How IoT increases crisis resilience

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Crisis or no crisis?

The ongoing COVID-19 situation is undoubtedly hitting some companies harder than others. The drop in sales has come as a shock to many, and some companies are even at risk of going out of business for good; meanwhile, others are flourishing, and almost seem to have been strengthened by the crisis. This raises several key questions:

- How do companies differ in terms of crisis resilience?

- Which factors make a company more crisis resilient?

- What can companies do to increase their crisis resilience?

Economic sector is not the only factor

When it comes to differences between companies, the first and most obvious thought is that a lot depends on which industry a company operates in. The travel industry, for example, has virtually come to a standstill in the pandemic, with many countries closing both external and internal borders to stop the virus from spreading: many of the worst-affected companies are those with a focus on travel and transport, with high double-digit falls in sales having been recorded (e.g. Lufthansa revenue was down by 80% in Q2 2020 compared to Q2 2019)[1]. On the other hand, companies such as the online giant Amazon are experiencing a sudden increase in revenue (up 40%[2] compared to same period last year); it seems likely that these companies will come out of the crisis more-or-less unharmed and will increase their market shares, despite having to bear extra costs due to anti-COVID measures.

So is a company's fate determined solely by its natural area of business? On the contrary. When taking a closer look within industries, not all players seem to have been affected to the same extent. The latest quarterly report from Tesla is a good example: while Tesla has recorded a 5% drop in sales, other automotive companies such as

Daimler have been hit much harder, with a drop in revenues of around 20%. Examples like this suggest that there must be factors at play other than the industry in which a company operates – factors with more potential to be controlled or mitigated, and therefore worth investigating. In this article, we take a technology-focused look at crisis resilience and factors that can help companies to improve it. More specifically, we elaborate on the potential of the internet of things (IoT) for increasing a company's crisis resilience. What is the connection between digitalisation, IoT and crisis resilience? And how can IoT help a company to increase its crisis resilience, especially during a situation like COVID-19?

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[1] https://www.luftfahrtmagazin.de/wirtschaft/lufthansa-ergebnis-80-minus-im-2-quartal-durch-corona-216197.html

[2] https://de.statista.com/statistik/daten/studie/197099/umfrage/nettoumsatz-von-amazoncom-quartalszahlen/

Technology has always been a strong lever

Looking back into the past, one important differentiating factor is company willingness to embrace new technology and ways of doing business, including new business models. Over the last few decades, technology has been the most important driver of change, disruption and innovation in many sectors of the economy. It has shortened time to market by accelerating development cycles in engineering, allowed us to change the way we use and reuse resources for energy generation, and made the switch from product-oriented to service-oriented business concepts possible. One constant factor throughout this period is that companies which developed and integrated technology at an early stage often had – and still have – advantages over their competitors during times of change or stress. A good example of this is German homeware manufacturer Vorwerk, which established a digital ecosystem around its traditional homeware goods

(especially the Thermomix) early on to generate new, sustainable revenue streams. This led to an increase of the Thermomix revenue share by almost 15%[3] and helped the company to grow, even during difficult times. Conversely, technology manufacturer Kodak had started to move into digital photography but then pulled back, out of fear that producing digital cameras might lead to cannibalisation of its (at the time) extremely successful analogue models. This led to Kodak losing all relevance in the camera market. Crises such as the one we are currently facing often act as catalysts for these developments: on the one hand, there are winners – leaders in technology with robust, flexible business models which survive the crisis almost unscathed – and, on the other hand, there are companies that struggle because they are not flexible enough to adapt their operations and business models to a new situation in an ever-changing world.
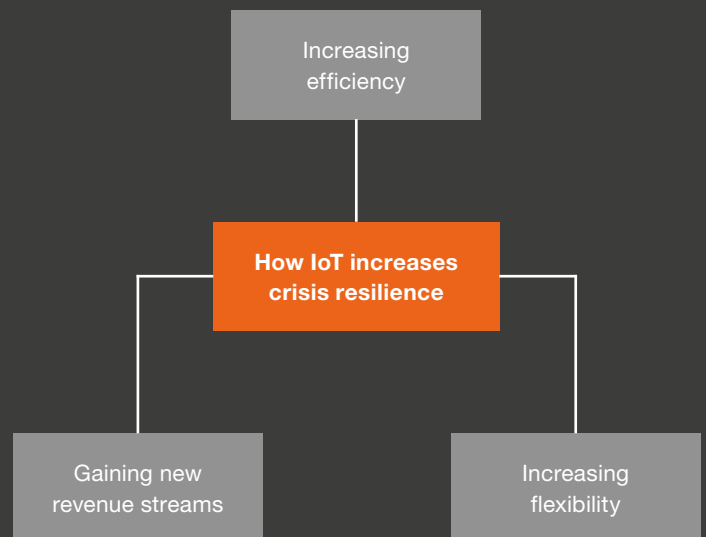
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[3] Vorwerk Geschäftsbericht 2018.

IoT – a way out?

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Before taking a deep dive into IoT, we need to explain the concept. We see IoT as more than just the next step in incrementally improving existing products; rather, it offers a chance to rethink your way of doing business. Although technology-based, IoT is more than just a new technology. It is an enabler and offers a broad range of opportunities for optimisation across the entire value chain, helping to make companies more resistant and flexible – whichever industry you are operating in. To illustrate the point, let's take a closer look at three pillars of optimisation that are closely linked to IoT:

• Increasing efficiency

• Increasing flexibility

• Gaining new revenue streams

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Efficiency and productivity

IoT can boost efficiency and productivity in many fields, with many different micro-solutions working together. Generally speaking, boosting efficiency means either generating more output with the same input, or using less input for the same output.

IoT tackles both approaches. The technology can be used to reduce consumption within production processes by optimising the flow of materials – for example, with in-house tracking systems, and using sensors and data analytics to forecast machine downtime. At the same time, output can be increased by creating a digital version of company assets – a digital twin – which opens up the possibility of 24/7 status monitoring and optimisation of operations based on instant feedback. Processing data on edge devices and analysing in almost-real time creates valuable insights on patterns, bottlenecks and dependencies; these allow both optimisation of production processes and prediction of future events by running simulations based on the data collected.

Iconic motorcycle manufacturer Harley-Davidson offers a good example of how IoT can increase efficiency in production. The company recognised the industry trend of increasing customisation instead of mass production early on and shifted its production processes towards smart manufacturing. The effective, tried-and-tested assembly line was replaced by a digital supply chain with automated solutions. Production is now driven by production needs and guided by software, combining individualisation and scaling. All machines in the factory are connected and feed their data to a single platform. This makes the production process more transparent, enabling workers to make informed decisions quickly, based on real-time information. The new approach sustainably decreased the planning cycles within the factory, reduced costs by 7% (due to reduction of waste) and improved net margins by 19% overall. Coming back to the current crisis, Harley Davidson was struck as hard as others. However, the survival of the company is not endangered by the crisis. It build up a strong cash balance in the last years and was able to scale down capax quickly.[4]

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[4] https://www.xam-consulting.com/blog/5-examples-of-iot-in-business

While the transformation of Harley-Davidson illustrates how IoT can boost efficiency in general, agricultural equipment and heavy machinery manufacturer John Deere provides an example of how IoT can help in a crisis explicitly. John Deere started adapting early to the field of IoT, laying the foundations to boost innovation through new technologies and new approaches. Back in 2012, John Deere launched its first software products to connect machines, operators and owners, helping them analyse soil conditions, estimate the current workload and – based on this data – predict future revenues. In 2013, the company made the solution available to other manufacturers, suppliers and software developers, creating its own platform service and a new revenue stream.

Today, every machine is equipped with sensors and connected to the platform. When the COVID-19 crisis peaked in Italy and curfews were in force, John Deere was able to adapt to the new conditions quickly because all John Deere machinery supports remote display access and maintenance. This made it possible to remotely set up new machines and maintain machines already in use.

As well as the quick win of allowing customers to keep working and keep their businesses running, this also strengthened customer ties to John Deere, helping the company to increase revenue in the long term.[5]

Flexibility and adaptability
In today's digital world, requirements and external factors are constantly changing. To keep pace with these requirements and adapt to new environmental conditions and customer needs, companies should use technology to create flexibility and adaptability. The need for adaptability disproportionately increases in crisis situations, emphasising that technology is essential to allow companies to react quickly to new circumstances.

For example, production plants had to be shut down as COVID-19 spread, which inevitably led to a slump in sales. As a result, business plans for the following months became irrelevant or unfeasible, making rapid measures necessary to keep the core business running and make up for losses. Amazon provides a good example of adaptability in a crisis: besides working in a field which is profiting from the crisis, a switch in operational strategy enabled the company to be one of the first to reopen its logistics hubs; some hubs, in fact, did not close at all.[6] This switch involved installing thermal imaging cameras at warehouse entrances and scanning employees; employee movements were also anonymously tracked to avoid crowding and maintain social distancing. These measures safeguarded operations in the non-automated parts of the value chain and enabled deliveries to be made with only short delays. Taking this principle further, the technology used by Amazon can be scaled and used wherever remote working is not possible. Whether in manufacturing, logistics, on the shop floor or in nursing, IoT gives the flexibility to adapt to new circumstances almost immediately.

The key point here is that both of these measures can be implemented even with simple IoT technology and only a moderate amount of work and expense. You don't have to be the next Amazon; on the contrary, medium-sized companies will benefit most relative to the effort required, simply due to the fact that they are starting to become more crisis-resilient. The underlying success factor is that the necessary technological infrastructure is already available or can be purchased quickly.

Another example is automotive supplier Webasto from Bavaria. When coronavirus reached Germany, the company shifted 10,000 employees into working from home overnight. Strong IT infrastructure and a digital mindset were essential to successfully achieve this. Now that the peak of the economic shutdown has passed, Webasto has been able to draw its first conclusions from the crisis, saying that the last few months were the perfect catalyst to digitalise and rethink current processes and assets. As a company, the aim going forward is to be more digital in general, overcome the data silo approach and transform IT into a unified platform[7], collecting and analysing more data across the value chain.

5   https://www.deere.de/de/blog/articles/technik/john-deere-connected-support-fernwartung-corona/
6   https://www.reuters.com/article/us-health-coronavirus-amazon-com-cameras/exclusive-amazon-deploys-thermal-cameras-at-warehouses-to-scan-for-fevers-faster-idUSKBN2200HT
7   https://www.cio.de/a/process-optimization-im-krisenmodus,3632983

New revenue streams

The third pillar of optimisation with IoT is exploring new revenue streams by going all-digital. This represents a huge step forward, not only for crisis resilience but also in terms of staying relevant and increasing customer focus. Tesla, Uber and AirBnB are well-known examples of this change; their methods of cutting costs and using data to gain additional value are disrupting entire sectors. However, an increasing number of medium-sized companies are also now demonstrating that the switch from the old economy to the new is a very feasible proposition.

The KION Group is one of them. The company is the leading supplier of forklift trucks and automated warehouse logistics solutions in Europe, and has accomplished an impressive, in-house digital transformation. Alongside this, the company's latest statistics on orders show that the number of new orders increased by a total of 11% in the second quarter of 2020, even with COVID-19 overshadowing the global economy. The reason for this growth is the company's Supply Chain Solutions (SCS) segment, which has gained a strong position in the field of automated solutions and is experiencing increasing demand from e-commerce customers; the total value of orders in this segment in Q2 2020 was more than double what it had been in Q2 2019.[8] KION offers highly automated solutions for supply chain and warehouse management, based on IoT edge devices, connectivity and data analytics combined with a solid platform solution. This enabled the SCS segment to not only balance out the decline in the forklift segment, but outweigh it and contribute to overall company growth.

The example of KION shows three things. The first and most general point: broad diversification is indispensable for businesses. The second: automated solutions are on the rise, meaning that more and more companies are trying to increase their digital maturity and make up for missed opportunities or investments in the past. The third and most important point: digital solutions can and will outrun a company's traditional core business in the blink of an eye. KION – more specific its subsidiary STILL – has been producing forklifts since 1920. No doubt they fully have optimised their products. Buying a forklift from KION nowadays means getting a high-tech product, equipped with all kinds of sensors to collect and stream data. But despite this, the automated, digital solution has won the race. Why? Because it represents service over product. In terms of a digital solution, a forklift is just one component of many. Buying a whole solution, on the other hand, means getting the whole ecosystem out-of-the-box, including sensors, edge devices, software and storage. The enabler for this is IoT technology, combined with a digital platform approach.

To return to the first pillar, digitalising revenue streams as much as possible increases internal efficiency while also reducing costs and risk. New digital business models will not only achieve return on investment much faster, but will also be much more resilient to a crisis thanks to the combination of the other two pillars mentioned above – increased productivity and increased flexibility. As well as horizontally diversifying revenue streams by going digital, securing your current business by switching from analogue to digital is a good starting point for the IoT and digitalisation process. The exact strategy and how it is implemented will depend on budget, time and needs.

Heidelberger Druck is another excellent example of how this can work. Alongside sale of industrial printing machines and supplies, the company has also offered printing services for a number of years (production as a service), creating added value both for itself and for companies processing small, one-off orders, as this saves these companies having to purchase extra assets. Heidelberger Druck has also digitalised its assets, enabling it to tackle both areas of focus mentioned above (securing current business and generating new revenue streams). Equipping machines with sensors has reduced unplanned downtime, as well as automating maintenance scheduling and restocking of consumables.
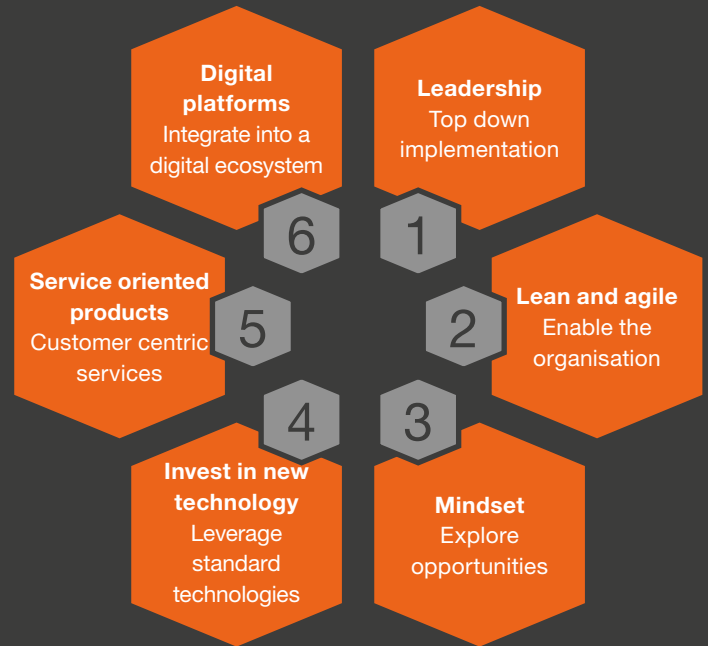

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8 https://www.kiongroup.com/de/News-Stories/Pressemitteilungen/
   Pressemitteilungen-Detail.html?id=1999115&type=corporate&title
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How to leverage the potential

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So what can companies take from these examples? There are signs that crises are becoming more frequent; the last major crisis was only a decade ago and affected companies in a similar way to the COVID-19 crisis. It is impossible to predict what will cause the next crisis – and, ultimately, the cause is irrelevant. Whether a crisis is caused by political uncertainty, financial instability, another pandemic – the German Minister of Health expects that pandemics will occur more often in future – or climate change in general, the uncertainty of the circumstances and their impact remains. But what is certain is that digital maturity will be the key factor dictating how severely companies are affected, as it enables companies to rapidly react and adapt to a new situation. A high level of digital maturity, for which stable infrastructure and interconnected assets are essential, will become even more important in the next crisis and will create an even wider gap between truly digital businesses and those which are reluctant to innovate.

We have identified six fields of action every company should consider in order to boost crisis resilience with IoT. These fields of action are based on experience that we and our clients have gained in a number of completed and ongoing projects – from designing, implementing and operating a new IoT platform, right up to supporting change management within the organisation throughout the digital upscaling process.

Digital platforms
Integrate into a digital ecosystem

Leadership
Top down implementation

Service oriented products
Customer centric services

Lean and agile
Enable the organisation

6 **1** **5** **2** **4** **3**

Invest in new technology
Leverage standard technologies

Mindset
Explore opportunities

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1 Leadership

It doesn't matter if you're talking about a country or a company: in challenging times, strong leadership and a clear vision are key.

Over the years, IT has developed from a cost centre to a collaborative partner. Companies should exploit this to initiate top-down implementation of IoT as an enabler for new revenue streams. Don't wait any longer – the time to act is now.

2 Be quick, lean and agile

The example of Amazon has made it clear that winners need to respond quickly to external changes. Reduce management overhead and start delegating more. IoT makes this possible: with real-time edge data processing, IoT brings decision making closer on-site and makes it easier to make fast, accurate, fact-based and informed decisions.

3 Mindset

Strongly connected to the leadership pillar but on a more general level, company mindset during difficult economic periods is important. Does it seem like the world is ending, or does it inspire your entrepreneurial spirit? If the situation inspires you as an entrepreneur, chances are high that your company will not only survive the crisis, but will emerge from it stronger in the long term. To get into the right mindset, start exploring new opportunities and focus on the things that you still have control over. One of these things is investments in scaling up technology, and IoT offers a point of entry.

4 Invest in new technology

Digital business models, processes and supply chains are no longer a selling point – they are now essential factors that make the difference between success or failure in business. Today's customers and clients want services rather than products, and those services are driven by data. The choice you have to make is not whether to go digital, but rather how and how fast to go digital. There are plenty of out-of-the-box solutions on the market which enable prototypes and pilot projects to be developed very quickly and at a reasonable price. Moving to a customised solution later is cheaper then losing market share now.

5 Shift to service-oriented products

Today's customers are becoming more service-oriented all the time. A good product is still crucial, but the services around it and across the value chain are becoming an increasingly important focus. Customers want the full package, and this is exactly the approach that IoT can deliver, making it possible to develop, personalise and monetise services around a product and bundle everything into one digital platform.

6 Digital platforms

The full potential of IoT can only be realised if it is integrated in a digital ecosystem. Think of it as swarm or collective intelligence: while creating a data silo for one area can bring benefits, you'll only be able to create added value if you link this data across the entire value chain. As you won't be working alone, you need an open platform that allows you to process data from a variety of sources. Again, what matters is not the data itself but what you get out of it. Linking data, extrapolating scenarios and making data-driven decisions enables you to keep an eye on the bigger picture and work towards optimising your business model – and this potential can only be realised within an ecosystem enabled by a digital platform.

What does it all mean?

After examining the facts, what can we conclude? The COVID-19 crisis has undoubtedly hit the economy hard. But the pandemic can also be seen as a chance. The new circumstances are giving a major boost to enterprises with truly digital business models. Brutal though it might seem, the crisis is separating the digital winners from the losers. Well-prepared digital leaders, using technology as an enabler, were able to alter their processes to adapt to the new circumstances and continue business, or even scale things up. Companies which weren't in this position have lost customers, market share and revenue on a massive scale and it will take years for them to recover – if they ever recover at all. It is unlikely that we will return to the pre-COVID economy. Because of this, it is vital that companies use this new drive towards digitalisation and rethink their business models to prepare for a new economic paradigm.

Ask yourself: how resistant is my business model to external changes? Which parts are already digital and which aren't? Why aren't they digital? How can I digitalise and what added value will this create? And most importantly: how can technology – and IoT in particular – help me achieve this?

In this article, we have seen examples of how IoT technology has brought about rapid performance improvements for various players in various industries. The good news is that this technology is available and usable out of the box. Therefore, it is not too late to start taking advantage. The downside is that technology does not create flexibility, sustainability and efficiency by itself; it is simply the tool for achieving these qualities. What is also needed is strong leadership and the right mindset to bring about the cultural changes required.

The decision to digitalise and invest must be made now, even if the effectiveness of the measures can currently be quantified to a limited extent only. We encourage you to start asking the right questions as a starting point for a clear top-down strategy, since the transformation will not happen bottom up on its own.

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