



15 Predictions for 2022

A Strategic Market Insight:

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We at James Brehm & Associates are frequently asked to give some predictions on what the future holds. When answering a few years ago, I was quoted in a major publication stating, *"we've entered an era where any device that can benefit from being internet connected can and should be connected to the internet and other devices."*

Why? Data.

And while IoT has been transforming the way businesses operate for a few years now, IoT nirvana has not been achieved. But with the constant evolution in the technological world, there more breakthroughs are sure to come. So, with applications in IoT riding high in 2021, here are some thoughts on things we might witness in 2022 and beyond.

-James Brehm, Chief Technology Evangelist

15 Predictions for 2022

The Metaverse Disappoints

What's old is new again. Facebook's announcement of a name change and new focus on the Metaverse harkens visions of Second Life. In the mid-2000s, Second Life was one of the most talked-about things in tech. But what it turned into was not "the future of the internet" as CNN had predicted, but a weird little virtual world where people could hang around, interact, and create and/or sell virtual goods. Like the early days of the internet, Second Life was fueled by porn, gambling and illicit trade.

The early stage Metaverse "launch or beta" icons remind me of playing pieces on the board game "Sorry" with a dangling head and body, and no legs. If it is to be a representation of humanity, where are the differences – where is the uniqueness and individuality of each person. To me, and others I've spoken with, it is less appealing than PokeMon.

While pundits like CNN, CNBC and Bloomberg keep pointing the Metaverse being the financial future of the nation, I really see little appeal to the Metaverse. Do I have to wear a headset? Remember the promise of the 3D tv a few years ago? Appealing to many until you had to wear 3D glasses.

What I'm really worried about is of debt laden alternate realities fueled by companies raising capital to create virtual worlds like: the petaverse (for pets), the sweataverse (for fitness), or the debtaverse (for financial planning) or the betaverse (for gambling)? And what happens if this is done using alternate funding (crypto). Does it become a bubble we cannot escape?

What is the promise of the Metaverse? To enhance our existing reality and unlock new worlds through virtual reality (VR), augmented reality (AR), or smartphones, tablets and laptops we use today? Or will it create a generation of headset-wearing, device-fixated, uncommunicating drones?

The Changing Role of the CIO

During the pandemic, IT departments have pivoted away from being a function that is simply about boxes, software licenses and network connectivity, to one which is instrumental to driving digital capabilities throughout the entire organization.

For CIOs, 2022 will be the year that the job finally moves away from just looking after infrastructure. Rather, they will need to think strategically about where the organization could go and how to drive it in that direction. CIO's will need to play the role of peacemaker with other departments within an organization and really show what their leadership can do for the enterprise. Likewise, organizations won't be able to pivot without having digital leadership properly challenging the business to re-think. Therefore, to not only survive, but thrive, enterprises will need to make technology leaders the tip of the spear for decision making.

The Rollup Continues.

IPOs, SPACs, and billion-dollar valuations fueled by venture capital have dominated the headlines over the past year. And the money flying around the industry has many founders and C-level execs of small machine to machine and IoT organization dreaming of a big payoff. And despite the number of column inches devoted to the mega billion-dollar M&A transactions, record IPOs and growth of SPACs, small deals fueled by private equity will be the most likely exit for the vast majority of tech startups.

With no shortage of institutional money, private equity firms buy up companies in the same or adjacent markets and complete "roll ups". By using this strategy, multiple small companies are combined into a larger entity that is better positioned to enjoy economies of scale. Private equity firms use roll-up mergers to rationalize competition in crowded and/or fragmented markets and to combine companies with complementary capabilities into a full-service business.

Because most startups are not prepared for an exit via a merger or sale, our team has taken an active role in making introductions, with several success stories. And we believe there is no slowing down, as the IoT market matures.

Security Gets a Serious Focus

Following a year of high-profile breaches of IoT devices, manufacturers and enterprise users alike are expected to finally put security at the top of their agendas.

Security breaches have put individuals at risk and led to botnets of compromised devices that have conducted record-breaking DDoS attacks. Ransomware attacks, one a rare occurrence are becoming almost commonplace.

Our annual survey consistently ranks Security at the top of the list of Challenges in Deploying IoT.

Manufacturers that don't make security a core focus will be penalized as new laws come into force around the world that aim to get a grip on the issue. In the UK, recent legislation includes the Product Security and Telecommunications Infrastructure (PSTI) bill. PSTI bans the use of default passwords, requires manufacturers to let consumers know how long a product will receive updates, provide a specific contact for reporting vulnerabilities, and more.

Smart Water – the New Gold

Water shortages are expected to rise along with population and food demand spikes as a result of migration, urbanization, and climate change. Today, EPA estimates show that most American cities and water districts that pump water from wells, aquifers, reservoirs, and other water sources, only get roughly 60 to 70 percent of the water to the end user. That means that 30 to 40 percent of that water is lost in the processes, generally due to leaks or poor pressure. This leakage is called “non-revenue water”.

And because of population growth and non-revenue water leakage, according to the Nature Conservancy, by 2050, it is projected that more than 1 billion urbanites could be living on less than a bathtub full of water per day (approximately 26 gallons). What's more, water use by industry is set to rise. Putting additional pressure on our water supply, according to IBM, water demand for manufacturing is going up by 400 percent by 2050.

Today, EPA estimates show the average American household uses north of 300 gallons of water per day, and of that, roughly 75 percent (~210-250 gallons) of the water is used indoors. Of the water used indoors, approximately half (~112 gallons) of water used within the home comes from flushing toilets and running the washing machine. Intelligent IoT meters and advanced analytics could curb unnecessary waste.

The Rise of the Hybrid Network

Private networks will continue to increase in number, due to the availability of both licensed and unlicensed spectrum. New technologies, including LPWA and 5G, are maturing, as adoption is increasing. Most of the new networks will be 5G as enterprises falsely believe they have more control and better security.

National networks reduce the friction and time-to revenue for IoT for organizations who want to scale quickly without a massive CapEx investment and get their IoT applications deployed and generating value.

When building private networks, there is a need for roaming on commercial service providers to fill in the gaps of coverage in both rural and urban environments. For example, areas of the map in some mid-west states may be better suited for an MNO vs private licensed spectrum.

Enterprises will also be able to get up and going faster if they take a hybrid approach and can move quickly to leverage existing MNOs networks already in service. They can then later ramp up their own private networks to be more cost-effective over time.

Growth of the Smart Grid – Resilience in Action

Following the major electrical grid failures that occurred in Texas and other southern states during the winter storms of 2021, the door has opened to these systems becoming a priority for major upgrade. The expansion of Smart Grid programs is due to increase with the availability of about \$65 Billion of newly available money tagged for grid infrastructure from the Biden programs.

There are approximately 115 million smart meters deployed in the US. If you look at the country, you see that the largest opportunity is still in the Rural “fly over” states. Increased focus on connectivity in rural areas through the infrastructure spending funds should bring about a dramatic increase in the availability to connect more grid infrastructure especially in more remote areas. Availability of better and more diverse connectivity will allow for the deployment of IoT monitoring systems down to the pole level will give utility companies and COOPs the ability to expand the Smart Grid to give vision to areas that have previously not been monitored electronically.

More funding and focus will of rural and small to medium sized deployments of under 500 and 2,000 customers.

Low Code / No Code, AI/ML

Low/No Code will continue to accelerate quick onboarding and help with getting past having experienced developers, engineering, and security staff to get more IoT pilots/prototypes up and running. These solutions will have limits to scale in cost-effective long-term ramifications for end users.

This is good and bad story. The good: more prototypes and more pilots grow the experience level, can help people ramp up their skills, and make it easy for brining web-centric developer into IoT projects. The bad: over-simplification, can lead to creating a tech driven use-case vs a business centric problem-solving use case, which can lead to losing the ROI value of projects, can enable security risks to solutions, and drive-up costs over time.

An exception to this will be AI/ML solutions. AI and Machine leaning will continue to add significant value with IoT solutions. Low/no-code “ad-ons” will enable solutions already collecting and storing data, valuable tooling and insights to multiple touch points in a solution. Look for quick and easy anomaly detection and predictions based on data patterns with cost management, error rates, traffic pattern analysis, etc.

Digital Transformation and Resilience Dominate

The pandemic drove enterprises to accelerate their digital transformation, but the Great Resignation will accelerate this even more, as companies are finding themselves with large labor gaps. Most enterprises will continue to develop new tracking and monitoring solutions to become more efficient in the face of a talent shortage.

The market is demanding a change to how the world is designed, operated, and experienced. On-time delivery will continue to become more in demand. Improved data analytics, through AI and machine learning, will continue to grow at a fast pace to keep up with demand.

While these technologies are completely new, they will be adopted by industries that traditionally did not rely on them, such as utilities, to ensure grid resiliency as climate changes accelerate.

Business shutdowns from the pandemic have driven businesses to create alternative digital solutions to keep businesses open and to mitigate risk from anticipated events in the future. Air quality sensors, employee proximity detectors, and advanced filtration monitors will become normal infrastructure in buildings.

Biden Money and Building Back Better

Congress passed the Infrastructure Law (Infrastructure Investment and Jobs Act) which went into law on November 15, 2021. This \$1.2 trillion Infrastructure law is designed to rebuild America's roads, bridges, and rails, expand access to clean drinking water, ensure every American has access to high-speed Internet, tackle the climate crisis, advance environmental justice, and invest in low-income communities.

While there is a lot of ambition and optimism in these great projects, it remains to be seen whether these plans will trigger inflationary pressure on the economy. With a lower participation rate of the workforce, automation and remote monitoring tools could be some of the big winners, ironically as the infrastructure law was passed partly with a promise of creating jobs.

Rural broadband upgrades coupled with the infrastructure to get there should be a game changer in agriculture, increasing production and lowering prices for consumers.

Unfortunately, most of these infrastructure projects will not happen overnight. This is because the pace of federal funding largely depends on the programs or departments channeling resources to these projects.

The Fight Around eSIM and Remote SIM Provisioning

Every MVNO is pushing eSIM as the flexible solution for the future, while nearly every MNO has been fighting against it to protect their ground. Some perceive this as a friction point for embracing embedded SIMs.

MNOs are already working with the support of private embedded SIMs with custom MNO profiles with large OEMs on a limited basis but are not calling this eSIM support.

MVNOs push the view that with eSIM, users have the flexibility of configuring the SIM card per region or country, post manufacturing process, thereby simplifying the experience.

However, MNOs counter this with established roaming agreements claiming that there is no need for per-country customized profiles. The single MNO profile can be used globally.

This year, MVNOs, will focus on global enterprises with some success with eSIM. MNOs, will continue to be successful with OEMs and private embedded SIMs.

Platforms Improve: tools and analytics merge into solutions

IoT platforms will move in two very different directions in 2022: deconstruction and expansion.

Large CDPs will focus on lower costs and a la carte offerings for MNOs and end users. For example, packaging Cisco IoT Control Center Essential vs Advantage offers creates lower-cost packages by removing features.

“End to end” platform solutions will expand beyond their layer of the solution stack into new areas, such as device management, protocol translation, cost management, security, anomaly detection, and operations management. For example, Ericsson IoT Accelerator will be adding on a Cloud Connect software feature to start helping move data around for UDP, LWM2M and COAP support for AWS IoT.

Lookout for platform players doing small, targeted acquisitions in order to add new functional areas to their solution story in device management, LWM2M, protocol translation, and cost optimization areas.

Smarter Health Devices and Real-time Patient Monitoring

Real-time patient monitoring, including device development, will accelerate to keep at-risk patients out of doctors' offices, clinics, urgent care, and hospital settings.

While this was well underway before Covid, the pandemic accelerated this transformation. Virtual doctor visits, or telehealth, and patient monitoring not only reduces the spread of infection but also minimizes the load on medical staff.

Remote patient monitoring is increasingly seen as an important solution as the aging population increases and the growing number of chronic diseases around the world continues to outpace the number of medical professionals in the industry.

The ability to connect rural and underserved communities through funds from the infrastructure spending bill will make smart devices and remote monitoring a viable option in areas where it is currently not an option.

More advanced security built into newer hardware and network designs will advance confidence in keeping the data and information HIPAA compliant. However, even trust in less expensive smart devices such as diabetic glucometers has reached the point that patients are requesting the options.

ResMed and Philips are the two brands dominating the sleep therapy market which has swelled to 23.5 million patients in 2020. Glucose monitoring for diabetes control is the second-largest segment following rapid growth in recent years. Remote monitoring solutions are used by 6.2 million patients, with notable continuous glucose monitoring (CGM) system brands including Abbott and Dexcom.

Edge IoT

Edge IoT solutions find a home and add some real value in 2022. Edge computing continues to get more and more powerful, and with the ability of running real compute workloads at the edge, we should see more industrial, manufacturing, retail and other use cases doing more than just collecting and forwarding data back to centralized compute infrastructure.

Expect to see AI/ML models pushed to the edge to pre-process data and only send up alerts/changes in behavior. Enablement of gateways of gateways and local routing of devices, enabling local ecosystems at a campus/warehouse network.

Sustainability Will (No Surprise) Play an Even Larger Role in the Transportation Sector in 2022

While no surprise, let's review a few of the key sustainability trends that the transport sector will witness in 2022.

Climate change will continue to drive the adoption of electric vehicles (EVs). About 10 million passenger cars, or about 4 percent of the total cars on the road worldwide, are currently zero-emission. This is expected to increase to 34 percent by 2030, according to [Bloomberg New Energy Finance](#).

Ground transport, including delivery, municipal and school fleets, will also migrate to the use of more sustainable forms of transport. It isn't just the consumer revolution in EVs: commercial, municipal, and school fleets will also transition to electric. Currently, only 1 percent of light duty trucks (and less than that for medium and heavy-duty trucks combined) are electric, this is expected to grow to 31 percent and 12 percent, respectively by 2030, as per Bloomberg NEF.

Buses are a different story. Close to 40 percent of buses are electric; this number has been driven by zero-emissions initiatives, mandates, and incentives put in place by municipalities, states, and even the federal government.

EV adoption will accelerate as electric and hybrid become integrated into mainstream brands and models. To accelerate adoption, Ford, such as with its F-150 Lightning truck model, and other manufacturers will build electric or hybrid versions of their more popular models. This will require retrofitting or building entirely new manufacturing plants to meet anticipated demand, such as what General Motors is doing in North Carolina; the plants will also manufacture electric batteries. Tesla is planning on shipping 1 million vehicles in 2022.

Delivery service will increase the percentage of electric fleets, such as Amazon with Rivian trucks. The introduction of class 8 heavy trucks by the likes of Volvo, Peterbilt, and Kenworth will start to drive that heavy-duty delivery market. While currently at less than 1 percent, as cited above, the medium and heavy-duty truck EV market will grow, especially with short-range delivery and distribution routes. Range is currently an issue with long-haul trucking, but the expansion of charging networks will mitigate this pain point in EV adoption for heavy-duty trucks.

The impact for IoT in electric vehicles has increased automation and data collection footprints vs traditional vehicles. Wireless networks will need to adapt to changing usage profiles of moving assets rapidly and volumes of data transmitted.

Telematics is nothing new; the collection and reporting of vehicle data has been in place for nearly two decades. However, vehicle data usage will increase, especially as the need to share information related to battery health, charging levels, and other parameters will grow. Not only are drivers interested in this information, but so are fleet owners.

Looking forward to 2022

IoT is a technology that has enormous potential to make a positive economic impact on globally. While improving operational efficiencies of industrial and supply chain organizations everywhere, IoT will impact the overall economy by increasing consumer spending on technology-based products, driving CAPEX investments of business deploying solutions, and transforming the industrial practices of most enterprises and industrial organizations. Given the challenges involved in integrating hardware, communication networks with software and various platforms like cloud, edge analytics, AI and machine learning, IoT development will certainly be affected by the shortage of relevant skill sets. Given the challenges outlined above, collaborative development may be the only possible way forward.

It is our goal at James Brehm & Associates to equip you, the reader, with the knowledge and insight you need to make wise decisions regarding your IoT and IoT- related ventures and projects. This goal drives us to uncover and report the most accurate and telling financials, key performance indicators (KPI's), and news regarding IoT.

Each issue contains actionable intelligence on a host of vertical markets being transformed by IoT. To view simply click the link above. We hope that you enjoy reading it as much as we enjoyed putting it together.

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