

# Management guide for the utilization of the Internet of Things

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# 1. Introduction

This guide will help you to lead your company's future with intelligent data and the interpretations based on it.

- Is your company steered based on past reports?
- Do you feel the handling, safe transmission and utilization of data is laborious – does data guide your operations predictively?
- Would you like to be able to make business developing decisions based on real-time knowledge collected from the different functions of your company?

dents say they truly understand on a satisfactory level what it is and how it affects their business in the near future. In recent years, Internet of Things has been widely discussed, together with big data and analytics – and not without reason. After all, global markets of USD 1.9 billion in 2020 is the goal sought after here. In the same way, it has been predicted that if Finnish companies actively begin to build a role as key operators of platforms and ecosystems for the Internet of Things, Finland can achieve growth prospects of up to EUR 12 000 million in investments and 48 000 jobs.

**Finland can achieve growth prospects of up to EUR 12 000 million in investments and 48 000 jobs.**

When asked from the Finnish management what the Internet of Things is all about, only a fraction of the respon-

In order for such predictions to come true, and that the possibilities of the Internet of Things could be systemati-

cally utilized in the Finnish corporate world, one must first understand what it is all about.

## What is the Internet of Things?

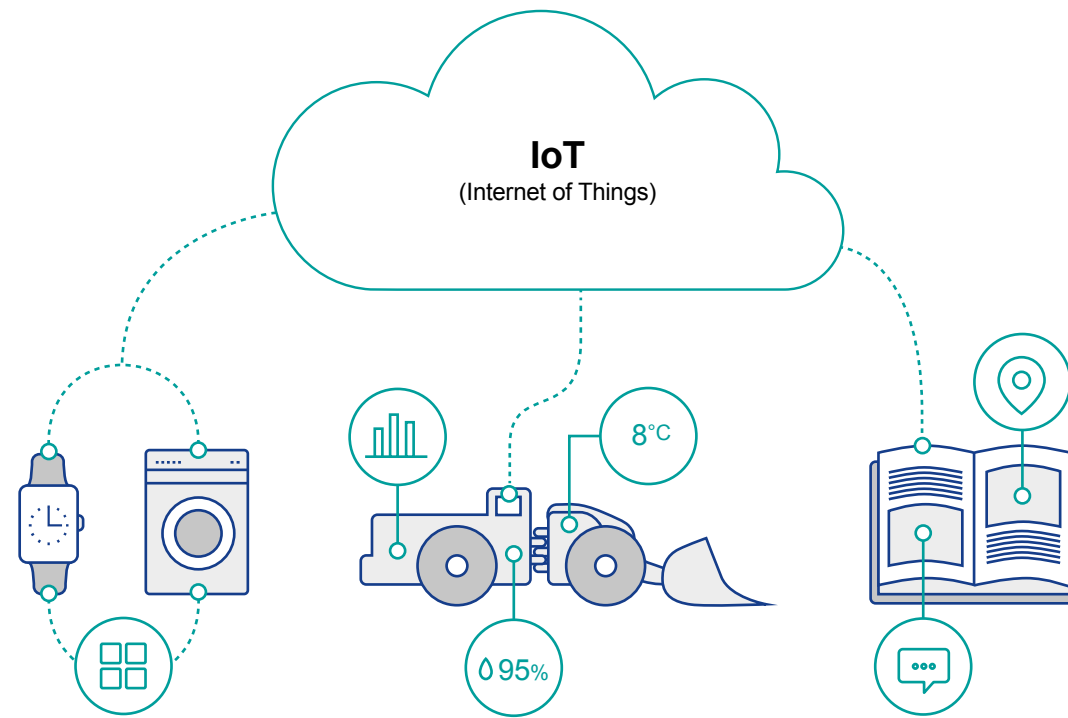
The purpose of this guide is to strip away the big hype about the Internet of Things and to bring it closer to the daily life of Finnish industrial companies through concrete examples. The aim is that the guide helps to understand the cross-industry revolution and offer insight to how a company can make use of the Internet of Things both in order to boost its own business processes and increase its competitiveness.

According to Gartner's forecast, today (in 2015) about 4 900 million devices are connected online, whereas in 2020, the corresponding figure is no less than 25 000 million devices – that equals five devices per each person inhabiting the Earth. We are talking about digital business, which in the future will connect people, devices and companies in a manner never seen before.

In turn, digital business is made possible by the networking of devices, which is the Internet of Things (IoT). According to Gartner's definition, the Internet of Things is about physical devices that can sense their environment and intelligently communicate or operate based on this sensory information. This requires the devices with sensors, software and a data connection, all of which comes with their sensors, machines, processes and services. All of those are producing constant information that can be refined to predict and automate different work stages, for example.

Networked devices can range from airplane engines, welding equipment, and wind turbines to a harbor's container transport system. Rolls-Royce PLC is considered to be one of the first industrial companies to employ an output-based business model where airline companies are billed according to the "Power by the Hour" -principle.

Kemppi, a Finnish company providing welding equipment and software, utilizes the Internet of Things by, among other things, connecting their welding equipment to a cloud computing service. All information about the welding occurrence is transmitted to the cloud. This includes information such as the ID of the welder, as well as the settings and additives used in the job. A welder does not have to do anything more than to scan the barcode on his or her card, after which the data from the process is recorded to support future company decision making.



### Internet of objects

Smart objects that can communicate either with each other or with cloud applications via an internet network.

### Industrial internet

Intelligent devices that gather and transmit information with their sensors about the state of the device and its usage conditions in order to boost business activities.

### Internet of goods

Individual goods on the internet have their own identity, even if they wouldn't be especially intelligent otherwise. An item like this can be, for example, a book or a mitten, which is referred to with an individual identifier.

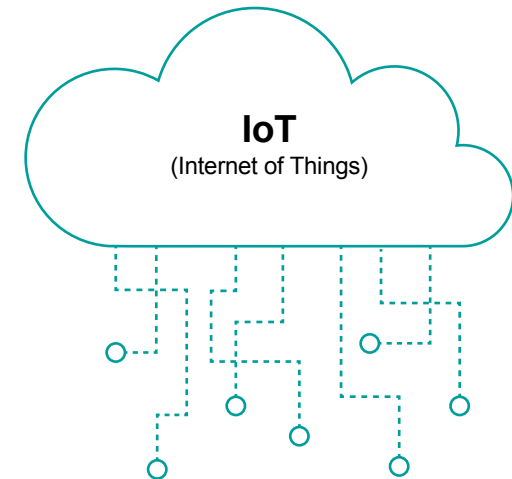
*Image 1: The IoT, or the Internet of Things, is a broad term that covers multiple interconnected technologies and concepts. These can be divided into the internet of objects, industrial internet and the internet of goods.*

## 2. Industrial internet

### 2.1 IoT is the resurgence of the internet

Discussion over the Internet of Things has been going on both globally and locally for quite a long time now. The term was first used already in the 1990s. To put in short the IoT is the resurgence of the internet, but through things that can be measured and applied sensors to. Who would have

thought 15 years ago how significant a role the internet would have in today's business. The same phenomenon is becoming a reality for the Internet of Things, but in much quicker development cycles.



#### **Who would have thought 15 years ago how significant of a role the internet would have in today's business.**

To develop one's competitiveness in business framework, and especially within a Finnish manufacturing industry, it is no longer enough to just have high class engineering know-how, which is often supplemented with an aggressive bids waiting mentality – the customer will order when the need arises. The strong involvement of the Internet of Things changes the competition, and the exponential growth of available information forces companies to look into their ways of operating in totally new way. Digitalism,

and the Internet of Things along with it, will be radically changing the operating logic of most industries in the coming years.

The additional value that Internet of Things can offer is largely based on the information gathered and produced with it. The rising possibilities of new business can be seen in two ways: companies' ability to refine the available information into an easily utilizable form, and their ability in creating automatic, real-time analytics that chooses and organizes the large mass of data into usable figures and depictions of situations to support company decision making.

With the help of communication networks, the data can be analyzed in almost real-time. This way, the collected data can be analyzed more effectively, which means that

the production processes and equipment can be monitored and managed better. The analyzed data can be harnessed to fulfill the requirements of different parties – from device owners, users and service providers to the manufacturer.

The time to start utilizing the Internet of Things is right now, because the technology it requires has progressed so quickly being available at reasonable price. The internet is open to all and thus enables the management and operation of processes and business on a global scale. Companies have also made many investments in recent years into making measurements, data collection and monitoring operations. Therefore, the conditions are in place to enable the implementation of deeper analytics and applying this knowledge in developing comprehensive business.

## 3. The Internet of Things boosts current operations

### 3.1 From cost savings to growth-inducing innovations

The possibilities of the Internet of Things sound promising and several companies are already utilizing Internet of Things in their operations in high speed. According to a research carried out by Gartner ("The outlook of remote monitoring and control in Finland"), 72 % of industrial companies that are either Finnish or operating in Finland say they utilize remote monitoring or control in their business. The number sounds good but only 40 % of industrial companies take advantage of remote diagnostics, whereas the corresponding number is about 65 % with energy, water and waste management or health care devices. So it appears that industrial companies still have a rather conservative outlook on a software based mode of operations.

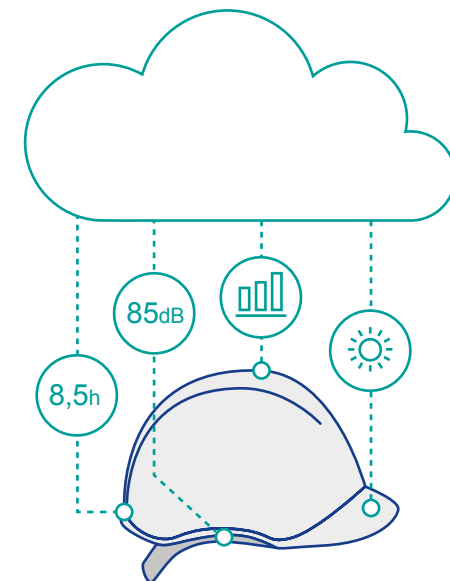
Online smart products and services enable more efficient ways of working than before. However only after real-time visibility into inner processes and actual customer needs are improved. Boosting one's existing business and efficient use of capital are the first goals in adapting the Internet of Things – the effects of which results can be clearly seen from company's costs and balance-sheet value. Another significant way to adapt the Internet of Things is to develop the existing products and services to be even more intelligent. This can be done by incorporating prod-

ucts and services with new features, increasing customization and improving usability. This way, the customer value of current business can be increased, and thus produce growth in company revenue and profitability.












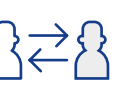
**The value of the Internet of Things comes from the possibility it gives for modifying all business value chains.**

Today there is more information about a company's operational activity available than ever before. Therefore, making use of the operational information for not only controlling current operations, but also for collecting data in order to develop better and more efficient devices is one of the most considerable competitive factors that companies will face.. In the future, a company can either try to grow the customer potential of its current products by adding IoT qualities and extra services to them, or want to develop completely new solutions. It will also be important to recognize the challenges that either the current or possibly even

entirely new customer segments encounter – challenges that could be solved with real-time monitoring and active responses. Those companies that bravely utilize the available information to develop their business will find completely new possibilities to change the entire value chain.



## The Internet of Things breaks traditional operational models

A traditional operator			An operator utilizing the Internet of Things
Slow and costly		<b>Innovations</b>	 Fast and cost-effective
Weakens and investments in Finland decrease		<b>Competitiveness</b>	 Remains good and Finland is becoming an attractive target for investment
Reactive		<b>Service model</b>	 Proactive
Offers a product that will be serviced when necessary		<b>Products and services</b>	 The product is updated and enriched
Data supports maintenance and upkeep		<b>The role of data</b>	 Data is information that can generate new business models
Hierarchical and rigid		<b>Management culture</b>	 Participatory and transparent

## 3.2 Agile data utilization to support decision making

Advanced technology in, for example, the field of sensors enables the intact and safe gathering of even more versatile data from different production processes, devices and assemblies. Company systems and tools are also capable of implementing real-time data based on monitoring and automatic supervision of parameter alarm trigger levels. Many factories utilize tools for analyzing data that has been gathered afterwards and mainly manually. These kinds of analyses are carried out, for example, when trying to find causes for production deviations. Many factory activities are largely automated, and also the production monitoring is at least partially automated. Nevertheless, better understanding of data and the steerability of operations based on that data are in a very minor role. The work is also manual and thus it is not real-time work.

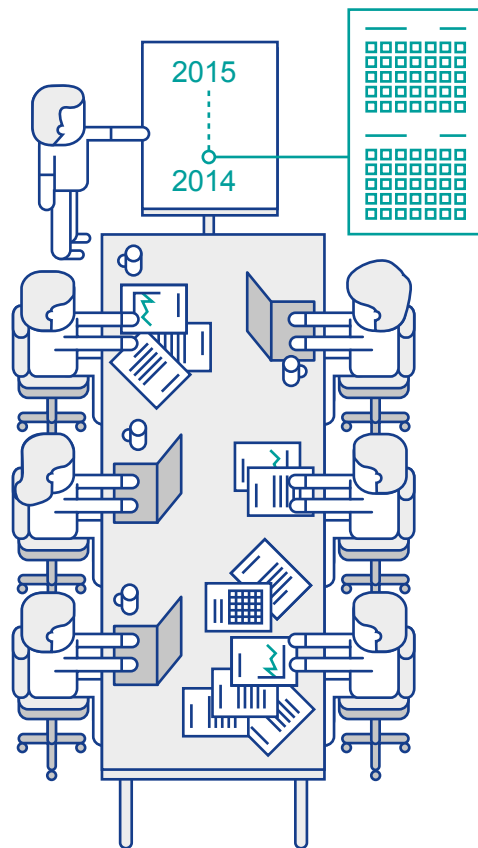
**It is better to know beforehand when our production is second-rate or some damage causing deviation is about to happen than read about it in a report afterwards.**

Table 1: Utilizing the Internet of Things to increase global competitiveness demands courage to let go of traditional operational models.

Let's take a closer look on the case described above. A company that operates in process industry surveys its business in a weekly development meeting in the form of production and quality reports. The whole project team is present to analyze the previous month's production figures and the events that led to these figures. When examining

the production control systems and the data received from production – data that is routinely collected anyway and the follow-up on which is not so active – one notices that a lot of important information is left completely unexploited. The so called raw data is collected from production all the time, from tens to hundreds of variables, depending on the

process. Data is also accumulated into electronic service manuals and client registers. The raw data itself is rarely used as such, but matters are mainly controlled with traditional reports, average values and other key figures.



## From examining the past to anticipating the future

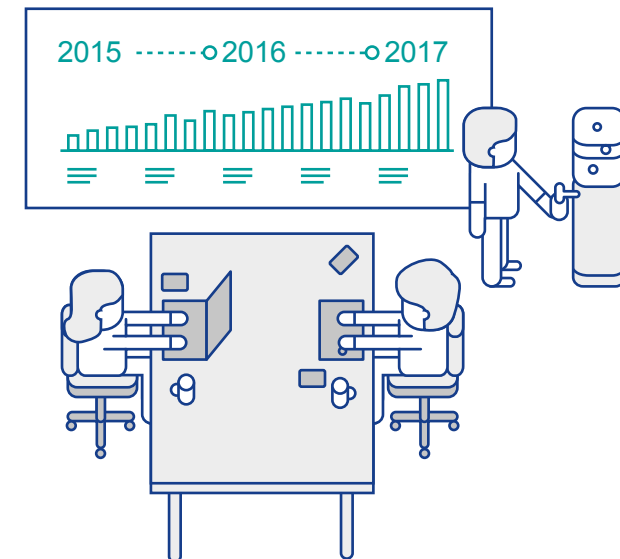
### The team examines last month's figures:

Utilizes 10-20% of the accumulated company data in decision making retrospectively.



### Automatic information handling:

Utilizes 90-100% of the accumulated company data in decision making proactively.





Previously, different technologies such as processing power and the size of data storage didn't make it possible to refine data automatically and in real-time. Nowadays technology for these already exists. Retrieving such information out of data that is now both significant and central for business, and can be done with agility, cost-efficiently and automatically. This has also been proven in practice at a Stora Enso carton factory, which began testing the utilization possibilities of the Internet of Things with a pilot project in fall 2014. The aim of the pilot, which just reached its conclusion, was to generate more intelligence to the upkeep and maintenance of the carton line by using IoT methods. Results received from the pilot were very encouraging.

An unprecedented amount of information is available, but in reality, most companies don't have the ability to control the whole – especially when it comes to understanding huge amounts of data in a way that is meaningful for business. This notion is supported by a management study carried out by Gartner. The study stated that up to 70% of managers say they do get new ideas from the data, but only 30% of them are actually able to take action based on received information.

From the standpoint of profitability, it is good to combine, interpret, analyze and further process the data and its systematics already available. This is how business relevant information can be drawn out of data to support decision making.

### 3.3 The technology of the industrial internet

Data and analytics are strategic competitive factors; they are not supposed to be support functions, nor used only for report the past. Instead, data and analytics are about understanding the present and predicting the future – things crucial to the whole organization, including top management. By utilizing the knowledge of the present and predictions of the future, one can make the right business decisions based on the company's real-time status. In addition to data being a critical tool for a manager, the intact and orthodox handling of data has far-reaching effects on business. New technologies enable such benefits as real-time and information based product development, predictive maintenance, remote upkeep and in general having an overall view of the whole installed device base.

#### Everything stems from making use of data in support of business.

The Internet of Things also strongly signifies a transition in the information technology industry. The available and open development environments lower the companies' innovation threshold to develop some risk-free, novel service business. This happens because companies are able to take over distinct IoT solutions in a flexible and scalable manner. These distinct IoT solutions include such examples as contact and relay information systems, fire and crime reporting systems, vending machines, real-estate automation systems, different industrial machinery and equipment, and trade machinery and equipment.



Image 2: Utilize data to support decision making.

The more data several processes accumulate, matters like storage of collected information and its safe future processing are things that increasingly in the minds of Finnish industrial management. What affects in the background is a lesser understanding of and concern over the required

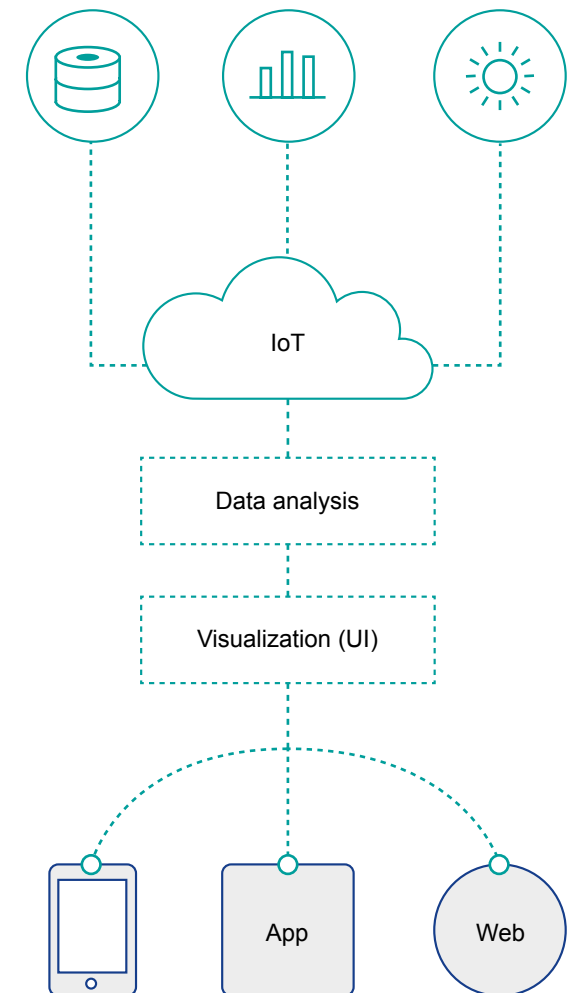
technology, questions about information ownership and matters of information security. Actually the management feels information security one of the biggest challenges concerning the utilization of the Internet of Things.

Choosing the right technology always depends on the

scale of operations, the number of operators, goals and requirements, but some general guidelines are good to bear in mind when thinking about utilizing the possibilities the Internet of Things offers in business.

### At least the following questions should be in mind:

- Are your company's operations based on a centrally-administered solution and do subcontractors have access to the same data? This affects what kind of information security and management features the solution requires so that data can be handled safely, with integrity and in real-time.
- Will existing network infrastructure be used in the operations, such as Wi-Fi-networks in offices, machine lines and factory halls, or should there be more powerful operator assistance?
- Is the data produced by devices and processes collected into a cloud or into some other platform, and does it also include the required analysis and visualization tools?
- Is the current platform adaptive enough so that varying cooperation enhancing mobile devices and applications can be built on it in the future? It should also be possible to modify the device and application functionalities as client information is accumulated.
- What sort of lifespan does the produced solution have? And in turn, should the company that delivered the technical platform still support the solution in 5, 10 or 20 years?



## 4. The Internet of Things looks towards the future

### 4.1 Predictive analytics streamlines operations

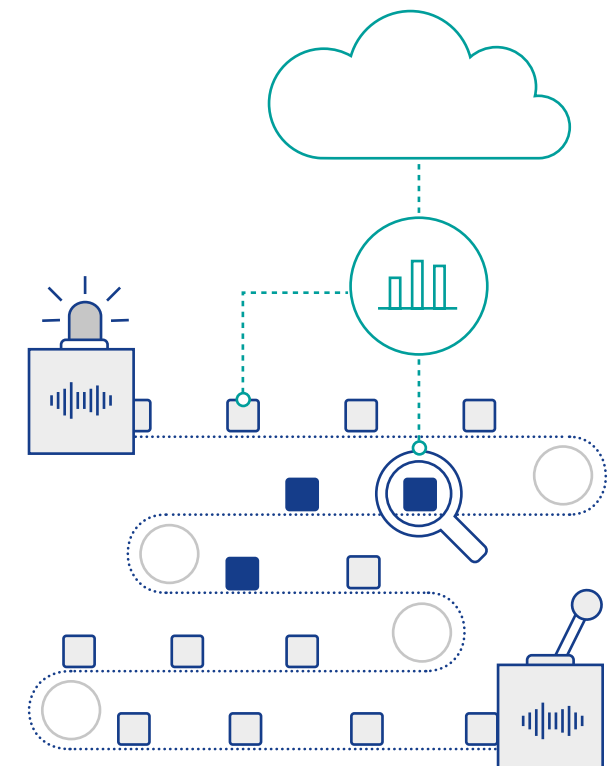
In operational business, the customer often has the understanding that in order to streamline operations, a certain variable or issue should be examined. Raw data interpretation answers the question of which variable or issue should be examined, and is the chosen variable or issue the right one in terms of the end result the examination is after. In the same way we can also determine what happens to the big picture if we solve some known and specific problem, and what other problems concerning processes and operations could be predicted so that operations would be made more effective.

#### **Real-time raw data helps to predict deviations.**

The full understanding of raw data thus helps in noticing reasons leading to harmful trends and optimizing production speed and quality. By analyzing raw data, problematic solutions can be spotted that would normally be noticed only by the company's most experienced workers. In addition,

by analyzing raw data and then employing real-time analysis, a company has a chance to predict deviations before any financial harm occurs. The starting point for making use of predictive analytics is always the customer's need to understand what is to come on the basis of what has already taken place. Information that can explain a certain phenomenon is needed next. With analytical methods, information can be refined, effects of a phenomenon can be found enabling projections of the future. Once the metrics affecting a phenomenon have been identified, different phenomena can be simulated by altering the metrics – if things are done differently, how will it change the outcome.

#### **A starting point for making use of predictive analytics is always the customer's need to understand what is to come on the basis of what has already taken place.**



## 4.2 Predictive analytics helps to understand collected data

Nowadays there are many companies that have been able to streamline their business by taking advantage of methods of predictive analytics. E-commerce has been able to produce outstanding sales relevancy by offering customers exactly the right products and services at exactly the right time. In the tourism business, service pricing has been optimized in such a way that one gets the highest possible price with which the capacity is sold out. Commercial chains are able to predict the demand better and better and thus optimize the availability of goods, as well their storage and logistics costs. New solutions enable novel revenue models and service centered business. At the same time, companies have the possibility to offer additional services and products, such as maintenance services, software that can be downloaded into the product, and parts that wear out in use.

Ambitious examples often come from big global companies, but one doesn't always need millions of lines of data for analytics to give new information for controlling and optimizing business. In most organizations, a more analytical control of business data produces useful new ways to improve operating efficiency, regardless of the company size. Different kinds of analytics exist as well, and there doesn't need to be a plenty of data to start having difficulties seeing the big picture.

### **A more analytical control of business data produces competitiveness regardless of company size.**

Therefore, regardless of a company's business logic, predictive analytics can always be utilized when a client has existing data accumulated from different processes. For example, accumulated data can be used, to make fault forecasts for predicting a device malfunction in the production or to make predictions about future needs by evaluating the amount of consumption in light of consumption data history.

Let's take an example: an important machine is in a production line in a heavy industry company. In this example, the machine produces metal parts. For an unknown reason, the machine malfunctions and produces broken units or, in the worst case, damages the whole machine or the entire production line. This results in a stoppage which in turn causes financial harm for the company. By utilizing predictive analytics on machine failure, the company can lessen the odds for a chain of events such as described above.

### **How is the data available from your company's processes currently utilized?**

- 1) Would you like to be able to predict the next production stoppage, the resulting production quality or evaluate the amount of consumption in the future?
- 2) Are you getting maximum effect of the machine's data production potential?
- 3) Do you understand the data that the machine produces?
- 4) Who is currently interpreting and analyzing the produced data, and how long does this process take?
- 5) Would you like to increase the capacity utilization rate of production?

So, companies have plenty of data collected from operation processes. Part of this data is surely utilized, but several companies leave a tremendous amount of development potential unused offered by this information. . Either the companies aren't fully aware of the existence of information, or there isn't adequate in-house expertise for interpreting the data. For this situation, there is a good real-life example that comes from a carton line (the processes of

which is defined by over 20 000 variables and only a fraction of these can be easily detected by a person). By making use of the methods of modern analytics, varying data from numerous variables can be collected from the carton machines. The data offers a view to the possibilities that the analysis and further processing of the existing information gives to the company. By using analytics, the company has a better understanding of the already collected

data, even without making any new investments in devices which demand more capital. With predictive analytics, it can also be seen if the data mass has the answer to what will happen in the future and what should be done next. Basically, one shouldn't just concentrate on a single variable, but focus on the big picture, lead company activities with information, and deploy the benefits the information offers throughout the whole organization.

## 4.3 Analytics provides clarity in a complex environment

The more complex of an environment is in question, the greater the benefit of utilizing modern, predictive analytics is for a company. A person cannot observe over five variables well, which is when analytics helps by providing understanding to what human logic cannot perceive. With analytics, one can compress enormous amounts of information into packages that a human being can comprehend better, such as key figures comprised out of several variables.

### **Analytics provides understanding when a human being's perception is not enough.**

As a method, utilizing predictive analytics is completely independent of the industry – whether it is the manufacturing industry, medicine or farming. Predictive analytics enables the implementation of real-time data analysis that is

generated from operational activities, making conclusions based on that information. But teaching the models is implemented on historical data. Modern analytics can generally also provide answers to what took place in history and automate its analysis and further processing from the standpoint of business development.

### **Analytics packages central information to support business.**

With the help of automated data processes, speed benefits can be achieved, repetition robustness and ways to lower the costs caused by breakdowns, suboptimal use and human errors. Historical data collected by the customers themselves is used as a basis for data analysis work, and the data is managed with methods of machine learning, mathematical learning models, statistical methods and dependency and multivariate analysis. Typically, hundreds

of different variables are analyzed in a process, and software solutions will lead you to the right track automatically when searching for a fault. In addition, once new data accumulates, the learned methods are utilized to predictively identify problems.

**Are you still wondering whether predictive analytics could be utilized in your company?**

**Are you also wondering if problems can be predicted and if forecasts can be made in a real-time environment, and what type of forecast is in question?**

Every time regularities and repeating phenomena are detected in processes, the problem is also somewhat predictable, and a prediction can always be made in a real-time environment while the production is still going on with full power. When making a forecast, one utilizes models from machine learning; the machine is given a goal to learn a certain model that the forecast is based on. It is important to understand what kind of forecast the machine is taught – does the company want to identify the propability of a

machine break down in the next six hours, or in the hours following that.. Or should the machine be able to predict one or two things at the same time, like when will it have a failure and what is the future temperature of a certain thing. The challenges in question may already be known to the customer or there already is a solution to solve them. In reality, dependencies are rarely so simple, and predictive analytics is most beneficial when the examined interactions are more complex, such as the joint effect of dozens

or even hundreds of variables, which function as the basis for machine failure predictions.

**The user gets simple and clear information as they need it, in the right place and form.**

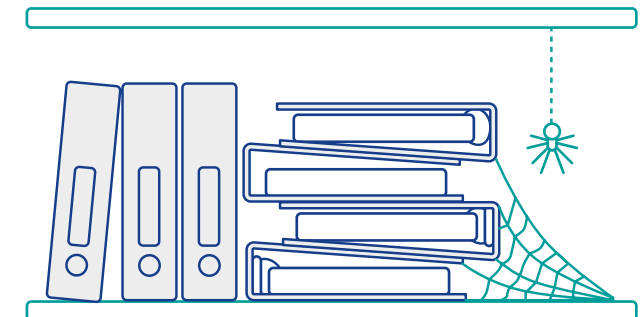
## 4.4 Analytics reduces information overflow and guides to the right direction

By utilizing a predictive method, interpretations can be made out of the data accumulated from your company's core functions. With these interpretations, your company's business can be guided to the right direction. This may sound complicated, but in reality it is not. In practice, this simply means that there is, for example, a process where a computer algorithm is given a goal to learn a certain model that is expected to become common in the future. , On the basis of this model, future events can be predicted more effectively.

According to the model described above, a company's complex data can be transformed into simple knowledge that can be utilized by several different parties within the organization. So the information is filtered in an under-

standing and easy way. . The method also doesn't call for any special integration requirements so that the predictable method can be taken into production – at best only one single computer, a trustworthy data transfer channel and analytics software are needed connected to relevant customer data.

Nearly all production lines have systems that notify the process operator's control monitor about all deviations that the machine detects. During one shift, there can be dozens, even hundreds of deviations that pop up on the screen. A person grows numb with that kind of an amount of fault and alert messages, which is when the alarms lose their meaning. Additionally, long-term utilization of alarm notification data without analytics is impossible. A machine



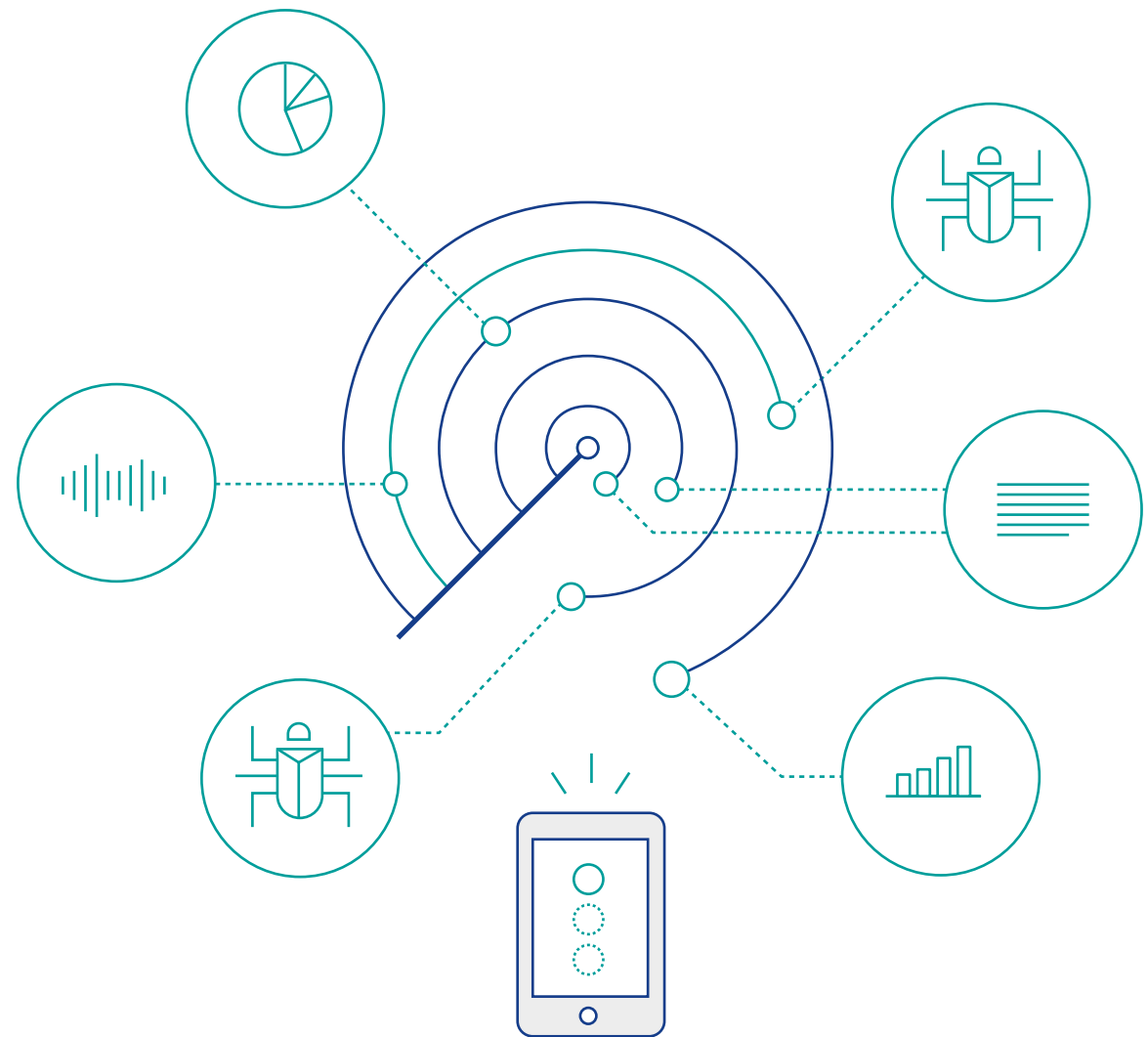
might store all alarms and warnings into an archive that are able to be searched manually later on, but defining any causality is nearly impossible. Analytics picks out the most

essential alarms from the mass, lets the process engineer know about the alarms by way of, for example, traffic lights, and offers a real-time tool to solve them. This is how redundant alarms can be removed, and remarkably improve the efficiency of activities.

A machine can also have an inbuilt disruption forecast model constructed with methods of predictive analytics. With the help of this model, it is possible to predict, for example, a disruption at a production line post even before it occurs. The control room receives explicit disruption forecasts due to the collected data and its accurate analytics. And so the control room is able to react proactively to what is to come.

## 4.5 Automation of information improves productivity

The greatest benefits of predictive analytics are achieved with automation. Once the data handling is fully automated, real-time, safe, and intact, conclusions to support business can be made predictively. One can still hear it said in companies that the most popular tool for data analysis is Excel, which cannot be utilized effectively without any hardcore expertise. Additionally, updating information in an Excel table is laborious and its upkeep is all too often based on manual work. This activity takes up a lot of time and eats away at the operational efficiency – a matter the top management is often unaware of.



## 5. Lead your company and customers with information



### 5.1 How to start utilizing information

To start utilizing raw data in business is simple. It can be put in practice by simply collecting information from different company sources and measurement points. The collected information is then delivered for further processing. During this phase, information is mapped out on how the company's future business can be predicted based on this data that has already been collected.

It is also good to remember that information processing is always an operational solution. In the testing phase, the data is manually transferred to be analyzed and to have analytics models developed for it. Once the models are ready, they can be taken into use in operational activities. The models are integrated into customer environment

in such a way that the manual interphase doesn't have to be repeated anymore.

Utilizing predictive analytics and interpreting data in order to strengthen one's business certainly improves a company's competitiveness in the long run. By employing new technological methods,

#### **Process effectiveness may even grow tenfold**

process effectiveness may even grow tenfold, when earlier product development can now be implemented in just a few minutes at its best.

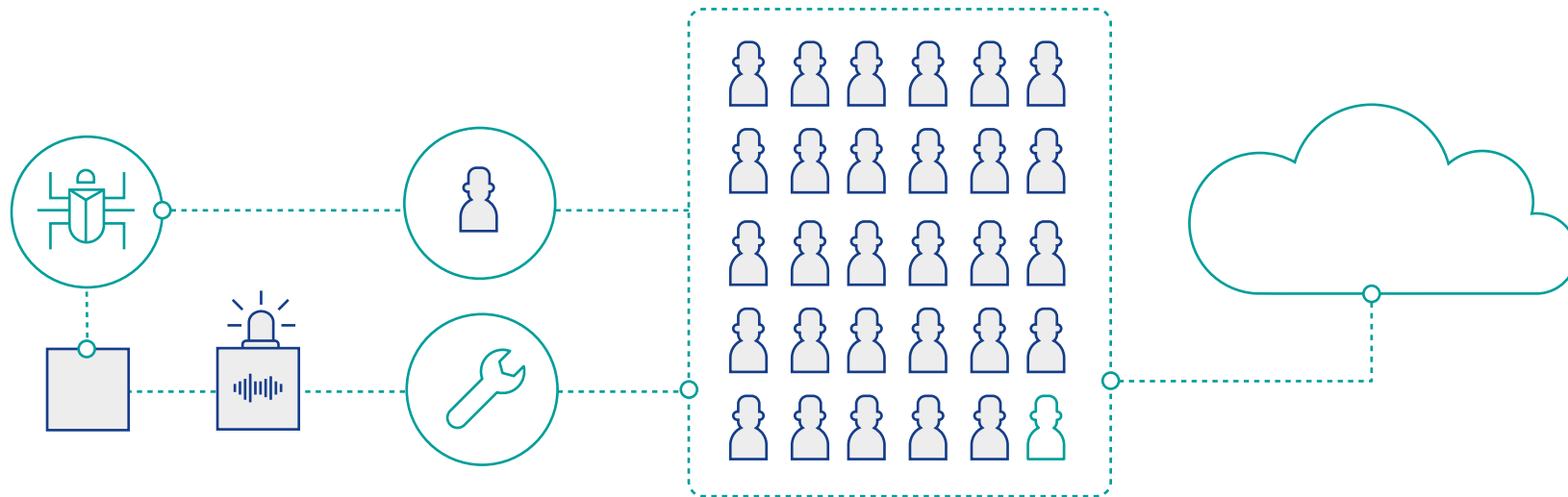
So, to begin the utilization of the Internet of Things, a company can start off with agile Lean methods,

#### **It is not foolish to start small.**

with very small investments, and with some gutsy and risk-free experimentation and mapping out new business possibilities.

#### **The biggest customer risk is to "not get anything out of the data".**





## 5.2 The organization's tacit knowledge is made visible

By making use of the Internet of Things, the organization's tacit knowledge is made visible. In this process, each and every company employee has a significant role in bringing forth their own know-how and sharing their expertise amongst colleagues. Once the whole company's knowledge potential is utilized via IoT techniques, the company's processes and their individual procedures can be focused correctly in terms of business objectives. All too often only the most experienced workers of companies know and are familiar enough with the processes and individual procedures that they are able to sufficiently interpret the ma-

chine's alarms and/or problems detected in the production process.

If the veteran worker happens to be gone, the worst case is that the production is at a standstill until that required know-how is again exploitable. With the help of predictive analytics, it is assured that the necessary operational knowledge is not only stored in the workers' pockets and brains, but that the information gained from the processes is made visible in real-time for anyone to utilize.

In the future, a company must also develop its employees' competences, sales skills and service management to

better respond to the requirements of this new era, as well as create processes that include the company's business logic, and the technology connecting the sensors to the processes. For the sake of increasing competitiveness, it is vital that the company builds its personnel's understanding of different software, whether or not the company chooses to build its expertise from within the company or to acquire the needed IoT expertise externally.

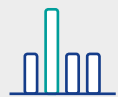
## 5.3 How to utilize predictions in business management

By utilizing methods of predictive analytics, a company's business processes can be streamlined, while the company can also optimize its investments in the right direction. By analyzing and utilizing the data from the operations, the company can see in real-time in which direction they are heading and, based on this, to plan future actions.

**The best way to lead a company's success story is to develop an environment that promotes quick testing.**

Once collecting and interpreting data is made into a continuing process within the company, it will be useful in the long-run as well. Based on the collected history data, the company can make better decisions now and in the future. At the same time, understanding of the overall process grows since truthful information about where the business challenges lie and how the challenges should be met is always available.

**In order for a company to revolutionize the markets instead of getting caught in the grips of uncontrolled turmoil, it must be able to manage the following things:**



Predicting new possibilities in the markets



Enabling individual experiences for the customers



Increasing transparency of operations



Enabling real-time operations



Agile innovation

The time for waiting around is over for good. Equipped with agile experiments, one should go out and boldly seek for a new direction and thereby build both the company's future, as well as the future of Finland. The best advice for managers for increasing a company's competitiveness in this new era is to develop an environment that promotes quick testing – an environment that has the ability to make agile, strategic and operative choices and implementations on the basis of achieved results.

**"What Finland is missing is a culture of experimentation. Preliminary negotiations can last up to three months. Whereas in the United States they say: 'let's try this'".**

**–Micke Paqvalen / CEO Kiosked**

Image 3: Supplies for increasing competitiveness in a time revolutionized by the Internet of Things

# We are happy to help you in leading your company into a world where business decisions are based on realtime information with predictive methods.



**Quva** offers scalable analytics software for the Internet of Things. Our clients benefit from the increasing automation and better predictability of operations in the fields of upkeep, production quality and process optimization, among other things. Our clients include Efora, SSAB, Outotec, Valmet and Sandvik.

[www.quva.fi](http://www.quva.fi)



**Elisa IoT™** is an open service and development platform where customer can build the best overall solution for its own business. The service platform includes all pieces necessary for successful IoT business; starting from technologies and maintenance to skillful professionals. Elisa IoT™ is easily modified and can be integrated to the customer's current back-end systems. It's easy to expand the service also afterwards with new elements. Want to hear more? Contact us.

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