

# Maturity model guide



Developed by:



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## Introductory text

### Welcome to our maturity level page on digitization!

Our maturity level consists of several parts, which can be filled in optionally. Depending on which area of your company you would like to determine your digital maturity level in, you can choose between the areas of development, production, assembly and after sales. In addition to the selected area, a questionnaire on the entire company is always automatically prefaced.

We recommend that the questionnaire for the entire company be completed by a person at management level and the questionnaires for the individual company divisions by a division manager. Since some questions are found in all questionnaires, a comparison between the different actual situations can be made. When filling out the questionnaire, please make sure which questionnaire you are currently in. For example, the questionnaire on development should also exclusively record the current status of development.

In terms of content, the questionnaires cover at least three dimensions: Technology, organization and employees. In addition, the topic of strategy is also considered for the company as a whole. Each dimension contains a different number of indicators. The maturity levels for all dimensions and indicators are graphically illustrated in the final result.

If you need additional information to fill out some of the questions, you can use the question mark symbols to obtain additional explanations or examples.

# Companywide

## T Technology

### T1 IT-system design

T1	Indicator	Level 1	Level 2	Level 3	Level 4
T1.1	Are the IT systems of your departments integrated into the higher-level corporate systems?	No integration	Individual systems are integrated into the higher-level enterprise systems	Systems are predominantly integrated across divisions	Systems are fully integrated into the higher-level enterprise systems
		Your systems are not connected to the higher-level enterprise systems and cannot exchange information. The data exchange takes place exclusively manually, e.g. by printing out Excel lists or by verbally passing on information.	Their systems are only occasionally connected to the higher-level enterprise systems, so information cannot be exchanged automatically. Information is passed on manually due to media discontinuity.	A large part of your systems is connected to the higher-level enterprise systems and can exchange information automatically. There are only a few media breaks, i.e. missing interfaces between systems where manual information transfer is required.	Their systems are networked with the higher-level enterprise systems and enable end-to-end collaboration. Relevant information is automatically forwarded. Product-related data from after-sales, for example, is also automatically transferred to development.
T1.2	Are your IT systems networked along the entire value chain (to customers and suppliers)?	No networking	Systems are only networked to a small extent; numerous media breaks exist	Systems are mostly networked; isolated media breaks exist	Systems are consistently networked without media breaks
		Your systems are not connected to systems of your customers and suppliers and cannot exchange information. The data exchange takes place exclusively manually, e.g. by printing out Excel lists or by verbally passing on information.	Your systems are only occasionally connected to systems of your customers and suppliers, so information cannot be exchanged automatically. Information is transferred manually due to media discontinuity.	Most of your systems are connected to systems of your customers and suppliers and can exchange information automatically. There are only a few media breaks, i.e. missing interfaces between systems where manual information transfer is required.	Your systems are networked with your customers' and suppliers' systems and enable end-to-end collaboration. Relevant information is automatically forwarded.

T2 *IT-security*

T2	Indicator	Level 1	Level 2	Level 3	Level 4
T2.1	Is there a concept to guarantee IT security?	No concept available	Concept available, no reference to ISO standards or comparable	Concept according to ISO standards or comparable available, not audited	Audited concept according to ISO standard or comparable available
		Your company has no concept for IT security.	Your company has an individual concept for IT security, but this does not correspond to any standard, e.g. the ISO standard 27001.	Your company has an IT security concept that complies with a standard, e.g. ISO standard 27001. The security concept is not audited.	Your company has an IT security concept that follows a standard, e.g. the ISO standard 27001, which is audited.

**O Organisation**

O1 *Data management*

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.1	How do you evaluate data in your company?	No data evaluation	Manual evaluation of data, no software support	Predefined evaluations can be called up by software	Individual evaluations possible through Big Data Analytics
		Your company does not use analytical methods to evaluate data digitally.	Data is evaluated manually, e.g. handwritten, using Excel tables or by manual input into simple evaluation software.	Your company uses digital analysis methods. However, only pre-defined analyses are carried out, which record standardized key figures. Individual analyses are not possible.	Your company uses Big Data Analytics. Here, the data is obtained from various sources using search queries and then optimized and evaluated. The results of the analyzed data are processed and presented. This allows the company to evaluate a wide variety of data formats in an application-oriented manner.

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.2	How do you provide data in your company?	Data is stored locally and can be called up in an individual view	Data is centrally available and retrievable in a standardized view	Data is centrally available and can be retrieved for specific areas	Data is centrally available and can be accessed contextually
		The provision of information is based on available individual information. There is no selection of relevant data regarding area or task. Each department can view identical information regardless of the intended use of the data.	Data is displayed in a standardized view, i.e. all employees see identical information that is not adapted to specific areas or functions.	Data is made available for specific areas, i.e. sales employees see other information about a product in the same way as employees in development.	Information is provided contextually, i.e. employees receive different information depending on the person, task and situation.
O1.3	How do you use cloud solutions?	No usage	Use as online storage	Information exchange via online storage	Use of computing power in the cloud
		Cloud solutions are not used in the company.	The cloud is used exclusively to store files.	Content stored in the cloud can also be shared online.	Cloud solutions are not only used to store and share information. The computing power required for these processes is also provided by the cloud.
O1.4	How do you store data in your company?	Data is stored in multiple, proprietary formats and cannot be shared between departments	A lot of data is stored in standard formats and can therefore be accessed by all departments	Almost all data is stored in uniform standard formats that can be used by all departments	Data is stored as meta data independent of format and can be retrieved as required
		Data is stored using proprietary formats. The data can therefore only be processed with the original system of the respective file. In this case, employees maintain individual Excel lists, for example, to record information. This means that information is only recorded selectively. The exchange is only possible manually.	A lot of information is stored in standard formats and can thus be retrieved by various programs. Occasionally, however, information is still available in proprietary formats and can therefore only be processed with the original system of the respective file.	Almost all data is stored in standard formats so that it can be processed by many applications and thus used by all employees in different programs.	Data is stored as meta data. Meta data contain structured information about characteristics of data sets. Information and evaluations can be provided and modified as needed on the basis of this information storage, outside the original system.



## O2 Cooperation & collaboration

O2	Indicator	Level 1	Level 2	Level 3	Level 4
O2.1	What opportunities do you offer teams for collaboration in your company?	There is no teamwork	Teams work together exclusively on site	Teams also exchange information via digital media	Cooperation also takes place in virtual teams
		Your company does not promote teamwork. Employees work on individual tasks at individual workstations.	Teams meet on site for face-to-face meetings to exchange information.	Teams also work together via digital media, such as web or Skype conferences.	Teams consist of geographically and physically separated team members who communicate predominantly through digital media.
O2.2	Does your company have the necessary interdisciplinary skills to develop innovative solutions?	Digital solutions for products and systems cannot be developed in-house, as there are no interdisciplinary teams	Digital solutions for products and systems must be sourced almost entirely from suppliers, since only isolated partial solutions can be developed by internal teams	The majority of digital solutions for products and systems can be developed in interdisciplinary teams, only occasionally partial solutions have to be purchased	Digital solutions for products and systems can be developed completely independently due to the interdisciplinary competences
		Digital solutions cannot be developed because disciplines within the company operate separately. There is no exchange between the departments.	Interdisciplinary teams occasionally work together within the company, so that digital partial solutions can be developed individually. In most cases, however, digital solutions are purchased from external companies.	Interdisciplinary teams work together within the company and are able to develop digital solutions almost completely independently. Only occasionally do partial solutions have to be purchased from external companies.	Interdisciplinary teams work together in the company to develop digital solutions.

## M Social

### M1 Corporate culture

M1	Indicator	Level 1	Level 2	Level 3	Level 4
M1.1	How are strategic decisions made?	Strategic decisions are based exclusively on empirical knowledge	Strategic decisions are made sporadically on the basis of evaluated data	Strategic decisions are mainly made on the basis of evaluated data	Evaluated data form the basis for strategic decisions in the company
		Managers make decisions based on experience. Data does not play a role in the decision-making process.	Some managers use evaluated data as a basis for decision-making. However, the majority of decisions are still based on empirical knowledge.	For many managers, decisions are based on analyzed data.	Decisions of all managers are completely based on analyzed data.

M1	Indicator	Level 1	Level 2	Level 3	Level 4
M1.2	Do your employees support digitization projects?	The necessity of digitization projects is fundamentally questioned by the employees	The need for digitization projects is generally recognized, but only isolated projects are supported	The necessity of digitization projects is generally recognized, so that projects are usually supported by the employees	The need for digitization projects is recognized by all employees and corresponding projects are supported
		The potential of digitization is not recognized. The corporate culture is geared towards routines and stability. Digitization projects are therefore not supported by the employees.	The potential of digitization is recognized by only a few employees, so digitization projects have rarely been supported to date.	The potential of digitization is recognized by the majority of employees, so that changes are already being proactively managed in most areas and digitization projects are supported.	The benefits of digitization have been recognized by all employees, so that changes are proactively managed and digitization projects are supported by the employees.

## M2 Leadership

M2	Indicator	Level 1	Level 2	Level 3	Level 4
M2.1	How are employees involved in digitization projects?	Employees are not involved	Employees are involved in some projects	Employees are involved in most projects	Employees are involved in all projects
		Employees have no opportunity to participate in the introduction of digitization solutions.	Employees have the opportunity to participate in a few digitization projects.	Employees have the opportunity to participate in most digitization projects.	Employees have the opportunity to participate in all digitization projects.
M2.2	How do you communicate digitization projects to your employees?	No communication	Sporadic communication via analog media	Sporadic communication via digital media	Regular communication via digital media
		Digitization projects are not communicated. Employees receive information on the use of the technology when it is introduced.	At irregular intervals, news about upcoming digitization projects are disseminated via analog media, e.g. by means of posters.	News about upcoming digitization projects are communicated at irregular intervals via digital media, e.g. by e-mail, intranet or messages on tablets.	Employees are informed about upcoming digitization projects using digital media, e.g. by e-mail, intranet or messages on tablets.
M2.3	How willing are managers to push ahead with digitization projects?	No willingness	Willingness on the part of some managers	Willingness exists among a large number of managers	Willingness of all managers
		Managers see no need to implement digitization projects and are therefore not prepared to actively shape change.	Some managers are willing to help shape digitization projects.	Most managers see the need to implement digitization projects and are willing to help shape them.	All managers see the need to implement digitization projects and are prepared to actively participate in shaping them.

M2	Indicator	Level 1	Level 2	Level 3	Level 4
M2.4	Do your managers act as digital role models?	Managers are not digital role models	Some managers are digital role models	Most managers are digital role models	All managers are digital role models
		The managers do not use digital media and therefore do not model their use. This does not promote acceptance among employees.	Some managers use digital media and thus also exemplify their use. This promotes acceptance among employees to a limited extent.	Most managers use digital media and thus live their use. This promotes acceptance among employees to a greater extent.	All managers use digital media and thus live out their use. This promotes acceptance among employees.

### M3 *Employee development*

M3	Indicator	Level 1	Level 2	Level 3	Level 4
M3.1	What is the priority of developing the digital skills of your employees?	No priority	Low priority	Medium priority	High priority
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional training courses are offered. However, these must always be of immediate benefit.	Training courses are offered, which are usually of immediate benefit.	A wide variety of training courses are offered, not all of which are of direct benefit to the companies. Some training courses also aim to create innovation potential.
M3.2	How do you train your employees?	No training courses are offered	Trainings take place exclusively as face-to-face events	Trainings are also offered online	Learning takes place as smart learning integrated in the work process
		Trainings are not offered.	Trainings are only possible as on-site presence events.	In addition to classroom training, online training or e-learning is also offered.	Your employees can take advantage of virtual training opportunities, e.g. through VR glasses.
M3.3	Which contents are discussed within the training courses?	No training courses are offered	Exclusively application-oriented training	In addition to application-oriented training courses, we also offer individual advanced topics	In addition to application-oriented training courses also equivalent advanced topics
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional application-oriented training is offered to prepare employees for planned digitization projects. This includes, for example, the use of digital tools or ERP systems.	In addition to application-oriented training courses that prepare employees for planned digitization projects, e.g. the use of digital equipment or ERP systems, there are also some advanced topics such as agile management or SCRUM.	A variety of training courses are offered to prepare employees for upcoming digitization projects. In addition to application-oriented training courses, advanced topics such as agile management or SCRUM are also addressed.

M3	Indicator	Level 1	Level 2	Level 3	Level 4
M3.4	How willing is your staff to use digital media?	No willingness	Willingness of some employees available	Willingness of the majority of the employees available	Willingness of all employees available
		There is no willingness to use digital media.	Some employees are willing to use digital media. However, the majority rejects this.	A majority of employees is willing to use digital media. This is only occasionally rejected.	All employees are willing to use digital media.

## S Strategy

### S1 Digitalization strategy

S1	Indicator	Level 1	Level 2	Level 3	Level 4
S1.1	Does your company already have a digitalization strategy?	Development of a digitization strategy not planned	Development of a digitization strategy not started	Development of a digitization strategy started but not completed	Digitization strategy finalized and published
		Your company has not yet addressed the definition of a digitization strategy. This is also not planned.	Your company plans to develop a digitization strategy. However, the process has not yet been started.	Your company has already started to develop a digitization strategy. The first building blocks, e.g. target values or measures for implementation, have already been defined. Completion and publication are still pending, however.	Your company has defined and published a digitization strategy consisting of target values and measures for implementation.
S1.2	What percentage of your revenue do you invest in digitization projects that are designed to drive digital innovation independently of your current IT activities?	Less than 2 %	2-3 %	4-5 %	More than 5 %
		Your company invests less than 2% of its turnover in digitization projects. This turnover does not refer to the regular IT budget, but exclusively to investments for future-oriented, innovative projects.	Your company invests 2-3 % of its turnover in digitization projects. This turnover does not refer to the regular IT budget, but exclusively to investments for future-oriented, innovative projects.	Your company invests 4-5 % of the turnover in digitization projects. This turnover does not refer to the regular IT budget, but exclusively to investments for future-oriented, innovative projects.	Your company invests more than 5% of its turnover in digitization projects. This turnover does not refer to the regular IT budget, but exclusively to investments for future-oriented, innovative projects

S2 Business model

S2	Indicator	Level 1	Level 2	Level 3	Level 4
S2.1	What does your business model look like?	Pure product sales	Non-coordinated material and service products	Product Service Systems (PSS) and related integrated development	Smart and data-based Product Service Systems (PSS 4.0)
		Your company produces material products and sells them exclusively.	Your company produces material products and offers additional service products, such as annual maintenance work.	Your company offers service products tailored to the product. Both were developed in an integrated way.	Your company offers smart service products tailored to the smart product. Data can be collected and processed on this basis.
S2.2	To what extent can your customers use digital platforms to put together services?	No digital platforms for selling services available	Customers can select standardized services via digital platforms	Customers can modularly combine services on digital platforms	Customers can individually combine services on digital platforms without using predefined modules
		Your company does not use digital distribution channels.	Standardized products can be purchased by customers via digital distribution channels, e.g. an online store.	When buying products online, customers can assemble their own products based on predefined components.	When buying products online, customers can design their own goods individually without having to use predefined parts.
S2.3	Are you looking around the market for new digital technologies?	No activities	Activities in case of concrete need	Occasional but irregular activities	Systematic technology management
		New digital technologies are not sought.	New digital technologies will only be sought in specific cases of need.	New digital technologies available on the market are checked at irregular intervals for their relevance for use in the company.	At regular intervals, technologies available on the market are analyzed to check their relevance for use in the company.

## Development

### T Technology

#### T1 Requirement definition

T1	Indicator	Level 1	Level 2	Level 3	Level 4
T1.1	How do you capture your product requirements?	Requirements are not recorded	Recording of requirements in a local file	The product requirements are recorded on a model basis	The product requirements are captured model-based and integrated into the requirements management
		Requirements are not digitally recorded.	Requirements are derived from the customer's specifications and the specifications and saved in a document-based format, e.g. with Word or Excel.	Model-based mapping of product requirements. Requirements management systems are used locally. Product specifications can therefore be created automatically.	Integrated requirements management solution with the possibility of continuous tracking of requirements and product characteristics. Variant-specific component properties and requirements are modeled and linked to the following development steps. The artifacts of the models are stored and managed in the data management system.

#### T2 System design & architecture

T2	Indicator	Level 1	Level 2	Level 3	Level 4
T2.1	How do you map system designs?	System designs are not mapped	System designs are mainly derived manually and stored locally.	System designs are mainly supported by modeling software	System designs are mainly created with the help of integrated system modeling
		There are no activities in the area of system design.	Solution principles and sub-functions are derived and stored in a document-based manner.	Modeling of functions, behavior and logical product structures in digital form. Discipline-specific system models are created.	Integrated interdisciplinary system modeling; starting with system requirements, system structure, behavior and parameters are mapped.

### T3 Modelling and simulation

T3	Indicator	Level 1	Level 2	Level 3	Level 4
T3.1	How do you create and analyze your designs?	Manual construction	Isolated digital simulation and modeling	Mainly digital simulation and modeling	Completely model-based virtual product development
		Calculations are mainly done manually.	Occasionally, digital simulations and modelling are carried out, e.g. with the aid of CAD models or FEM simulations.	Main calculations are made simulation-based, products are mapped with the help of software like MBSE, M-CAD, E-CAD, CASE, FEM, MKS, CFD, NVH, DMU.	Continuous computer-aided modelling and documentation with the aim of passing the model on to the next development phase.

### T4 Validation

T4	Indicator	Level 1	Level 2	Level 3	Level 4
T4.1	How does the validation and development system work?	Physical prototype	Partially simulation-based	Comprehensive simulation support	Consistent verification and validation through the use of an all-encompassing digital twin
		Physical prototypes are mainly used.	Partly, developments are validated by simulation. However, physical prototypes still have to be created.	Comprehensive simulation models support the functional testing and replace mainly the physical prototyping. Due to the existing expertise, simulations are realistically.	Digital twins of the products are used so that verification and validation is automated. Variants and modifications can be created and released quickly and cost-effectively.
T4.2	How do production and field data flow back to development?	Not at all	On demand	Predefined	Automated
		Production and field data do not flow back to development. A systematic process is not implemented.	Production and field data are passed on as required, e.g. after quality rounds. Especially production deviations are reported to the development department.	A systematic data collection, analysis and feedback with predefined procedures is implemented in the company.	Based on the implemented data analysis, development services are automatically optimized and the knowledge gained is systematically utilized. The analysis modules are integrated in the data management system.

T5 System integration & process planning / technical organization / IT-system design

T5	Indicator	Level 1	Level 2	Level 3	Level 4
T5.1	Are the IT systems within development networked?	No networking	Individual systems are integrated	Systems are partially integrated	Systems are fully networked
		The various IT systems of the product development departments are not networked.	There is a partial networking of tools such as CAD designs into an environment like Product Data Management (PDM).	There is a networking and coupling between some systems. These systems can exchange data and synchronize changes	All systems in the product development area are networked and coupled. This allows data to be exchanged and changes to be synchronized.
T5.2	Are the IT systems of the development integrated into the superordinate enterprise systems?	No integration	Individual systems are integrated	Systems are integrated across divisions	Systems are fully integrated into the higher-level enterprise systems
		Your systems are not connected to the higher-level enterprise systems and cannot exchange information. The data exchange takes place exclusively manually, e.g. in paper form, through Excel lists or by verbal transfer of information	Their systems are only occasionally connected to the higher-level enterprise systems, so information cannot be exchanged automatically. Information is passed on manually due to media discontinuities.	The majority of your systems are connected to the superordinate enterprise systems and can exchange information automatically. There are only a few media breaks, i.e. missing interfaces between systems where manual information transfer is required.	Your systems are networked with the higher-level enterprise systems and enable end-to-end collaboration. Relevant information is forwarded automatically.
T5.3	Are your IT systems networked along the entire value chain (to customers and suppliers)?	No networking	Systems are only networked to a small extent; numerous media breaks exist	Systems are for the most part networked, isolated media breaks exist	Systems are consistently networked without media breaks
		Your systems are not connected to systems of your customers and suppliers and cannot exchange information. The data exchange takes place exclusively manually, e.g. in paper form, through Excel lists or by verbal transfer of information.	Your systems are only occasionally connected to systems of your customers and suppliers, so information cannot be exchanged automatically. Information is transferred manually due to media discontinuity.	The majority of your systems are connected to systems of your customers and suppliers and can exchange information automatically. There are only a few media breaks, i.e. missing interfaces between systems where manual information transfer is required.	Your systems are networked with your customers' and suppliers' systems and enable end-to-end collaboration. Relevant information is forwarded automatically.



## T6 Product and program Planning

T6	Indicator	Level 1	Level 2	Level 3	Level 4
T6.1	Are you planning to expand your products to communicate products?	Not yet investigated	In planning	Under development	Implemented
		Possibilities of communication capabilities of the products have not yet been investigated.	Products are technically equipped with sensors and actuators, but do not yet have access to the Internet. However, there is no possibility of data transfer.	Communication-capable products equipped with sensors, actuators and access to the Internet are in planning.	Communication-capable products equipped with sensors, actuators and access to the Internet are implemented in the company.
T6.2	Do you develop services to match your products?	Not yet investigated	In planning	Under development	Implemented
		The possibility of matching services has not yet been investigated.	Possible services are being investigated for future product programs.	Services will be developed for current products.	Services are developed for current products and are offered to customers.

## O Organization

### O1 Data management

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.1	How do you evaluate data in your company?	No data evaluation	Manual evaluation of data, no software support	Predefined evaluations can be called up by software	Individual evaluations possible through Big Data Analytics
		Your company does not use analytical methods to evaluate data digitally.	Data is evaluated manually, e.g. handwritten, with the help of Excel tables or by manual input in simple evaluation software.	Your company uses digital analysis methods. However, only pre-defined analyses are carried out, which record standardized key figures. Individual analyses are not possible.	Your company uses Big Data Analytics. Here, the data is obtained from various sources using search queries and then optimized and evaluated. The results of the analyzed data are processed and presented. This allows the company to evaluate a wide range of data formats in an application-oriented manner.

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.2	How do you provide data in your company?	Data is stored locally and can be accessed in an individual view	Data is centrally available and retrievable in a standardized view	Data is centrally available and can be retrieved for specific areas	Data is centrally available and can be retrieved contextually
		The provision of information is based on available individual information. There is no selection of relevant data regarding area or task. Each department can view identical information regardless of the intended use of the data.	Data is displayed in a standardized view, i.e. all employees see identical information that is not adapted to specific areas or functions.	Data is made available on a departmental basis, i.e., sales employees see different information about a product than development employees.	Information is provided contextually, i.e. employees are provided with different information depending on the person, task and situation.
O1.3	How do you store data in your company?	Data is stored in many different formats and cannot be exchanged between departments	Most of the data is stored in standard formats and can therefore be accessed by all departments	All data is stored in uniform standard formats that can be used by all departments	Data is stored as meta data independent of format and can be retrieved as required
		Data is stored using individual formats. For example, employees keep individual Excel lists to record information. Thus, information is only recorded selectively. The exchange is only possible manually.	Almost all information is stored in standard formats and can be retrieved via standardized views. Occasionally, however, information is still available in individual formats and must be shared manually.	All data is stored in standard formats so that it can be processed by all applications and thus used by all employees.	Data is stored as meta data. Meta data contains structured information about characteristics of data sets. Information and evaluations can be provided as needed based on this information storage.

## O2 *Process design*

O2	Indicator	Level 1	Level 2	Level 3	Level 4
O2.1	How do you design your data structure in terms of mapping the digital product and production model?	Native data stored locally	Data available in exchange formats	Data is merged depending on the product	Digital twin
		Digital documents in proprietary formats of the respective generating system are stored locally.	Data is stored locally in exchange formats and can therefore be used independently of the program.	Data is stored in exchange formats in a data management system, allowing the digital twin to be expanded and adapted based on the data structure.	Data are combined in standardized exchange formats in a data management system. There is a permanent alignment of the digital twin of a product through current information based on data from the complete product life cycle

O2	Indicator	Level 1	Level 2	Level 3	Level 4
O2.2	How are your development processes designed, e.g. change and release processes?	Paper-based	Partly digital	Mainly digital	Digital and integrated
		There is no transfer of the processes into a digital form.	Individual processes are digitalized. Paper-based processes are added	Processes are predominantly digitized. Several systems exist and the system landscape is not integrated.	All product-defining data (product model) in the context of technical and organizational business processes (process model) is mapped in a data management system. Change and release processes take place in a digital system.
O2.3	How are your data used for early product or product service development provided?	Paper-based	Partly digital	Mainly digital	Digital and integrated
		No digital provision of the data.	The data is available in digital form. Early production process and service planning can be applied on demand.	There are defined processes for early production and service planning. The development data can be provided completely digitally.	By integrating PPS, ERP, CRM and PLM systems, the production and service planning processes are linked. Parts list views for production, technical planning and service are synchronized. The development data is systematically provided and processed digitally.
O2.4	How do you plan your production systems for developed products?	Analogue	Partially computer-aided	Simulation model	Digital production and assembly process planning
		Analogue planning of production systems.	Digital planning of the production systems, but without simulations.	Production systems for developed products are mapped as a simulation model and digitally checked before realization.	Production systems are developed and fully simulated using digital manufacturing and assembly process planning.

### O3 Cooperation & collaboration

O3	Indicator	Level 1	Level 2	Level 3	Level 4
O3.1	What opportunities do you offer teams for collaboration?	There is no teamwork	Teams work together exclusively on site	Teams also exchange information via digital media	Cooperation also takes place in virtual teams
		Your company does not promote teamwork. Employees work on individual tasks at individual workstations.	Teams meet on site for face-to-face meetings to exchange information.	Teams also work together via digital media, such as web or Skype conferences.	Teams consist of team members who are separated in terms of location and place and who communicate mainly via digital media.

O3	Indicator	Level 1	Level 2	Level 3	Level 4
O3.2	Does the development department have the necessary interdisciplinary skills to develop innovative solutions?	Digital solutions for products and systems cannot be developed in-house, as no interdisciplinary teams are available	Digital solutions for products and systems must be sourced almost entirely from suppliers, since only a few partial solutions can be developed by internal teams	The majority of digital solutions for products and systems can be developed in interdisciplinary teams, only in a few cases partial solutions have to be purchased	Digital solutions for products and systems can be developed completely independently due to the interdisciplinary competences
		Digital solutions cannot be developed because disciplines within the company operate separately. There is no exchange between the departments.	Interdisciplinary teams occasionally work together within the company, so that digital partial solutions can be developed individually. In most cases, however, digital solutions are purchased from external companies.	Interdisciplinary teams work together within the company and are able to develop digital solutions almost completely independently. Only occasionally do partial solutions have to be purchased from external companies.	Interdisciplinary teams work together within the company to develop digital solutions.

## M Social

### M1 Corporate culture

M1	Indicator	Level 1	Level 2	Level 3	Level 4
M1.1	How are decisions made?	Decisions are based exclusively on experience	Decisions are occasionally made on the basis of evaluated data	Decisions are mainly made on the basis of evaluated data	Evaluated data form the basis for decisions in the company
		Managers make decisions based on experience. Data does not play a role in the decision-making process.	Some managers use evaluated data as a basis for decision-making. However, the majority of decisions are still based on experience.	For many managers, decisions are based on analyzed data.	Decisions of all managers are based entirely on analyzed data.
M1.2	Do your employees support digitization projects?	The necessity of digitization projects is fundamentally questioned by the employees	The need for digitization projects is generally recognized, but only isolated projects are supported	The necessity of digitization projects is generally recognized, so that projects are usually supported by the employees	The need for digitization projects is recognized by all employees and corresponding projects are supported
		The potential of digitization is not recognized. The corporate culture is geared towards routines and stability. Digitization projects are therefore not supported by the employees.	The potential of digitization is recognized by only a few employees, so digitization projects are rarely supported.	The potential of digitization is recognized by the majority of employees, so that changes are already being proactively designed in most areas and digitization projects are supported.	The advantages of digitization have been recognized by all employees, so that changes are proactively managed and digitization projects are supported by the employees.

## M2 Leadership

M2	Indicator	Level 1	Level 2	Level 3	Level 4
M2.1	How are employees involved in digitization projects?	Employees are not involved	Employees are involved in some projects	Employees are involved in most projects	Employees are involved in all projects
		Employees have no opportunity to participate in the introduction of digitization solutions.	Employees have the opportunity to participate in a few digitization projects.	Employees have the opportunity to participate in most digitization projects.	Employees have the opportunity to participate in all digitization projects.
M2.2	How do you communicate digitization projects to your employees?	No communication	Sporadic communication via analog media	Sporadic communication via digital media	Regular communication via digital media
		Digitization projects are not communicated. Employees receive information on the use of the technology when it is introduced.	At irregular intervals, news about upcoming digitization projects is disseminated via analog media, e.g. by means of posters.	News about upcoming digitization projects is communicated at irregular intervals via digital media, e.g. by e-mail, intranet or tablet notifications.	Employees are informed about forthcoming digitization projects using digital media, e.g. by e-mail, intranet or tablet notifications.
M2.3	How willing are managers to push ahead with digitization projects?	No willingness	Willingness on the part of some managers	Willingness is present among a large number of managers	Willingness on the part of all managers
		Managers see no need to implement digitization projects and are therefore not prepared to actively shape change.	Some managers are willing to help shape digitization projects.	Most managers see the necessity to implement digitization projects and are willing to help shape them.	All managers see the necessity to implement digitization projects and are ready to actively participate in the creation of such projects.
M2.4	Do your managers act as digital role models?	Managers are not digital role models	Some managers are digital role models	Most managers are digital role models	All managers are digital role models
		The managers do not use digital media and therefore do not model their use. This does not promote acceptance among employees.	Some managers use digital media and therefore exemplify their use. This promotes acceptance among employees to a limited extent.	Most managers use digital media and therefore exemplify their use. This promotes acceptance among employees to a greater extent.	All managers use digital media and thus live out their use. This promotes acceptance among employees.

### M3 Employee development

M3	Indicator	Level 1	Level 2	Level 3	Level 4
M3.1	What is the priority of developing the digital skills of your employees?	Not a priority	Low priority	Medium priority	High priority
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional training courses are offered. However, these must always be matched by an immediate benefit.	Training courses are offered, which are usually matched by an immediate benefit.	A wide variety of training courses are offered, not all of which have an immediate benefit for the company. Some training courses also aim to create innovation potential.
M3.2	How do you train your employees?	No training courses are offered	Training courses take place exclusively as face-to-face events	Trainings are also offered online	Learning takes place as smart learning integrated in the work process
		Trainings are not offered.	Training is only possible as on-site presence events.	In addition to classroom training, online training or e-learning is also offered.	Your employees can use virtual training opportunities, e.g. through VR glasses.
M3.3	Which contents are discussed within the training courses?	No training courses are offered	Exclusively application-oriented training	In addition to application-oriented training courses, we also offer individual advanced topics	Beside application-oriented training courses also equivalent advanced topics
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional application-oriented training is offered to prepare employees for planned digitization projects. This includes, for example, the use of digital tools or ERP systems.	In addition to application-oriented training courses that prepare employees for planned digitization projects, e.g. the use of digital equipment or ERP systems, there are also some advanced topics such as agile management or SCRUM.	A variety of training courses are offered to prepare employees for upcoming digitization projects. In addition to application-oriented training courses, advanced topics such as agile management or SCRUM are also addressed.
M3.4	How willing is your staff to use digital media?	No willingness	Willingness of some employees available	Willingness of the majority of the employees available	Readiness of all employees available
		There is no willingness to use digital media.	Some employees are willing to use digital media. However, the majority rejects this.	A majority of employees is willing to use digital media. This is only occasionally rejected.	All employees are willing to use digital media.

<b>M3</b>	<b>Indicator</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
M3.5	Do you have possibilities for virtual visualization?	Individual visualization of the products on the screen	Digital, realistic, visual representation of the products	Visual representation of the products in virtual reality	Visual representation of products and production systems with possibilities for virtual collaboration
		Occasionally visualizations are available e.g. on the basis CAD and simulation pictures.	Solutions such as digital mockups help employees design, configure and validate complex products.	Solutions such as AR and VR support employees in the design and validation of complex products.	Use of the collaboration platform, in which several users meet in the virtual world from any location and work together on the virtual product. The goal is to make decisions about the development status of the digital prototype.

# Production

## T Technology

### T1 Production processes & machining

T1	Indicator	Level 1	Level 2	Level 3	Level 4
T1.1	Are the machines and equipment available in the company capable of communication?	No communication capability The existing machines and equipment in your company are similar.	Occasionally available Partly there are communication-capable machines in the company. These have sensors, actuators and are equipped with access to the Internet.	Predominantly available Communication-capable machines / plants are mostly available. They have sensors and actuators and are equipped with access to the Internet.	Completely available All machines and plants in the company are communication-capable. They are equipped with sensors and actuators and have access to the Internet.
T1.2	Are the communication-capable machines and equipment available in the company used?	No use	Partial use	Predominant use	Use of all existing communication-capable machines and equipment
		The abilities for data exchange or communication of machines or plants are not used in the company.	The abilities for data exchange or communication of machines or plants are partly not used in the company.	The abilities for data exchange or communication of machines or plants are mostly not used in the company. These are e.g. transmission of error messages or messages of bottlenecks.	In the company, all existing communication-capable machines and systems are used. These are completely networked with each other, so that e.g. bottlenecks can be recognized early and appropriate measures can be initiated.
T1.3	Are human-machine interfaces / user interfaces available in the production process?	Text-oriented user input available	User interfaces with graphical symbols available	User interface with speech recognition available	User interfaces with gesture recognition available
		The user input to machines and systems is done as text-oriented command lines (Character User Interface).	The user interface of human-machine interfaces is divided into specific areas in which programs and functions are stored as graphical symbols (Graphical User Interface).	The human-machine interface or user interface works with speech recognition and uses voice control (Voice User Interface). It can also have a voice output.	The human-machine interfaces with Graphical User Interface and Voice User Interface are further developed by adding gesture recognition (Natural User Interface). Two-finger movements for the execution of commands on a touch screen is an example.



T1	Indicator	Level 1	Level 2	Level 3	Level 4
T1.4	Are the manufactured product parts / components smart?	The manufactured product parts / components are physical parts	Product parts / components have sensors and actuators	Product parts / components are capable of communication	Product parts / components are smart (Smart Products)
		The manufactured product parts / components have no possibility to communicate. They represent a physical part and consist e.g. of mechanical and electronic components.	The manufactured product parts / components are equipped with sensors and actuators. A minicomputer controls the sensors and actuators. The sensors measure time-variable, physical or electrochemical parameters. The actuators, on the other hand, lead to a movement or production.	The product parts/components equipped with sensors and actuators are given access to the Internet, which means that the product can be accessed worldwide. The product parts/components are thus capable of communication.	The manufactured communication-capable product parts/components are given analytical capabilities, such as collecting, storing, plausibilising and classifying sensor data. In addition, insights from other components and web services are added. Thus, consequences for the actuators can be calculated and related information can be generated. The result is a Smart Product.

## T2 Storage

T2	Indicator	Level 1	Level 2	Level 3	Level 4
T2.1	How is pre-picking done in the warehouse?	No pre-picking	Manual pre-picking	Software-supported pre-picking	Autonomous pre-picking
		There is no picking in the warehouse. Ordered items are therefore not assembled in the warehouse, but are picked as required.	An employee manually searches for the required products for the order in the warehouse, notes down the collected products and assembles them into a package.	Employees are guided by software to the correct shelf in the warehouse and scan the collected products, which are assembled into the ordered order.	The orders are assembled fully autonomously. To do this, a robot, for example, collects and scans the required products and delivers them to the designated collection point via a conveyor belt.

T2	Indicator	Level 1	Level 2	Level 3	Level 4
T2.2	How are the product parts/components stored and retrieved in the warehouse?	Manually	Partly automatically	Fully automatic	The warehouse controls itself (Smart Warehousing)
		Employees manually place and remove product parts/components into and out of designated storage locations.	The storage and retrieval of product parts/components is done partly automatically, partly manually. Very frequently used or small parts are stored and removed automatically by a robot. Rarely used or large parts are still stored and retrieved manually by employees.	The storage and retrieval of product parts/components is done completely automatically. Robots take over the complete storage and retrieval of all products in the warehouse.	The storage and retrieval of product parts/components is carried out completely automatically. Robots take over storage and retrieval of all products in the warehouse. In addition, robots independently re-sort the warehouse according to analyses in order to make more frequently required parts accessible more quickly.
T2.3	How is inventory management performed?	Manual, paper-based inventory management	Software-supported, but still with a high paper content	Software-supported with occasional use of paper	Fully software-based with use of algorithms
		The inventory list of the warehouse is noted manually on paper list by an employee at each storage and withdrawal.	The stock list of the warehouse is still noted manually by an employee on paper lists for each storage and withdrawal, but then entered into a digital list with the help of software.	The inventory list of the warehouse is filled in software-supported, e.g. the product is scanned during withdrawal or storage. In some cases, paper lists are still used, e.g. for parts that are rarely used or for inspections.	The inventory list of the warehouse is filled out completely software-supported. Every withdrawal or storage is registered by scanner, for example, and automatically noted. Additional algorithms provide information, for example, about predicted stock levels of the products.

T3 Transport

T3	Indicator	Level 1	Level 2	Level 3	Level 4
T3.1	How can parts / components be identified in the production process?	Parts / components cannot be identified	Parts / components can be identified manually	Parts / components are identified automatically	Parts / components are intelligent and control themselves through the manufacturing process (smart products)
		There is no insight into the production process and parts / components cannot be identified.	Employees can manually identify the parts / components in the production process based on ID number, appearance or other characteristics.	Sensors in the production process can automatically identify the parts / components and output the information. Automatic identification (AutoID) includes different methods such as barcode and RFID technology as well as optical recognition using cameras as an umbrella term together. Automatic identification enables the connection of information and material flows.	During the production process, the parts and components use sensors to recognize which parts/components have already been installed and which are still missing. Accordingly, the product steers itself to the next correct step.
T3.2	How can parts / components be traced?	Parts / components cannot be traced	Parts / components can only be traced manually	Parts / components can be traced completely automatically	Parts / components are intelligent and know their components (smart products)
		Parts / components can therefore also not be traced.	On the basis of ID numbers, for example, the installed parts/components can be recorded and traced manually by employees. Traceability means that it is possible to determine at any time when, where and by whom a product or merchandise was obtained, manufactured, processed, stored, transported, consumed or disposed of.	For example, by means of chips installed in the parts/components, it is possible to automatically trace when and where the part was obtained, manufactured, processed, stored, transported, consumed or disposed of, and by whom.	The smart product can recognize its own installed parts/components and thus itself trace which parts were obtained, manufactured, processed, stored, transported, consumed or disposed of when and where and by whom.

T4 Quality management

T4	Indicator	Level 1	Level 2	Level 3	Level 4
T4.1	How are quality measurements made in the production process?	Only outside the production process	Mostly outside, occasionally inside the production process	Occasionally outside, mostly inside the production process	Completely during the production process
		Quality measurements are made manually by an employee (manual measurements of desired characteristics) not in the production process, but afterwards or outside.	The quality measurement is carried out to a very large extent manually by an employee (manual measurements of desired characteristics) not in the production process, but afterwards or outside. In isolated steps, automatic quality measurement (measurement by sensors) is performed during the production process.	Quality measurement is performed manually only in individual steps by an employee (manual measurements of desired characteristics) not in the production process, but afterwards or outside. Most of the quality measurement is performed automatically (measurement by sensors) during the production process and an automatic assessment of the product is made.	The quality measurement takes place completely automatically (by measurement sensors, ...) during the production process. After an automatic assessment, parts that do not meet the specifications are automatically sorted out.
T4.2	Are the measurement systems integrated into existing IT systems?	No integration	Measurement systems are integrated in isolated cases	Measurement systems are predominantly integrated	Fully integrated
		The existing measurement systems are not integrated in IT systems and are completely independent.	In isolated cases, the existing measurement systems are directly linked to IT systems in order to transfer and digitally store / analyze results.	The existing measuring systems are mainly directly linked to IT systems in order to transmit and digitally store / analyze results.	The existing measurement systems are fully integrated with existing IT systems. The measurement results are automatically stored and processed digitally.
T4.3	Are the methods in quality management, such as FMEA, 8D, SPC, digitized?	Methods are not digitized	Methods are predominantly not digitized	Methods are mostly digitized	Methods are completely digitized
		D Quality management methods are not digitized and results are recorded manually by an employee, e.g. on paper.	Most methods are still recorded manually by an employee, e.g. on paper. Individual methods are already performed on a tablet or PC and the results are stored digitally	Few methods are still recorded manually by an employee, e.g. on paper. Individual methods are already performed on a tablet or PC and the results are stored digitally.	All methods are performed digitally on a tablet or PC. The associated data or information and results are stored and processed digitally.

T5 *Production planning & control*

T5	Indicator	Level 1	Level 2	Level 3	Level 4
T5.1	How are the KPIs recorded?	Manually	Occasionally automatically	Predominantly automatic	Fully automatic
		The KPIs are recorded and noted manually by an employee.	Parts of the production line determine KPIs automatically. Large parts are still recorded and noted manually by employees.	The majority of the KPIs are determined automatically on the production line. Isolated key figures have to be determined manually by employees.	All KPIs are determined and noted fully automatically in the production process.
T5.2	How is production planning done?	Manually	Software-supported (stand-alone)	Through integrated systems e.g. ERP, MES	Through complete digital planning (digital twin)
		Your company performs production planning in a paper-based and manual manner	Production planning in your company is carried out with the help of software that is not, however, connected to other systems. This means that there are media discontinuities between the IT systems, so that the necessary information has to be passed on manually.	Production planning in your company is carried out with the help of integrated systems, e.g. ERP system or MES system. In some cases, manual intervention is still required.	Production planning in your company takes place completely digitally, in that, for example, IT systems and associated processes are fully integrated into e.g. ERP systems or MES systems. Information and data are exchanged automatically. Manual intervention no longer takes place.
T5.3	How is the commissioning of machines and systems in production carried out?	Commissioning in a real environment	Commissioning is occasionally supported by simulation	Use of a simulation model for commissioning	Virtual commissioning
		Commissioning and test runs of new machines and systems are only tested after they have been set up in the production line.	Isolated machines and plants can be tested in simulations to simplify the real commissioning. However, the majority of machines and plants are still commissioned without simulation / test runs.	All machines and systems are first commissioned and tested in a simulation before the real commissioning takes place.	After a simulated commissioning of the machines and plants, the production process can be run through on a test basis with the help of a real or virtual control system.

T5	Indicator	Level 1	Level 2	Level 3	Level 4
T5.4	How is the maintenance of machines and equipment in manufacturing carried out?	Reactive	Proactive, manual planning	Proactive, support by algorithms (predictive maintenance)	Proactive, predictive maintenance, automated problem solving
		Maintenance of machinery and equipment takes place only after the occurrence of damage / problem.	Maintenance of machinery and equipment is performed at planned intervals. The planning for this maintenance takes place manually by employees.	Maintenance of machinery and equipment is carried out proactively. The planning of when maintenance will take place is determined by algorithms that identify the probability of occurrence based on available data.	The maintenance of machinery and equipment is carried out proactively. The planning of when maintenance will take place is determined by algorithms that identify the probability of occurrence based on available data. In addition, the system can resolve faults itself or, for example, call a repair service without the need for an employee to actively intervene.
T5.5	How is production control carried out?	Manually	Software-supported (stand-alone)	Through integrated systems	Through a complete digital control
		Production control, i.e. initiating, monitoring and ensuring the execution of released orders, is performed manually.	Production control is supported by stand-alone software. It is not connected to existing IT systems, so that there are media breaks between the systems.	Production control is supported by software. The software is integrated into existing IT systems so that information and data can be passed on and processed automatically. The intervention of an employee is still necessary in some cases	Production control in your company is fully digital, for example, IT systems and associated processes are fully integrated into ERP systems or MES systems. Information and data are exchanged automatically, manual intervention no longer takes place.

T6 *IT-system design*

T6	Indicator	Level 1	Level 2	Level 3	Level 4
T6.1	Are the IT systems within the production networked with each other?	No networking	Individual systems are integrated	Systems are partially integrated	Systems are fully networked
		Your systems are not connected and cannot exchange information. Data is exchanged only manually, e.g. by printing out Excel lists or by passing on information verbally.	Systems are only connected sporadically, so information cannot be exchanged automatically. Information is passed on manually due to media discontinuities, e.g. when information on orders is printed out from the ERP database and passed on to production.	The majority of systems are connected and can exchange information automatically. There are only a few media discontinuities, i.e., missing interfaces between systems, where manual information forwarding is required.	Your systems are networked and enable end-to-end collaboration. Relevant information is forwarded automatically.
T6.2	Are manufacturing IT systems integrated with higher-level enterprise systems?	No integration	Individual systems are integrated	Systems are integrated across divisions	Systems are fully integrated into the higher-level enterprise systems
		Their systems are not connected to the higher-level corporate systems and cannot exchange information. Data is only exchanged manually, e.g. by printing out Excel lists or passing on information verbally.	Their systems are only sporadically connected to the higher-level enterprise systems, so information cannot be exchanged automatically. Information is passed on manually due to media disruptions.	The majority of your systems are connected to the higher-level enterprise systems and can exchange information automatically. There are only a few media discontinuities, i.e., missing interfaces between systems, where manual information transfer is required.	Your systems are networked with the higher-level enterprise systems and enable end-to-end collaboration. Relevant information is forwarded automatically.

**O Organization**

O1 *Data management*

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.1	Is the data collected in real time on the shop floor?	No collection of data in real time	sporadically data is collected in real time	Data is predominantly, but not yet completely, collected in real time	Complete collection of data in real time
		The systems are not designed to capture and process data in real time.	Individual systems are capable of capturing and processing real-time data.	Almost all systems are capable of capturing and processing real-time data.	All systems acquire and process data in real time.

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.2	How is the data storage done during the equipment inspection?	Paper-based	Manually, e.g. Excel tables	Partially automated	Fully automated on-site data storage, e.g. directly in CAQ system
		Results are recorded manually on paper and filed in folders. Digital storage does not take place.	Results are entered manually into online programs. However, since the programs do not interface with other systems, data must be evaluated manually and passed on if necessary.	Results can be inserted and stored in a digital system. However, the entry is still done manually.	Results are inserted and stored in a system fully automatically. Manual activities are not necessary.
O1.3	How do you evaluate data in your company?	No data evaluation	Manual evaluation of data, no software support	Predefined evaluations can be called up by software	Individual evaluations possible through Big Data Analytics
		Your company does not use analytical methods to evaluate data digitally.	Data is evaluated manually, e.g. handwritten, with the help of Excel tables or by manual input in simple evaluation software.	Your company uses digital analysis methods. However, only pre-defined analyses are carried out, which record standardized key figures. Individual analyses are not possible.	Your company uses Big Data Analytics. Here, the data is obtained from various sources using search queries and then optimized and evaluated. The results of the analyzed data are processed and presented. This allows the company to evaluate a wide range of data formats in an application-oriented manner.
O1.4	How do you provide data in your company?	Data is stored locally and can be accessed in an individual view	Data is centrally available and retrievable in a standardized view	Data is centrally available and can be retrieved for specific areas	Data is centrally available and can be retrieved contextually
		The provision of information is based on available individual information. There is no selection of relevant data regarding area or task. Each department can view identical information regardless of the intended use of the data.	Data is displayed in a standardized view, i.e. all employees see identical information that is not adapted to specific areas or functions.	Data is made available on a departmental basis, i.e., sales employees see different information about a product than development employees.	Information is provided contextually, i.e. employees are provided with different information depending on the person, task and situation.



O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.5	How do you store data in your company?	Data is stored in many different formats and cannot be exchanged between departments	Most of the data is stored in standard formats and can therefore be accessed by all departments	All data is stored in uniform standard formats that can be used by all departments	Data is stored as meta data independent of format and can be retrieved as required
		Data is stored using individual formats. For example, employees keep individual Excel lists to record information. Thus, information is only recorded selectively. The exchange is only possible manually.	Almost all information is stored in standard formats and can be retrieved via standardized views. Occasionally, however, information is still available in individual formats and must be shared manually.	All data is stored in standard formats so that it can be processed by all applications and thus used by all employees.	Data is stored as meta data. Meta data contains structured information about characteristics of data sets. Information and evaluations can be provided as needed based on this information storage.

## O2 *Process design*

O2	Indicator	Level 1	Level 2	Level 3	Level 4
O2.1	Are your production processes controlled digitally and decentrally?	Production processes are controlled centrally	Manufacturing processes are controlled centrally	Production processes are mainly controlled decentrally	All production processes are fully digitally and decentrally controlled
		Your company uses centralized control through e.g. a leading system like MRP II. Here, a push strategy (sliding logic) is pursued, where, for example, production is made to order and product information is linked to the product (e.g. through accompanying documents). In addition, the flow of information and goods run in the same direction.	Your company controls the manufacturing processes using hybrid methods, such as CONWIP.	Your company uses digital, decentralized control of manufacturing processes in most areas, e.g., through KANBAN. Only a few processes are controlled centrally.	Your company uses digital, decentralized control of manufacturing processes throughout, e.g., through a digital KANBAN. Here, a pull strategy (target logic) is pursued. Production takes place according to demand, product and information are separated from each other and the flow of information and goods run in the opposite direction.

### O3 Cooperation & collaboration

O3	Indicator	Level 1	Level 2	Level 3	Level 4
O3.1	What opportunities do you offer teams for collaboration?	There is no teamwork	Teams work together exclusively on site	Teams also exchange information via digital media	Cooperation also takes place in virtual teams
		Your company does not promote teamwork. Employees work on individual tasks at individual workstations.	Teams meet on site for face-to-face meetings to exchange information.	Teams also work together via digital media, such as web or Skype conferences.	Teams consist of team members who are separated in terms of location and place and who communicate mainly via digital media.
O3.2	Does the production department have the necessary interdisciplinary skills to develop innovative solutions?	Digital solutions for products and systems cannot be developed in-house, as no interdisciplinary teams are available	Digital solutions for products and systems must be sourced almost entirely from suppliers, since only a few partial solutions can be developed by internal teams	The majority of digital solutions for products and systems can be developed in interdisciplinary teams, only in a few cases partial solutions have to be purchased	Digital solutions for products and systems can be developed completely independently due to the interdisciplinary competences
		Digital solutions cannot be developed because disciplines within the company operate separately. There is no exchange between the departments.	Interdisciplinary teams occasionally work together within the company, so that digital partial solutions can be developed individually. In most cases, however, digital solutions are purchased from external companies.	Interdisciplinary teams work together within the company and are able to develop digital solutions almost completely independently. Only occasionally do partial solutions have to be purchased from external companies.	Interdisciplinary teams work together within the company to develop digital solutions.

## M Social

### M1 Corporate culture

M1	Indicator	Level 1	Level 2	Level 3	Level 4
M1.1	How are decisions made?	Decisions are based exclusively on experience	Decisions are occasionally made on the basis of evaluated data	Decisions are mainly made on the basis of evaluated data	Evaluated data form the basis for decisions in the company
		Managers make decisions based on experience. Data does not play a role in the decision-making process.	Some managers use evaluated data as a basis for decision-making. However, the majority of decisions are still based on experience.	For many managers, decisions are based on analyzed data.	Decisions of all managers are based entirely on analyzed data.

M1	Indicator	Level 1	Level 2	Level 3	Level 4
M1.2	Do your employees support digitization projects?	The necessity of digitization projects is fundamentally questioned by the employees	The need for digitization projects is generally recognized, but only isolated projects are supported	The necessity of digitization projects is generally recognized, so that projects are usually supported by the employees	The need for digitization projects is recognized by all employees and corresponding projects are supported
		The potential of digitization is not recognized. The corporate culture is geared towards routines and stability. Digitization projects are therefore not supported by the employees.	The potential of digitization is recognized by only a few employees, so digitization projects are rarely supported.	The potential of digitization is recognized by the majority of employees, so that changes are already being proactively designed in most areas and digitization projects are supported.	The advantages of digitization have been recognized by all employees, so that changes are proactively managed and digitization projects are supported by the employees.

## M2 Leadership

M2	Indicator	Level 1	Level 2	Level 3	Level 4
M2.1	How are employees involved in digitization projects?	Employees are not involved	Employees are involved in some projects	Employees are involved in most projects	Employees are involved in all projects
		Employees have no opportunity to participate in the introduction of digitization solutions.	Employees have the opportunity to participate in a few digitization projects.	Employees have the opportunity to participate in most digitization projects.	Employees have the opportunity to participate in all digitization projects.
M2.2	How do you communicate digitization projects to your employees?	No communication	Sporadic communication via analog media	Sporadic communication via digital media	Regular communication via digital media
		Digitization projects are not communicated. Employees receive information on the use of the technology when it is introduced.	At irregular intervals, news about upcoming digitization projects is disseminated via analog media, e.g. by means of posters.	News about upcoming digitization projects is communicated at irregular intervals via digital media, e.g. by e-mail, intranet or tablet notifications.	Employees are informed about forthcoming digitization projects using digital media, e.g. by e-mail, intranet or tablet notifications.
M2.3	How willing are managers to push ahead with digitization projects?	No willingness	Willingness on the part of some managers	Willingness is present among a large number of managers	Willingness on the part of all managers
		Managers see no need to implement digitization projects and are therefore not prepared to actively shape change.	Some managers are willing to help shape digitization projects.	Most managers see the necessity to implement digitization projects and are willing to help shape them.	All managers see the necessity to implement digitization projects and are ready to actively participate in the creation of such projects.

M2	Indicator	Level 1	Level 2	Level 3	Level 4
M2.4	Do your managers act as digital role models?	Managers are not digital role models	Some managers are digital role models	Most managers are digital role models	All managers are digital role models
		The managers do not use digital media and therefore do not model their use. This does not promote acceptance among employees.	Some managers use digital media and therefore exemplify their use. This promotes acceptance among employees to a limited extent.	Most managers use digital media and therefore exemplify their use. This promotes acceptance among employees to a greater extent.	All managers use digital media and thus live out their use. This promotes acceptance among employees.

### M3 *Employee development*

M3	Indicator	Level 1	Level 2	Level 3	Level 4
M3.1	What is the priority of developing the digital skills of your employees?	Not a priority	Low priority	Medium priority	High priority
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional training courses are offered. However, these must always be matched by an immediate benefit.	Training courses are offered, which are usually matched by an immediate benefit.	A wide variety of training courses are offered, not all of which have an immediate benefit for the company. Some training courses also aim to create innovation potential.
M3.2	How do you train your employees?	No training courses are offered	Training courses take place exclusively as face-to-face events	Trainings are also offered online	Learning takes place as smart learning integrated in the work process
		Trainings are not offered.	Training is only possible as on-site presence events.	In addition to classroom training, online training or e-learning is also offered.	Your employees can use virtual training opportunities, e.g. through VR glasses.
M3.3	Which contents are discussed within the training courses?	No training courses are offered	Exclusively application-oriented training	In addition to application-oriented training courses, we also offer individual advanced topics	Beside application-oriented training courses also equivalent advanced topics
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional application-oriented training is offered to prepare employees for planned digitization projects. This includes, for example, the use of digital tools or ERP systems.	In addition to application-oriented training courses that prepare employees for planned digitization projects, e.g. the use of digital equipment or ERP systems, there are also some advanced topics such as agile management or SCRUM.	A variety of training courses are offered to prepare employees for upcoming digitization projects. In addition to application-oriented training courses, advanced topics such as agile management or SCRUM are also addressed.

M3	Indicator	Level 1	Level 2	Level 3	Level 4
M3.4	How willing is your staff to use digital media?	No willingness	Willingness of some employees available	Willingness of the majority of the employees available	Readiness of all employees available
		There is no willingness to use digital media.	Some employees are willing to use digital media. However, the majority rejects this.	A majority of employees is willing to use digital media. This is only occasionally rejected.	All employees are willing to use digital media.

# Assembly

## T Technology

### T1 Assembly process & machining

T1	Indicator	Level 1	Level 2	Level 3	Level 4
T1.1	Are the machines and equipment available in the company capable of communication?	No communication capability The existing machines and equipment in your company are similar.	Occasionally available Partly there are communication-capable machines in the company. These have sensors, actuators and are equipped with access to the Internet.	Predominantly available Communication-capable machines / plants are mostly available. They have sensors and actuators and are equipped with access to the Internet.	Completely available All machines and plants in the company are communication-capable. They are equipped with sensors and actuators and have access to the Internet.
T1.2	Are the communication-capable machines and equipment available in the company used?	No use	Partial use	Predominant use	Use of all existing communication-capable machines and equipment
		The abilities for data exchange or communication of machines or plants are not used in the company.	The abilities for data exchange or communication of machines or plants are partly not used in the company.	The abilities for data exchange or communication of machines or plants are mostly not used in the company. These are e.g. transmission of error messages or messages of bottlenecks.	In the company, all existing communication-capable machines and systems are used. These are completely networked with each other, so that e.g. bottlenecks can be recognized early and appropriate measures can be initiated.
T1.3	Are human-machine interfaces / user interfaces available in the assembly process?	Text-oriented user input available	User interfaces with graphical symbols available	User interface with speech recognition available	User interfaces with gesture recognition available
		The user input to machines and systems is done as text-oriented command lines (Character User Interface).	The user interface of human-machine interfaces is divided into specific areas in which programs and functions are stored as graphical symbols (Graphical User Interface).	The human-machine interface or user interface works with speech recognition and uses voice control (Voice User Interface). It can also have a voice output.	The human-machine interfaces with Graphical User Interface and Voice User Interface are further developed by adding gesture recognition (Natural User Interface). Two-finger movements for the execution of commands on a touch screen is an example.

T1	Indicator	Level 1	Level 2	Level 3	Level 4
T1.4	Are the manufactured product parts / components smart?	The manufactured product parts / components are physical parts	Product parts / components have sensors and actuators	Product parts / components are capable of communication	Product parts / components are smart (Smart Products)
		The manufactured product parts / components have no possibility to communicate. They represent a physical part and consist e.g. of mechanical and electronic components.	The manufactured product parts / components are equipped with sensors and actuators. A minicomputer controls the sensors and actuators. The sensors measure time-variable, physical or electrochemical parameters. The actuators, on the other hand, lead to a movement or production.	The product parts/components equipped with sensors and actuators are given access to the Internet, which means that the product can be accessed worldwide. The product parts/components are thus capable of communication.	The manufactured communication-capable product parts/components are given analytical capabilities, such as collecting, storing, plausibilising and classifying sensor data. In addition, insights from other components and web services are added. Thus, consequences for the actuators can be calculated and related information can be generated. The result is a Smart Product.

## T2 Storage

T2	Indicator	Level 1	Level 2	Level 3	Level 4
T2.1	How is pre-picking done in the warehouse?	No pre-picking	Manual pre-picking	Software-supported pre-picking	Autonomous pre-picking
		There is no picking in the warehouse. Ordered items are therefore not assembled in the warehouse, but are picked as required.	An employee manually searches for the required products for the order in the warehouse, notes down the collected products and assembles them into a package.	Employees are guided by software to the correct shelf in the warehouse and scan the collected products, which are assembled into the ordered order.	The orders are assembled fully autonomously. To do this, a robot, for example, collects and scans the required products and delivers them to the designated collection point via a conveyor belt.

T2	Indicator	Level 1	Level 2	Level 3	Level 4
T2.2	How are the product parts/components stored and retrieved in the warehouse?	Manually	Partly automatically	Fully automatic	The warehouse controls itself (Smart Warehousing)
		Employees manually place and remove product parts/components into and out of designated storage locations.	The storage and retrieval of product parts/components is done partly automatically, partly manually. Very frequently used or small parts are stored and removed automatically by a robot. Rarely used or large parts are still stored and retrieved manually by employees.	The storage and retrieval of product parts/components is done completely automatically. Robots take over the complete storage and retrieval of all products in the warehouse.	The storage and retrieval of product parts/components is carried out completely automatically. Robots take over storage and retrieval of all products in the warehouse. In addition, robots independently re-sort the warehouse according to analyses in order to make more frequently required parts accessible more quickly.
T2.3	How is inventory management performed?	Manual, paper-based inventory management	Software-supported, but still with a high paper content	Software-supported with occasional use of paper	Fully software-based with use of algorithms
		The inventory list of the warehouse is noted manually on paper list by an employee at each storage and withdrawal.	The stock list of the warehouse is still noted manually by an employee on paper lists for each storage and withdrawal, but then entered into a digital list with the help of software.	The inventory list of the warehouse is filled in software-supported, e.g. the product is scanned during withdrawal or storage. In some cases, paper lists are still used, e.g. for parts that are rarely used or for inspections.	The inventory list of the warehouse is filled out completely software-supported. Every withdrawal or storage is registered by scanner, for example, and automatically noted. Additional algorithms provide information, for example, about predicted stock levels of the products.



T3 Transport

T3	Indicator	Level 1	Level 2	Level 3	Level 4
T3.1	How can parts / components be identified in the assembly process?	Parts / components cannot be identified	Parts / components can be identified manually	Parts / components are identified automatically	Parts / components are intelligent and control themselves through the manufacturing process (smart products)
		There is no insight into the assembly process and parts / components cannot be identified.	Employees can manually identify the parts / components in the assembly process based on ID number, appearance or other characteristics.	Sensors in the assembly process can automatically identify the parts / components and output the information. Automatic identification (AutoID) includes different methods such as barcode and RFID technology as well as optical recognition using cameras as an umbrella term together. Automatic identification enables the connection of information and material flows.	During the assembly process, the parts and components use sensors to recognize which parts/components have already been installed and which are still missing. Accordingly, the product steers itself to the next correct step.
T3.2	How can parts / components be traced?	Parts / components cannot be traced	Parts / components can only be traced manually	Parts / components can be traced completely automatically	Parts / components are intelligent and know their components (smart products)
		Parts / components can therefore also not be traced.	On the basis of ID numbers, for example, the installed parts/components can be recorded and traced manually by employees. Traceability means that it is possible to determine at any time when, where and by whom a product or merchandise was obtained, manufactured, processed, stored, transported, consumed or disposed of.	For example, by means of chips installed in the parts/components, it is possible to automatically trace when and where the part was obtained, manufactured, processed, stored, transported, consumed or disposed of, and by whom.	The smart product can recognize its own installed parts/components and thus itself trace which parts were obtained, manufactured, processed, stored, transported, consumed or disposed of when and where and by whom.

T4 Quality management

T4	Indicator	Level 1	Level 2	Level 3	Level 4
T4.1	How are quality measurements made in the assembly process?	Only outside the assembly process	Mostly outside, occasionally inside the assembly process	Occasionally outside, mostly inside the assembly process	Completely during the assembly process
		Quality measurements are made manually by an employee (manual measurements of desired characteristics) not in the assembly process, but afterwards or outside.	The quality measurement is carried out to a very large extent manually by an employee (manual measurements of desired characteristics) not in the assembly process, but afterwards or outside. In isolated steps, automatic quality measurement (measurement by sensors) is performed during the assembly process.	Quality measurement is performed manually only in individual steps by an employee (manual measurements of desired characteristics) not in the assembly process, but afterwards or outside. Most of the quality measurement is performed automatically (measurement by sensors) during the assembly process and an automatic assessment of the product is made.	The quality measurement takes place completely automatically (by measurement sensors, ...) during the assembly process. After an automatic assessment, parts that do not meet the specifications are automatically sorted out.
T4.2	Are the measurement systems integrated into existing IT systems?	No integration	Measurement systems are integrated in isolated cases	Measurement systems are predominantly integrated	Fully integrated
		The existing measurement systems are not integrated in IT systems and are completely independent.	In isolated cases, the existing measurement systems are directly linked to IT systems in order to transfer and digitally store / analyze results.	The existing measuring systems are mainly directly linked to IT systems in order to transmit and digitally store / analyze results.	The existing measurement systems are fully integrated with existing IT systems. The measurement results are automatically stored and processed digitally.
T4.3	Are the methods in quality management, such as FMEA, 8D, SPC, digitized?	Methods are not digitized	Methods are predominantly not digitized	Methods are mostly digitized	Methods are completely digitized
		D Quality management methods are not digitized and results are recorded manually by an employee, e.g. on paper.	Most methods are still recorded manually by an employee, e.g. on paper. Individual methods are already performed on a tablet or PC and the results are stored digitally	Few methods are still recorded manually by an employee, e.g. on paper. Individual methods are already performed on a tablet or PC and the results are stored digitally.	All methods are performed digitally on a tablet or PC. The associated data or information and results are stored and processed digitally.

T5 Assembly planning & control

T5	Indicator	Level 1	Level 2	Level 3	Level 4
T5.1	How are the KPIs recorded?	Manually	Occasionally automatically	Predominantly automatic	Fully automatic
		The KPIs are recorded and noted manually by an employee.	Parts of the production line determine KPIs automatically. Large parts are still recorded and noted manually by employees.	The majority of the KPIs are determined automatically on the production line. Isolated key figures have to be determined manually by employees.	All KPIs are determined and noted fully automatically in the production process.
T5.2	How is assembly planning done?	Manually	Software-supported (stand-alone)	Through integrated systems e.g. ERP, MES	Through complete digital planning (digital twin)
		Your company performs assembly planning in a paper-based and manual manner	Assembly planning in your company is carried out with the help of software that is not, however, connected to other systems. This means that there are media discontinuities between the IT systems, so that the necessary information has to be passed on manually.	Assembly planning in your company is carried out with the help of integrated systems, e.g. ERP system or MES system. In some cases, manual intervention is still required.	Assembly planning in your company takes place completely digitally, in that, for example, IT systems and associated processes are fully integrated into e.g. ERP systems or MES systems. Information and data are exchanged automatically. Manual intervention no longer takes place.
T5.3	How is the commissioning of machines and systems in assembly carried out?	Commissioning in a real environment	Commissioning is occasionally supported by simulation	Use of a simulation model for commissioning	Virtual commissioning
		Commissioning and test runs of new machines and systems are only tested after they have been set up in the assembly line.	Isolated machines and plants can be tested in simulations to simplify the real commissioning. However, the majority of machines and plants are still commissioned without simulation / test runs.	All machines and systems are first commissioned and tested in a simulation before the real commissioning takes place.	After a simulated commissioning of the machines and plants, the assembly process can be run through on a test basis with the help of a real or virtual control system.

T5	Indicator	Level 1	Level 2	Level 3	Level 4
T5.4	How is the maintenance of machines and equipment in assembly carried out?	Reactive	Proactive, manual planning	Proactive, support by algorithms (predictive maintenance)	Proactive, predictive maintenance, automated problem solving
		Maintenance of machinery and equipment takes place only after the occurrence of damage / problem.	Maintenance of machinery and equipment is performed at planned intervals. The planning for this maintenance takes place manually by employees.	Maintenance of machinery and equipment is carried out proactively. The planning of when maintenance will take place is determined by algorithms that identify the probability of occurrence based on available data.	The maintenance of machinery and equipment is carried out proactively. The planning of when maintenance will take place is determined by algorithms that identify the probability of occurrence based on available data. In addition, the system can resolve faults itself or, for example, call a repair service without the need for an employee to actively intervene.
T5.5	How is assembly control carried out?	Manually	Software-supported (stand-alone)	Through integrated systems	Through a complete digital control
		Assembly control, i.e. initiating, monitoring and ensuring the execution of released orders, is performed manually.	Assembly control is supported by stand-alone software. It is not connected to existing IT systems, so that there are media breaks between the systems.	Assembly control is supported by software. The software is integrated into existing IT systems so that information and data can be passed on and processed automatically. The intervention of an employee is still necessary in some cases	Assembly control in your company is fully digital, for example, IT systems and associated processes are fully integrated into ERP systems or MES systems. Information and data are exchanged automatically, manual intervention no longer takes place.

T6 *IT-system design*

T6	Indicator	Level 1	Level 2	Level 3	Level 4
T6.1	Are the IT systems within the assembly networked with each other?	No networking	Individual systems are integrated	Systems are partially integrated	Systems are fully networked
		Your systems are not connected and cannot exchange information. Data is exchanged only manually, e.g. by printing out Excel lists or by passing on information verbally.	Systems are only connected sporadically, so information cannot be exchanged automatically. Information is passed on manually due to media discontinuities, e.g. when information on orders is printed out from the ERP database and passed on to production.	The majority of systems are connected and can exchange information automatically. There are only a few media discontinuities, i.e., missing interfaces between systems, where manual information forwarding is required.	Your systems are networked and enable end-to-end collaboration. Relevant information is forwarded automatically.
T6.2	Are assembly IT systems integrated with higher-level enterprise systems?	No integration	Individual systems are integrated	Systems are integrated across divisions	Systems are fully integrated into the higher-level enterprise systems
		Their systems are not connected to the higher-level corporate systems and cannot exchange information. Data is only exchanged manually, e.g. by printing out Excel lists or passing on information verbally.	Their systems are only sporadically connected to the higher-level enterprise systems, so information cannot be exchanged automatically. Information is passed on manually due to media disruptions.	The majority of your systems are connected to the higher-level enterprise systems and can exchange information automatically. There are only a few media discontinuities, i.e., missing interfaces between systems, where manual information transfer is required.	Your systems are networked with the higher-level enterprise systems and enable end-to-end collaboration. Relevant information is forwarded automatically.

**O Organization**

O1 *Data management*

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.1	Is the data collected in real time in the assembly process?	No collection of data in real time	sporadically data is collected in real time	Data is predominantly, but not yet completely, collected in real time	Complete collection of data in real time
		The systems are not designed to capture and process data in real time.	Individual systems are capable of capturing and processing real-time data.	Almost all systems are capable of capturing and processing real-time data.	All systems acquire and process data in real time.

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.2	How is the data storage done during the equipment inspection?	Paper-based	Manually, e.g. Excel tables	Partially automated	Fully automated on-site data storage, e.g. directly in CAQ system
		Results are recorded manually on paper and filed in folders. Digital storage does not take place.	Results are entered manually into online programs. However, since the programs do not interface with other systems, data must be evaluated manually and passed on if necessary.	Results can be inserted and stored in a digital system. However, the entry is still done manually.	Results are inserted and stored in a system fully automatically. Manual activities are not necessary.
O1.3	How do you evaluate data in your company?	No data evaluation	Manual evaluation of data, no software support	Predefined evaluations can be called up by software	Individual evaluations possible through Big Data Analytics
		Your company does not use analytical methods to evaluate data digitally.	Data is evaluated manually, e.g. handwritten, with the help of Excel tables or by manual input in simple evaluation software.	Your company uses digital analysis methods. However, only pre-defined analyses are carried out, which record standardized key figures. Individual analyses are not possible.	Your company uses Big Data Analytics. Here, the data is obtained from various sources using search queries and then optimized and evaluated. The results of the analyzed data are processed and presented. This allows the company to evaluate a wide range of data formats in an application-oriented manner.
O1.4	How do you provide data in your company?	Data is stored locally and can be accessed in an individual view	Data is centrally available and retrievable in a standardized view	Data is centrally available and can be retrieved for specific areas	Data is centrally available and can be retrieved contextually
		The provision of information is based on available individual information. There is no selection of relevant data regarding area or task. Each department can view identical information regardless of the intended use of the data.	Data is displayed in a standardized view, i.e. all employees see identical information that is not adapted to specific areas or functions.	Data is made available on a departmental basis, i.e., sales employees see different information about a product than development employees.	Information is provided contextually, i.e. employees are provided with different information depending on the person, task and situation.

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.5	How do you store data in your company?	Data is stored in many different formats and cannot be exchanged between departments	Most of the data is stored in standard formats and can therefore be accessed by all departments	All data is stored in uniform standard formats that can be used by all departments	Data is stored as meta data independent of format and can be retrieved as required
		Data is stored using individual formats. For example, employees keep individual Excel lists to record information. Thus, information is only recorded selectively. The exchange is only possible manually.	Almost all information is stored in standard formats and can be retrieved via standardized views. Occasionally, however, information is still available in individual formats and must be shared manually.	All data is stored in standard formats so that it can be processed by all applications and thus used by all employees.	Data is stored as meta data. Meta data contains structured information about characteristics of data sets. Information and evaluations can be provided as needed based on this information storage.

## O2 *Process design*

O2	Indicator	Level 1	Level 2	Level 3	Level 4
O2.1	Are your production processes controlled digitally and decentrally?	Production processes are controlled centrally	Manufacturing processes are controlled centrally	Production processes are mainly controlled decentrally	All production processes are fully digitally and decentrally controlled
		Your company uses centralized control through e.g. a leading system like MRP II. Here, a push strategy (sliding logic) is pursued, where, for example, production is made to order and product information is linked to the product (e.g. through accompanying documents). In addition, the flow of information and goods run in the same direction.	Your company controls the manufacturing processes using hybrid methods, such as CONWIP.	Your company uses digital, decentralized control of manufacturing processes in most areas, e.g., through KANBAN. Only a few processes are controlled centrally.	Your company uses digital, decentralized control of manufacturing processes throughout, e.g., through a digital KANBAN. Here, a pull strategy (target logic) is pursued. Production takes place according to demand, product and information are separated from each other and the flow of information and goods run in the opposite direction.

### O3 Cooperation & collaboration

O3	Indicator	Level 1	Level 2	Level 3	Level 4
O3.1	What opportunities do you offer teams for collaboration?	There is no teamwork	Teams work together exclusively on site	Teams also exchange information via digital media	Cooperation also takes place in virtual teams
		Your company does not promote teamwork. Employees work on individual tasks at individual workstations.	Teams meet on site for face-to-face meetings to exchange information.	Teams also work together via digital media, such as web or Skype conferences.	Teams consist of team members who are separated in terms of location and place and who communicate mainly via digital media.
O3.2	Does the production department have the necessary interdisciplinary skills to develop innovative solutions?	Digital solutions for products and systems cannot be developed in-house, as no interdisciplinary teams are available	Digital solutions for products and systems must be sourced almost entirely from suppliers, since only a few partial solutions can be developed by internal teams	The majority of digital solutions for products and systems can be developed in interdisciplinary teams, only in a few cases partial solutions have to be purchased	Digital solutions for products and systems can be developed completely independently due to the interdisciplinary competences
		Digital solutions cannot be developed because disciplines within the company operate separately. There is no exchange between the departments.	Interdisciplinary teams occasionally work together within the company, so that digital partial solutions can be developed individually. In most cases, however, digital solutions are purchased from external companies.	Interdisciplinary teams work together within the company and are able to develop digital solutions almost completely independently. Only occasionally do partial solutions have to be purchased from external companies.	Interdisciplinary teams work together within the company to develop digital solutions.

## M Social

### M1 Corporate culture

M1	Indicator	Level 1	Level 2	Level 3	Level 4
M1.1	How are decisions made?	Entscheidungen basieren ausschließlich auf Erfahrungswissen	Entscheidungen werden vereinzelt auf Basis von ausgewerteten Daten getroffen	Entscheidungen werden meistens auf Basis von ausgewerteten Daten getroffen	Ausgewertete Daten bilden die Grundlage für Entscheidungen im Unternehmen
		Führungskräfte treffen Entscheidungen auf Grundlage von Erfahrungen. Daten spielen bei der Entscheidungsfindung keine Rolle.	Einige Führungskräfte nutzen ausgewertete Daten als Entscheidungsgrundlage. Ein Großteil der Entscheidungen basiert jedoch noch auf Erfahrungswissen.	Entscheidungen basieren bei einer Vielzahl der Führungskräfte auf analysierten Daten.	Entscheidungen aller Führungskräfte basieren vollständig auf analysierten Daten.



M1	Indicator	Level 1	Level 2	Level 3	Level 4
M1.2	Unterstützen Ihre Mitarbeiter Digitalisierungsvorhaben?	Die Notwendigkeit von Digitalisierungsvorhaben wird von den Mitarbeitern grundsätzlich in Frage gestellt	Die Notwendigkeit von Digitalisierungsvorhaben wird grundsätzlich erkannt, dennoch werden nur vereinzelte Vorhaben unterstützt	Die Notwendigkeit von Digitalisierungsvorhaben wird grundsätzlich erkannt, sodass Vorhaben meist von den Mitarbeitern unterstützt werden	Die Notwendigkeit von Digitalisierungsvorhaben wird von allen Mitarbeitern erkannt und entsprechende Vorhaben werden unterstützt
		Die Potenziale der Digitalisierung werden nicht erkannt. Die Unternehmenskultur ist auf Routinen und Stabilität ausgerichtet. Digitalisierungsvorhaben werden von den Mitarbeitern daher nicht unterstützt.	Die Potenziale der Digitalisierung werden von wenigen Mitarbeitern erkannt, sodass Digitalisierungsvorhaben bisher nur selten unterstützt werden.	Die Potenziale der Digitalisierung werden von der Mehrzahl der Mitarbeiter erkannt, sodass Veränderungen bereits in den meisten Bereichen proaktiv gestaltet und Digitalisierungsvorhaben unterstützt werden.	Die Vorteile der Digitalisierung sind von allen Mitarbeitern erkannt worden, sodass Veränderungen proaktiv gestaltet und Digitalisierungsvorhaben von den Mitarbeitern unterstützt werden.

## M2 Leadership

M2	Indicator	Level 1	Level 2	Level 3	Level 4
M2.1	How are employees involved in digitization projects?	Employees are not involved	Employees are involved in some projects	Employees are involved in most projects	Employees are involved in all projects
		Employees have no opportunity to participate in the introduction of digitization solutions.	Employees have the opportunity to participate in a few digitization projects.	Employees have the opportunity to participate in most digitization projects.	Employees have the opportunity to participate in all digitization projects.
M2.2	How do you communicate digitization projects to your employees?	No communication	Sporadic communication via analog media	Sporadic communication via digital media	Regular communication via digital media
		Digitization projects are not communicated. Employees receive information on the use of the technology when it is introduced.	At irregular intervals, news about upcoming digitization projects is disseminated via analog media, e.g. by means of posters.	News about upcoming digitization projects is communicated at irregular intervals via digital media, e.g. by e-mail, intranet or tablet notifications.	Employees are informed about forthcoming digitization projects using digital media, e.g. by e-mail, intranet or tablet notifications.
M2.3	How willing are managers to push ahead with digitization projects?	No willingness	Willingness on the part of some managers	Willingness is present among a large number of managers	Willingness on the part of all managers
		Managers see no need to implement digitization projects and are therefore not prepared to actively shape change.	Some managers are willing to help shape digitization projects.	Most managers see the necessity to implement digitization projects and are willing to help shape them.	All managers see the necessity to implement digitization projects and are ready to actively participate in the creation of such projects.

M2	Indicator	Level 1	Level 2	Level 3	Level 4
M2.4	Do your managers act as digital role models?	Managers are not digital role models	Some managers are digital role models	Most managers are digital role models	All managers are digital role models
		The managers do not use digital media and therefore do not model their use. This does not promote acceptance among employees.	Some managers use digital media and therefore exemplify their use. This promotes acceptance among employees to a limited extent.	Most managers use digital media and therefore exemplify their use. This promotes acceptance among employees to a greater extent.	All managers use digital media and thus live out their use. This promotes acceptance among employees.

### M3 *Employee Development*

M3	Indicator	Level 1	Level 2	Level 3	Level 4
M3.1	What is the priority of developing the digital skills of your employees?	Not a priority	Low priority	Medium priority	High priority
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional training courses are offered. However, these must always be matched by an immediate benefit.	Training courses are offered, which are usually matched by an immediate benefit.	A wide variety of training courses are offered, not all of which have an immediate benefit for the company. Some training courses also aim to create innovation potential.
M3.2	How do you train your employees?	No training courses are offered	Training courses take place exclusively as face-to-face events	Trainings are also offered online	Learning takes place as smart learning integrated in the work process
		Trainings are not offered.	Training is only possible as on-site presence events.	In addition to classroom training, online training or e-learning is also offered.	Your employees can use virtual training opportunities, e.g. through VR glasses.
M3.3	Which contents are discussed within the training courses?	No training courses are offered	Exclusively application-oriented training	In addition to application-oriented training courses, we also offer individual advanced topics	Beside application-oriented training courses also equivalent advanced topics
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional application-oriented training is offered to prepare employees for planned digitization projects. This includes, for example, the use of digital tools or ERP systems.	In addition to application-oriented training courses that prepare employees for planned digitization projects, e.g. the use of digital equipment or ERP systems, there are also some advanced topics such as agile management or SCRUM.	A variety of training courses are offered to prepare employees for upcoming digitization projects. In addition to application-oriented training courses, advanced topics such as agile management or SCRUM are also addressed.

M3	Indicator	Level 1	Level 2	Level 3	Level 4
M3.4	How willing is your staff to use digital media?	No willingness	Willingness of some employees available	Willingness of the majority of the employees available	Readiness of all employees available
		There is no willingness to use digital media.	Some employees are willing to use digital media. However, the majority rejects this.	A majority of employees is willing to use digital media. This is only occasionally rejected.	All employees are willing to use digital media.

## Aftersales

### T Technology

#### T1 Customer service

T1	Indicator	Level 1	Level 2	Level 3	Level 4
T1.1	What communication options do you offer your customers?	Exclusively analog	Via a digital medium	Via several digital media	Integrated communication platforms
		Communication with the customer takes place, for example, by letter, fax or telephone.	Communication with the customer takes place via a digital medium, such as e-mails or platforms	Multiple digital media are used simultaneously to communicate with customers (omnichannel), such as web presence, platforms, social media, apps, and customer service portals.	Customer communication takes place via a platform that is integrated into the company's internal system landscape so that service processes can be optimized on the basis of the data obtained. In addition, artificial intelligence or virtual customer consultants can be used for communication.
T1.2	What human-machine interfaces are available in the aftersales or service process?	Human interface	Personal, Internet-based information, help and contact options available	Non-personal, Internet-based information, help and contact options available	Non-personal, Internet-based information, help and contact options available
		There are no human-machine interfaces in aftersales. For example, the customer communicates directly with the service employee (call center, face-to-face customer center).	Your company uses human-machine interfaces at individual points in the service process, such as online customer centers or online help and support.	Your company uses human-machine interfaces for the most part of the service process, such as Internet portals, self-services, mobile applications (customer self-service). Personal contact is no longer necessary.	Your company uses human-machine interfaces throughout the service process, such as the use of artificial intelligence, Internet portals, partner portals, self-services, mobile applications. Personal contact is no longer necessary.
T1.3	How do you collect data for product analysis?	No data collection	Partial data collection	Intermittent data collection	Automated data collection
		Product data is not collected.	Product data is collected in some cases.	Product data is collected at regular intervals, e.g. during regular inspections, or maintenance. The data to be collected are defined (e.g. operating data).	Product data can be collected automatically, e.g. by smart products.

T1	Indicator	Level 1	Level 2	Level 3	Level 4
T1.4	How do you utilize your collected product data? (Degree of utilization of the data)	Evaluations not available	manual evaluations	automated evaluations	Evaluations are carried out by means of algorithms
		Data is not evaluated.	Data is analyzed manually if required.	Data is analyzed according to predefined criteria.	New insights are gained from data using Big Data, Deep Learning or data mining.
T1.5	How do you collect data for customer analysis?	No data collection	partial data collection	Interval data collection	Automated data collection
		Customer data is not collected.	Customer data is collected in some cases.	Customer data is collected at regular intervals, e.g. during regular inspections, maintenance or surveys. The data to be collected is defined (service orders, information requests, inquiries).	Customer data can be collected automatically, e.g. by smart products. A connection to the customer data system enables further use of the data.
T1.6	How do you utilize your collected customer data? (Degree of utilization of the data)	Evaluations not available	manual evaluations	automated evaluations	Evaluations are carried out by means of algorithms
		Data is not evaluated.	Data is analyzed manually if required.	Data is analyzed according to predefined criteria.	New insights are gained from data using Big Data, Deep Learning or data mining.
T1.7	How does their maintenance work at the customer's site?	Reactive	Proactive	Proactive and Adaptive	Predictive Maintenance
		At the customer's request or in case of defective parts of the product or equipment.	Maintenance at the customer's site is carried out on the basis of specified intervals.	Maintenance work and intervals are updated considering product and customer data.	By using automated and self-learning algorithms, failures can be predicted and eliminated.
T1.8	Do you offer standardized service products for existing smart tangible products?	Is not offered	Is being planned	Will be partially implemented	Are fully implemented
		Your company does not offer standardized service products for intelligent tangible products.	Your company plans to introduce standardized service products for existing intelligent tangible products and has already developed initial approaches, but has not yet implemented them.	Your company offers associated standardized service products for individual intelligent tangible products.	Your company offers standardized service products for existing intelligent tangible products throughout.
T1.9	Do you offer your customers options for individual data-based customization of the property and service products you offer?	Not offered	Is planned	Are partially offered	Are fully offered
		Your company does not customize the property and service products offered.	Your company plans to adapt the property and service products individually and on the basis of data. Initial approaches to this exist, but have not yet been implemented.	Existing property and service products are adapted individually and on the basis of data.	Existing property and service products are adapted individually on the basis of data and in some cases newly developed.

## T2 Spare parts logistics & maintenance

T2	Indicator	Level 1	Level 2	Level 3	Level 4
T2.1	How do you store the maintenance history in your company?	A maintenance history does not exist	Paper-based	Digitized	Digital and integrated in data system
		A maintenance history is not available.	The maintenance history is stored in paper form.	The maintenance history is available digitally, e.g. in Excel tables.	The maintenance history is available digitally and is integrated into the company's internal data system so that product development, for example, can access it.
T2.2	How is your inventory management performed?	Manual	Software-supported	Software-supported and partially automated	Software-supported and integrated
		Inventories are entered manually. Ordering processes are activated manually.	Inventories are entered in software solutions. However, the ordering processes must be activated manually by employees.	Inventory entry and ordering are partially automated through the use of software solutions.	Inventory entry is fully automated and the ordering process is triggered based on data (customer and production data) and algorithms.

## T3 IT-system design

T3	Indicator	Level 1	Level 2	Level 3	Level 4
T3.1	Are the IT systems within the aftersales networked with each other?	No networking	Individual systems are integrated	Systems are partially integrated	Systems are fully networked
		Your systems are not connected and cannot exchange information. Data is exchanged only manually, e.g. by printing out Excel lists or by passing on information verbally.	Systems are only connected sporadically, so information cannot be exchanged automatically. Information is passed on manually due to media discontinuities, e.g. when information on orders is printed out from the ERP database and passed on to production.	The majority of systems are connected and can exchange information automatically. There are only a few media discontinuities, i.e., missing interfaces between systems, where manual information forwarding is required.	Your systems are networked and enable end-to-end collaboration. Relevant information is forwarded automatically.

T3	Indicator	Level 1	Level 2	Level 3	Level 4
T3.2	Are aftersales IT systems integrated with higher-level enterprise systems?	No integration	Individual systems are integrated	Systems are integrated across divisions	Systems are fully integrated into the higher-level enterprise systems
		Their systems are not connected to the higher-level corporate systems and cannot exchange information. Data is only exchanged manually, e.g. by printing out Excel lists or passing on information verbally.	Their systems are only sporadically connected to the higher-level enterprise systems, so information cannot be exchanged automatically. Information is passed on manually due to media disruptions.	The majority of your systems are connected to the higher-level enterprise systems and can exchange information automatically. There are only a few media discontinuities, i.e., missing interfaces between systems, where manual information transfer is required.	Your systems are networked with the higher-level enterprise systems and enable end-to-end collaboration. Relevant information is forwarded automatically.
T3.3	Are your IT systems networked along the entire value chain (to customers)?	No networking	Systems are only networked to a small extent; numerous media breaks exist	Systems are networked for the most part, isolated media breaks present	Systems are networked throughout without media discontinuities
		Your systems are not connected to your customers' systems and cannot exchange information. Data is only exchanged manually, e.g. by printing out Excel lists or passing on information verbally.	Your systems are connected to your customers' systems only sporadically, so information cannot be exchanged automatically. Information is passed on manually due to media disruptions.	The majority of your systems are connected to your customers' systems and can exchange information automatically. There are only a few media discontinuities, i.e., missing interfaces between systems, where manual information transfer is required.	Your systems are networked with your customers' systems and enable end-to-end collaboration. Relevant information is forwarded automatically.

## O Organization

### O1 Data management

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.1	Is the data collected in real time in the aftersales department?	No collection of data in real time	sporadically data is collected in real time	Data is predominantly, but not yet completely, collected in real time	Complete collection of data in real time
		The systems are not designed to capture and process data in real time.	Individual systems are capable of capturing and processing real-time data.	Almost all systems are capable of capturing and processing real-time data.	All systems acquire and process data in real time.

O1	Indicator	Level 1	Level 2	Level 3	Level 4
O1.2	How do you evaluate data in your company?	No data evaluation	Manual evaluation of data, no software support	Predefined evaluations can be called up by software	Individual evaluations possible through Big Data Analytics
		Your company does not use analytical methods to evaluate data digitally.	Data is evaluated manually, e.g. handwritten, with the help of Excel tables or by manual input in simple evaluation software.	Your company uses digital analysis methods. However, only pre-defined analyses are carried out, which record standardized key figures. Individual analyses are not possible.	Your company uses Big Data Analytics. Here, the data is obtained from various sources using search queries and then optimized and evaluated. The results of the analyzed data are processed and presented. This allows the company to evaluate a wide range of data formats in an application-oriented manner.
O1.3	How do you provide data in your company?	Data is stored locally and can be accessed in an individual view	Data is centrally available and retrievable in a standardized view	Data is centrally available and can be retrieved for specific areas	Data is centrally available and can be retrieved contextually
		The provision of information is based on available individual information. There is no selection of relevant data regarding area or task. Each department can view identical information regardless of the intended use of the data.	Data is displayed in a standardized view, i.e. all employees see identical information that is not adapted to specific areas or functions.	Data is made available on a departmental basis, i.e., sales employees see different information about a product than development employees.	Information is provided contextually, i.e. employees are provided with different information depending on the person, task and situation.
O1.4	How do you store data in your company?	Data is stored in many different formats and cannot be exchanged between departments	Most of the data is stored in standard formats and can therefore be accessed by all departments	All data is stored in uniform standard formats that can be used by all departments	Data is stored as meta data independent of format and can be retrieved as required
		Data is stored using individual formats. For example, employees keep individual Excel lists to record information. Thus, information is only recorded selectively. The exchange is only possible manually.	Almost all information is stored in standard formats and can be retrieved via standardized views. Occasionally, however, information is still available in individual formats and must be shared manually.	All data is stored in standard formats so that it can be processed by all applications and thus used by all employees.	Data is stored as meta data. Meta data contains structured information about characteristics of data sets. Information and evaluations can be provided as needed based on this information storage.



O2 Process design

O2	Indicator	Level 1	Level 2	Level 3	Level 4
O2.1	How do you document the maintenance records?	Paper-based documentation	Paper-based documentation and digital processing of information	Digital documentation with media discontinuity	Complete digital documentation
		The maintenance of a product / machine is documented paper-based.	The data and information generated during maintenance are recorded on paper. The recorded data is transferred manually to a system and processed further there.	Your company documents the maintenance digitally, e.g. using a tablet. The recorded digital maintenance logs are manually transferred to the further processing system, as there are media breaks between the individual systems.	Your company documents maintenance completely digitally, e.g. using a tablet. The captured digital maintenance logs are automatically transferred to the corresponding IT system and processed centrally there.
O2.2	How do you perform maintenance and updates of electronic and software components of products, machines and systems at the customer's site?	Manual maintenance and updates are performed on site	Manual maintenance and updates are occasionally supported digitally	Manual maintenance and updates are mainly supported digitally	Maintenance and updates are carried out completely digitally
		Your company carries out maintenance and updates of electronic and software components of the products, machines and systems at the customer's site.	In some cases, your company performs maintenance and updates of electronic and software components of products, machines, and systems digitally, e.g., via remote access or mobile controls.	Your company carries out maintenance and updates of electronic and software components of products, machines and systems mainly digitally, e.g. by remote access or mobile controls.	All maintenance and updates of electronic and software components of the products, machines, and systems are performed digitally, e.g., over-the-air.
O2.3	What options do you have to support your employees on physical maintenance jobs on site?	No support	Digital support only for frequently occurring maintenance cases	Digital support for the majority of maintenance cases that occur	Digital support for all maintenance cases that occur
		Work instructions for the necessary maintenance work are only available in paper form and are not supported digitally.	In some cases, work instructions can be retrieved via digital end devices. In the event of problems that occur more frequently, troubleshooting measures can be called up in this way.	In most maintenance cases, on-site employees are supported by work instructions on digital end devices. For this purpose, product information can be retrieved directly from the company's information system.	All maintenance processes that occur are supported digitally, e.g., by assistance systems such as AR glasses.

O2	Indicator	Level 1	Level 2	Level 3	Level 4
O2.4	How do you carry out service planning and scheduling?	Manually	Software-supported (stand-alone)	Through integrated IT systems	Through complete digital planning and scheduling
		Your company performs service planning and scheduling in a paper-based and manual manner.	Service planning and scheduling is carried out in your company with the help of software, but this is not linked to other systems. This means that there are media discontinuities between the IT systems, which means that the necessary information has to be passed on manually.	Service planning and scheduling in your company is carried out with the help of integrated processes in the IT system, e.g. ERP system or cloud platforms. In some cases, manual intervention is still required.	Service planning and scheduling in your company is carried out completely digitally, for example, by fully integrating IT systems and associated processes in ERP systems or cloud platforms. Information and data are exchanged automatically, manual intervention no longer takes place.

### O3 Cooperation & collaboration

O3	Indicator	Level 1	Level 2	Level 3	Level 4
O3.1	What opportunities do you offer teams for collaboration?	There is no teamwork	Teams work together exclusively on site	Teams also exchange information via digital media	Cooperation also takes place in virtual teams
		Your company does not promote teamwork. Employees work on individual tasks at individual workstations.	Teams meet on site for face-to-face meetings to exchange information.	Teams also work together via digital media, such as web or Skype conferences.	Teams consist of team members who are separated in terms of location and place and who communicate mainly via digital media.
O3.2	Does the aftersales department have the necessary interdisciplinary skills to develop innovative solutions?	Digital solutions for products and systems cannot be developed in-house, as no interdisciplinary teams are available	Digital solutions for products and systems must be sourced almost entirely from suppliers, since only a few partial solutions can be developed by internal teams	The majority of digital solutions for products and systems can be developed in interdisciplinary teams, only in a few cases partial solutions have to be purchased	Digital solutions for products and systems can be developed completely independently due to the interdisciplinary competences
		Digital solutions cannot be developed because disciplines within the company operate separately. There is no exchange between the departments.	Interdisciplinary teams occasionally work together within the company, so that digital partial solutions can be developed individually. In most cases, however, digital solutions are purchased from external companies.	Interdisciplinary teams work together within the company and are able to develop digital solutions almost completely independently. Only occasionally do partial solutions have to be purchased from external companies.	Interdisciplinary teams work together within the company to develop digital solutions.

## M Mensch

### M1 Corporate culture

M1	Indicator	Level 1	Level 2	Level 3	Level 4
M1.1	How are decisions made?	Decisions are based exclusively on experience	Decisions are occasionally made on the basis of evaluated data	Decisions are mainly made on the basis of evaluated data	Evaluated data form the basis for decisions in the company
		Managers make decisions based on experience. Data does not play a role in the decision-making process.	Some managers use evaluated data as a basis for decision-making. However, the majority of decisions are still based on experience.	For many managers, decisions are based on analyzed data.	Decisions of all managers are based entirely on analyzed data.
M1.2	Do your employees support digitization projects?	The necessity of digitization projects is fundamentally questioned by the employees	The need for digitization projects is generally recognized, but only isolated projects are supported	The necessity of digitization projects is generally recognized, so that projects are usually supported by the employees	The need for digitization projects is recognized by all employees and corresponding projects are supported
		The potential of digitization is not recognized. The corporate culture is geared towards routines and stability. Digitization projects are therefore not supported by the employees.	The potential of digitization is recognized by only a few employees, so digitization projects are rarely supported.	The potential of digitization is recognized by the majority of employees, so that changes are already being proactively designed in most areas and digitization projects are supported.	The advantages of digitization have been recognized by all employees, so that changes are proactively managed and digitization projects are supported by the employees.

### M2 Leadership

M2	Indicator	Level 1	Level 2	Level 3	Level 4
M2.1	How are employees involved in digitization projects?	Employees are not involved	Employees are involved in some projects	Employees are involved in most projects	Employees are involved in all projects
		Employees have no opportunity to participate in the introduction of digitization solutions.	Employees have the opportunity to participate in a few digitization projects.	Employees have the opportunity to participate in most digitization projects.	Employees have the opportunity to participate in all digitization projects.

M2	Indicator	Level 1	Level 2	Level 3	Level 4
M2.2	How do you communicate digitization projects to your employees?	No communication	Sporadic communication via analog media	Sporadic communication via digital media	Regular communication via digital media
		Digitization projects are not communicated. Employees receive information on the use of the technology when it is introduced.	At irregular intervals, news about upcoming digitization projects is disseminated via analog media, e.g. by means of posters.	News about upcoming digitization projects is communicated at irregular intervals via digital media, e.g. by e-mail, intranet or tablet notifications.	Employees are informed about forthcoming digitization projects using digital media, e.g. by e-mail, intranet or tablet notifications.
M2.3	How willing are managers to push ahead with digitization projects?	No willingness	Willingness on the part of some managers	Willingness is present among a large number of managers	Willingness on the part of all managers
		Managers see no need to implement digitization projects and are therefore not prepared to actively shape change.	Some managers are willing to help shape digitization projects.	Most managers see the necessity to implement digitization projects and are willing to help shape them.	All managers see the necessity to implement digitization projects and are ready to actively participate in the creation of such projects.
M2.4	Do your managers act as digital role models?	Managers are not digital role models	Some managers are digital role models	Most managers are digital role models	All managers are digital role models
		The managers do not use digital media and therefore do not model their use. This does not promote acceptance among employees.	Some managers use digital media and therefore exemplify their use. This promotes acceptance among employees to a limited extent.	Most managers use digital media and therefore exemplify their use. This promotes acceptance among employees to a greater extent.	All managers use digital media and thus live out their use. This promotes acceptance among employees.

### M3 *Employee development*

M3	Indicator	Level 1	Level 2	Level 3	Level 4
M3.1	What is the priority of developing the digital skills of your employees?	Not a priority	Low priority	Medium priority	High priority
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional training courses are offered. However, these must always be matched by an immediate benefit.	Training courses are offered, which are usually matched by an immediate benefit.	A wide variety of training courses are offered, not all of which have an immediate benefit for the company. Some training courses also aim to create innovation potential.
M3.2	How do you train your employees?	No training courses are offered	Training courses take place exclusively as face-to-face events	Trainings are also offered online	Learning takes place as smart learning integrated in the work process
		Trainings are not offered.	Training is only possible as on-site presence events.	In addition to classroom training, online training or e-learning is also offered.	Your employees can use virtual training opportunities, e.g. through VR glasses.

<b>M3</b>	<b>Indicator</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
M3.3	Which contents are discussed within the training courses?	No training courses are offered	Exclusively application-oriented training	In addition to application-oriented training courses, we also offer individual advanced topics	Beside application-oriented training courses also equivalent advanced topics
		No training is offered, as it is assumed that the requirements will not change due to digitalization.	Occasional application-oriented training is offered to prepare employees for planned digitization projects. This includes, for example, the use of digital tools or ERP systems.	In addition to application-oriented training courses that prepare employees for planned digitization projects, e.g. the use of digital equipment or ERP systems, there are also some advanced topics such as agile management or SCRUM.	A variety of training courses are offered to prepare employees for upcoming digitization projects. In addition to application-oriented training courses, advanced topics such as agile management or SCRUM are also addressed.
M3.4	How willing is your staff to use digital media?	No willingness	Willingness of some employees available	Willingness of the majority of the employees available	Readiness of all employees available
		There is no willingness to use digital media.	Some employees are willing to use digital media. However, the majority rejects this.	A majority of employees is willing to use digital media. This is only occasionally rejected.	All employees are willing to use digital media.

#### M4 *Customer development*

<b>M4</b>	<b>Indicator</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>
M4.1	Do you offer your customers product-related training?	No, no training offered	Yes, through classroom training	Yes, through online courses	Yes, training courses can be completed virtually
		No product-related training courses are offered.	Training courses are offered. These take place as classroom events.	Training content is made available in online courses and can thus be viewed by participants worldwide.	Training courses are held virtually so that practical content can be taught in addition to theoretical content. Training courses are offered online and supported by VR/AR glasses, for example.

M4	Indicator	Level 1	Level 2	Level 3	Level 4
M4.2	How do you help your customers with inquiries?	By phone In case of questions, the customer must contact the company by phone, as there is no possibility to contact the company by e-mail.	By e-mail The customer can contact the company by e-mail. Individual employees can be addressed directly or a central office takes over the forwarding of questions to the respective addressees.	Online portal The customer can log in to a personal area online and thus view information on orders directly. Open questions can be addressed directly to the responsible department via the online portal.	Use of bots Your company uses bots to answer frequent customer inquiries. A bot is a software solution that can recognize questions and answer them in a standardized way. An employee only needs to be contacted for more complex questions.