

Digital diagnostics

GOOD PRACTICE

Important information for the contracting entity and
provider of digital diagnostics

INTRODUCTION

The good practice of digital diagnostics describes in detail the process and methodology of performing diagnostics. Adherence to good practice is a prerequisite for conducting successful digital diagnostics and compiling a digitalization roadmap report that complies with the terms and conditions of the industry support measure.

Digital diagnostics offers manufacturing enterprises an opportunity to map their production, find ways to improve management of production and decrease human intervention by using digital technologies, automation and robots. Enterprise Estonia provides financial support both for conducting digital diagnostics and for investing on the basis of the digitalization roadmap report that is prepared as a result of the digital diagnostics. The provision of grants for digital diagnostics is based on the Regulation of the Digital Diagnostics and Automation Grant. Provision of grants for investments based on the roadmap report is conducted on the basis of the "Grant for using digital technologies, robots and automation in manufacturing and mining industry".

The aim of digital diagnostics is to get an overview of the current state of digitalization and automation in the enterprise, map the relevant development positions and suggest specific solutions:

1. an assessment is provided to the enterprise's digitalization and automation, as well as the functionality of processes;
2. an overview is formed of the improvement activities related to digitalization and automation;
3. an assessment is provided for the cost, payback period and impact on the enterprise's economic indicators.

As a result of digital diagnostics, entrepreneurs' awareness of the impact that investing into technologies that reduce human intervention has on an entrepreneur's business model will increase as well.

The methodology of digital diagnostics is based on the self-assessment questionnaire included in Chapter 5. In order to succeed, it is very important to form a team of representatives of the enterprise and external experts of the relevant field. It is vital that both parties be demanding towards one another – this is how the best possible result is ensured.

The digital diagnostic team will process the questionnaire in the form of a discussion, in which it is recommended to involve persons responsible for the fields as well (e.g. purchasing manager, sales manager, quality manager, production manager).

1. PROCESS



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| Price offer | <ul style="list-style-type: none">• The enterprise that wants to undergo digital diagnostics will get price offers from enterprises that offer digital diagnostics. See also competence requirements of a service provider (Chapter 3) |
| Performance of digital diagnostics | <ul style="list-style-type: none">• Conducting digital diagnostics is a bilateral activity of the enterprise and the provider of diagnostics; it is carried out as team work and with the help of a self-assessment questionnaire |

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| Roadmap report | <ul style="list-style-type: none"> The diagnostics provider has submitted a digital diagnostics roadmap report for the enterprise that ordered it; the enterprise will then approve the roadmap report. |
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2. PRICE OFFER FOR PREPARATION OF A ROADMAP

A provider of digital diagnostics has to have conducted at least three digitalization, automation or production management auditing projects of a manufacturing enterprise. For example, analysis of integration of production equipment, analysis of automation systems, analysis of management systems, analysis of IT solutions of production, analysis of production process according to the principles of digitalization.

In order to make a price offer for the compilation of a digitalization roadmap for an enterprise, the diagnostics provider has to be knowledgeable of the specific enterprise, including understand its:

- business model;
- economic situation;
- organisation of work;
- technological and technical level of the enterprise;
- structure and work culture of the enterprise.

3. PERFORMANCE OF DIGITAL DIAGNOSTICS

In order to carry out diagnostics and to prepare a roadmap report, the diagnostic team must have the following competences:

1. production and supply chain organisation;
2. digital technologies used in production, automation and robotics;
3. software robots and big data processing.

Conducting digital diagnostics includes detailed familiarisation with the enterprise's supply chain and production processes. During that familiarisation, problems that can be improved with management or organisational changes, automation, digital technologies or the use of robots, are identified.

The diagnostic team must ensure that:

- the methodology, i.e. self-assessment questionnaire, is followed;
- the team includes external providers of diagnostics as well as representatives of the enterprise;
- people in the enterprise have been informed of performing digital diagnostics, explanations have been provided to the team concerning the diagnostic process and methodology, including the preparation and collection of recommended documents has been agreed upon.

The enterprise has to ensure that:

- the diagnostic team is made up of specialists in the field (e.g. purchasing managers, sales managers, warehouse managers, production managers, production unit managers, setters);

- specialists in the diagnostic team have sufficient experience in working in the enterprise and/or in the field (making decisions based on information received from new and not yet very knowledgeable employees should be avoided);
- all employees required for successful diagnostics are informed about conducting diagnostics.

It is advisable to go through the following activities when performing diagnostics in an enterprise:

1. an external diagnostics provider will get **acquainted** with the enterprise and the organisation of work in various departments of the enterprise. A great way to do this is to take a tour of the enterprise, going through the entire chain of action (from receiving raw materials to delivering the finished products) and, if necessary, to meet the enterprise's suppliers and clients;
2. an **opening meeting** of the diagnostic team, with the participation of all key persons and employees, who will have significant exposure to the diagnostic process and who will contribute to its successful performance, of the enterprise that ordered the diagnostics. At the opening meeting, the diagnostic team must agree on the organisation and timing of the digital diagnostics, explain its content, process, objective, expected results and other important information;
3. the opening meeting shall be followed by a **self-assessment questionnaire**, preferably in the form of group work, during which information will be collected about the bottlenecks and problems in the enterprise and possible solutions to those. The work should be conducted in the form of moderated joint discussions, where the information collected should be visually visible to the participants (e.g. projected, written on post-its). In the case of a larger enterprise, it is advisable to divide participants into smaller groups;
4. after completing the questionnaire, a **discussion of the diagnostic team** should follow, specifying the issues and problems that have arisen. It is advisable to further involve representatives of the enterprise, e.g. to conduct discussions at workplaces with bottlenecks or other issues. This allows to effectively view the critical moments of the organisation of work and the supply chain, and access the necessary materials. During the work, it is necessary to ensure that all stages of the production process specified in the report are handled in accordance with the questionnaire in Chapter 5:
 - a. structure of the supply chain, relationship with strategy and business model;
 - b. organisation/planning, including production management, HR management and management of the quality system;
 - c. procurement;
 - d. manufacturing;
 - e. supply;
 - f. returning;
5. the **external diagnostics provider** shall collect the information of each discussion, the problems and solutions found and the conclusions. Based on the information collected, a project of the enterprise's digital diagnostics roadmap report will be compiled in accordance with the structure set out in Chapter 4;
6. the **report project will be submitted to the diagnostic team** for examination;

7. **approval** of the report has to be provided by the enterprise and during a joint discussion between the diagnostic team and the managers of the enterprise. During the discussion, the main problems and solutions will be introduced and discussed. If necessary, the report will be expanded and improved according to the proposals arising from the discussion.

The discussed and approved report will be digitally signed by a representative of the diagnostics provider and a representative of the enterprise.

4. DIGITALIZATION ROADMAP REPORT

The goal of the digitalization roadmap report is to document the problems or areas of improvement found in the enterprise and to provide solution options.

Below are the minimum requirements for the digitalization roadmap report. It is highly recommended for the diagnostic team to include other written, graphic, etc. elements (descriptions, pictures, figures, charts, etc.) to the assessment, if that is required by the minimum requirements.

The methodology for compiling the digitalisation roadmap report is made up of the self-assessment questionnaire in Chapter 5. Since the questionnaire consists of "whether or not" questions, the first answer to each question is either "yes" or "no", and every following step must only take into account the "and" question. The roadmap compiled in this way displays all the bottlenecks in the supply chain, but it is up to the enterprise to decide which of these bottlenecks can be solved by using digital technologies, automation or robots.

Problems should be presented on the basis of the main processes:

1. structure of the supply chain, relationship with strategy and business model;
2. organisation/planning (including production management, HR management and management of the quality system);
3. procurement;
4. manufacturing;
5. supply;
6. returning.

The problems identified should be **divided into the following three categories:**

1. management and organisation;
2. automation;
3. digitalization.

When identifying problems, it is necessary to **assess each problem** in terms of the relevance of the problem and the priority of solving the problem by using the traffic lights principle.

1. Red:
 - The problem poses a high risk to the operation of the enterprise, and the risk may materialise at any moment;
 - It is possible or necessary to solve the problem immediately.
2. Yellow:
 - The problem does not directly impede work, but solving it will increase the enterprise's efficiency significantly;

- postponing solving the problem by a couple of years may increase the priority level of the problem in the short term.
3. Green:
- The problem does not hinder the enterprise's work or operation, but solving it would definitely increase the efficiency of the enterprise;
 - this investment can be delayed by a few years.

To better monitor the result, each finding should be presented on a separate line.

In the course of compiling the digitalization roadmap report, solutions have to be suggested for the problems that have been identified.

- A specific solution has to be suggested for every problem. A problem and its solution have to be linked. The solution should include instructions for solving the problem and an explanation of how the solution works.
- The solution option should also indicate whether the solution can be carried out with the enterprise's own resources or whether it will be necessary to outsource the solution.
- The suggested solutions should be placed on a timeline indicating the advisable time for the implementation of the solution – i.e. the suggested implementation times of solutions are presented in chronological order.
 - At the very least solutions should be allocated to suitable years; although it is recommended to provide a more detailed distribution in the roadmap (e.g. plan per quarter).
- In addition to the proposed solution, the roadmap should also reflect the magnitude of the cost of the solution.
- In the case of a solution that requires the use of digital technologies, automation or robots, in the interest of transparency, at least two alternative solutions, with the necessary functionality, from different contracting authorities should be suggested, if there is a sufficient number of solutions available on the market.
- Based on the cost of solution options, it is necessary to add up the magnitudes of cost of the investments and provide those for each stage of the assessment (year, quarter, etc.). In addition, it is important to assess the payback period of the solutions and the potential impact on the enterprise's financial performance. Assessments should be provided in summarised form for each stage.

Should the diagnostic team make **product development suggestions** during the performance of diagnostics, those ought to be presented as well.

5. SELF-ASSESSMENT QUESTIONNAIRE STRUCTURE OF THE SUPPLY CHAIN

| Strategic management and business model of the enterprise |
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| 1. Are long-term goals set and defined in the enterprise? |
| 1.1 Whether and how has the enterprise defined the profile of its supply chain partners? |
| 1.2 Whether and how have business rules have been laid down for the supply chain? |
| 1.2.1 Whether and how are business rules documented? |
| 1.2.2 Whether and how are business rules communicated between the parties? |
| 1.2.3 Whether and how is regular overview and improvement/replacement of business rules organised? |
| 1.3 Whether and how does the enterprise conduct regular audits of the supply chain and are those audits managed in a systematic way? |
| 1.4 Whether and how have the exact parts and organisations of the supply chain been determined? |

| Productivity management of the supply chain |
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| 2. Has the reporting of the supply chain been organised in a systematic way? |
| 2.1 Whether and how is the analysis of reports organised and managed? |
| 2.2 Are systematic metrics used for monitoring productivity, what are those? |
| 2.3 Has a system been implemented in the enterprise for identifying bottlenecks in production? |
| 2.3.1 Are management control systems in use for equipment and systems (e.g. PLC, SDCD)? |
| 2.3.2 Are monitoring and control systems in use on production lines (e.g. SCADA, PIMS)? |
| 2.3.3 Whether and how are management decisions made based on data received from monitoring metrics? |
| 2.4 Are any (computer) programmes in use for monitoring productivity? |
| 2.4.1 Is the enterprise knowledgeable of the full functionality of the programmes used? |

| Data management of the supply chain |
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| 3. Whether and how is input data defined? |
| 3.1 How is access to data organised? |
| 3.2 How is the confidentiality of data ensured? |
| 3.3 How is data protected and stored? |
| 3.4 Whether and for what purpose are ready-made solutions for planning and quality management (e.g. MES) used? |
| 3.5 Whether and for what purpose are ready-made solutions (e.g. ERP) used when managing orders and processes within the enterprise? |
| 3.6 How are work orders issued? |
| 3.6.1 Are software solutions used for giving work orders? What kind of software solutions? |

| Organisation/management of human resource of the supply chain |
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| 4. Whether and how are the necessary human resources and skills planned (description of the necessary skills, explanations of changes)? |
| 4.1 Whether and how are the existing knowledge and human resources (matrix of skills) recorded? |
| 4.2 Whether and how is the planning of existing labour force planned (including notification)? |
| 4.3 Whether and how are training needs planned and organised (e.g. refresher and conversion training)? |
| 4.4 Whether and what kind of labour-related metrics do you use (e.g. hourly productivity)? |
| 4.5 Do you use digital remote management solutions (e.g. controlling equipment or robots)? |

Management of instruments/assets of the supply chain

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| 5. Whether and how is the systematic management of the instruments/assets of the supply chain conducted? |
| 5.1 Whether and how is the use of <i>instruments/assets</i> scheduled? |
| 5.2 Whether and how are the instruments/assets reviewed and any determined issues solved? |
| 5.3 Whether and how is the installation and configuration of new instruments/assets (e.g. new equipment) organised? |
| 5.4 Whether and how is the regular cleaning, maintenance and repair works of instruments/assets organised? |
| 5.5 How are depreciated instruments/assets recorded and removed? |
| 5.6 Whether and how is regular monitoring of maintenance of instruments/assets conducted? |
| 5.7 How is the restoration/replacement of instruments/assets conducted? |
| 5.8 How would you assess the management's competence regarding new technologies? |

Organisation of supply chain contracts

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| 6. Whether and how is the systemic management of contracts conducted? |
| 6.1 How is the receipt and updating of contracts conducted? |
| 6.2 How is the entry and distribution of contracts conducted? |
| 6.3 How is the activation and archiving of contracts conducted? |
| 6.4 How is the monitoring/review of fulfilling contracts conducted? |
| 6.5 Whether and how are the issues and opportunities of fulfilling contracts documented? |
| 6.6 Whether and how is systematic review of contracts (necessary alterations and amendments) and the introduction of changes conducted? |

Compliance with supply chain requirements

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| 7. Whether and how is the establishment and introduction of requirements of the supply chain conducted? |
| 7.1 Whether and how are existing requirements reviewed? |
| 7.2 Whether and how are any shortcomings in the requirements determined (outdated requirements, new requirements necessary, amendments)? |
| 7.3 Whether and how is the approval of new requirements conducted? |
| 7.3.1 How is the sharing/disclosing of new requirements organised? |

Risk management of the supply chain

8. Are the supply chain risks managed in a systematic way?

8.1 Whether and how are processes described?

8.2 Whether and how are potential risk events identified?

8.3 Whether and how are potential risks quantified?

8.4 Whether and how are potential risk events assessed?

8.5 How is the mitigation/prevention of risks conducted?

8.6 Is there a business continuity plan in place?

Management of procurement process of the supply chain

9. Are procurement processes managed in a systematic way?

9.1 Whether and how is the strategy of procurement described and how is procurement planned?

9.2 Whether and in what format is procurement documentation prepared?

9.3 Is a systematic, competitive procurement process conducted?

9.3.1 How are procurement orders defined?

9.3.2 How is the selection of tenderers for participation in the procurement organised (including testing)?

9.3.3 How is the evaluation and validation of tenders conducted?

9.3.4 How is the conclusion of a contract with the winner and the implementation process conducted?

9.4 Whether and how is the list of preferred suppliers of equivalent products or materials determined?

Technology management of the supply chain

10. Are the technological solutions of the supply chain managed in a systematic way?

10.1 Whether and how are requirements for the technological solution of the supply chain defined?

10.1.1 Whether and how is the roadmap of the technological solution for the supply chain defined and updated?

10.1.2 Whether and what kind of principles are used as basis for selecting a technological solution (e.g. life cycle cost, API availability (interfaceability))?

10.2 How is the technological solution specified and implemented?

10.3 How are the maintenance and improvement of technology conducted?

10.4 How are the readiness levels of technology regulated (old, new)?

10.5 How is the depreciation of technology determined?

10.6 How is technology updated (availability of new versions)?

10.7 Have you planned investments into the improvement of existing technologies or into the introduction of new ones?

ORGANISATION/PLANNING

Planning of supply chain

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| 11. How do you plan/schedule your supply chain? |
| 11.1 How have the necessary requirements of the supply chain been determined and described? |
| 11.2 How have the necessary resources of the supply chain been determined and described? |
| 11.3 Has a supply chain plan been prepared and how has it been communicated to the parties? |
| 11.4 How is the management of the product's life cycle planned from product development to exiting the market (existence/level of development capacity)? |
| 11.5 How is the compatibility of data (automatic/digital?) generated in the supply chain planned? |
| 11.6 How are the enterprise's IT systems and workplaces linked to a single network? |

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| Planning a procurement |
| 12.1 Do you plan procurements in a systematic way? |
| 12.1.1 Has a procurement plan been prepared and how has it been communicated to the parties? |
| 12.1.2 How are the product/service requirements determined and described? |
| 12.1.3 How are the product/service resources determined and described? |
| 12.2 How are suppliers determined for supplying equivalent products? |
| 12.3 How is the management of the purchase order process planned? |
| 12.3.1 Whether and how are automatic solutions used for conducting purchase orders? |
| 12.4 Whether and how do you monitor the automatic compatibility of data exchange when selecting suppliers? |

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| Planning of production |
| 13.1 Do you plan your production process in a systematic way? |
| 13.1.1. Has a production plan been prepared and how has it been communicated to the parties? |
| 13.1.2 How are the product/service requirements determined and described? |
| 13.1.3 How are the product/service resources determined and described? |
| 13.2 How is the management of production capacities' flexibility (covering capacities with supplies, management of overcapacity or undercapacity) organised? |
| 13.3 Is simulation used for the planning of a product? |
| 13.4 Is simulation used for production planning? |
| 13.5 Whether and how do you explain the automatic compatibility of data exchange of the client and your production process? |
| 13.6 Whether and how do you implement various quality management systems (e.g. ISO, GMP, SixSigma)? |
| 13.7 Are your products certified and how is the certification process managed? |
| 13.8 Is the production process of the enterprise or are its management systems certified? |
| 13.9 Whether and how do you implement LEAN production tools (5S, andone, Gemba, JIT, Kaizen, Kanban, Muda (waste), PDCA, Poka-Joke, SMED, etc.)? |
| 13.10 Whether and how do you manage production data? |
| 13.11 Have you determined objectives concerning quality, productivity and production cost? |

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| 13.12 How is the management of internal and external reclamations conducted? |
| 13.13 Whether and how do you use measurement results to optimise your production process? |
| 13.14 Whether and how is the implementation of the budget monitored and any deviations managed? |
| 13.15 Whether and how is the collection of data from devices conducted and is the data transferred to ERP automatically? |
| 13.16 Do you monitor that the performance of devices complies with the allowed parameters and do you conduct preventative maintenance? |
| 13.17 How do you measure the expenses arising from defective products? |
| 13.18 Whether and how do you monitor the bottlenecks and efficiency of the production process (including various stages of it)? |
| 13.19 Whether and how do you measure setup time (e.g. OEE)? |
| 13.20 Whether and how do you determine your capability to develop new applications, products, services? |

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| Planning delivery |
| 14. Do you plan your supplies in a long-term and systematic way? |
| 14.1 Whether and how are the supply requirements determined and described? |
| 14.2 Whether and how are the supply resources determined and described? |
| 14.3 Has a supply plan been prepared and how has it been communicated to the parties? |
| 14.4 Whether and how do you monitor the automatic compatibility of data with the client that arises from supply? |

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| Planning of return |
| 15. Do you have a specific return system in place? |
| 15.1 Whether and how are the returning requirements determined and described? |
| 15.2 Whether and how are the returning resources determined and described? |
| 15.3 Has a return plan been prepared and how has it been communicated to the parties? |
| 15.4 Whether and how do you monitor the automatic compatibility of data with the client that arises from supply? |

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| Planning product development |
| 16. Are you active in systematic product development? |
| 16.1 Do you use various systems, such as CAD, CAE, CAM, PDM, PLM, in product development processes? |
| 16.2 Do you take reclamations into account in the product development process? |
| 16.3 Do you take the feedback received from after-care into account in product development processes? |
| 16.4 Have you automated product introduction into production? |
| 16.5 How do you manage prototype creation and the feedback received from that for the introduction process? |
| 16.6 If you are a subcontractor, are you aware of what the final product is like and what are the requirements set for the final product? |
| 16.6.1 Do you monitor the market situation of the final product and are you aware of market trends? |

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| 16.6.2 Does the client involve you in the product development process? |
| 16.6.3 Whether and how have you made proposals to the client for developing the final product |
| 16.7 If you are the manufacturer of the final product, whether and how do you monitor customer satisfaction and market trends? |
| 16.8 Do you keep track of the latest technological discoveries and solutions in your field? |
| 16.9 Does your enterprise have a motivation system in place that supports product development activities among the employees of the enterprise? |

PROCUREMENT

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| Procurement of standard products |
| 17. Do you procure a standard product? |
| 17.1 Whether and how are the deliveries of products scheduled? |
| 17.2 Whether and how is the receipt of a product regulated? |
| 17.3 Whether and how is the verification of a product regulated? |
| 17.4 Whether and how is the storage of a product regulated? |
| 17.5 How and on what grounds is a supplier's invoice confirmed? |
| 17.6 Whether and how do you measure the supply quality of a procurement product/service (including timeliness, product, compiling consignments)? |
| 17.6.1 Whether and how do you use measurement results for improving processes? |
| 17.7 Whether and what kind of technological solutions are used in the procurement of products? |

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| Procurement of customised products |
| 18. Do you procure a customised product? |
| 18.1 How are the deliveries of products scheduled? |
| 18.2 Whether and how is the receipt of a product regulated? |
| 18.3 Whether and how is the verification of a product regulated? |
| 18.4 Whether and how is the storage of a product regulated? |
| 18.5 How and on what grounds is a supplier's invoice confirmed? |
| 18.6 Whether and how do you measure the supply quality of a procurement product/service (including timeliness, product, compiling consignments)? |
| 18.6.1 Whether and how do you use measurement results for improving processes? |
| 18.7 Whether and what kind of technological solutions are used in the procurement of products? |

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| Procuring a custom-made product |
| 19. Do you procure custom-made products? |
| 19.1 How are potential procurement suppliers identified? |
| 19.2 How is the final selection of a supplier and how are negotiations conducted? |
| 19.3 Whether and how are the deliveries of products scheduled? |
| 19.4 Whether and how is the receipt of a product regulated? |

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| 19.5. Whether and how is the verification of a product regulated? |
| 19.6 How is the storage of a product regulated? |
| 19.7 How and on what grounds is a supplier's invoice confirmed? |
| 19.8 Whether and what kind of technological solutions are used in the procurement of products? |
| 19.9 Whether and how do you measure the supply quality of a procurement product/service (including timeliness, product, compiling consignments)? |
| 19.9.1 Whether and how do you use measurement results for improving processes? |

MANUFACTURING

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| Production of standard products |
| 20. Do you produce a standard product? |
| 20.1 Whether and how are production activities scheduled? |
| 20.2 How is the availability of raw materials ensured? |
| 20.3 How are production and testing organised? |
| 20.4 Whether and how is the quality control of a product organised (e.g. tomography)? |
| 20.5 How is packaging organised? |
| 20.6 How is the storing of a product organised? |
| 20.7 How is the product issued for delivery? |
| 20.8 How is waste disposal organised? |

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| Production of customised products |
| 21. Do you produce a customised product? |
| 21.1 Whether and how are production activities scheduled? |
| 21.2 How is the availability of raw materials ensured? |
| 21.3 How are production and testing organised? |
| 21.4 Whether and how is the quality control of a product organised (e.g. tomography)? |
| 21.5 How is packaging organised? |
| 21.6 How is the storing of a product organised? |
| 21.7 How is the product issued for delivery? |
| 21.8 How is waste disposal organised? |

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| Production of custom-made products |
| 22. Do you produce a custom-made product? |
| 22.1 How is the preparation of a product's documentation conducted (including product and assembly figures)? |
| 22.2 How are production activities scheduled? |
| 22.3 How is the availability of outsourced products and materials that are necessary for production of the product ensured? |
| 22.4 How are production and testing organised? |
| 22.5 What means are used for quality control (e.g. tomography)? |
| 22.6 How is packaging organised? |

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| 22.7 How is the storing of a product organised? |
| 22.8 How is the final product issued for delivery? |
| 22.9 How is waste disposal organised? |
| 22.10 Do you monitor the custom-made product's production process and data processing options? |
| 22.11 Whether and how do you use simulation solutions when creating a prototype? |
| 22.12 Whether and how is a product's after-care and its registration conducted? |
| 22.12.1 Is the data registered during after-care used for improving the production process? |

SUPPLY

| Supply of standard product |
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| 23. Do you supply a standard product? |
| 23.1 How is an order accepted, entered and validated? |
| 23.2 How is stock reserved and how are delivery times set? |
| 23.3. Whether and how are orders consolidated? |
| 23.4 How is a consignment put together for delivery? |
| 23.5 How are logistics organised? |
| 23.6 How is transporter selected, how are the time and cost of transport assessed? |
| 23.7 How is the product received from the supplier or from production? |
| 23.8 How is the product received for packaging prior to transport? |
| 23.9 How are products packaged for transport? |
| 23.10 How is the consignment loaded and how are the accompanying documents formalised? |
| 23.11 How is the receipt and verification of a product organised by the contracting entity? |
| 23.12 Whether and how is the product installed at the client's location? |
| 23.13 How is an invoice sent and confirmed by the contracting entity? |
| 23.14 Whether and how do you measure the accuracy level of fulfilling orders (timeliness, quality, etc.)? |
| 23.15 Whether and how do you use information received from measuring compliance of fulfilling orders for corrective activities? |

| Supplying a customised product |
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| 24. Do you supply a customised product? |
| 24.1 How is an order accepted, entered and validated? |
| 24.2 How is stock reserved and how are delivery times set? |
| 24.3 Whether and how are orders consolidated? |
| 24.4 How is a consignment put together for delivery? |
| 24.5 How are logistics organised? |
| 24.6 How is transporter selected, how are the time and cost of transport assessed? |
| 24.7 How is the product received from the supplier or from production? |
| 24.8 How is the product received for packaging prior to transport? |

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| 24.9 How are products packaged for transport? |
| 24.10 How is the consignment loaded and how are the accompanying documents formalised? |
| 24.11 How is the receipt and verification of a product organised by the contracting entity? |
| 24.12 Whether and how is the product installed at the client's location? |
| 24.13 How is an invoice sent and confirmed by the contracting entity? |
| 24.14 Whether and how do you measure the accuracy level of fulfilling orders (timeliness, quality, etc.)? |
| 24.15 Whether and how do you use information received from measuring compliance of fulfilling orders for corrective activities? |

Supplying a custom-made product

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| 25. Do you supply a custom-made product? |
| 25.1 How is a tender received and how do you reply to it? |
| 25.2 How are negotiations and receipt of contract conducted? |
| 25.3 How is an order entered, resources planned and production organised? |
| 25.4 How is the supplying of a product scheduled? |
| 25.5 How is a consignment put together for delivery? |
| 25.6 How are logistics organised? |
| 25.7 How is transporter selected, how are the time and cost of transport assessed? |
| 25.8 How is the product received from the supplier or from production? |
| 25.9 How is the product received for packaging prior to transport? |
| 25.10 How are products packaged for transport? |
| 25.11 How is the consignment loaded and how are the accompanying documents formalised? |
| 25.12 How is the receipt and verification of a product organised by the contracting entity? |
| 25.12.1 How is the client's feedback from the control of supplied goods submitted to the enterprise? |
| 25.13 Whether and how is the product installed at the client's location? |
| 25.14 How is an invoice sent and confirmed by the contracting entity? |
| 25.15 Whether and how do you measure the accuracy level of fulfilling orders (timeliness, quality, etc.)? |
| 25.16 Whether and how do you use information received from measuring compliance of fulfilling orders for corrective activities? |

Retail sale

| |
|--|
| 26. Are you active in retail sale? |
| 26.1 How is warehouse planning conducted? |
| 26.2 How is the product stored? |
| 26.3 How is warehouse management/traceability organised? |
| 26.4 How is an order form prepared? |
| 26.5 How is issuing of goods conducted? |
| 26.6 Whether and how is delivery and installation conducted? |
| 26.6.1 Whether and how do you measure the accuracy level of fulfilling orders (timeliness, quality, etc.)? |

26.7 Whether and how do you use information received from measuring compliance of fulfilling orders for corrective activities?

RETURNING

Returning a defective procurement product

27.1 How is the situation of a defective product determined and recorded?

27.2 How is a defective product eliminated and stored?

27.3 How is the sending and accepting of a defective product notification conducted?

27.4 How is the transport of a defective product conducted?

27.5 How is a defective product identified and received upon return?

Returning an MRO (*maintenance, repair and operations*) procurement product

28.1 How is the situation of an MRO product determined and recorded?

28.2 How is the elimination and storing of an MRO conducted?

28.3 How is the sending and accepting of an MRO product notification conducted?

28.4 How is the transport of an MRO product conducted?

28.5 How is an MRO product identified and received upon return?

Returning an incorrectly/excessively delivered procurement product

29.1 How is an incorrectly/excessively delivered product received and recorded?

29.2 How is an incorrectly/excessively delivered product eliminated and stored?

29.3 How is a notification of an incorrectly/excessively delivered product sent and accepted?

29.4 How is an incorrectly/excessively delivered product transported?

29.5 How is an incorrectly/excessively delivered product identified and received upon return?

Returning a supply procurement product

30.1 How is the authorisation/confirmation of the return of a defective product conducted?

30.2 How is the scheduling and documentation of the return of a defective product conducted?

30.3 How is a defective product received and identified/verified?

30.4 How is the *transfer* of a defective product conducted?

30.5 How is the replacing/supplementing of a defective product conducted?

Returning an MRO product

31.1 How is the authorisation/confirmation of the return of an MRO product conducted?

31.2 How is the scheduling and documentation of the return of an MRO product conducted?

32.3 How is an MRO product received and identified/verified?

32.4 How is the *transfer* of an MRO product conducted?

32.5 How is the replacing/supplementing of an MRO product conducted?

Returning an incorrectly/excessively delivered product

32.1 How is the authorisation/confirmation of the return of an incorrectly/excessively delivered product conducted?

32.2 How is the scheduling and documentation of the return of an incorrectly/excessively delivered product conducted?

32.3 How is an incorrectly/excessively delivered product received and identified/verified?

32.4 How is an incorrectly/excessively delivered product *transferred*?

32.5 How is an incorrectly/excessively delivered product replaced/supplemented?

Sample of a automation and digitalization roadmap report

Issues identified in the enterprise

Roadmap

| | Management/organization | Automation | Digitization | 2018 | | ... | | 2021 | |
|--|-------------------------|------------|--------------|----------|-------------------|----------|-------------------|----------|-------------------|
| | | | | Solution | Magnitude of cost | Solution | Magnitude of cost | Solution | Magnitude of cost |
| Structure of the supply chain (including strategy and business model) | | | | | | | | | |
| 1. | | | | | | | | | |
| ... | | | | | | | | | |
| Organisation/planning (including production management, HR management and management of the quality system) | | | | | | | | | |
| 1. | | | | | | | | | |
| ... | | | | | | | | | |

| | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|
| Procurement | | | | | | | | | |
| 1. | | | | | | | | | |
| ... | | | | | | | | | |
| Manufacturing | | | | | | | | | |
| 1. | | | | | | | | | |
| ... | | | | | | | | | |
| Supply | | | | | | | | | |
| 1. | | | | | | | | | |
| ... | | | | | | | | | |
| Returning | | | | | | | | | |
| 1. | | | | | | | | | |
| ... | | | | | | | | | |
| Total magnitude of investment: | | | | | | | | | |
| Potential impact on the enterprise's turnover and profits | | | | | | | | | |

Sample of identified problems and assessment. The sample is meant to illustrate the structure of assessment. The problems and solutions of the assessment presented to the enterprise have to be described thoroughly, so that the entire problem and nature of the solution would be understood unambiguously. The diagnostic team can use other forms as well, if those are similar to the provided structure.

| Issues identified in the enterprise | | | | Roadmap | | | |
|--|------------------------------|------------|---|--|-----------------------------------|-----------|-------------------|
| | | | | 2018 | | 2019, ... | |
| | Management/organisation | Automation | Digitalization | Solution | Magnitude of cost | Solution | Magnitude of cost |
| Structure of the enterprise (including strategy and business model) | | | | | | | |
| 1. | Deficient introduction of 5S | | | Explaining 5S principles to all employees | Conducted by the enterprise | | |
| 2. | | | | | | | |
| 3. | | | | | | | |
| ... | | | | | | | |
| Organisation/planning (including production management, HR management and management of the quality system) | | | | | | | |
| 1. | | | | | | | |
| 2. | | | | | | | |
| 3. | | | | | | | |
| ... | | | | | | | |
| Procurement | | | | | | | |
| 1. | | | | | | | |
| 2. | | | | | | | |
| 3. | | | | | | | |
| ... | | | | | | | |
| Manufacturing | | | | | | | |
| 1. | | | A notebook, into which each employee writes their work hours, is used | Implement a solution for working time tracking | • WorktimeMax ver 5.1 € 150/month | | |

| | | | | | | | |
|------------------|--|---|---|--|--|---|--|
| | | | to keep track of working time. An accountant enters the work hours from the notebook into a payroll programme manually. | solution linked with an accounting programme, e.g. WorktimeMax ver 5.1 or AutoWages 400. | • AutoWages 400 licence without a term € 2,000 | | |
| 2. | | There's a workplace on the production line the work of which consists of lifting the product from the line onto a pallet. | | | | Replace human workplace with a robot workplace, e.g. CoBot643 or RobotAdv | •CoBot643 € 15,000 •RobotAdv € 30,000 |
| 3. | | | | | | | |
| ... | | | | | | | |
| Supply | | | | | | | |
| 1. | | | | | | | |
| 2. | | | | | | | |
| 3. | | | | | | | |
| ... | | | | | | | |
| Returning | | | | | | | |
| 1. | | | | | | | |
| 2. | | | | | | | |
| 3. | | | | | | | |
| ... | | | | | | | |
| | | | | Total magnitude of investment: | € 1,800–2,000 | | € 15,000–30,000 |
| | | | | Assessment to the payback period of the solutions: | | | 15–30 months |
| | | | | Potential impact on the enterprise's turnover and profits: | Reduced need for accounting resources | | Labour savings in the extent of wages for one employee – € 12,000 per year |
| | | | | Product development suggestions: | | | The enterprise could plan combining the functions of Product 1 and |

| | | | |
|--|--|--|---|
| | | | Product 3 in order to create a new product. |
|--|--|--|---|