Report

Membership survey by the Open Industry Alliance 4.0 on the topic Industry 4.0

Industry 4.0 may be an overused term, but it is already a reality in many companies. How fit do companies feel about digitalising their production? What is the current state of play? What challenges do they face? And where do they still see a need to catch up? A recent membership survey by the Open Industry 4.0 Alliance paints an exciting picture of the current situation and level of maturity of Industry 4.0 initiatives.

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Methodology

In March 2022, the Open Industry 4.0 Alliance conducted an online survey of its members on the subject of Industry 4.0 – in particular on the topics of connectivity, sustainability, interoperability, and infrastructure. A total of 24 members of the Alliance participated in the survey. The survey reveals interesting trends regarding the practical implementation and planning of digitalisation initiatives in an industrial environment.

"The exciting thing about the survey of our members is that we received a very broad picture in terms of our members' Industry 4.0 initiatives, from basic digitalisation measures such as connecting machines digitally and the infrastructure used for this purpose to forward-looking themes such as artificial intelligence and sustainability. There are industries that have progressed further than others in terms of digitalisation. Our aim as the Alliance is to drive the implementation and establishment of digitalisation in industry – regardless of a sector's or a company's level of maturity – whether in the basics such as connectivity or in high-level topics such as leveraging data through artificial intelligence," says Ekrem Yigitdöl, Managing Director of the Open Industry 4.0 Alliance.

"Our members are at the forefront of industrial digitalisation in many areas. We are therefore also glad to see that the issues of sustainability and sharing open data were relevant topics in the survey. By working together in practice on the implementation of interfaces and the active implementation of digital twins as well as the application of artificial intelligence, we are giving both global companies and SMEs with global operations decisive impetus in realising Industry 4.0 and unleashing the full value creation potential of data spaces," adds Ekrem Yigitdöl in his assessment of the survey results.
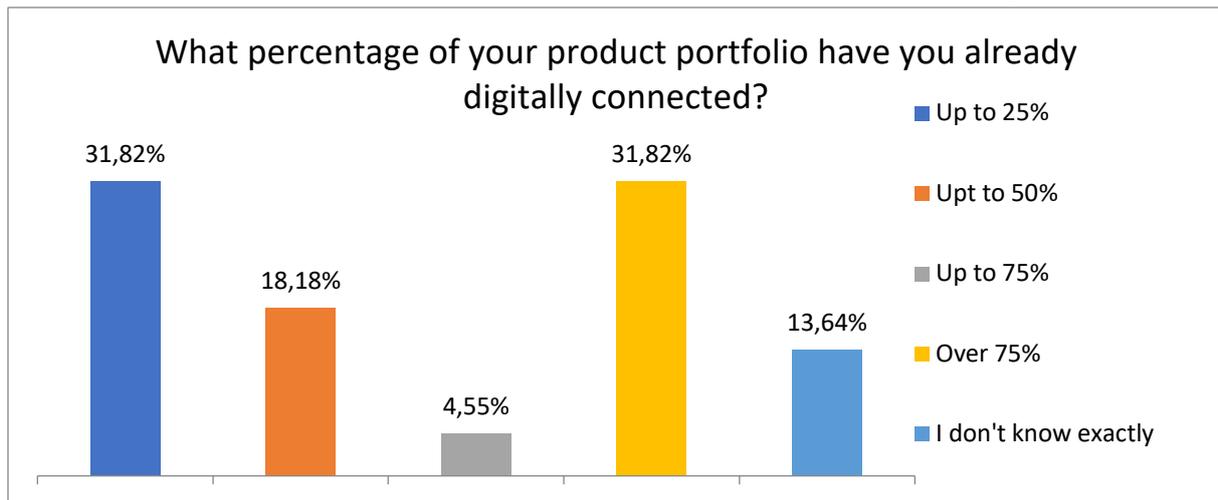
Connectivity...

... of the product portfolio

Over half (57 per cent) of Alliance members surveyed say more than three-quarters of their product portfolio can be digitally connected; for 25 per cent of respondents, it's less than 75 per cent of the portfolio and another 17 per cent say they do not know.
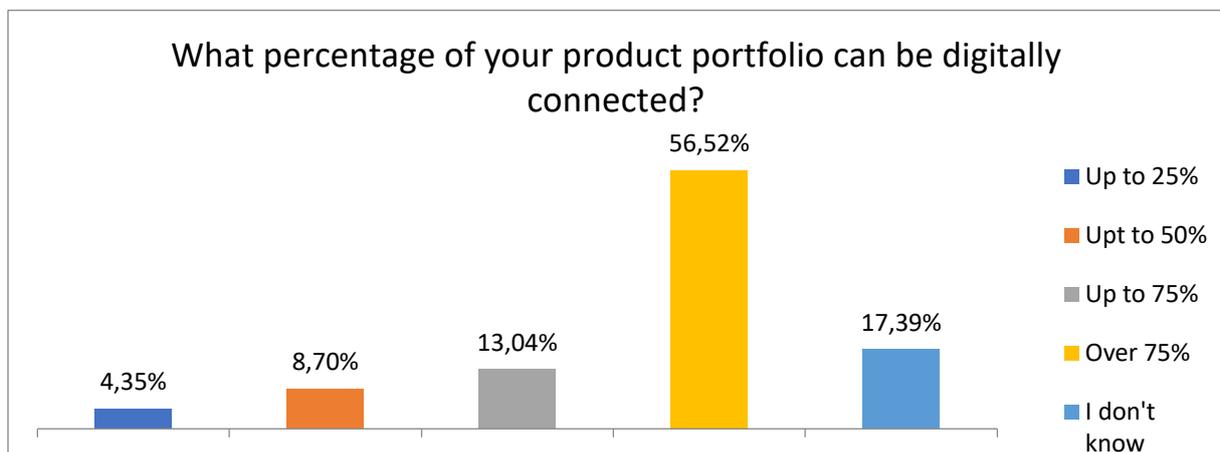
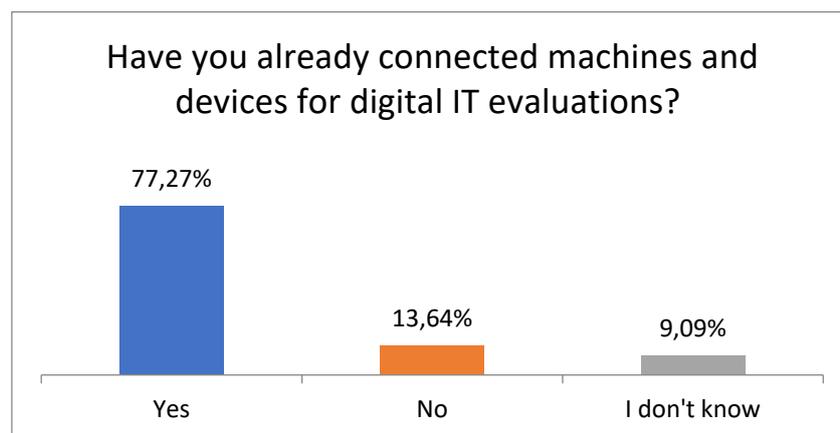**86 per cent of the companies surveyed have already connected their product portfolios digitally**, although there are significant variations here when it comes to the overall scope of their particular portfolios:

- 32 per cent of respondents have already digitally integrated more than 75 per cent of their product range;
- 5 per cent up to 75 per cent;
- 18 per cent up to 50 per cent; and
- 32 per cent less than 25 per cent

What percentage of your product portfolio have you already digitally connected?

- Up to 25%
- Upt to 50%
- Up to 75%
- Over 75%
- I don't know exactly

31,82%   18,18%   4,55%   31,82%   13,64%

… in production

According to the survey, more than three out of four respondents (77 per cent) have already connected machines and devices digitally for evaluation. However, the degree of connection across the overall portfolio is relatively low at 25 per cent for 45 per cent of the companies surveyed. Only 19 per cent of respondents provide digital IT evaluation for three-quarters of their portfolio, while 36 per cent do not know the level.

Have you already connected machines and devices for digital IT evaluations?

77,27%   13,64%   9,09%

Yes   No   I don't know

More than one in four (27 per cent) have also networked shop floor and top floor systems (such as ERP or PLM) for digital real-time analysis. 32 per cent have not, and another 41 per cent are not sure.

In this respect, a third (33 per cent) of the companies surveyed use the collected data for internal evaluation; another 33 per cent for disclosure to third parties (customers and suppliers), and 29 per cent within an extended ecosystem (for example, for B2C, B2G or multi-vendor systems).

Furthermore, 29 per cent of the companies surveyed are already using artificial intelligence (AI) to take their data analytics to a new level. Another 57 per cent plan to introduce this in the next two years. Respondents identified customer services, shop floor and production data as well as automation as interesting areas for data analysis and ultimately for process optimisation and business improvement.
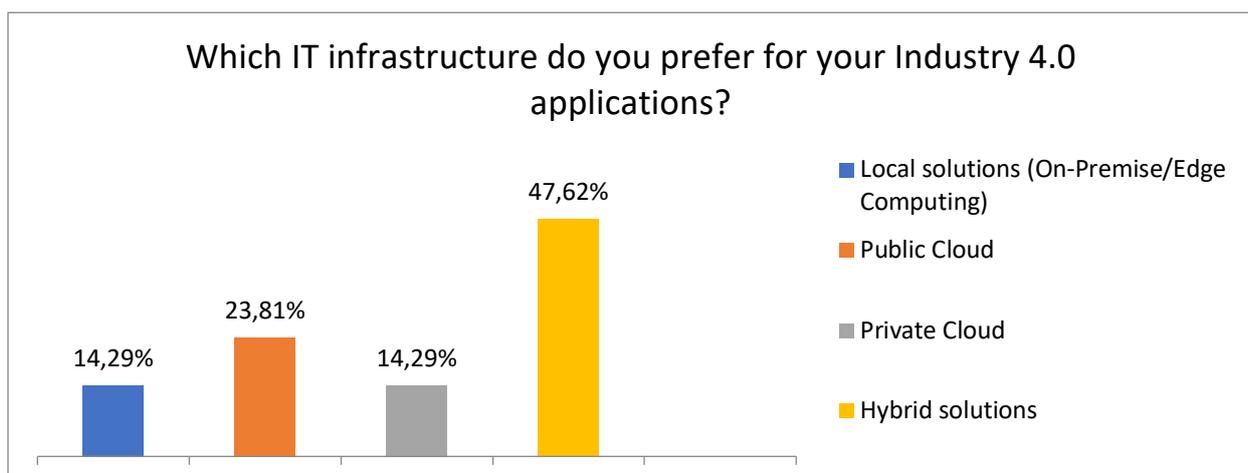
"We want to go one step further than the OPC standard, which primarily offers connectivity for machines. Bringing data and apps together via the cloud and legacy IT systems such as ERP and the like provides companies with a data hub that combines data and processes using their IoT architecture or their digital twins. It is important for us as the Alliance to master not just one discipline, but several – whether it is edge, cloud, shop floor or top floor," explains Ekrem Yigitdöl, Managing Director at the Open Industry 4.0 Alliance.

Infrastructure – cloud or no cloud?

A total of 67 per cent of the Alliance members surveyed already use Industry 4.0 applications in the cloud – the remaining 33 per cent say they do not.

Do you use Industry 4.0 applications in the cloud?

33,33%

66,67%

■ No

■ Yes, for certain applications
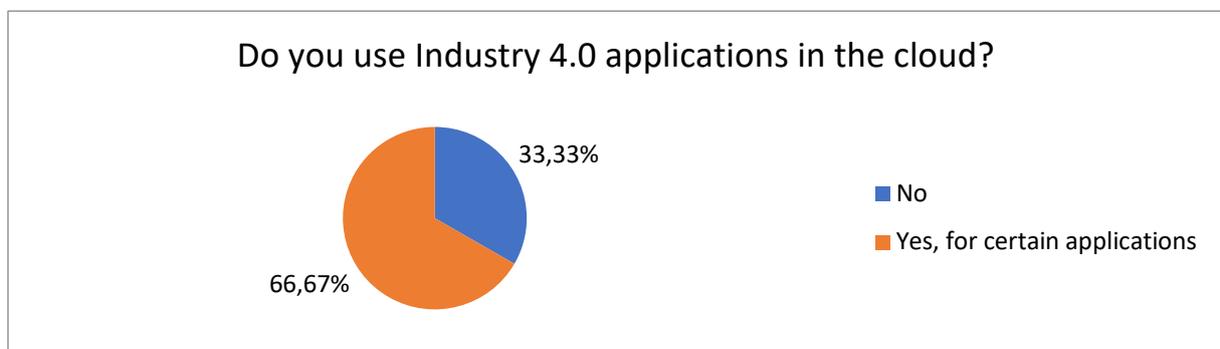
Hybrid systems (48 per cent) are the preferred choice for 'cloudification', followed by the public cloud (24 per cent), local IT infrastructure systems – on-premise or edge computing – and the private cloud (both 14 per cent).

Which IT infrastructure do you prefer for your Industry 4.0 applications?

14,29%   23,81%   14,29%   47,62%

■ Local solutions (On-Premise/Edge Computing)

■ Public Cloud

■ Private Cloud

■ Hybrid solutions

Use of digital twins...

… in product engineering: **40 per cent** of the member companies surveyed intend to use a digital twin in their product engineering in the next 18 months. 25 per cent are already doing this, and another 15 per cent are not planning to do so and 20 per cent do not know.
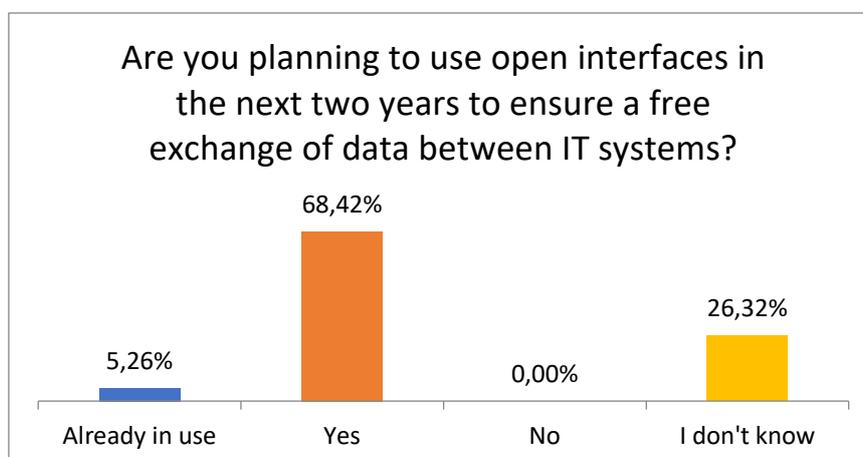
Are you planning to use a 'digital twin' for the product design phase in the next 6-18 months?

Already in use	Yes	No	I don't know
25,00%	40,00%	15,00%	20,00%
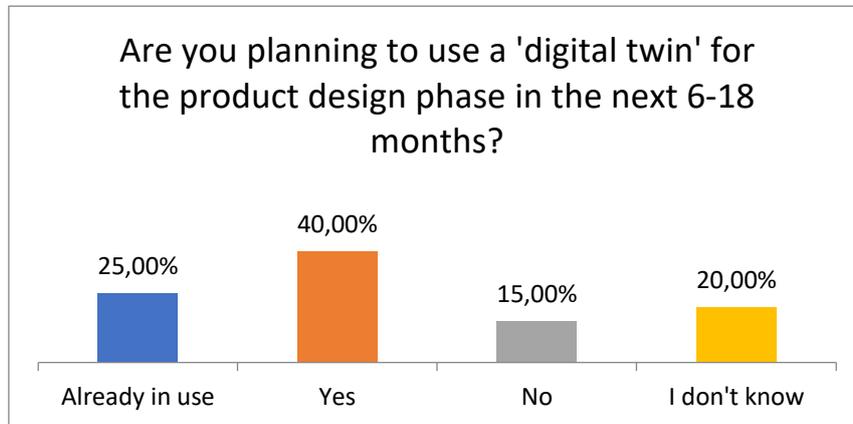
… in simulation: 30 per cent are planning to use a digital twin for simulation purposes (e.g. for process optimisation or collision control) in the next two years. 25 per cent already do so, according to the survey.

… in production: when it comes to using digital twins for real-time evaluation (i.e. using a semantic data model of production), **30 per cent** say they plan to do so in the next two years and five per cent say they are already doing so. A further 45 per cent are undecided on the question and 20 per cent say they are not planning to do so.

Interoperability

There is strong support for the use of open interfaces in the future (68 per cent plan to use them and 5 per cent are already doing so) for the free exchange of data between IT systems.

Are you planning to use open interfaces in the next two years to ensure a free exchange of data between IT systems?

Already in use	Yes	No	I don't know
5,26%	68,42%	0,00%	26,32%

"Our big advantage is interoperability. Almost 70 per cent of our members say they plan to use open interfaces to share data. We are delighted with this statement because the Open Industry 4.0 Alliance precisely provides these interfaces and will continue to do so in the future. This is the only way our members can benefit from the business opportunities of an increasingly digitalised industry," says Ekrem Yigitdöl, Managing Director at the Open Industry 4.0 Alliance.

When asked about the biggest opportunities in sharing data freely, the Alliance members surveyed responded as follows (multiple answers were possible):

- 35 per cent: efficiency and competitive advantage
- 33 percent: new business models
- 24 per cent: achieving sustainability goals
- Mentioned once: product information for customers; product optimisation and further development; additional services and functionalities

The biggest challenges with the free exchange of data, on the other hand, are:

- 43 per cent: IT security
- 30 per cent: safeguarding intellectual property
- 5 per cent: data loss
- Mentioned once: a willingness to share customer data, commercial model for data sharing, rapid semantic standardisation, old-school mindset, and enabling, monitoring, and training.

"We support leveraging data across organisational boundaries. This is the only way to fully exploit the potential for adding value from what are known as data spaces. The intelligence that emerges from this reduces industry's carbon footprint by making it more efficient. Furthermore, new business models can also be imagined as a result. It is important that the data are organised according to type. This is not about data storage. It is vital to indicate the origin of the data – for example, via a digital twin that is responsible for the original data and enables others to access this data," says Ekrem Yigitdöl, Managing Director at the Open Industry 4.0 Alliance.

When it comes to **IT security**, the survey also shows that 28 per cent of respondents have strictly separated their OT (Operating Technology) from IT. A total of 89 per cent say that they address the issue of IT security in-house; although 39 per cent are also assisted by an external partner in matters of IT security.

"Application management and security are key issues. Together with our partners, we give special focus to the aspects of security, authentication, signing and data exchange of industrial apps," says Ricardo Dunkel, Technical Director at the Open Industry 4.0 Alliance.

Strategic implementation and political framework

When asked about their digitalisation strategy, the companies surveyed prefer vendor neutrality with a choice of partners (70 per cent) rather than one preferred partner (20 per cent). 10 per cent are undecided.

"Our members are diverse, whether they are medium-sized companies or corporate groups, whether they are in manufacturing or IT. This means that each member is active in different fields of activity and has a different level of maturity in terms of digitalisation. Vendor-independent ecosystems are essential for us to allow each member to fully leverage the benefits of the Alliance according to their

preferences and level of maturity," says Ekrem Yigitdöl, Managing Director at the Open Industry 4.0 Alliance.

According to the respondents, the state should also invest in the following areas to promote the digitalisation of Germany as an international industrial location (by priority):

1. High-speed Internet roll-out (5G)
2. Collaboration between business and science
3. place: Energy supply
4. Research and development
5. place: European cloud infrastructure
6. Mentioned once: Regulations governing the sharing of data, apps and services, stable domestic policies, education and knowledge transfer, low hurdles for open-source data sharing

Nils Herzberg, board spokesperson of the Open Industry 4.0 Alliance, adds: *"As the Alliance, we are strongly in favour of the regulated exchange of data and therefore support the EU Data Act. However, we hope that by the time the draft is finalised in 2023, it will not be too complex a law, making implementation unnecessarily difficult. Our Alliance membership will in any case find it easier to put the requirements of the law into practice. After all, as an alliance of pragmatists, we will draw up best practices in our working groups for the use of machine data, for example, in compliance with the rules, thereby saving implementation costs for our members. Our members can increase their speed in the market and gain impetus for new business models from the alliance community.*
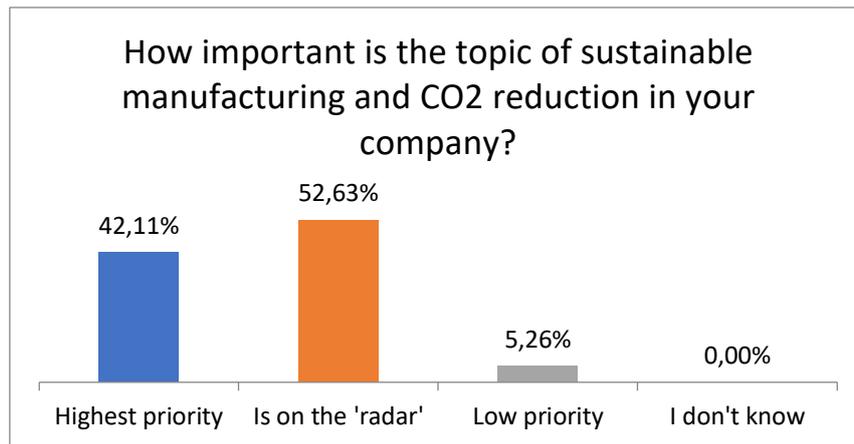

Investment plans according to respondents' prioritisation in the field of Industry 4.0:

1. 71 per cent: connectivity...
2. 68 per cent: interoperability
3. 67 per cent: digital twin
4. 59 per cent: infrastructure
5. 58 per cent: training and professional development

"The need for connectivity is high. Why is this? Because connections are needed all the time. This makes plug-and-play solutions even more important to be able to connect machines and components quickly and easily. The Alliance's reference architecture and implementation guidelines can provide practical help here," explains Ekrem Yigitdöl, Managing Director at the Open Industry 4.0 Alliance.

Sustainability

The topic of sustainable manufacturing and CO_2 reduction has the highest priority for 42 per cent of respondents (and has low priority for only 5 per cent). More than half (53 percent) have this subject on their radar.

How important is the topic of sustainable manufacturing and CO2 reduction in your company?

- Highest priority — 42,11%
- Is on the 'radar' — 52,63%
- Low priority — 5,26%
- I don't know — 0,00%

When asked about projects related to resource efficiency and CO2 reduction in order to achieve sustainability in manufacturing, 29 per cent mention production itself; 22 per cent say their product portfolio and another 20 percent mention materials management or their supply chains (10 per cent).

Members also made specific suggestions on how to save CO2:
analysis of industrial processes and their automation, collection of use cases and implementation of prototypes, sharing of good examples from the Alliance and the
reduction of energy consumption of machines during use.

"As suppliers of industrial equipment, we can make a key contribution to the environmental sustainability of factories and supply chains around the world. We are putting supply chain resilience into *practice and building 'sustainability by design' into networked software applications,"* says Nils Herzberg, board spokesperson of the Open Industry 4.0 Alliance.

About the Open Industry 4.0 Alliance:

The Open Industry 4.0 Alliance acts as a collaborative partnership of leading industrial companies that take a pragmatic approach to implementing cross-vendor Industry 4.0 solutions and services for manufacturing facilities and automated warehouses. Industry experts collaborate in industry and technology working groups to develop use cases and implement them technically based on the OI4 reference architecture. These solutions, along with implementation guides, are shared in the community and made available outside the Alliance. The Alliance was launched in April 201 and its headquarters are located in Reinach, Switzerland.

You can find more information at: https://openindustry4.com/

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