

Connected software solutions for *Industry 4.0*

User demand and requirements – today and in the future

Download the Industry 4.0 market study.
www.bosch-si.com/survey

For this market study, more than 180 users of Industry 4.0 software have been surveyed who work at manufacturing companies in Germany, Austria, and Switzerland. Around one third are production managers at Bosch plants. Two thirds work at other manufacturing companies.

Connected software solutions for Industry 4.0?

- 01** They make existing data from various manufacturing systems available in an integrated user interface.
- 02** Using visualization tools and evaluation methods, they help mine the data for new insights (manually and automated).
- 03** They provide a basis from which to make quick and informed decisions, continuously improve productivity and flexibility, and sustainably increase competitiveness.

01 Where do manufacturing experts get information on *Industry 4.0*?



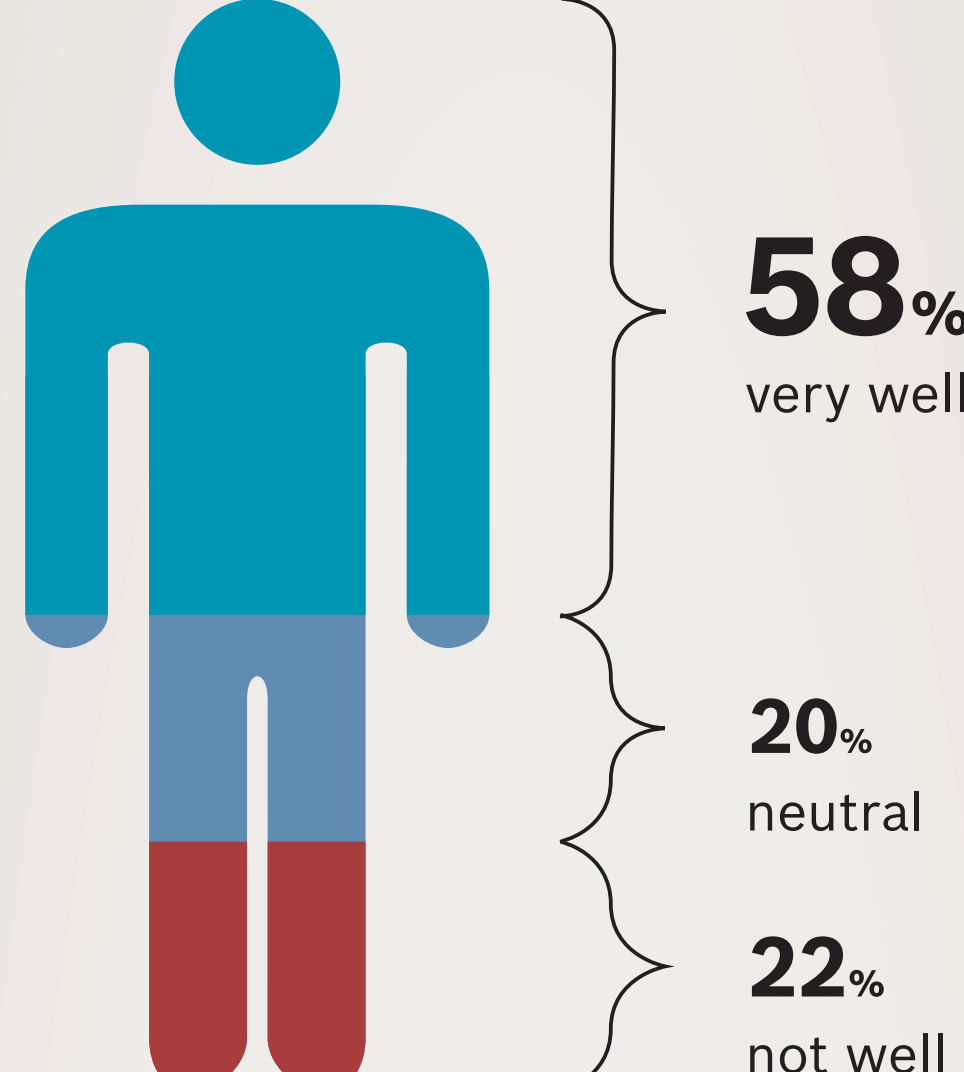
Industry 4.0 is everywhere. Where do manufacturing experts get their information?

Conventional sources continue to play a major role.

02 How do production managers rate their knowledge of *Industry 4.0*?

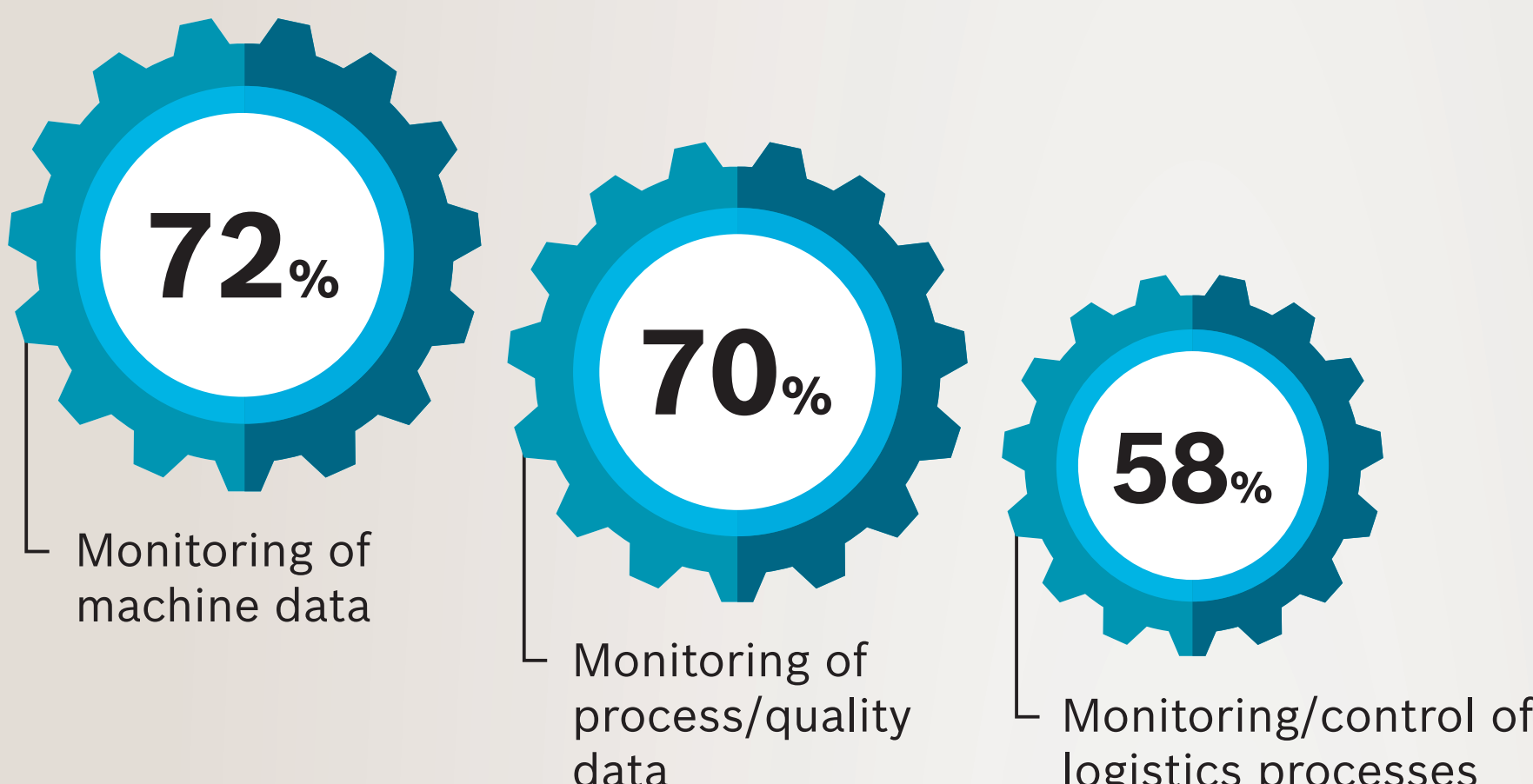
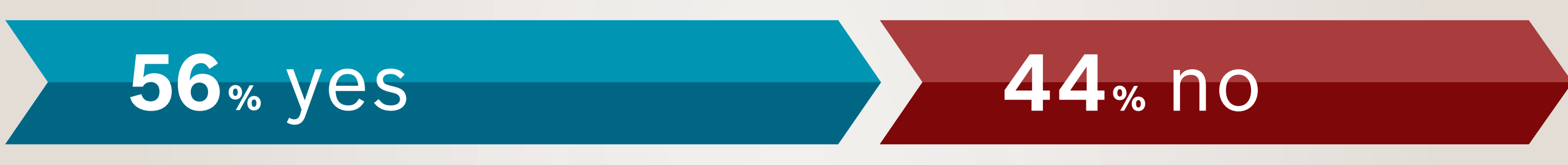
The level of information is very high – communities play an important role.

When asked to rate their own knowledge, 58 percent said they felt very well informed. Within the Bosch Group, the level of information is even higher at 65 percent. Bosch places great value on the topic of the "future of manufacturing," both as a leading supplier and leading user. As the level of information increases, so does the importance of Industry 4.0 communities for expanding and shaping the overall store of knowledge.



- 67%** Industry 4.0 communities
- 64%** Analyst studies
- 64%** Trade magazines

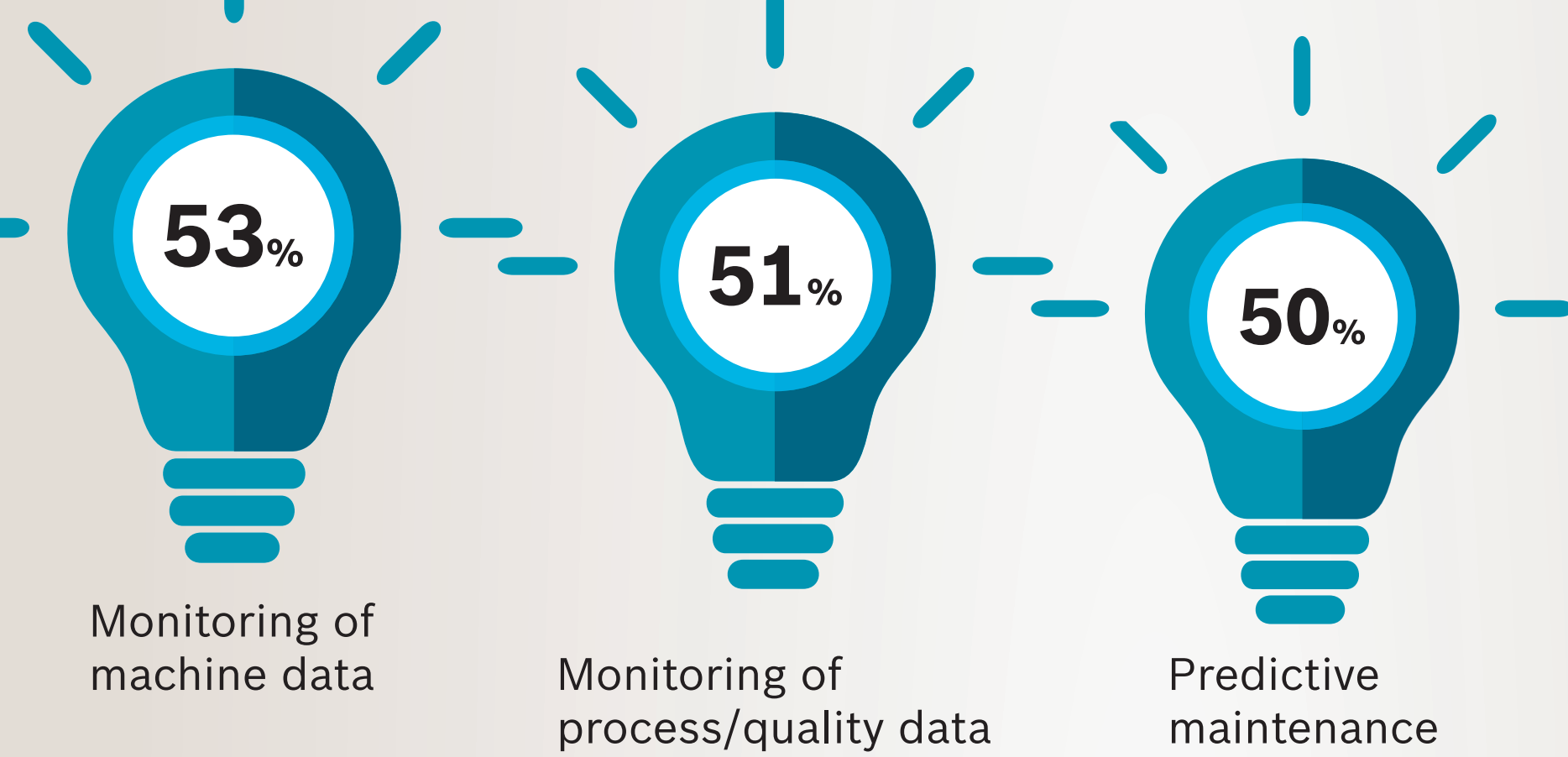
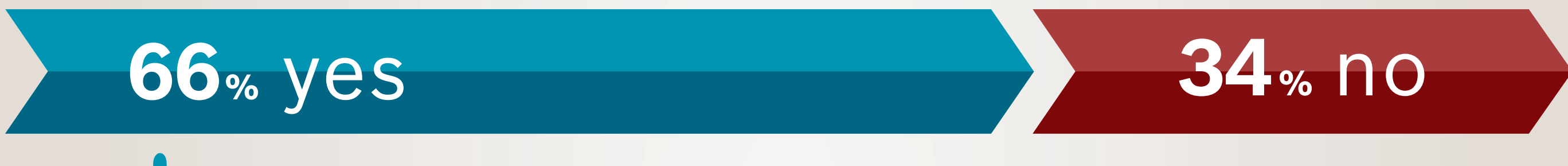
03 *Industry 4.0* software solutions in use



Practical implementation of Industry 4.0 software is already well advanced.

Of the production managers surveyed, some 56 percent are already using Industry 4.0 software. Within the Bosch Group, this figure is again significantly higher at 73 percent. Bosch plants are already advanced when it comes to practical implementation.

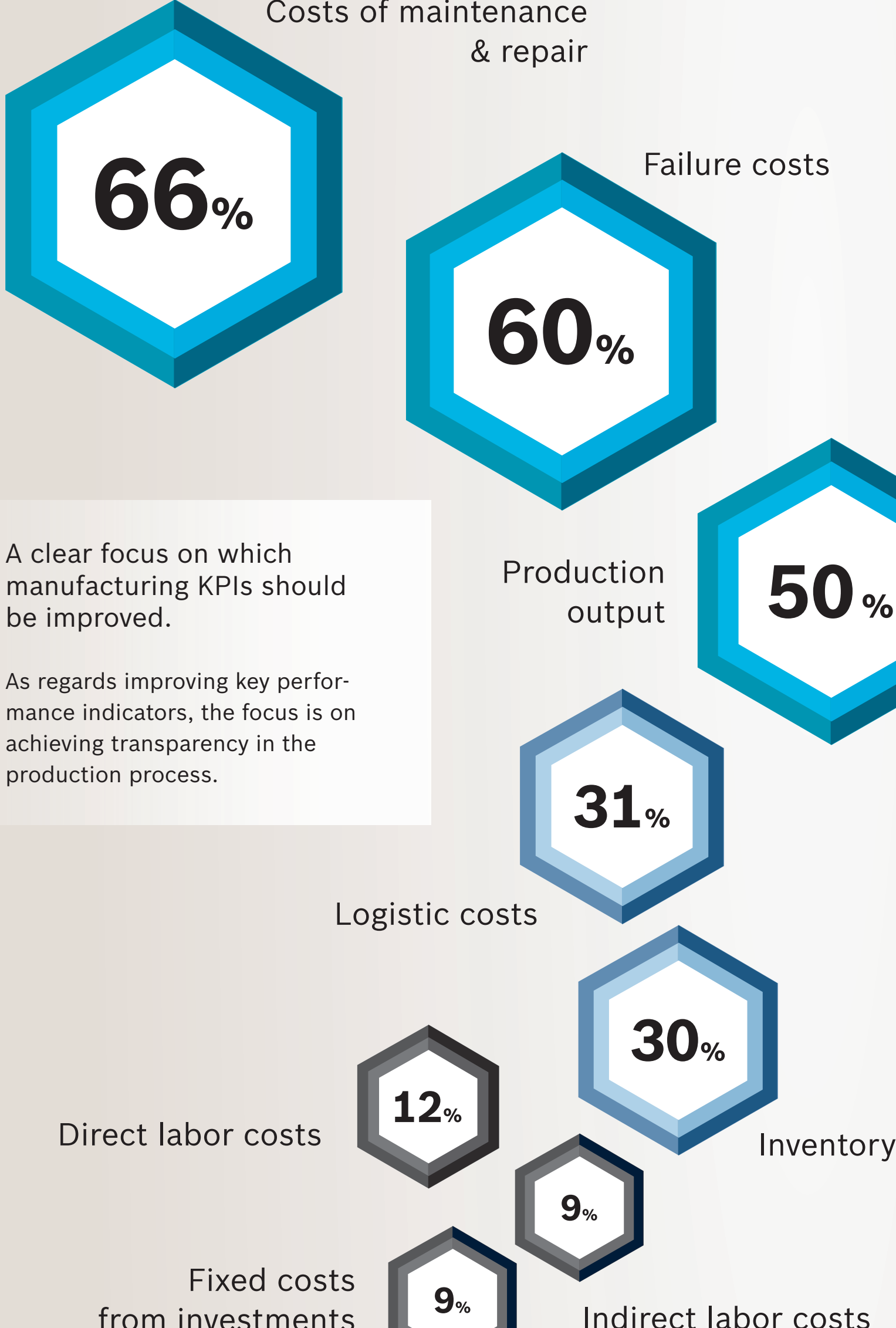
04 *Industry 4.0* software solutions in the pipeline



Demand continues to grow.

Some 66 percent of production experts plan to implement an Industry 4.0 software solution within the next 12 months. At Bosch, that proportion is 82 percent.

05 Improving KPIs in the manufacturing environment



A clear focus on which manufacturing KPIs should be improved.

As regards improving key performance indicators, the focus is on achieving transparency in the production process.

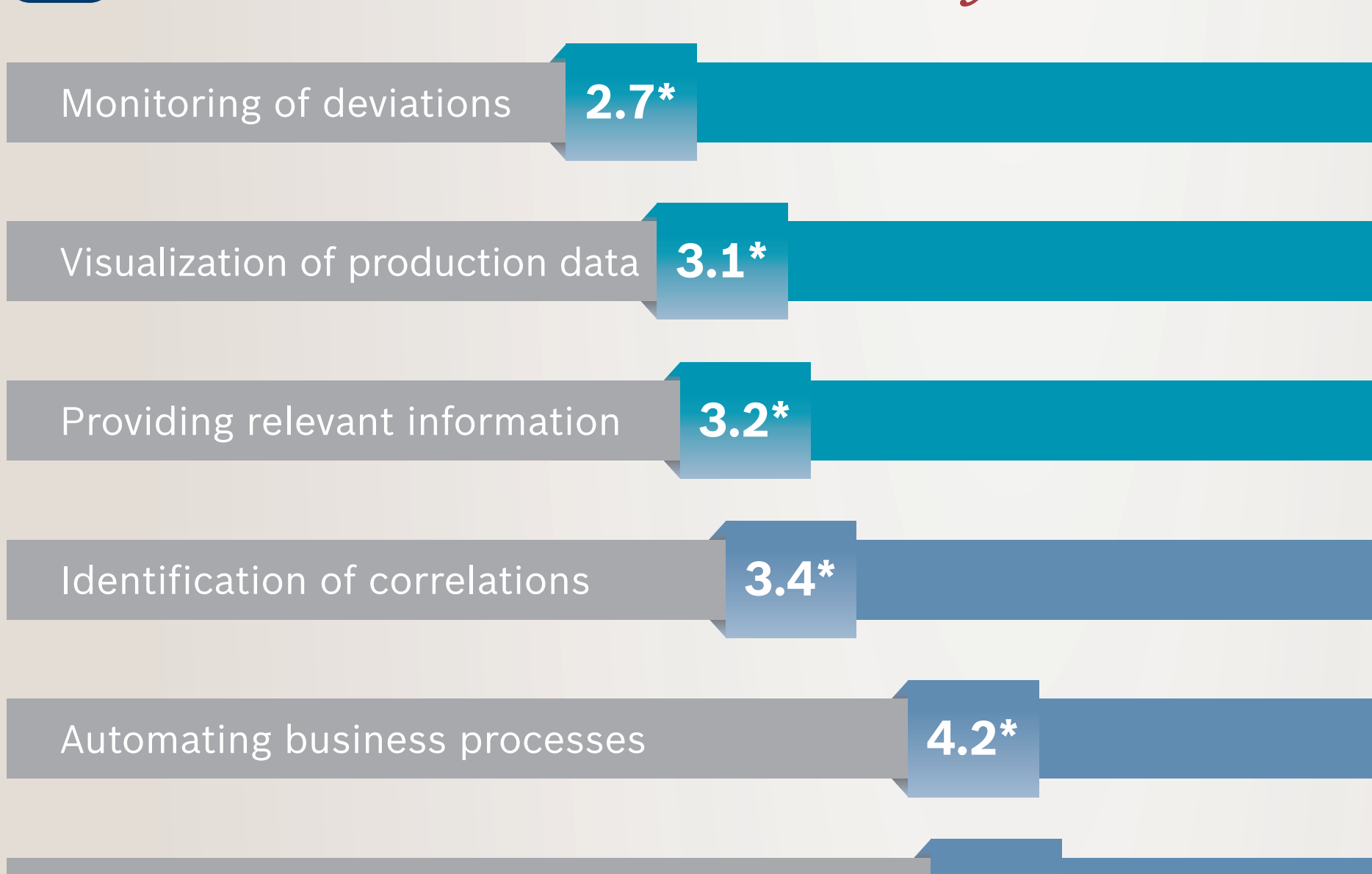
06 Production output KPI

- 77%** OEE: Technical downtime
- 62%** OEE: Performance losses
- 44%** OEE: Organizational downtime
- 32%** OEE: Quality losses
- 31%** OEE: Changeover losses
- 23%** Plan occupancy time

Benefits according to type of OEE loss.

In relation to the KPI for production output (overall equipment effectiveness), the main benefits promised by Industry 4.0 software solutions are minimized downtimes and performance losses, for instance by reducing cycle-time losses.

07 Functionalities of *Industry 4.0* software solutions

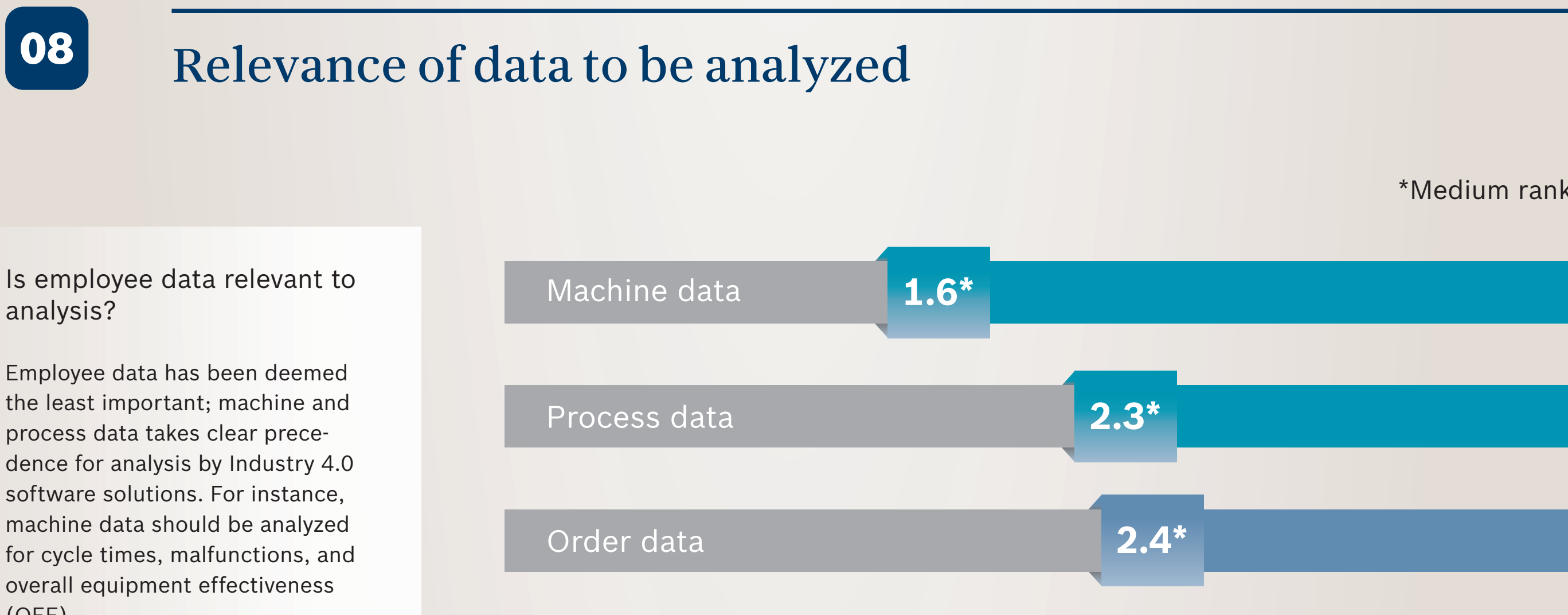


*Medium rank

Demand for functionalities – ranked according to focus KPIs.

The functionalities most in demand are those that help deliver even greater transparency on the status of production systems. This includes active notification and suggestions for how to improve the current activity. At Bosch for instance, monitoring the cycle times of production facilities (Cyclotime Monitoring) resulted in a proven return.

08 Relevance of data to be analyzed

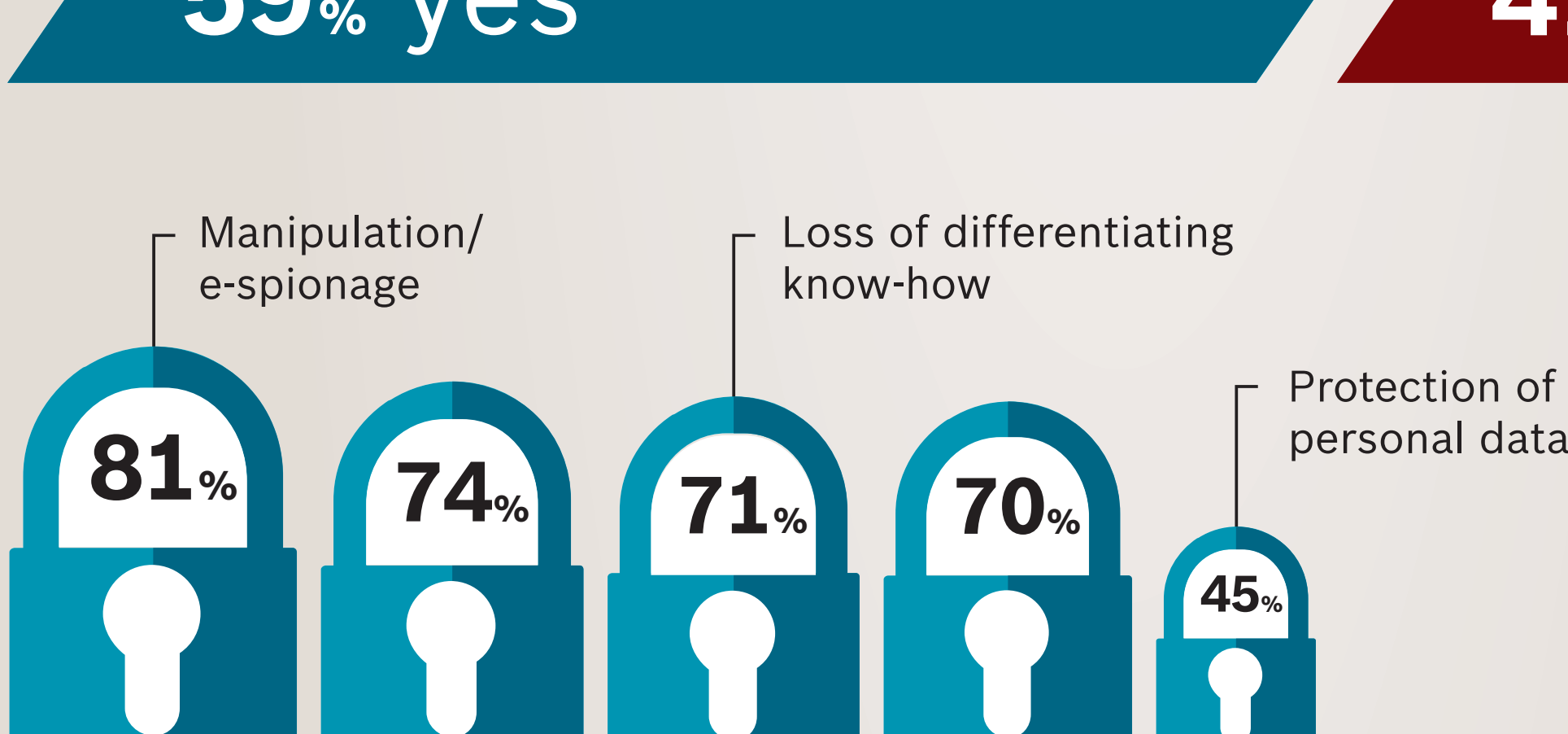


Is employee data relevant to analysis?

Employee data has been deemed the least important; machine and process data takes clear precedence for analysis by Industry 4.0 software solutions. For instance, machine data should be analyzed for cycle times, malfunctions, and overall equipment effectiveness (OEE).

*Medium rank

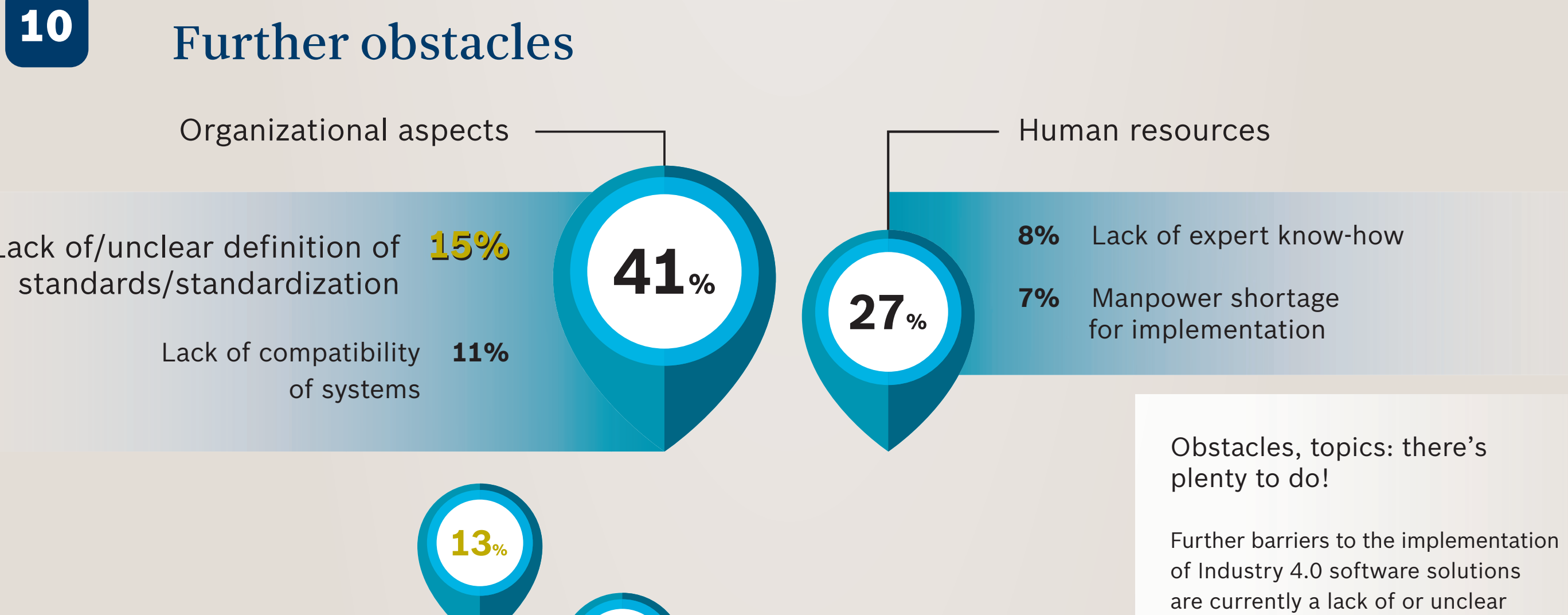
09 The obstacle of data security



This much is sure: data security is a barrier.

One survey respondent said: "For me, data security is the most important issue." There's no doubt that data security is an issue when it comes to Industry 4.0. These concerns are widespread and are seen as an obstacle to the sustainable implementation of Industry 4.0 software solutions. Key approaches such as the threat and risk analyses that go into secure software development processes have to be universally understandable and communicated.

10 Further obstacles



Obstacles, topics: there's plenty to do!

Further barriers to the implementation of Industry 4.0 software solutions are currently a lack of or unclear standards and cost/benefit analyses for these future projects. "Too little is shared about specific examples of applications and their tangible benefits for plant operators." is the opinion of another survey participant.