WHITE PAPER

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delivering business outcomes

# TOP 3 WAYS IIOT ENABLES BUSINESS OUTCOMES IN MANUFACTURING

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# EXECUTIVE SUMMARY

The Manufacturing industry, as whole, is the least digitally advanced industry today. It is also the industry with the most to gain from the **Industrial Internet of Things (IIoT).**

With shrinking margins and increasing pressure to deliver better - faster - cheaper, manufacturers are looking for ways to **improve efficiencies, reduce costs, and open up new revenue streams**. None of which can be accomplished without embracing the IIoT.

The key areas in which the IIoT is poised to help manufacturers achieve their target business outcomes are:

**Asset Services** - the continual monitoring and analysis of production line and/or supply chain data points that are most influential to a manufacturing enterprise. This data can be used to trigger automated responses in the machines, or alert employees, track production and inventory in real time, and even enable custom product manufacturing.

**Predictive Maintenance** - the ability to conduct "just in time" maintenance, drastically reducing costs related to unplanned downtime as well as unnecessary preventative maintenance visits for healthy equipment. Through advanced analytics and anomaly detection, predictive maintenance capabilities only grow smarter over time through AI capabilities, to continually refine and improve manufacturers' maintenance performance.

**Device Management** - the functionality delivered by the ability to connect, retrieve data, and take action at the device (equipment) level. This interoperability is only achievable through a solid foundation of an IIoT middleware platform, connected hardware, and a solid device management software component. Through retrofitting, device management can be enabled in legacy equipment of any age and level of connectivity.

There is no denying that the IIoT is going to significantly impact business development plans for manufacturers for the immediate and foreseeable future. The only question that remains is: **Will your company digitize or die?**

# INTRODUCTION

It is an exciting time for industry, in particular, manufacturing. **The Industrial Internet of Things (IIoT) is beginning to mature, and market leaders are stabilizing.** Whispers that it may be as significant as the Industrial Revolution itself have become standard statements across key business analyst publications. This recent status of dependability means that soon, all industrial manufacturers will be benefitting from the technology. When is the right time for you to start?

This white paper will help you to clearly understand the benefits in store for your business, by embracing the IIoT. It will also broadly outline the requirements of adapting to this technology. If being the leader in your core market is important to you – read on!

## MANUFACTURING APPLICATIONS

Manufacturing is a huge global industry, yet is **one of the least digitally advanced**. There is vast business potential waiting to be unlocked by accessing, analyzing and storing the data produced in any manufacturing facility.

> The old adage of "adapt or die" that has its roots in Darwinism states that if an organism does not adapt to its environment, it will die. Only the fittest will survive, and those are the ones that transform themselves to live with a new environment. The same goes for companies and the changing technology environment around them that is now directed at the Digital Age.
>
> FORBES

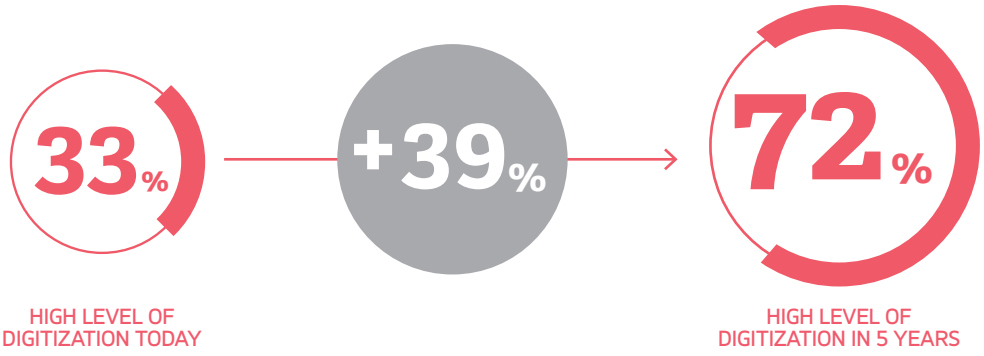



**FIGURE 1:** MANUFACTURERS EXPECT TO MORE THAN DOUBLE THEIR LEVEL OF DIGITIZATION BY 2020
SOURCE: FORBES

There are three key areas in which the IIoT is proving to be particularly valuable to manufacturers:

- Asset Services
- Predictive Maintenance
- Device Management

Through respected industry research reports, and real case studies, we will illustrate the business outcomes that manufacturers can achieve by implementing an IIoT strategy. You will discover **how to improve OEE, reduce unscheduled downtime, maximize efficiencies** – things that truly impact your bottom line. You will also gain insights to what to expect from your competitors in the near future.

# ASSET SERVICES

Asset services are a core function of the Industrial IoT (IIoT) in manufacturing. In broad terms, it means **better managing the products you manufacture, as well as the machinery you use to manufacture them.** Specifically, it refers to the constant monitoring and analysis of the production line data points that are most influential to your business goals. The data generated at these points can trigger automated responses in the machines, or alert employees to review the data and take action.

A MID-SIZED MANUFACTURER IS ABLE TO REDUCE WASTE THROUGH A COMBINATION OF DATA POINTS THAT WERE PREVIOUSLY UNAVAILABLE

DOWNLOAD USE CASE

Asset services benefit manufacturers by providing data in real-time and comparing it historically. This closes the gap on previously inaccessible information, enabling you to make smarter decisions to **improve overall operating efficiency**. Through asset services, multiple data points that were previously "hidden" can now be exposed, combined, and utilized like never before.

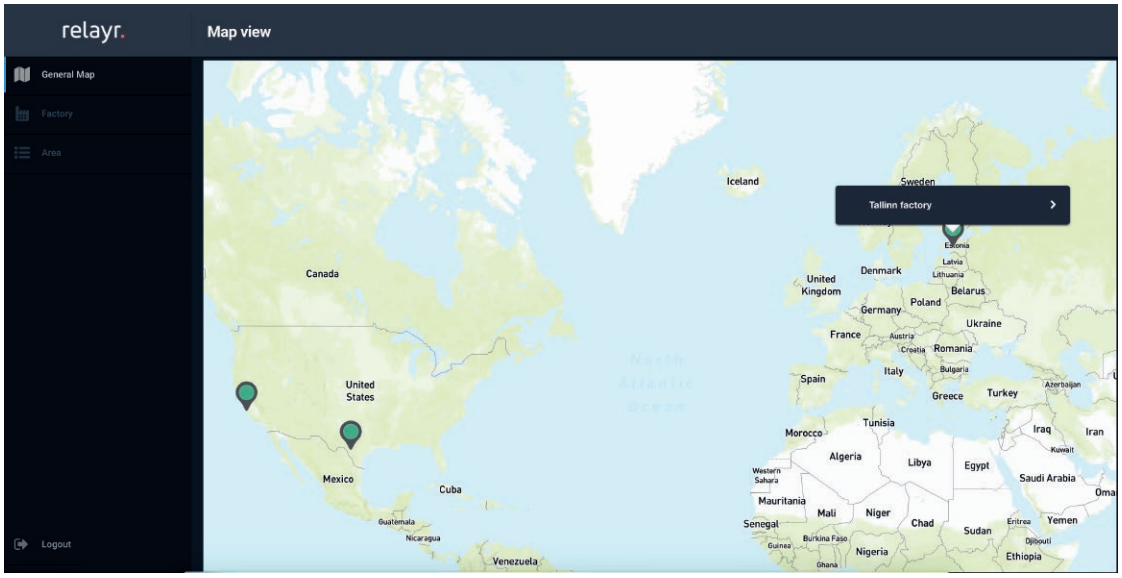



FIGURE 2:
SAMPLE OF ASSET LOCALIZATION DASHBOARD FOR MANUFACTURING APPLICATIONS

## REAL-TIME PRODUCT TRACKING

Real-time product tracking **gathers a full set of data about a product** as it moves through the production line, and the ensuing supply chain logistics, if desired. Real-time data assists workers to not only react to issues as they occur on the line, but also enables development of models to predict recurring issues.

How real-time product tracking is beneficial to your business:

- Status updates available at the frequency you need
- Real-time error detection and alerts
- Improved production line design
- Overall improved internal operations

## INVENTORY TRACKING

Inventory tracking records the movement of goods in and out of storage, quite simply. Inventory tracking with the IIoT is an advanced version of classic inventory tracking. Using external as well as internal data sources, needs become more predictable and therefore possible to automate. External data refers to the data available from the entire factory, not just the data in the inventory system. Syncing information from systems beyond the inventory allows for the rapid increase in the efficiency of inventory management, which is particularly acute with perishable goods.

**The goal is that materials will be ordered in more accurate quantities at the right time**. The savings made from avoiding over- or under-ordering is a clear, instant benefit.

## MANUFACTURING CONNECTED PRODUCTS

Retrofitting means **outfitting legacy equipment with sensors**, to record data where it is needed and send that data to the cloud for analysis. What if your new equipment could be manufactured with those sensors from the beginning? This is the future of machinery. These "connected products" would not only share data with the cloud, but also with each other if so desired. **This means total integration.**

AN ESPRESSO MACHINE MANUFACTURER TRACKS WHERE ITS MACHINES ARE ACROSS EUROPE IN ORDER TO PROVIDE BETTER CUSTOMER SERVICE

DOWNLOAD USE CASE

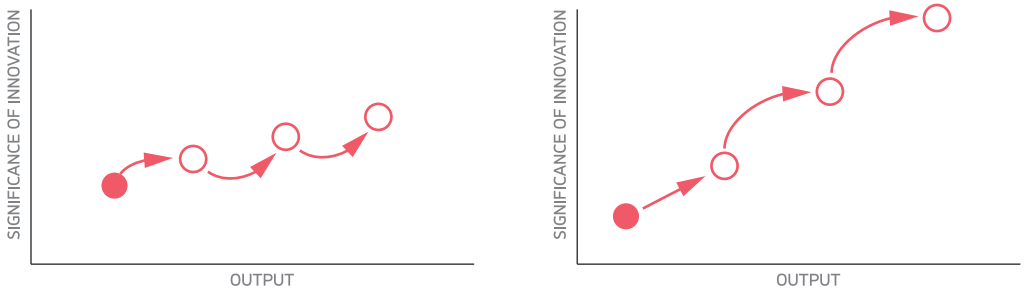
Retrofitting is an option that many manufacturers will have to consider for the time being, as equipment upgrade costs and downtime are expensive, making a single update virtually impossible. **A cost-benefit analysis of installing pre-connected products should be carefully calculated versus the costs of retrofitting.**

## CUSTOM MANUFACTURING

The demand for affordable custom products is on the rise, ever since the notion was introduced to the masses with 3D printing. Manufacturers have the opportunity to react to this demand of custom product offerings through IoT asset management capabilities.

Integrated asset management systems will allow your business to **develop a "custom product" revenue stream**, and possibly a brand new business model.

With integrated asset management, unique manufacturing data can be created to command machinery to **manufacture customized components on demand**. This customized data is used to ensure that the final product meets the customer's exact specifications. It can even be integrated with the manufacturer's shipping system, to ensure that the custom product is correctly packaged and addressed. The IoT can turn this highly complex process into a seamless one.




EVOLUTIONARY INNOVATION:
LEADS TO STAGNATION

Evolutionary innovation is incremental and frequent in nature. It occurs when a new product, service, process, or experience is created to improve on the attributes of the existing offerings in the market. Innovations which are evolutionary result in new attributes to be created, whereby customers expect these attributes to be developed eventually within the market.

REVOLUTIONARY INNOVATION:
LEADS TO GROWTH AND COMPETETIVE ADVANTAGE

Revolutionary innovation is radical and less frequent in nature. It occurs when a new and unexpected product, service, process, or experience is created within the market. Revolutionary innovation does not typically affect existing markets, since the innovation being offered in the market is completely new to customers.

FIGURE 3: INNOVATION THROUGH TRADITIONAL MANUFACTURING, AS COMPARED TO INNOVATION THROUGH CUSTOM MANUFACTURING
SOURCE: DELOITTE

# PREDICTIVE MAINTENANCE

Unscheduled downtime is the enemy of productivity for all manufacturing businesses. Downtime results in the loss of billions each year. Not only is production halted, but employees have to be paid while awaiting the repairs, never mind the cost of the repairs themselves.

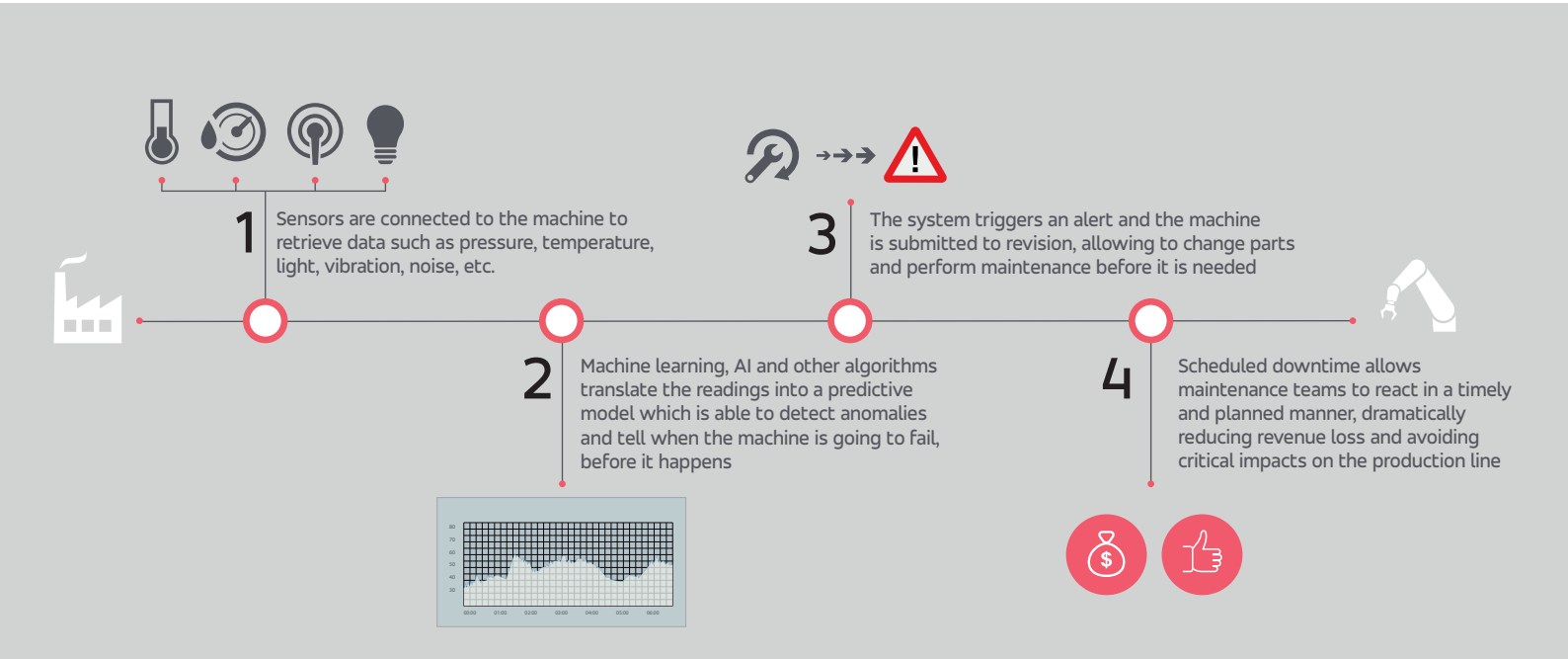
> Traditionally, maintenance professionals have combined many techniques, both quantitative and qualitative, in an effort to predict impending failures and mitigate downtime in their manufacturing facilities. Predictive maintenance offers them the potential to optimize maintenance tasks in real time, maximizing the useful life of their equipment while still avoiding disruption to operations.
>
> DELOITTE

Predictive Maintenance prevents and minimizes downtime by:

- Collecting historical data
- Analyzing anomalous data leading up to the downtime
- Recording the anomaly and cause
- Creating an alert or automating a fix
- Recording and continuously updating the model

Predictive maintenance is not only about improving manufacturers' agility and profitability. Since reaction time to dangerous and hazardous situations can now be linked to machine learning, **factory floor safety can also be drastically improved.**

FIGURE 4: HOW PREDICTIVE MAINTENANCE PREVENTS AND MINIMIZES DOWNTIME



## DOWNTIME PREVENTION AND SAFETY

The prevention of catastrophic failures is of paramount importance to managers in manufacturing. Catastrophic failure refers to huge losses of revenue due to stoppages, massive equipment failure or damage, and injury or loss of life of workers. The IIoT, and its predictive maintenance capabilities, can mitigate catastrophic failures.

Predictive maintenance is unique in that it can take both historical and real-time data into account. Through a system of sensors and machine learning models, predictive maintenance can predict when something is about to fail or break before a problem occurs.

This allows on-time equipment servicing - before a catastrophe can happen but not before it is needed. For manufacturers that work with particularly hazardous materials, or have older less reliable equipment, the benefits of predictive maintenance are clear.

## COST CONTROL

Naturally, preventing catastrophes is a form of cost control in itself. But there are other ways that cost control is obtained with predictive maintenance.

- Excessive or unnecessary maintenance is costly in its own right.
- Depending on the complexity and age of the machine, finding, hiring or training the people to perform the maintenance is expensive.
- Pre-stocking a supply of spare parts that may or may not ever be used is wasteful.

On top of all this, the enemy, as always, is downtime.

## ANOMALY DETECTION

Anomalies are data “exceptions” or “outliers” – basically, something out of the ordinary has happened in the manufacturing process. Anomalies are important to record, as they form the basis for predicting how and when something is about to go wrong in the process. Anomalies can be detected when unexpected or unexplained changes occur in a regular data flow. This data can then be separated, analyzed, and correlation/causation established.

HOW A BOTTLING PLANT SIGNIFICANTLY REDUCED DOWNTIME AND GAINED A 30% REDUCTION IN MAINTENANCE COSTS

DOWNLOAD USE CASE

# DEVICE MANAGEMENT

The software, middleware, and hardware that an IIoT system runs on forms the foundation for all other functionality. Companies like relayr and our technology partners have made middleware and network infrastructure a focus. This allows a wide variety of devices (as well as volume of devices) to interface and share data over a secure and solid platform.

> While connected devices are playing a central role in organizations' digital transformation, the key is to ensure a centralized management environment for efficiently managing all of these devices and extending its benefits. And to do this, in addition to just deploying IoT devices, enterprises should incorporate a complete technology platform with seamless integration, smart analytics and security capabilities to address the common issues that arise when managing these devices.
>
> TECH TARGET

## RETROFITTING

Retrofitting legacy equipment for the IIoT means identifying where and how to attach sensors to them, instrumenting the equipment with the appropriate sensors, then ensuring the data streams are correctly uploading. It allows older machinery and processes to benefit from new technology without the prohibitive cost of replacing them. The most advanced IIoT retrofit kits can be installed on most machinery in the same amount of time it takes for regular maintenance service to be completed. Therefore, it will not cause additional disruption to the business.

## CONNECTIVITY

Because IIoT systems inevitably use devices from many different manufacturers, middleware is essential. Most devices today use manufacturer-specific protocols to communicate with server-side software. As there currently aren't any industry-wide standards for IIoT device communication protocols, compatibility must be established in the layer between the software and the hardware: the middleware. This is why **device-agnostic IoT platforms are so powerful** – and frankly, necessary. Even if your IIoT devices don't interact directly with one another, middleware provides the interoperability to aggregate all your data in a uniform format and make it accessible.

**IIoT middleware platform providers are much more cost-effective than hiring an internal team to build and manage your own proprietary platform.**

## DATA MANAGEMENT SERVICES

A robust IIoT system will generate a vast amount of data over time. This data is valuable for discovering trends and analyzing long-term performance. As such, a suitable database is an absolute requirement. While some manufacturers opt to maintain their own databases, most use a data management service. Most middleware platforms also offer this service, or can make recommendations for one that meets your IIoT needs.

There are two important things to keep in mind about data management services: Security and Reliability.

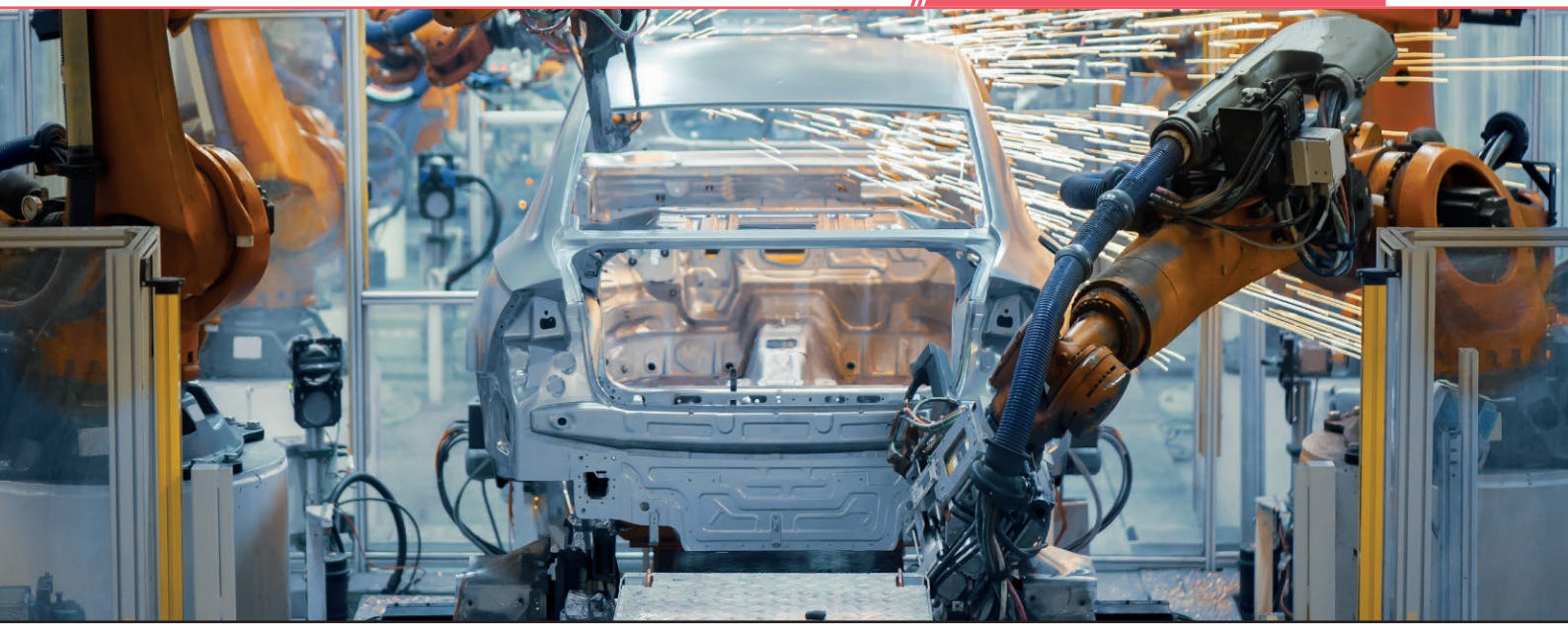
## SECURITY

IIoT systems create a lot of data. This increases the risk of corporate espionage. Detailed information about your business's operations could be disastrous in the wrong hands. As such, it is important to select a provider that has incorporated high security standards, and that employs technical experts on computer security.

## RELIABILITY

Reliability means ensuring that your data doesn't get lost. Nearly every data service keeps redundant backups. This means that even in a catastrophic failure (flooding or power failure, for example) your data is safe and available. The frequency of the backups vary depending on the services, so you should know if you need monthly, weekly or real-time backups before you decide on a provider. There is a business cost to lost data, too!





# CONCLUSION

The business outcomes of implementing IIoT solutions in manufacturing are clear:

- Reduce costs
- Create new revenue streams
- Extend the useful life of equipment
- Gain/retain competitive advantage

Middleware platforms are mature enough to form the glue between disparate software and devices. Data services are available to reliably, and affordably, deal with the vast quantities of data being generated. More and more consultancy services are available to inform you on the IIoT options available, and advise you on an IIoT system that would provide you with the best ROI.

This is the perfect time to discuss an IIoT budget with your business's stakeholders. As an early adopter, rates will be very competitive for all the current available IIoT solutions and peripheral services. On top of that, the competitive edge you will gain will keep your company ahead for many years after the IIoT is "as standard" in manufacturing.

The time is past to pretend that it will not make a significant impact on your business development plans for the next 5 – 10 years. The question is: will you adapt or die?

# ABOUT AUTHOR


## JACKSON BOND

Jackson Bond is Chief Product Officer and a Co-Founder of relayr. Definitely not a newcomer to the start-up scene, he previously co-founded MONOQI, Europe's premier store for discovering new designer products, and 8hertz, a speech-recognition application company (sold to VoxGen in 2007). He is also an advisor to JOBSPOTTING and previously built businesses and products for both XING and Holtzbrinck.

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# ABOUT RELAYR

relayr is a rapidly-growing company, delivering the most complete IoT solutions on the market for the digital transformation of industries. We unleash more data from your existing machines and systems – **from data inception to data insights – to improve your business outcomes.**

Our protocol-agnostic IoT middleware platform, device management and data analytics capabilities, and agile professional services teams are trusted by hundreds of companies worldwide. With relayr, any industry is empowered to implement fully interoperable IoT solutions guaranteed to achieve their target business outcomes.

**Smarter connectivity. Better business outcomes. Guaranteed.**

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