# Believe the Hype

## AI and IoT are fundamentally altering business

**2023 – AI+IoT M&A Year in Review**

*The Future*

# Introduction

## AI+IoT is Changing our World 🚀

We are seeing it every day – the world around us is marching toward hyper-connectivity. Artificial Intelligence enabled Internet of Things (AI+IoT) applications are at the forefront of this transformation. It started with the explosion of data generated by IoT applications which demanded more advanced technology to maximize organizational impact. This is where Artificial Intelligence (AI) comes into play. AI+IoT is revolutionizing nearly every industry imaginable. While we are witnessing the profound impact today, AI+IoT has only just begun.

Companies that have implemented fulsome IoT platforms report previously unseen business insights resulting in dramatic increases in operational efficiency and effectiveness, as well as vast improvements in safety, customer engagement and decision making. However, the growing use of IoT applications has resulted in massive amounts of data. Dealing with this data requires enormous amounts of resources and AI is purpose built for digesting these "oceans" of data and creating action. AI+IoT is making faster decisions, enhancing customer experiences, improving healthcare outcomes, enabling more personalized, targeted advertising, optimizing supply chains, prolonging the useful life of expensive production equipment, devising the most efficient delivery routes…the list is endless. As AI+IoT continues to deploy and evolve, the possibilities for what it can achieve are expansive and the impact on our world is practically limitless.

# Key Insights (1/3)

## Drivers of AI+IoT 🛞

The rise of AI can be attributed to several primary factors, such as the growing accessibility of software tools, the simplification of AI solution development and maintenance, and the rapid infusion of AI into existing applications. These driving forces enable businesses to harness the power of AI+IoT and innovate on an unprecedented scale. By making software tools increasingly available for industrial AI+IoT, companies can optimize their operations through the development of intelligent applications and facilitate seamless communication between interconnected devices. Simultaneously, the simplification of AI solutions, aided by user-friendly platforms and programming languages, allows for streamlined programming processes, while AI's rapid infusion into existing applications helps businesses enhance their processes and witness the value of AI+IoT firsthand.

In addition to these factors, the emergence of specialized hardware for industrial AI+IoT has played a significant role in advancing AI-driven systems capabilities.

> **"** AI is today's greatest growth opportunity, representing a **$13 trillion** potential addition to the global economy by 2030 **"**

These advanced hardware components bridge the gap between the virtual and physical realms, ensuring seamless communication and data processing between sensors, actuators, and AI algorithms.

Hardware tailored for AI+IoT applications demonstrates a greater tolerance for challenging conditions found in industrial settings, making it highly reliable and well-suited for wide-scale deployment. The convergence of these driving forces allows businesses to capitalize on AI+IoT's potential for revolutionizing operations, increasing efficiency, and discovering new opportunities for growth and innovation in the ever-evolving world of AI+IoT.

## 3-5%
*Potential increase of sales productivity of current global sales expenditures due to Generative AI*

## $91B
*Expected Global AI+IoT Market by 2028* 🌍

*Source: "McKinsey – Modeling the global economic impact of AI", "Statista –AI Market Size Worldwide", "Business wire –Global AIoT Market Projection"*

# Key Insights (2/3)

## Synergy Opportunities

The integration of AI and IoT creates new opportunities and benefits for both technologies. AI allows IoT devices to make sense of large amounts of data generated by sensors, and IoT provides AI with a wide range of real-world data to learn from and improve its algorithms. As these technologies become more advanced, we can expect even greater integration opportunities, unlocking new possibilities and innovations in data analytics, automation, and process improvement across various industries.

## Integration Benefits

The combination of AI and IoT offers a multitude of advantages, enabling both enterprises and individuals to utilize innovative tools that can amplify productivity, lower expenses, and augment user experiences. By synergizing AI and IoT, an extensive array of practical applications is made available, allowing for advancements in various industries, including healthcare, manufacturing, and transportation.

## Synergistic Advantages

| More Accurate Data Analysis | With the help of AI algorithms, IoT devices can process and analyze data faster and more accurately |

| Improved Automation & Efficiency | AI can automate many tasks that were previously performed manually, resulting in greater efficiency and cost savings |

| Enhanced Decision-Making | AI algorithms can help organizations make better and faster decisions by analyzing large amounts of data in real-time |

| Personalization & Customization | The integration of AI and IoT can enable companies to provide personalized and customized experiences for their customers |

| Predictive Maintenance | AI-powered analytics can detect potential equipment failures before they happen, allowing for preventative maintenance and avoiding costly unplanned downtime |

# Key Insights (3/3)

## Growth Potential of AI+IoT 🚀

AI+IoT Transforming Industries, Boosting GDP, and Reshaping User Habits

### AI Contribution to GDP

# +21%

Expected AI contribution net increase to the United States GDP by 2030

### Average Cost of Sensors

**2004: $1.30/unit**
**2020: $0.38/unit**

There is an increase in supply as these low power sensory tech become cheaper to manufacture

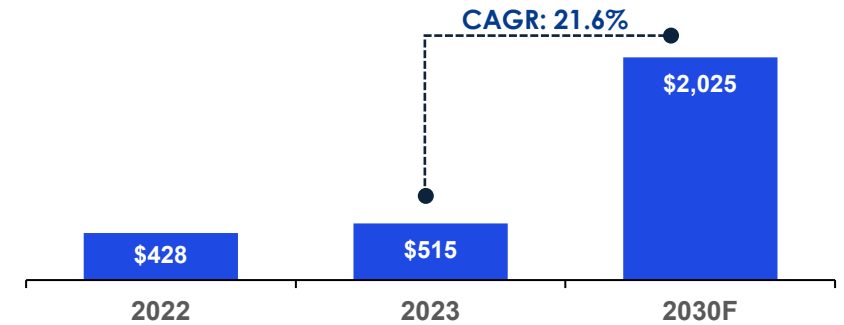### Global AI Market Revenue

63.2%  36.8%

% of Global Revenue from North America

### U.S. Mobile Users

# 1/2

of U.S. mobile users use voice search every day

## Market Statistics

### Global AI Market Size ($B)
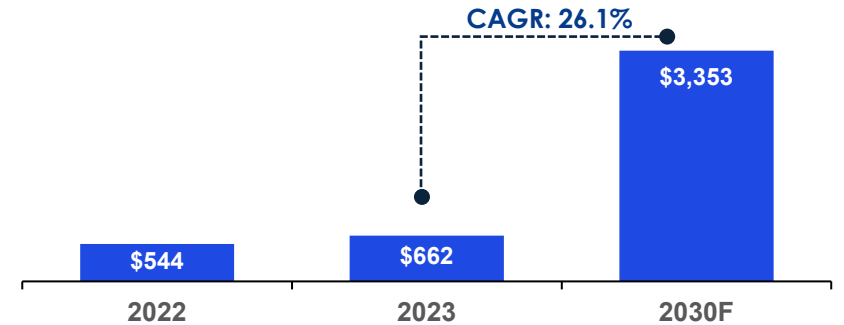
CAGR: 21.6%

| 2022 | 2023 | 2030F |
|------|------|-------|
| $428 | $515 | $2,025 |

### Global IoT Market Size ($B)

CAGR: 26.1%

| 2022 | 2023 | 2030F |
|------|------|-------|
| $544 | $662 | $3,353 |

# IoT Data Analytics (1/2)

## Enabling Smarter Business Operations ⚠️

The integration of IoT has brought about a disruptive revolution in the field of data analytics, providing businesses with the ability to collect, analyze, and process real-time data from a range of sources. IoT's integration with AI has been instrumental in this disruption by offering predictive and prescriptive analytics capabilities that transform data into valuable insights. IoT has quickly become a driving force for businesses to generate insights that enable them to make informed decisions and improve operational efficiency.

The numerous applications of IoT for data analytics have had a profound impact on the way businesses operate, from detecting potential equipment issues before they become a problem to environmental monitoring for optimizing energy consumption and improving sustainability. IoT's integration with AI has opened new possibilities that were previously out of reach for businesses. From automating operations to creating intelligent products and services, these technologies continue to disrupt the world as we know it. By leveraging the capabilities of IoT and AI, businesses are unlocking new opportunities to streamline their operations, enhance customer experiences, and drive growth in an increasingly data-driven world.

## AI+IoT Data Analytics

**Customer Insights**

**Real-Time Data Collection**

**Predictive Maintenance**

**Environmental Monitoring**

**Supply Chain Optimization**

# IoT Data Analytics (2/2)

### Leveraging AI

AI+IoT data analytics has become a crucial element in enabling businesses to gain valuable insights from the vast amount of data generated by IoT devices. The following are ways AI is used for IoT data analytics:
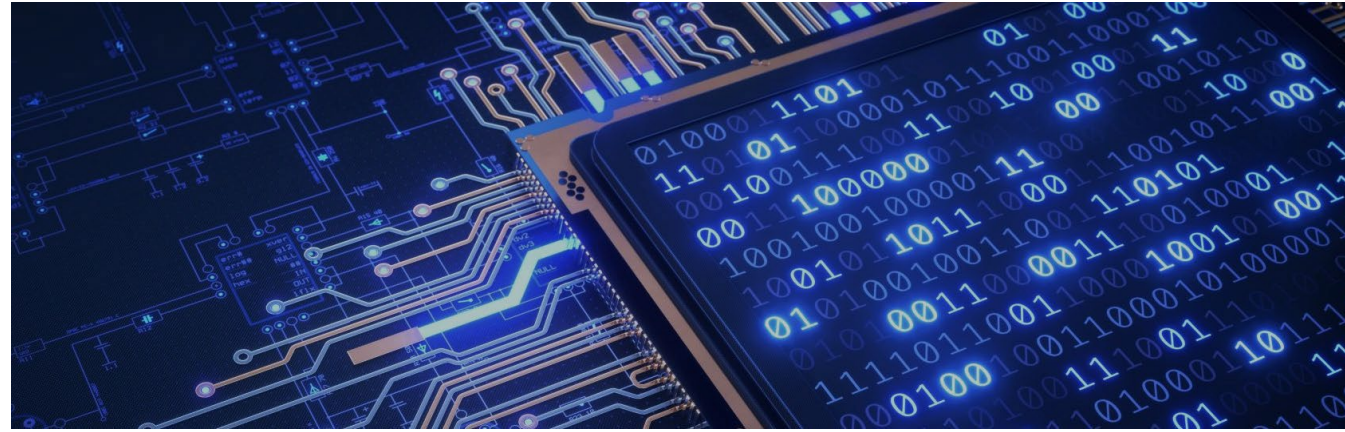
## Machine Learning

- AI algorithms can be used to analyze IoT data and detect patterns and anomalies that can be used to gain valuable insights

- Can help businesses anticipate trends, identify opportunities, and make informed decisions

## Predictive Maintenance

- IoT devices can monitor environmental conditions such as temperature, humidity, and air quality

- Data can be used to optimize energy consumption, reduce waste, and improve sustainability

## Deep Learning

- Deep learning algorithms can be used to analyze complex datasets generated by IoT devices

- Can help businesses gain insights into complex and constantly evolving systems, such as supply chains, transportation networks, and energy grids

## Natural Language Processing (NLP)

- Can be used to analyze and extract meaningful information from unstructured data generated by IoT devices in the form of text, images, and videos

- Can help businesses gain insights into customer sentiment, feedback, and behavior

## Cognitive Computing

- Combines machine learning, NLP, and deep learning to enable businesses to gain insights from unstructured data generated by IoT devices

- Can help businesses analyze data from multiple sources, including social media, web analytics, and IoT devices

# Smart Decision Making

## Transforming Business Insights with AI+IoT

Smart decision making with AI+IoT applications has revolutionized the way businesses operate in the digital age. The integration of AI and IoT has enabled companies to extract valuable insights from real-time data, allowing for improved decision-making processes, giving companies a competitive edge. Predictive analytics is one way that AI algorithms can help analyze data gathered from IoT devices to predict future trends and opportunities, giving businesses the opportunity to make proactive decisions. Real-time decision making is another advantage of the combination of AI and IoT, as IoT devices provide businesses with real-time data that can be analyzed with the help of AI algorithms, resulting in better and quicker decisions. Moreover, business process automation can help streamline operations by automatically executing repetitive tasks, reducing costs, and enhancing productivity levels. Personalized customer experiences can also be achieved by analyzing data from IoT devices to get insight into customer behavior, which can be customized using AI algorithms. Finally, AI and IoT can be used to improve safety and security by monitoring potential risks, which can be analyzed with the help of AI and addressed proactively.
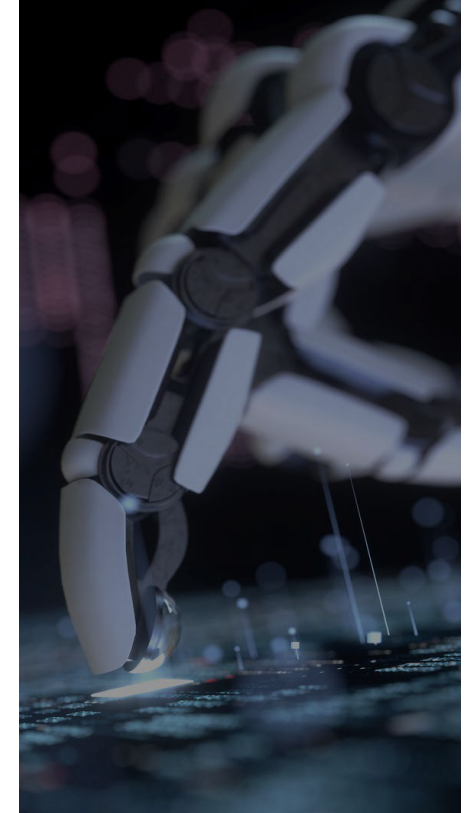
**AI Adoption has more than doubled over the past five years, and investment in AI is rapidly increasing**

# 2x

**84%** of executives believe that AI will help their organizations achieve greater speed and accuracy in operations

*Source: "Accenture –What is Artificial Intelligence?", "McKinsey –State of AI in 2022""*

# AI-Enhanced Control Systems

## Streamlining IoT Control Systems with AI

The integration of AI into IoT control systems offers a range of benefits for businesses. With the ability to analyze data from various sources across devices, intelligent systems can take actions and make decisions that are efficient and secure. Businesses can benefit from reduced downtime and maintenance costs, as well as improved energy efficiency. AI+IoT control systems can also be used to automate processes, improving productivity, and reducing errors.

As AI and IoT continue to grow, the market is expected to experience significant growth in the coming years, presenting vast opportunities for businesses. According to IDC's predictions, we can expect to see more companies leverage AI+IoT control systems to automate tedious, repetitive tasks and manage complex data sets. Additionally, AI+IoT devices have a high potential for cost savings, improving productivity, and energy efficiency, all of which will drive more businesses to adopt this technology.

*Source: "McKinsey Global Institute – IoT Applications Impact by 2025", "IoT Analytics – State of IoT 2023", "IDC – Worldwide Spending on the IoT is Forecast to Surpass $1 Trillion in 2026"*

The number of global IoT connections grew by 18% in 2022 to 14.3B active IoT endpoints. It is expected to grow another 16%, to 16.7B active endpoints by end of 2023

Industries that embrace AI+IoT control systems could expect up to 50% reduction in maintenance and repair downtime by 2025

Worldwide spending on IoT is forecast to be $805.7B in 2023, an increase of 10.6% over 2022

# Generative AI (1/3)

## Catalyst for the Future ▶▶

Generative AI describes a class of machine learning algorithms capable of generating new data samples based on existing ones. These algorithms can be used to create new content, including audio, code, images, text, simulations, and videos. Recent breakthroughs in generative AI has opened the world of content creation to another level.

OpenAI's ChatGPT is the face of generative AI to the public as of recent times. Just two months after its launch in late November, '22, it was estimated to have reached 100M active users in January '23. There is a reason behind its title of being the fastest-growing consumer application in history. The famous chatbot can create essays, articles, songs, poems, and much more based on just a prompt input.

The advancement and quick attraction of ChatGPT has changed the gears of all AI industry competitors. The race has begun, and everyone is rushing to bring revolutionary changes. These powerful and complex generative AI models can be leveraged to generate valuable insight and make data-driven decisions within the IoT ecosystem.

Emerging as the fastest-growing application in history, ChatGPT has taken the tech world by storm, captivating the attention of major industry players. Its roaring success has prompted behemoths such as Google and Microsoft to launch their own renditions. Today, ChatGPT's versatility enables it to tackle a diverse array of tasks, promising to reshape the landscape of technology and propel the evolution of devices on a global scale.

## AI & Edge Computing

It is very common to see these models in edge computing, which involves processing data at the source, rather than to a central server or cloud. By integrating AI algorithms directly into IoT devices, edge computing can reduce latency, save bandwidth, and enhance security. Generative AI can be applied at the edge to make real-time decisions and predictions, improving IoT efficiency and responsiveness.

***Case Example:*** *Deploying lightweight GANs (Generative Adversarial Networks) on IoT devices to perform tasks like image synthesis and anomaly detection.*

*Source: "Zigron - Generative AI: A Catalyst for IoT Growth and Efficiency in the Coming Decade", "Business Insider - Guide to the viral Chatbot"*

# Generative AI (2/3)

## In-Depth GAN Model

GANs are a powerful class of machine learning models capable of generating realistic data samples. In the context of IoT devices, GANs are being utilized for data augmentation, anomaly detection, and enhancing sensor data, providing valuable insights and improved performance in various applications.

**1 Input**
Initial features like machine type, operating conditions, production workload, and maintenance history

**2 Generator**
Takes initial features as input and produces fake equipment operation data mimicking the real usage patterns

**3 Real/Fake Data**
Data collected from actual equipment using IoT sensors like vibration and temperature, or generated data not from real environment

**4 Discriminator**
Component that receives both fake and real data to classify them as "real" or "fake"

**5 Condition**
Discriminator either correctly identifies or fails to correctly identify if data is "real" or "fake"

*This example demonstrates how the GAN model works in the context of a manufacturing IoT device*

Through the iterative training process, the generator will become more proficient at producing realistic equipment operation data, while the discriminator will improve its ability to differentiate between real and fake data. GAN-generated data can be used to create realistic, yet hypothetical scenarios for testing a system's performance or evaluating its response under various conditions. This approach can help identify potential issues or inefficiencies without relying solely on real-world testing.

*Source: "Google Developers – GAN Anatomy"*

# Generative AI (3/3)

## Application of AI Models in IoT

| Popular AI Models Today | Implementation of AI Models in IoT Devices |
|---|---|

**GAN:** A Generative Adversarial Network (GAN) comprises two neural networks, a generator and a discriminator, collaborating to create realistic synthesized data by emulating the original dataset's distribution

**CNN:** Convolutional Neural Networks (CNN) are deep learning models designed for grid-like data processing, excelling at tasks like object recognition and image classification by utilizing convolutional layers to learn spatial hierarchies

**Autoencoder:** A type of unsupervised artificial neural network that learn to efficiently encode and compress input data, then reconstruct it with minimal loss, making them useful for tasks such as data compression, denoising, and feature extraction

**GAN:** A smart photo frame could use a GAN to generate personalized artwork or photo filters based on the user's preferences, enhancing the displayed images and creating a unique visual experience

**CNN:** A smart thermostat utilizes CNNs to analyze patterns in residents' activity, adjusting the temperature accordingly and optimizing energy consumption in the household

**Autoencoder:** In a smart speaker, autoencoders can be used to denoise the audio input, improving speech recognition by filtering out background noise and ensuring clear communication with the device
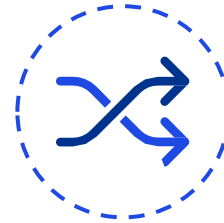
# AI+IoT Landscape

The companies listed here represent just a sampling of the players delivering AI+IoT solutions in these sectors. Contact us to delve deeper into the established companies and emerging innovators in these verticals.

# Focus Spotlights (1/2)

## OpenAI

A leading research institute focused on advancing the field of AI. Their development of powerful machine learning algorithms has already revolutionized interactions with tech. The AI models it has produced such as ChatGPT has been utilized in many ways such as controlling IoT devices.

**Example:** ChatGPT can assist in identifying potential vulnerabilities in IoT devices or systems. It can analyze device configurations, firmware versions, and known security issues to provide recommendations based on anonymized metadata or pattern analysis.

## Google

Established as a leader in both areas of AI and IoT, Google's mission is to create intelligent systems that can better understand and serve the needs of users from various devices. Google's AI and IoT strategies have extended to many industries such as smart homes, healthcare, and transportation.

**Example:** Google Nest creates an IoT ecosystem within the home where users can control their connected devices with voice commands. AI recognition identifies patterns to help optimize the user's experience.

## TESLA

The face in the development of autonomous vehicle technology utilizing AI. Tesla is also exploring how their AI can be incorporated into other industries like residential and commercial energy storage systems.

**Example:** Tesla's autopilot system uses AI to collect real-time data from various IoT devices and then uses machine learning algorithms to interpret the data and make decisions on how the car should behave.

# Focus Spotlights (2/2)


KONUX

A leading German AI scale-up, transforming railway operations for a sustainable future. It combines machine learning and IoT to make railway the mobility choice of tomorrow by increasing capacity, reliability, and cost-efficiency. It's building out a SaaS business powered by proprietary sensing hardware and AI that drives a predictive maintenance software.

**Example:** Konux uses deep tech methods and stress-tested connected hardware to gain visibility into the loads and forces railway lines are accommodating. It's measuring vibration through the tracks to pick up anomalies that may signal incoming failures.


CognitiveScale™

An enterprise AI software provider that focuses on combining AI and IoT for the development of intelligent, personalized solutions. CognitiveScale leverages machine learning algorithms and natural language processing to collaborate effectively with customers across diverse industries including retail, healthcare, and financial services to create more efficient decision-making processes.

**Example:** Its Cognitive Digital Twins tech seeks to provide enterprise-scale solutions that can drive greater customer engagement, create innovative business models, and improve operational efficiencies.


ELEMENTAL MACHINES

A Massachusetts-based software company focused on revolutionizing laboratory research through IoT and AI tech. Elemental Machines offers a suite of tools to help scientists and researchers to optimize their workflow, reduce errors, and improve experimental consistency, saving valuable time and money while allowing more time and resources to be focused on more complex and intricate projects

**Example:** Its IoT-enabled sensors capture real-time data on environmental conditions in the lab, including temperature, humidity, and air quality. It uses machine learning algorithms to analyze these data to create a more efficient, reproducible scientific process.

# Recent AI+IoT M&A Activity

| ProcessUnity | Blattner Technologies | GatherAI | XFactor.io | Nvidia |
|---|---|---|---|---|
| Acquired | Acquired | Acquired | Acquired | Acquired |
| **CyberGRX** | **DevDigital** | **Ware** | **DecisionLink** | **OmniML** |
| Provides third-party cyber risk management that replaces outdated processes with more efficient processes | Provides digital transformation consultancy to predictive transformation services | Provides autonomous drone inventory monitoring | Provides SaaS-based customer value management solutions | Provides software that miniaturizes machine-learning models to work on IoT devices |
| • July-23<br>• Deal metrics not disclosed | • July-23<br>• Deal metrics not disclosed | • July-23<br>• Deal metrics not disclosed | • April-23<br>• Deal metrics not disclosed | • Feb-23<br>• Deal metrics not disclosed |
| *In the short term, our customers gain program workflow, validated vendor assessment data and artificial intelligence in a single solution – safeguarding their critical assets while significantly reducing program costs* | *This collaboration will empower us to create even more innovative and impactful solutions, combining our software development proficiency with Blattner Technologies' advanced data analytics and AI capabilities* | *After assessing the proven technology and witnessing the tangible benefits experienced by Gather AI customers, we enthusiastically agreed to implement their solution in three of our warehouses. We are excited to initiate the deployment and leverage the advantages it offers* | *XFactor.io has the unique opportunity to become the most comprehensive go-to-market platform on the market, tying product value to market opportunity in a way that hasn't been done before* | *Our ML model compression addresses the gap between AI applications and Edge devices, increasing the devices' potential and allowing for hardware-aware AI that is faster, more accurate, cost effective, and easy to implement for anyone, on diverse hardware platforms* |
| **Steven Salsberg**<br>CEO<br>ProcessUnity | **Peter Marcum**<br>CEO<br>DevDigital | **Jeff Keene**<br>COO<br>DPI Specialty Foods *(former Ware Customer)* | **Sameer Gandhi**<br>Board Member<br>DecisionLink | **Di Wu**<br>Co-founder & CEO<br>OmniML |

# IoT M&A Performance Snapshot

Total global IoT deal volume in 2023
**216**

**$36.9B**
Aggregate deal value in 2023

**23%**
Y-o-Y growth in M&A activity volume in 2023

**36%**
Y-o-Y growth in M&A activity value in 2023

## IoT M&A Activity



| Year | Deal Value | Deal Volume |
|------|-----------|-------------|
| 2020 | $34.1 | 137 |
| 2021 | $50.2 | 169 |
| 2022 | $27.2 | 175 |
| 2023 | $36.9 | 216 |

Deal Value • Deal Volume
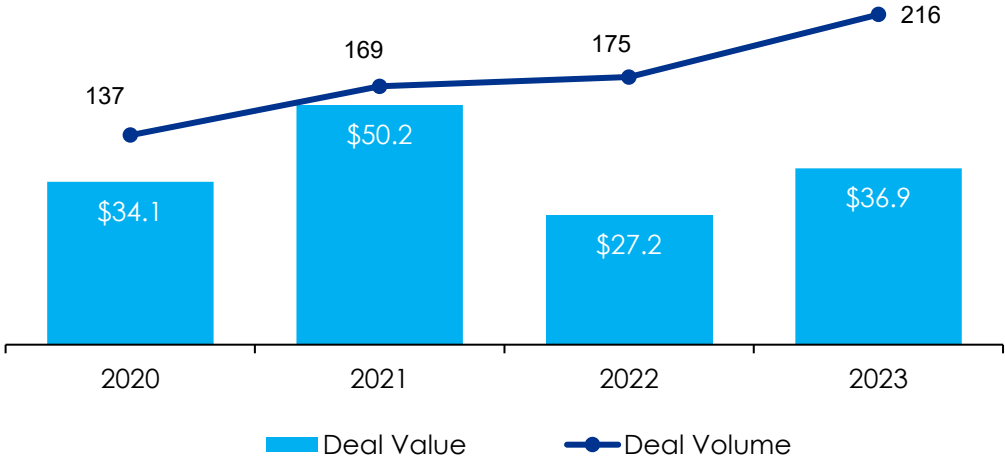
## Strategic vs. Financial Investors
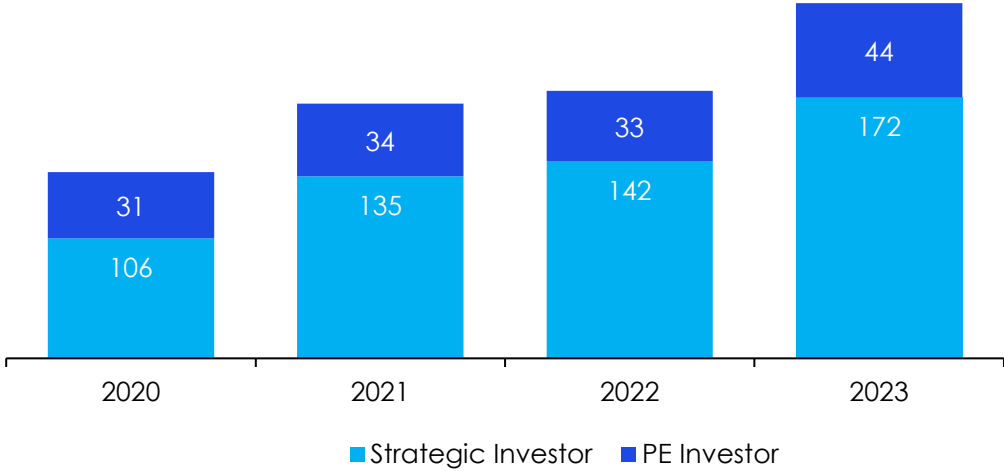


| Year | Strategic Investor | PE Investor |
|------|-------------------|-------------|
| 2020 | 106 | 31 |
| 2021 | 135 | 34 |
| 2022 | 142 | 33 |
| 2023 | 172 | 44 |

■ Strategic Investor  ■ PE Investor

*Source: 451 Reseach*

# 2023 IoT Transactions (1/6)

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Dec-23 | Emuron Technologies | Livguard Energy Technologies | - | - | - |
| Dec-23 | IPVideo Corporation | Motorola Solutions | - | - | - |
| Dec-23 | Fenix Group | Nokia | - | - | - |
| Dec-23 | Hollysys Automation | Ascendent Capital | $1,648.2 | 1.3x | 8.6x |
| Dec-23 | Green Brain | CropX | - | - | - |
| Dec-23 | Thornhill Research | U.S. Marine Corps | - | - | - |
| Dec-23 | Veoneer | American Industrial Partners | - | - | - |
| Dec-23 | Barth Industrial | Foodmate | - | - | - |
| Dec-23 | Cubic Telecom | SoftBank | $514.6 | - | - |
| Dec-23 | ROAM BV | Echo Analytics | - | - | - |
| Dec-23 | Beijing OrionStar Technology | Cheetah Mobile | $37.6 | - | - |
| Nov-23 | RLE Technologies | May River Capital | - | - | - |
| Nov-23 | Consilium Safety Group | Antin Infrastructure Partners | - | - | - |
| Nov-23 | Watgrid SA | Enartis Sepsa | - | - | - |
| Nov-23 | Reios SRL | Rajant Corporation | - | - | - |
| Nov-23 | DigiComm | AddSecure | - | - | - |
| Nov-23 | SixGen | Washington Harbour Partners | - | - | - |
| Nov-23 | Sonitrol Security Solutions | Pye-Barker Fire & Safety | - | - | - |

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Nov-23 | LLA Instruments | Tibidabo Scientific Industries | - | - | - |
| Nov-23 | Anagog | Intent HQ | - | - | - |
| Nov-23 | Utility Associates | Greater Sum Ventures | - | - | - |
| Nov-23 | OMWAVE | Groupe TERA | - | - | - |
| Nov-23 | Eskilstuna Dynamics | Pamica Group | - | - | - |
| Nov-23 | Bram Engineers | Epec | - | - | - |
| Nov-23 | SR Technologies | Eqlipse Technologies | - | - | - |
| Oct-23 | Alpha Ori Technologies | ZeroNorth | - | - | - |
| Oct-23 | ClearPathGPS | GPS Insight | - | - | - |
| Oct-23 | TnM AI | Scenera | - | - | - |
| Oct-23 | MobileQubes | Fuze Technology | - | - | - |
| Oct-23 | APCOA PARKING | Strategic Value Partners | - | - | - |
| Oct-23 | Verve Industrial Protection | Rockwell Automation | $185.0 | 5.8x | - |
| Oct-23 | KINEXON | Continental AG | - | - | - |
| Oct-23 | Kin and Carta | Apax Partners | $247.5 | - | - |
| Oct-23 | HomBase | Quext | - | - | - |
| Oct-23 | Sirius Automation Group | Addtronics | - | - | - |
| Oct-23 | EVPassport | Northleaf Capital Partners | $200.0 | - | - |

*Source: 451 Reseach*

# 2023 IoT Transactions (2/6)

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Oct-23 | Bsquare Corporation | Kontron America | $37.8 | 0.2x | - |
| Oct-23 | Powerfleet | MiX Telematics | $18.7 | 0.2x | 22.2x |
| Oct-23 | OpSens | Haemonetics Corporation | $244.9 | 7.5x | - |
| Oct-23 | Athelas | Commure | - | - | - |
| Oct-23 | Eco Geek Co | Landis+Gyr | - | - | - |
| Oct-23 | Blue Ring Imaging | VideoRay | - | - | - |
| Oct-23 | Oncomfort SA | HypnoVR SAS | - | - | - |
| Oct-23 | 3D at Depth | Nauticus Robotics | $38.1 | - | - |
| Oct-23 | Xena Networks | Teledyne Technologies | - | - | - |
| Sep-23 | Insight Risk Technologies | Velocity HoldCo | - | - | - |
| Sep-23 | Trimble (Ag assets and technologies) | AGCO Corporation | $2,000.0 | - | - |
| Sep-23 | Splunk | Cisco Systems | $26,457.8 | 7.5x | NM |
| Sep-23 | Avirtech Solutions | Terra Drone Corporation | - | - | - |
| Sep-23 | Matrix Industrial Control Systems | Valstone Corporation | - | - | - |
| Sep-23 | IIOOTE AB | TH1NG AB | $0.2 | - | - |
| Sep-23 | Ignis Technologies | Bridger Aerospace | $3.0 | - | - |
| Sep-23 | NeWave Sensor Solutions | Smart Label Solutions | - | - | - |
| Sep-23 | Bigfoot Biomedical | Abbott Laboratories | - | - | - |

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Sep-23 | Level 2 Security | MetAlert | $0.5 | - | - |
| Sep-23 | Clearpath Robotics | Rockwell Automation | - | - | - |
| Sep-23 | Clifford Electronics | AddSecure | - | - | - |
| Sep-23 | SETEX Schermuly textile computer | Elvaston Capital | - | - | - |
| Aug-23 | SatixFy Space Systems | MDA | $40.0 | - | - |
| Aug-23 | Altis Movement Technologies | Academy Medtech Ventures | - | - | - |
| Aug-23 | SymphonyAI Industrial | Fluke Corporation | - | - | - |
| Aug-23 | Pocket Virtuality | CZECHOSLOVAK GROUP | - | - | - |
| Aug-23 | DiDi Global | XPENG | $482.8 | - | - |
| Aug-23 | Soar Technology | Forward Slope | - | - | - |
| Aug-23 | Submerged | AKVA group | - | - | - |
| Aug-23 | Charge Amps | NaaS Technology | $66.4 | - | - |
| Aug-23 | Tomahawk Robotics, | AeroVironment | $120.0 | - | - |
| Aug-23 | Klein Marine Systems | General Oceans | $11.5 | - | - |
| Aug-23 | Sentient Buildings | Smartcon Solutions | - | - | - |
| Aug-23 | PhenomeX | Bruker Corporation | $99.3 | 1.4x | - |
| Aug-23 | Cinco Telecom | emnify | - | - | - |
| Aug-23 | Envonics | RussKap Water | - | - | - |

*Source: 451 Reseach*

# 2023 IoT Transactions (3/6)

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Aug-23 | Atlazo | Nordic Semiconductor | - | - | - |
| Aug-23 | Blyncsy | Bentley iTwin Ventures | - | - | - |
| Aug-23 | Machinestalk Company | Internet of Things Technologies | - | - | - |
| Aug-23 | ESSERT | SHS Gesellschaft fr Beteiligungsmanagement | - | - | - |
| Aug-23 | Intrensic | Wrap Technologies, | $2.7 | - | - |
| Jul-23 | FieldWise | Lindsay Corporation | - | - | - |
| Jul-23 | EI Electronics | Hubbell | $60.0 | - | - |
| Jul-23 | Visimid Technologies | LightPath Technologies | - | - | - |
| Jul-23 | WaterSignal | Metron-Farnier | - | - | - |
| Jul-23 | Inpixon | XTI Aircraft Company | - | - | - |
| Jul-23 | Kiona Holding | Carel Industries | $192.0 | - | - |
| Jul-23 | Questa | NiX JAPAN | - | - | - |
| Jul-23 | Ecliptic Enterprises | Arquimea Group | - | - | - |
| Jul-23 | FM:Systems Group | Johnson Controls International | $455.0 | - | - |
| Jul-23 | Smart Apply | Deere & Company | - | - | - |
| Jul-23 | Radiocrafts | LumenRadio | $8.2 | - | - |
| Jul-23 | InReality | Spectrio | - | - | - |
| Jul-23 | Rhythm | Beacon Biosignals | - | - | - |

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Jul-23 | SCADAfence | Honeywell | - | - | - |
| Jul-23 | Veritone (energy business) | GridBeyond | - | - | - |
| Jul-23 | Console Connect | Infratil | - | - | - |
| Jul-23 | SCIO Automation | AEA Investors | - | - | - |
| Jul-23 | Comlab AG | Kontron S&T | - | - | - |
| Jul-23 | Extend3D | Atlas Copco | - | - | - |
| Jul-23 | Metasphere | Grundfos Holding | - | - | - |
| Jul-23 | telematics4u services | eTrans Solutions | $1.0 | - | - |
| Jul-23 | Telit IoT Platforms | Kontron Europe | $26.7 | - | - |
| Jun-23 | Cloud Computing | EnergyInCloud | - | - | - |
| Jun-23 | Apex VR Holdings | MetaWorks Platforms | - | - | - |
| Jun-23 | Servicomput | Total Specific Solutions | - | - | - |
| Jun-23 | Infobric AB | Stirling Square Capital | - | - | - |
| Jun-23 | MicroStrain | Spectris | $37.6 | - | - |
| Jun-23 | OnTracMD | TNacity Blue Ocean | - | - | - |
| Jun-23 | Spider Tracks | Avinet | - | - | - |
| Jun-23 | HighIOT | ODI | - | - | - |
| Jun-23 | Bacom Internetwork | Gorilla Technology Group | - | - | - |

*Source: 451 Reseach*

# 2023 IoT Transactions (4/6)

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Jun-23 | Biomaneo | Shimadzu Corporation | - | - | - |
| Jun-23 | IrriWatch | Hydrosat | - | - | - |
| Jun-23 | Sensire | Main Capital Partners | - | - | - |
| Jun-23 | CleanSlate | Seal Shield | - | - | - |
| Jun-23 | Invrsion | Vection Technologies | - | - | - |
| Jun-23 | Mira Labs | Apple | - | - | - |
| Jun-23 | SlantRange | Hiphen | - | - | - |
| Jun-23 | Optrail | Siemens Mobility | - | - | - |
| May-23 | Portals Technologies | IN Groupe | - | - | - |
| May-23 | Tekelek Europe | Rochester Sensors | - | - | - |
| May-23 | Elatec | SGT Capital | $428.9 | - | - |
| May-23 | Kippy | Datamars SA | - | - | - |
| May-23 | Embark Technology | Applied Intuition | $69.3 | - | - |
| May-23 | CSM SA | Jooxter | - | - | - |
| May-23 | Markor Technology | Whitezip | - | - | - |
| May-23 | ORB Innovations | Glidewell | - | - | - |
| May-23 | Mazaari Autonomous Robotics System [dba MARS Robotics] | EDGE Group | - | - | - |
| May-23 | POMCube | Savant Systems | - | - | - |

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| May-23 | ProNES Automation | Averna Technologies | - | - | - |
| May-23 | i4SEE TECH | SkySpecs | - | - | - |
| May-23 | Performance Rotors | XTEND Reality Expansion | - | - | - |
| May-23 | Mecomo AG | Giesecke+Devrient | - | - | - |
| May-23 | Blue Cube Systems | Draslovka Holding | - | - | - |
| May-23 | Venueflex | Fulcrum Acoustic | - | - | - |
| May-23 | Assured Telematics | Pegasus Transtech | - | - | - |
| May-23 | Imagimob | Infineon Technologies | - | - | - |
| May-23 | Websym Solutions | Deloitte India | - | - | - |
| May-23 | MEKA | Revolution Brands | - | - | - |
| May-23 | Digital Communications Technologies | Qulitas Compaa de Seguros | - | - | - |
| May-23 | G2K Group | ServiceNow | - | - | - |
| May-23 | Rehaboo Oy | EvokAI Creative Labs | $4.1 | - | - |
| May-23 | TEOCO Corporation (service assurance business) | Amdocs Limited | $90.0 | - | - |
| May-23 | Blue Sparq | The Middleby Corporation | - | - | - |
| May-23 | EBS | Alarm.com | $9.8 | - | - |
| May-23 | Euresys Group | TKH Group | - | - | - |
| May-23 | Digirad Health | TTG Imaging Solutions | $40.0 | - | - |

*Source: 451 Reseach*

# 2023 IoT Transactions (5/6)

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| May-23 | 6 River Systems | Ocado Group | - | - | - |
| May-23 | Open-Co | Impresoft | - | - | - |
| May-23 | GeoMobile | T-Systems | - | - | - |
| May-23 | Marathon Products | ShockWatch | - | - | - |
| Apr-23 | CyOne Security | RUAG MRP | - | - | - |
| Apr-23 | Procensis | Barcoding | - | - | - |
| Apr-23 | Voyantic Ltd | Impinj | - | - | - |
| Apr-23 | Uptake Technologies | IBM | - | - | - |
| Apr-23 | Head Instruments | EvokAI Creative Labs | $3.3 | - | - |
| Apr-23 | Software Aktiengesellschaft | Silver Lake Technology Management | $2,128.7 | 2.5x | 17.2x |
| Apr-23 | TrafficLand | SMARTCTY | - | - | - |
| Apr-23 | TruckMap | Tenstreet | - | - | - |
| Apr-23 | Global Traffic Technologies | Miovision Technologies | $107.0 | 2.7x | 10.0x |
| Apr-23 | Deuser Tech Group | Indra Business Consulting | - | - | - |
| Apr-23 | OTUS Imaging | Kneron | - | - | - |
| Apr-23 | Intel Corporation (DSG business) | Mitac International Corporation | - | - | - |
| Apr-23 | Mobil Information Systems | Total Specific Solutions | - | - | - |
| Apr-23 | Pure IP California | BCM One | - | - | - |

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Apr-23 | Alert Systems (intellectual property) | CCL Industries | $3.0 | - | - |
| Apr-23 | Honeywell (Aircraft emergency locator transmitter business) | Dukane Seacom | - | - | - |
| Apr-23 | Solution Net Systems | Alstef Group | - | - | - |
| Apr-23 | Smart HMI | Beijer Electronics Group | $5.6 | 5.3x | - |
| Apr-23 | eAgile | CCL Industries | $53.0 | - | - |
| Apr-23 | Eagle Technologies | Convergix Automation Systems | - | - | - |
| Mar-23 | Socialwave | beaconsmind AG | $10.8 | 2.3x | 5.6x |
| Mar-23 | Noventa Energy Partners | Ancala Partners | - | - | - |
| Mar-23 | Hemisphere GNSS | CNH Industrial | $175.0 | - | - |
| Mar-23 | Softnautics | MosChip Technologies | $17.3 | - | - |
| Mar-23 | Twilio (IoT business unit) | KORE Wireless | $12.4 | - | - |
| Mar-23 | Insig Technologies | AvidSys Group | $4.6 | - | - |
| Mar-23 | Bentley Systems (Thread connectivity device business) | Worldsensing | - | - | - |
| Mar-23 | Panthronics AG | Renesas Electronics | - | - | - |
| Mar-23 | Flutura Business Solutions | Accenture | - | - | - |
| Mar-23 | Caliber Data Labs | Applied Intuition | - | - | - |
| Mar-23 | Morphosense SAS (assets) | Sercel SA | - | - | - |
| Mar-23 | Scandron Private | Magellanic Cloud | $0.02 | - | - |

*Source: 451 Reseach*

# 2023 IoT Transactions (6/6)

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Mar-23 | Miroculus | INTEGRA Biosciences | - | - | - |
| Mar-23 | IPKeys Power Partners | Parsons Corporation | $43.0 | 3.6x | - |
| Mar-23 | LIVMOR (Assets) | HeartBeam | - | - | - |
| Mar-23 | Smart Vision Works | KPM Analytics | - | - | - |
| Mar-23 | Augmenta Agriculture Technologies | CNH Industrial | $98.5 | - | - |
| Mar-23 | e-Msion | Agilent Technologies | - | - | - |
| Mar-23 | Movingdots | PowerFleet | - | - | - |
| Mar-23 | Nokia | Cygna Labs | - | - | - |
| Mar-23 | SET | National Instruments Corporation | - | - | - |
| Mar-23 | Amodo | Cambridge Mobile Telematics | - | - | - |
| Feb-23 | Algolux | Torc Robotics | - | - | - |
| Feb-23 | Taoglas Group | Graham Partners | - | - | - |
| Feb-23 | Viasat Group | Targa Telematics | - | - | - |
| Feb-23 | Hyrde Networks | Citymesh NV [Cegeka NV] | - | - | - |
| Feb-23 | Flight GPS | Black Mountain Investment Group | - | - | - |
| Feb-23 | Athonet srl | Hewlett Packard Enterprise | - | - | - |
| Feb-23 | Dizisoft SARL | Fives SAS [Novafives S.A.S.] | - | - | - |
| Feb-23 | Connecterra B.V. (sensor business) | Datamars | - | - | - |

| Closed Date | Target Company | Buyer | EV ($mm) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|
| Feb-23 | Skyhook Wireless | Qualcomm | $179.0 | 29.8x | - |
| Feb-23 | Renesas Electronics | GLOBALFOUNDRIES | - | - | - |
| Feb-23 | SB Energy | Toyota Tsusho | - | - | - |
| Feb-23 | GEO Semiconductor | indie Semiconductor | $185.0 | - | - |
| Feb-23 | Telecom Brokerage | AppDirect | - | - | - |
| Jan-23 | Assured Wireless | Nextivity | - | - | - |
| Jan-23 | TruQC | SPOT Tracker | - | - | - |
| Jan-23 | InfiSense | Sealed | - | - | - |
| Jan-23 | TrakTec | MetAlert | $4.5 | - | - |
| Jan-23 | Exipple Studio | PreAct Technologies | - | - | - |
| Jan-23 | Infineon Technologies (Hi-Rel DC-DC converter business) | Micross Components | - | - | - |
| Jan-23 | Semifore | Arteris | - | - | - |
| Jan-23 | Zinwave | Wilson Electronics | - | - | - |
| Jan-23 | Tome | Valtech | - | - | - |
| Jan-23 | Qeexo | TDK Corporation | - | - | - |
| Jan-23 | Hark Systems | SolarEdge Technologies | - | - | - |
| Jan-23 | Zebra Technologies | Matrix IT | $15.0 | - | - |
| Jan-23 | VPI Technology Group | Ludlum Measurements | - | - | - |

*Source: 451 Reseach*

# Publicly Traded IoT Companies

| Company | Share price[1] ($) | % of 52 Week High | Market Cap[1] ($M) | EV[2] ($M) | LTM Revenue ($M) | LTM EBITDA[3] ($M) | EV / LTM Revenue | EV / LTM EBITDA |
|---|---|---|---|---|---|---|---|---|
| PTC | $175.0 | 99.3% | $20,863.1 | $22,463.9 | $2,097.1 | $547.0 | 10.7x | 41.1x |
| Advantech | 12.1 | 90.6% | 10,415.0 | 9,903.5 | 2,070.1 | 413.1 | 4.8x | 24.0x |
| Digi International | 26.0 | 60.5% | 938.7 | 1,128.0 | 444.8 | 84.1 | 2.5x | 13.4x |
| Ericsson | 6.3 | 92.1% | 20,916.0 | 21,840.5 | 25,459.8 | 2,583.3 | 0.9x | 8.5x |
| Siemens | 187.8 | 100.0% | 147,802.1 | 192,828.1 | 82,312.7 | 12,600.6 | 2.3x | 15.3x |
| Honeywell | 209.7 | 96.5% | 138,251.5 | 152,169.5 | 36,408.0 | 8,713.0 | 4.2x | 17.5x |
| Hubbell | 328.9 | 96.7% | 17,637.9 | 18,639.5 | 5,246.7 | 1,132.2 | 3.6x | 16.5x |
| Legrand | 104.0 | 96.8% | 27,309.6 | 29,688.6 | 8,989.2 | 1,930.4 | 3.3x | 15.4x |
| Acuity Brands | 204.8 | 98.5% | 6,262.7 | 6,455.6 | 3,952.2 | 588.5 | 1.6x | 11.0x |
| Lindsay Corp. | 129.2 | 76.0% | 1,424.8 | 1,394.6 | 674.1 | 121.0 | 2.1x | 11.5x |
| Deere & Co. | 399.9 | 88.9% | 112,065.7 | 171,110.7 | 61,222.0 | 16,572.0 | 2.8x | 10.3x |
| The Toro Co. | 96.0 | 81.6% | 9,970.9 | 10,940.9 | 4,553.2 | 701.8 | 2.4x | 15.6x |
| CNH Industrial | 12.2 | 67.7% | 15,690.5 | 38,632.5 | 24,838.0 | 3,392.0 | 1.6x | 11.4x |
| FleetCor Tech. | 282.6 | 99.4% | 20,405.6 | 26,242.4 | 3,704.0 | 1,883.6 | 7.1x | 13.9x |
| Trimble | 53.2 | 85.8% | 13,234.4 | 16,175.4 | 3,722.8 | 746.7 | 4.3x | 21.7x |
| MiX Telematics | 0.3 | 78.7% | 166.9 | 157.6 | 148.8 | 33.5 | 1.1x | 4.7x |
| PowerFleet | 3.4 | 98.0% | 122.0 | 190.4 | 132.2 | (0.6) | 1.4x | NM |
| Cisco | 50.5 | 86.8% | 205,286.8 | 190,113.8 | 58,034.0 | 18,095.0 | 3.3x | 10.5x |
| Aspen Tech | 220.2 | 88.8% | 14,023.4 | 13,996.8 | 1,042.7 | 300.0 | 13.4x | 46.7x |
| **Mean** | | **88.6%** | | | | | **3.9x** | **17.2x** |
| **Median** | | **90.6%** | | | | | **2.8x** | **14.6x** |

*Source: 451 Reseach and Capital IQ*

# IoT Comps EBITDA Multiple & Stock Analysis

## IoT EV / LTM EBITDA Multiples



Values shown on chart: 16.7x (Jan-23), 16.5x (Feb-23), 16.3x (Mar-23), 15.2x (Apr-23), 15.2x (May-23), 15.9x (Jun-23), 16.1x (Jul-23), 16.1x (Aug-23), 15.7x (Sep-23), 14.6x (Oct-23), 15.5x (Nov-23), 17.2x (Dec-23)
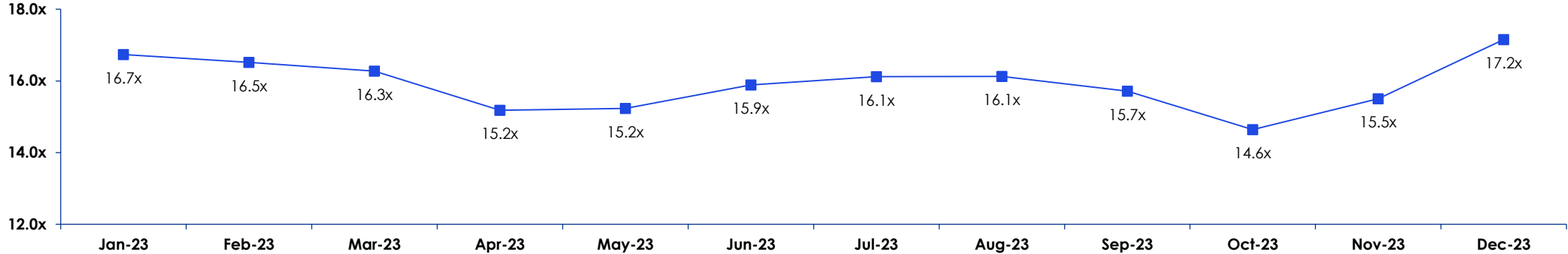
## IoT Share Price Performance
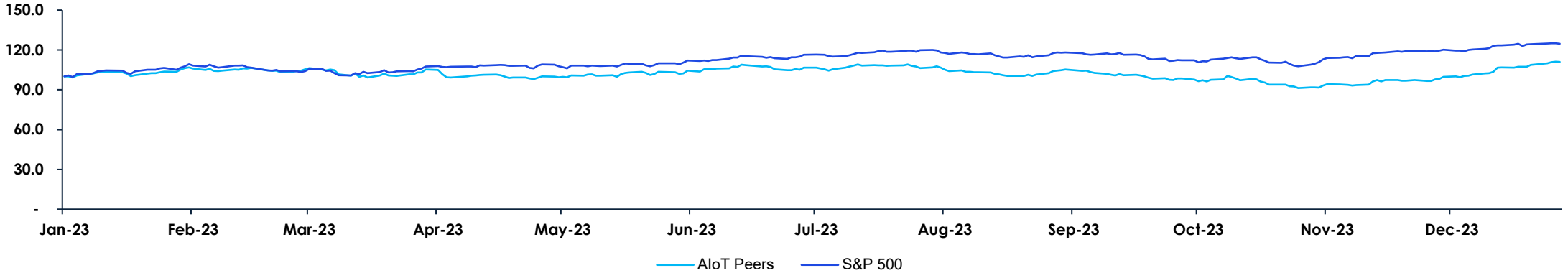
S&P500 **24.0%**
IoT **11.0%**



— AIoT Peers — S&P 500

*Source: 451 Reseach and Capital IQ*

# Closing Thoughts

## Key Takeaways 📋

The prevalence of AI technology in almost every industry indicates how critical it is to business success. As technology continues to evolve, its maintenance requirement levels grow. The recent advanced development of AI has shown that it can take business models and make them more efficient on a timely and costly basis.

Focus on R&D in AI is becoming more common in businesses today. AI software is being applied to many IoT applications as IoT devices can leverage the AI systems to deliver its services.

As businesses continue to integrate AI into their IoT systems, the focus increasingly turns towards vertical integration and edge computing solutions, ensuring efficient data management across the entire value chain. With the rising demand for real-time data processing, the surge in M&A activity within the edge computing domain highlights the growing importance of these sophisticated technologies in shaping the future of IoT and AI integration. As we move forward, exploring and harnessing these cutting-edge advancements will be crucial in unlocking the full potential of AI+IoT devices.

Source: "WTA Partners –(IoT) M&A 2023"

Advancements in AI Tech: Recent progress in AI tech, including machine learning and natural language processing, has simplified the processing and analysis of massive data produced by IoT devices

Increasing Use of AI in IoT Devices: Businesses are integrating AI into IoT devices to facilitate preventive maintenance, enhance energy efficiency, and elevate user experiences. In 2020, firms specializing in intelligent home appliances and wearable technology were the primary acquisition targets within the AI+IoT landscape

Vertical Integration: Firms aim to incorporate AI and IoT across their value chain, spanning production, distribution, and customer service. In 2020, healthcare led  AI+IoT deals, trailed by industrial automation and transportation

Focus on Edge Computing: Real-time data processing and analytics demands are driving M&A activity in edge computing, allowing data handling near the source. In  2020, 67% of AI+IoT deals involved edge computing

# One of the Most Active M&A Advisors in AI+IoT

**Representative Transactions**

| | | |
|---|---|---|
| **Ongoing** KPMG — **Project Kent** — Sale of an AI digital transformation company serving brick and mortar retailers | **Ongoing** KPMG — **Project Shade** — Sale of IoT enabled Smart Building solutions | **Ongoing** KPMG — **Project Hector** — Capital raise for an AI software company serving automotive OEMs |

KPMG — Talis CLINICAL — has been acquired by — GETINGE — Healthcare IoT

KPMG — matrix TELEMATICS — has been acquired by — BRIDGES Fund Management — IoT / Fleet Management

KPMG — LOCKMASTERS INCORPORATED — has been acquired by — DOMINUS CAPITAL — IoT / Smart Building

KPMG — ACD TRADE / DiversiTech — a portfolio company of — PERMIRA — has been acquired by — BEIJER REF — IoT / Smart Building

KPMG — ESC AUTOMATION — has been acquired by — AINSWORTH — IoT / Smart Building

KPMG — Cognizant — has acquired — ZENITH TECHNOLOGIES — Industrial IoT — *Technology Deal of the Year M&A Atlas Award*

KPMG — 3M — has divested its Smart Traffic and Tolling Technologies business to — NEOLOGY — IoT / Smart Traffic

KPMG — Ubisense — has sold its Smart Space division to — INVESTCORP — Industrial IoT

KPMG — OSRAM — has divested — LEDVANCE — to — IDG 资本 IDG Capital Partners / MLS — Smart Lighting

KPMG — TRS Technologies — has been acquired by — TAYCA TAYCA CORPORATION — Sensor Technologies

KPMG — FREEWAVE — FreeWave has been acquired by its founder — Industrial IoT

KPMG — GREENCREATIVE — has been acquired by — Harbour Group — Smart Lighting

KPMG — CLIFFORD THAMES — has been acquired by — OEConnection — a portfolio company of — PROVIDENCE EQUITY — IoT / Connected Car

KPMG — FINELITE Better Lighting — has been acquired by — legrand — Smart Lighting

KPMG — WABCO — Buyside financial advisory on an undisclosed fleet management company — Fleet Management

KPMG — ALPINE INVESTORS — has sold — Linx TECHNOLOGIES — to — ARGOSY CAPITAL — IoT Platform

KPMG — PINNACLE ARCHITECTURAL LIGHTING — has been acquired by — legrand — Smart Lighting

KPMG — lytx DriveCam — Financial advisory on Lytx for an undisclosed bidder — IoT / Fleet Management

KPMG — KIOSK Information Systems — has been acquired by — POSIFLEX — IoT / Embedded Computing

KPMG — Breathing Buildings — has been acquired by — volution group — HVAC / Smart Building

KPMG — CONTROLTEC — has been acquired by — APTIV — IoT / Telematics Solutions

# Let's Connect

**We look forward to talking with you and sharing the insights we have gathered in our extensive travels in the AI+IoT space.**

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