Applications and platforms in digitalization of wind farm O&M – community feedback and survey results

V. Berkhout,
B. Machill,
L. Reintanz

Contact:
volker.berkhout@iee.fraunhofer.de
Phone: +49 561 7294-477

Fraunhofer IEE
Königstor 59
34119 Kassel | Germany

www.iee.fraunhofer.de/en

Digital platforms in Wind O&M

Data analysis techniques promise numerous opportunities to create additional insights from turbine operation and provide actionable information that lead to better performance and lower operational expenses. Digital platforms are evolving as services where software developers and operational data owners can do business on the IT infrastructure provided by a third party. Fraunhofer IEE conducted an extensive survey about expectations within the industry related to applications, connectivity, benefits, funding and barriers to the future use of digital platforms.

Methodology

The online survey [1] was sent out through the main German wind energy industry associations BWE and FGW and relevant Fraunhofer contacts. During a two month survey period in Q3-2018 a number of 39 responses were submitted.
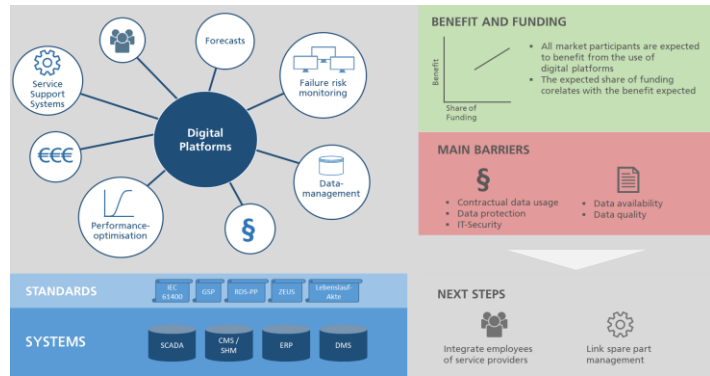

Figure 2: Summary of survey results on digital platforms in operation and management of wind farms
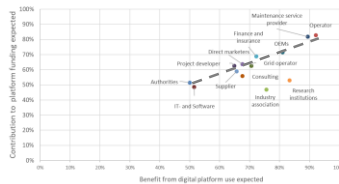

Figure 3: Benefit and expected founding contribution per actor

Figure 4: Founding contribution and suitability as app-store operator on a digital platform

Figure 1: Breakdown of responses by roles

Expected funding contribution

For all actors involved a majority expects benefits from the use of a digital platform. It is worth highlighting that the more respondents feel a specific actor benefits from platform usage the more respondents expect contributions from this role to the funding of the platform operation. Building a sustainable business model is a key to the long term success of digital platforms.

Operating the wind-app-store

The survey asked what kind of organizations would be suited best for managing the access to a wind energy data and application platform as an App-Store operator. Interestingly respondents perceived independent institution such as research organizations, software companies and industry associations favorable compared to companies within the direct wind value chain.

References:
[1] Machill, B., Berkhout V.: Ergebnisbericht - Umfrage zu digitalen Plattformen für die Windenergiebranche, Fraunhofer IEE, 2019
[2] DIN Deutsches Institut für Normung e.V. IGrundlagen der Instandhaltung (DIN 31051); DIN Deutsches Institut für Normung: Berlin, Germany, 2012.
[3] VGB PoweTech e.V. VGB-Standard RDS-PP: Application Guideline Part 32: Wind Power Plants: VGB-S823-32-2014-03-EN-DE; Verlag Technisch-Wissenschaftlicher Schriften: Essen, Germany, 2014
[4] MSC2010, Mathmatical Subject Classification, 2010, https://www.zbmath.org/classification/

Ideas for modern applications

In a parallel effort Fraunhofer IEE developed and evaluated ideas for modern digital application within the project »ModernWindABS«. The starting point was a breakdown of main processes in operation and maintenance under the guidance of maintenance standard DIN 31051 [2] and the RDS-PP [3] component structure.
Methods were structured according to the mathematical subject classification MSC2010 [4]. For each main class of methods brainstorming sessions with at least two process and two method experts were held inhouse. Figure 5 shows the matrix structure of the idea search and the number of ideas created for the respective combinations.

Community feedback

The ideas have been clustered, discussed with the project's steering committee and presented at an industry workshop held at Kassel on November, 26th 2019.
The 30 participants have been asked to rate and prioritize the ideas during the workshop. The results are shown in Figure 6.
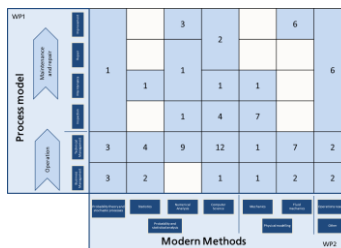
Anomaly detection as a tool for the early detection of failures in operation was ranked as the top priority of the overall group. Technical degradation models on the turbine and component level were ranked as second priority. Assistance functions for maintenance data collection and digital twins are next in the ranking.

Figure 5: Process-method-matrix for in-house workshops and the numbers of ideas developed.
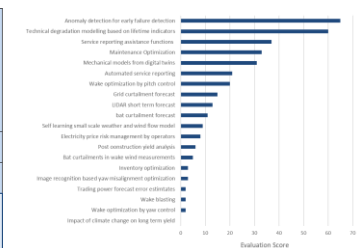

Figure 6: Priority in digital applications for wind farm O&M optimization as per industry workshop survey at Fraunhofer IEE on November, 26th 2019