately resulting in significantly revised guidance for 2017.<sup>24</sup>

## ENCOURAGE ADOPTION OF SOFT LAWS

Soft law mechanisms—instruments that are not directly enforceable such as codes of conduct, standards, or guidelines—offer another tool for shifting to more adaptive regulation. Unlike hard law requirements such as treaties and statutes, soft laws can include guidance, a push for industry self-regulation, best-practices codes, codes of conduct, and third-party certification and accreditation. Soft laws allow regulators to quickly respond to technology changes as they do not have to go through regulatory processes, whereas hard laws do. As a great deal within the AR space is still developing, use of soft laws can give regulators the flexibility to respond—no matter what direction the technology takes as it evolves.

Businesses and regulators can work together to apply soft laws by defining the scope of issues to be addressed, and developing industry standards and codes of conduct in response. The internet of today is built upon standards such as IP addresses and domain names that were forged by governments and industry. AR may develop similarly. For example, organizations such as the Institute of Electrical and Electronics Engineers (IEEE) Standards Association and Consumer Technology Association (CTA) are looking to build consensus on AR/VR standardization among device manufacturers, content providers, service providers, technology developers, government agencies, and

other relevant stakeholders for AR/VR technology advancement. One of the standards focuses on quality assurance and testing of environmental safety when the virtual world may interact with the physical environment.<sup>25</sup> Platforms like these have the potential to bring together regulators and AR developers and build consensus on a regulatory framework for AR.

To harmonize standards and collaborate effectively, governments can consider creating a multistakeholder governance model such as the Internet Corporation for Assigned Names and Numbers (ICANN). ICANN is a not-for-profit partnership, made up of people from all over the world who helped to develop policy and created the standard system of Web addresses.<sup>26</sup> An ICANN-like body for AR could be responsible for coordinating and maintaining databases of spatial addresses for AR experiences to help provide a secure AR experience.

## TEST REGULATORY APPROACHES IN SANDBOXES

In situations like AR where financial, reputational, and other factors of many different stakeholders can be intertwined, predicting exactly what the outcome of a regulation will be can be difficult. To mitigate this risk, businesses and governments can consider launching a regulatory sandbox for AR developers to test ideas before they launch it in the market. Sandboxes are controlled environments allowing innovators to test products, services, or new business models without having to follow all the standard regulations.<sup>27</sup> It allows government and business to partner in technology experimentation, while simultaneously testing the effects of proposed regulations. By working collaboratively, government and industry players can develop appropriate rules and regulations for emerging products, services, and business models based on AR.

The sandbox format has been adopted by developers of autonomous vehicles, virtual currencies, and fintech regulators to provide a safe environment to encourage innovation and also

protect consumer safety.<sup>28</sup> For example, the United Kingdom's Financial Conduct Authority launched the first fintech regulatory sandbox in June 2016. This sandbox allows fintech players to test innovative products and services in a safe, live environment, with the appropriate consumer safeguards, and, when appropriate, is exempt from some regulatory environments. After its first year of operation, 90 percent of firms that completed sandbox testing in the first cohort were continuing toward a wider market launch, and more than 40 percent received investment during or following their sandbox tests.<sup>29</sup> Hong Kong Monetary Authority has also launched a similar sandbox, which seeks to engage innovators developing fintech products based on augmented reality.<sup>30</sup>

For government agencies, these regulatory tools can allow them to begin to get a grip on technology even before its widespread adoption. But there are implications for businesses too. The collaborative nature of these tools means that businesses cannot simply sit back and wait for final regulations. They need to be engaged with government agencies throughout the process from start to finish.

## Where do businesses and governments start?

There may be few clear answers for how the ownership of augmented spaces will play out, but that is no reason for companies and governments alike not to begin realizing its benefits.

- **Start now.** As seen with other emerging technologies, we shouldn't underestimate AR's potential to disrupt business and society. It's only through broad participation of business and government from the beginning that we can hope to promote its advantages, consider its deep implications, and prevent negative outcomes as much as possible before it's too late.
- **Convene cross-functional/cross-agency AR working groups.** The impact of AR technology will surely be broad, and staying on top of

it will require broad perspectives. Governments should work with other agencies to make sure that they are covering all the technological, economic, and legal implications of AR. Businesses should identify a small team from different divisions in their organizations that can be tasked with monitoring and evaluating AR technology for its potential opportunities and challenges. This should include members from your IT team, but extend well beyond and into your product, marketing and PR, sales, and customer service teams and other core business functions. As this technology emerges, a large part of your organization will need to respond to it in different ways—from monitoring and responding to negative reviews in the spatial Web to working with government regulators to develop reasonable standards that allow for innovation and business growth.

- **Encourage external partnerships.** Understanding and influencing the impact of this technology is an important economic and policy issue. Both businesses and governments should make sure they are following the evolution of AR, through connections with each other as well as ecosystem partners, such as academic and startup communities. Governments should use these connections to invite industry participation in the regulatory process through policy labs, regulatory sandboxes, and crowdsourced policymaking, and by providing representation via self-regulatory and private standard-setting bodies.

Fear of uncertainty and technical complexity can be major barriers, but abandoning AR to others may only ensure that companies miss out on its benefits and governments are caught off guard by its impact on citizens.<sup>31</sup> Neither business nor government can solve these issues alone. It's only through deep partnership and an understanding of lessons learned from past technology transformations that we can shape the regulatory evolution of augmented reality in a way that promotes continued growth and innovation.

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Digital reality, which consists of augmented reality (AR), virtual reality (VR), mixed reality (MR), 360° videos, and immersive technologies, are rapidly gaining traction in the marketplace. The proliferation of these tools, applications, and solutions will permeate throughout everyday life and work in just a few years and will be as impactful as the PC, Web, and mobile. This has led to digital reality's reputation as the next technology transformation in the way people interact and use data. Companies around the world are applying these technologies to create revenue-generating and cost-saving solutions as well as wholesale changes to the way they work. Please contact the authors or read about our [digital reality services](#) to learn more.

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