



Maintenance on the way to the future

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Digitisation and Industry 4.0 are causing the wind industry to rethink how it does business. Sustainable growth is a constant entrepreneurial challenge. The market is characterised by continuous evolution that never takes a break. However, unlike biological evolution, companies can decide for themselves to a large extent how they want to develop.



The automation and digitisation of the working world is one of the greatest entrepreneurial changes of our time, and it challenges the wind industry to its core. Where does the industry stand in this process of change? It is exciting to see that wind turbine maintenance offers far more potential for development than many might think. Deutsche Windtechnik, a specialist maintenance provider for wind turbines, has internalised the principles of Industry 4.0 and is now at the forefront of this development.

Expecting a revolution

The process has been in full swing for years. Ever-shorter development cycles in numerous areas are increasing the speed of change management. Information is available more quickly worldwide. Trends are being circulated around the globe very quickly and products are changing and being placed on the market in ever shorter cycles. At the same time, the range of

potential decision-making options is increasing rapidly. This can make it hard to keep a cool head and always back the right horse.

An all-in-one solution is a long way off

One fundamental change is the fact that the rapidly shortening development cycles mean we can all say goodbye to the dream of developing a system that will ensure the long-term success of a company. In the IT area, powerful ERP systems that cover a wide range of business applications and process and store operating data in databases are barely able to keep up with the different wishes and requirements of markets and users.

Even the Big Five ERP vendors are increasingly opening up their software and providing interfaces to allow the integration of subsystems. These companies are actively promoting small, independent start-ups, which are developing new custom software because they are both closer to the special needs of the market as well as being more agile and creative.

Later, these same solutions are integrated or the companies that developed them are acquired. In the wind industry, especially, there are many of these custom solutions. Deutsche Windtechnik has helped to develop many of the solutions on the market, but it is now also increasingly focusing on developing its own solutions.

The digital world of Deutsche Windtechnik

In the day-to-day business of the service industry, software supports monitoring, reporting, analysis and much more. The changes brought on by digitisation are in full swing, including at Deutsche Windtechnik. So far, many applications have been integrated into 'Deutsche Windtechnik World', the company's service portal for employees:

- Training, further education and qualification are carried out using e-learning modules.
- The technicians use mobile solutions on-site, take photographs and create documents that can be edited immediately and/or shared with the customer.

- Offshore: The customer can digitally track the location, type and status of the work as well as the qualifications of the service teams.
- Remote data monitoring: Software systems use algorithms to detect trends in turbine performance. This is supported by the CMS vendors.
- Certificate management, hazardous substance registers, and more are digitally created and can be shared with the customer via interfaces.
- RFID technology enables automated detection, processing, and documentation of components and tools.
- Digital job application management and much more

Leveraging private innovation potential

In addition, there is currently another strong trend: developments in the private sector often progress more quickly than in the business environment. This means that future business solutions are often measured using a yardstick defined in the private sector.

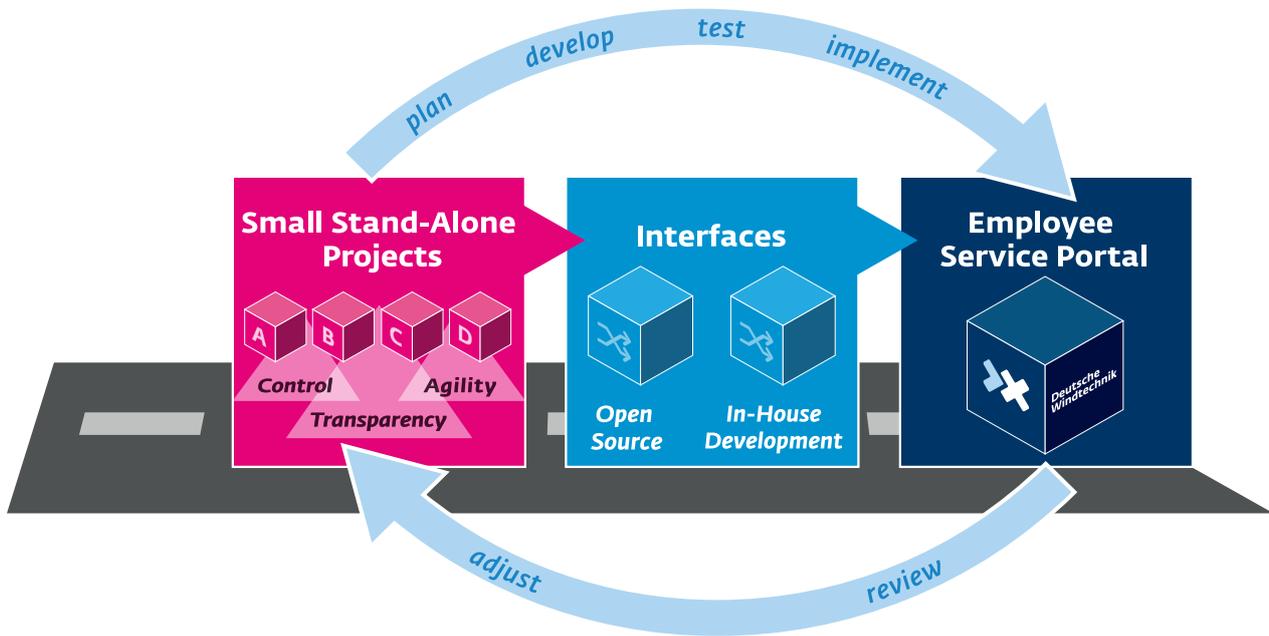
The wind services industry is increasingly hiring young technicians who have a clear expectation that systems should be as straightforward and easy-to-use as their smartphones and the apps installed on them. Many people in positions of responsibility would do well to try a fresh approach and allow things in their everyday lives to inspire, influence or even dictate business-related decisions. There are great opportunities.

Cutting the colossus into manageable chunks

The innumerable options are a real problem for companies trying to create a digital roadmap. Generally speaking, a roadmap provides an overview for the digital transformation so that individual developments do not get in each other's way. But where do you start?

In the IT sector, for example, complex issues are addressed using methods that focus on high agility.

The strategy is to create small, manageable individual projects that are transparently



Deutsche Windtechnik's digital roadmap provides an overview for the digital transformation. The strategy is to create small, manageable individual projects that are transparently managed, constantly monitored and tested as quickly as possible. Many applications have been successfully integrated this way into the service portal for Deutsche Windtechnik's employees.

managed, constantly monitored and tested as quickly as possible to be able to adapt and implement them quickly. The smaller and more agile the individual systems can be, the more dynamic the overall system becomes.

This allows very fast feedback. In particular, fast 'live testing' with selected users and lean project structures ensure rapid successes that can be further built upon.

The key factor is that these developments must remain open in order to be able to build new solutions on top of them or to gain access to them, think open source here.

Lots of inspiration but also plenty perspiration

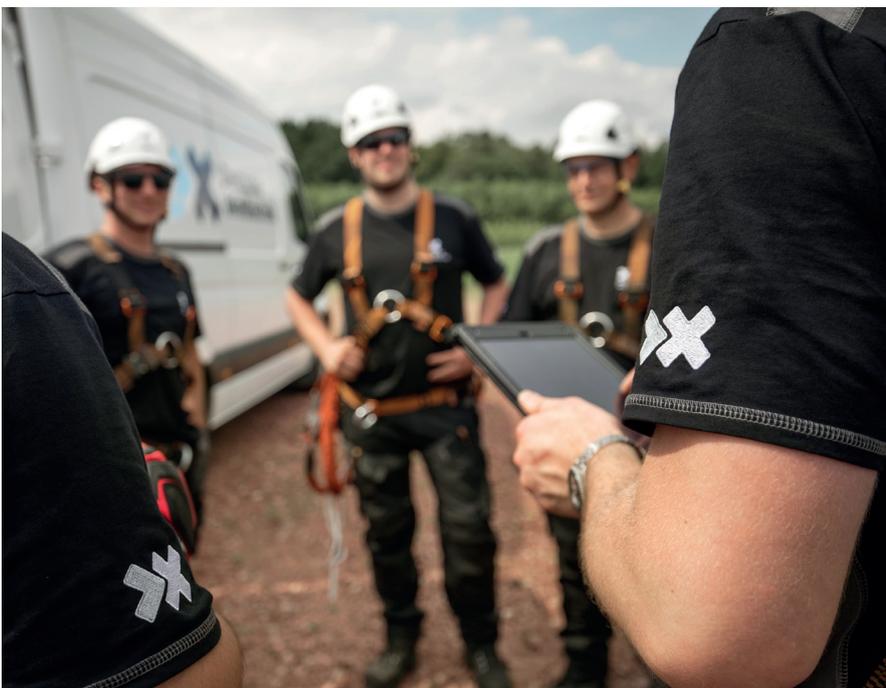
In this article, we do not want to rehash ideas like Big Data, Artificial Intelligence, and so on. Nevertheless, these buzzwords

accurately describe the driving forces behind current developments. Data is recorded and digitised everywhere, and it can be used in any form.

However, in order to successfully implement digitisation within a company, it takes a high level of skill to evaluate how effective it will be in any given scenario, and technical and economic parameters have to be constantly factored in. To achieve this, processes must be meticulously analysed and decision-making documents need to be prepared.

Let's be honest: Who actually has everything in use at home that would be technically possible? Often, state-of-the-art solutions are not yet economically viable, and conventional solutions may still be faster or easier to use. Developments in the automotive industry are a good example: where we used to have individual auxiliary systems we now have a wide range of standard support systems. Semi-autonomous driving is already on the rise.

Fully autonomous driving has also been feasible for quite some time already, but the market apparently still needs some time to catch on. There are many such examples in the wind industry as well. These include CMS systems, digital planning boards, digital resource management, wind and weather forecasts, the active pushing of error notifications and the use of assistance systems for error analysis and forecasting based on big data.





Visionaries take the lead - Maintenance 4.0

What might a vision for the future of maintenance look like? Imagination knows no boundaries. Read our vision of Maintenance 4.0:

The entire service plan as well as just-in-time spare parts management are handled fully automatically: the wind turbine autonomously plans its next service visit and reports all required spare parts and consumables directly to the manufacturers.

The manufacturer produces the required spare parts just in time using a 3D printer and delivers the products directly to the wind turbine with an electric helicopter. At the same time, if necessary, the service company automatically schedules a visit by properly qualified personnel and informs them of their upcoming deployment using an app.

A fully automated warehouse sends the necessary tools using an electric helicopter, which also picks up the technicians from their homes. Invoices and documentation are generated digitally via an interface, which also automatically sends the financial data to the accounting departments of the respective companies.



Openness as the basis for change

When visionaries present their ideas, in most cases it is the economically driven users who determine whether an innovation gets a chance. Only when it becomes clear that introducing a system will lead to a productivity increase will it have real market opportunities.

Even though there are already many projects in progress, there are also still many challenges ahead of us and our entire industry. This includes simple projects such as IT interfaces to wind turbines (e.g. OPC) or standardised markings (e.g. RDSPP).

Our current activities would not have been possible 15 years ago. Similarly, economically viable 10-MW wind turbines seemed unachievable to all but a few visionaries. All stakeholders need to remain open to change at a very fundamental level in order for the speed of development to continue at this pace. One thing is certain: the future will be different.

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