Human Capital and Knowledge Management

The first level of the competency mapping results is the measurement of competence in relation to the company's target level and strategy. Power BI reports generate the company's and its staff's competency profiles. The reports enable drilling down into data and making conclusions through the company's valuable tacit knowledge.

Report Creation and Retrieval

By purchasing the Machinist Competency Report product from MexLink's website, the customer obtains rights to the data collection application and their own Power BI reporting.

After registration, the service provider (MexLink) creates accounts for both the data collection and Power BI services and sends the registered contact person a URL link to the Power BI service and passwords for the Data Collection Application. This is currently a manual operation, but it is aimed to be completed within a day.

The data collection application, Poimapper Plus, is available on both Apple and Android Appstore's as well as a web version at https://portal.poimapper.com/login.jsp?lang=en

Operation of the Data Collection Application

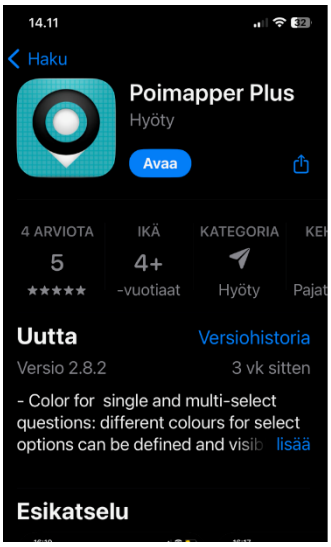


Figure 1. The Poimapper Data Collection Application

The company first selects the company to be evaluated and a preset individual (using only employee number for security purposes) from each basic information box, after which the company type and level of automation are selected (this choice can also be cell-specific if there are cells within the company with different levels of automation). The professional type is chosen along the turning-milling-automation line. Years of experience are given as an integer. It is

advisable to carefully select the type of machining equipment, as it is beneficial for analytics. An individual may have experience with several types of machining equipment that they operate simultaneously. If a machinist can operate several types of machinery at the same level, it is advisable to enter them at this point.

Evaluation process by picture 2 and 3: From page 1/12, use the arrow keys to select the first area of competence (page 2/11) and start progressing element by element in competence. The assessment must include at least a supervisor and the evaluated individual, and optionally a representative of a training unit or service provider. Typically, competence assessment requires discussion and adequate criticism. In our tests, self-assessment either overvalued or undervalued competencies.

In all items, the pre-selected option "not selected" eliminates the competence point for that item. When the actual assessment is chosen, the color code indicates the level of competence. Each selection must be saved for the assessment to take effect. Competence is selected from the next menu, which by default has a "Yes" option for suitability. If the competence is to be excluded from the overall work, select "No". Here is an example of one selection. When the actual assessment is chosen, the color code changes from an outlined green to a solid color bar, indicating the level of competence both in color and numerically.

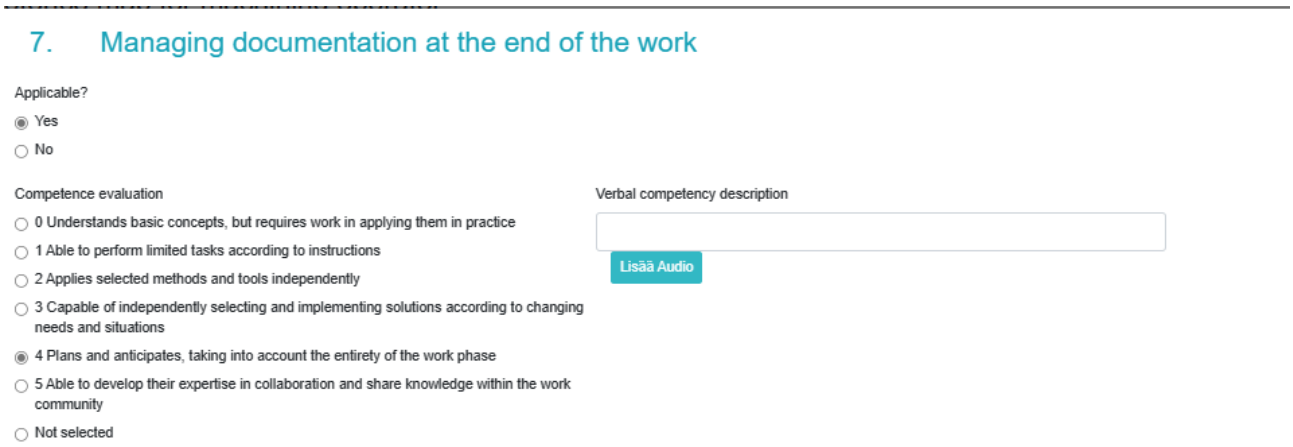


Figure 2. Competence evaluation criteria

A separate recording button is a very important additional feature that also allows for the collection of tacit knowledge in spoken form. Not all items need to be completed at once, especially if the competence does not extend to deeper levels or it is desired to proceed one step at a time. Once the assessment or partial assessment has been completed, press the Save button at the bottom of the competence area page, which then updates the information to the Poimapper portal.

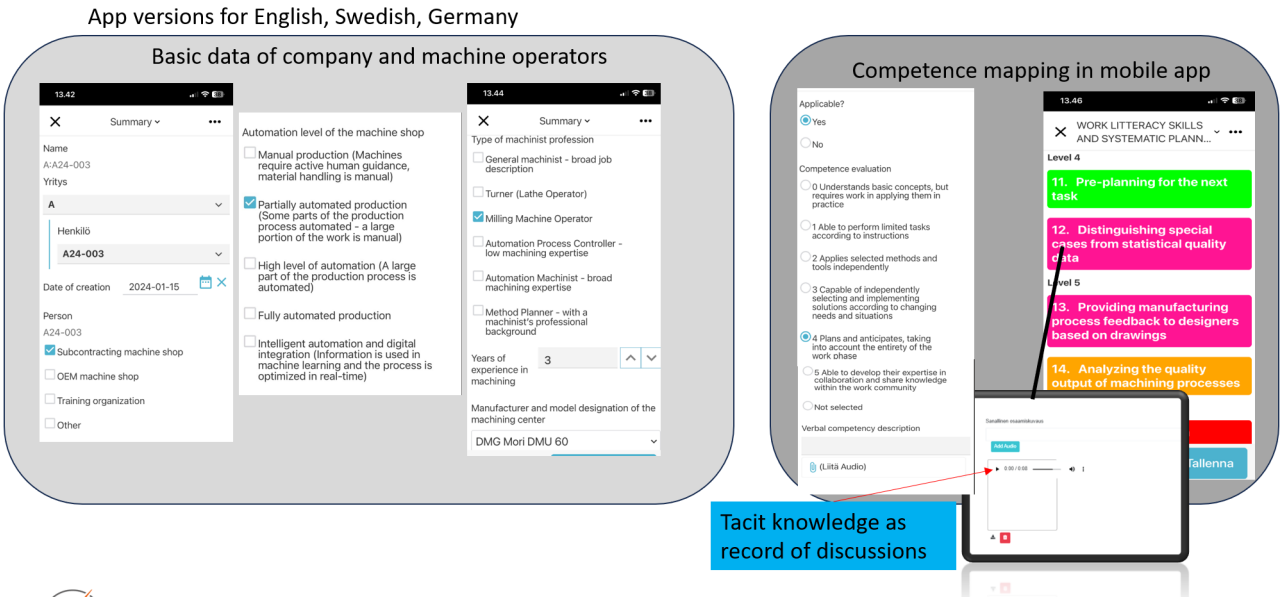


Figure 3. Data Collection Views by Competence Area

The service provider or their representative offers an orientation for using the data collection. Once all individuals have been evaluated, the evaluator sends an email request to transfer the evaluation data to Power BI reporting, after which the refined data is available for company-specific review. The company can grant rights to the training party to orchestrate the evaluation process.

Figure 4. The competence evaluation process

Here, however, the importance of discussion and the use of a physical competence map to support conceptualization must be emphasized.

Outsourcing the collection of critical knowledge as a self-service task to the creator is certainly the fastest way to obtain numbers, but without critical discussion, the numbers obtained can be overvalued or undervalued.

Future

Current reporting will expand on the same platform, utilizing artificial intelligence and enhancing the added value of reports with data linkage. The competence map provides a structured address for machine learning, which allows for the identification of relationships between competence elements, an intuitive way to navigate the competence network, individual competence cards, and the integration of profitability with competence data. The age structure and, on the other hand, the weak attractiveness of the sector force companies to consider ways to cope with both a lower starting level of professional workforce and a smaller staff. Simply through basic data collection and reporting, resources can be targeted. Tacit knowledge largely lies in the details, which become visible when a skilled person no longer covers the deficiencies of the process with their own competence. The utilization of competence profiles, product requirements, and the machinery stock requires skills from both the production manager and the operational staff, which necessitates systematic profiling of competence.

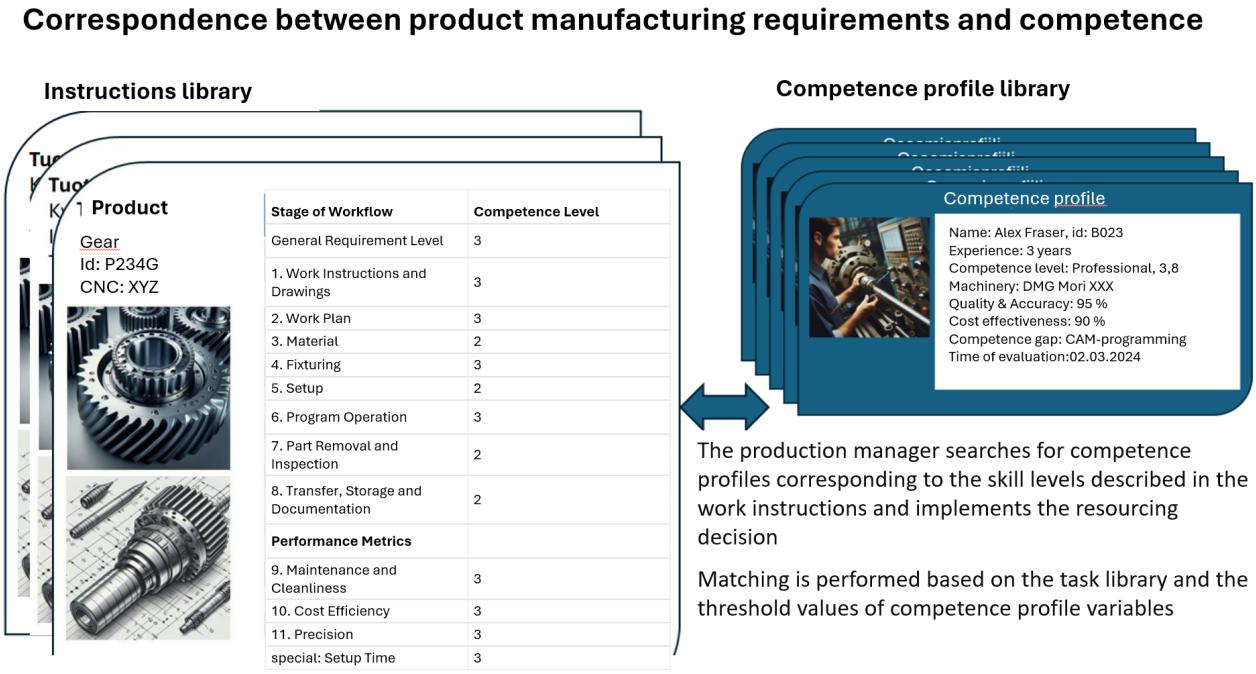


Figure 5. Visualization of the Future

The goal of competence mapping is to create an AI-based repository from which tacit knowledge can be transferred language-independently among different experts within the company. Companies related to the machine shop environment can produce valuable additional information in a way that intelligent search functions support various decision-making situations in a practical and concrete manner.

The AI application will be restricted, so it will not contain misleading information. For instance, the use of machining equipment in proprietary applications can be enhanced by processing the capabilities of the device with AI, translated into one's own language.

Machinist Competence Map – Power BI Report

The Machinist Skills Map provides an effective tool for analyzing the skills of a company or region as per the intended use. The report contains several different views that allow for the analysis of performance in various sub-areas. At the top of the view, you will find filters created for the tab, and on the left side, all the tabs.

Tabs	Description Overview
Overview – Competence Areas	Competence Areas Provides a quick overview of performance by skill areas, including multiple filtering options.
Top & Bottom 10 Questions	Shows where there is the most room for improvement and where performance is best in individual questions, including multiple filtering options. Experience Analyzes how experience affects skills, offers multiple filtering options for exploring different scenarios.
Experience / Competence Area	Analyze how experience affects skills, offering multiple filtering options for exploring different scenarios.
Competence Areas / Levels Heatmap	Displays performance at different levels for each skill area, allows for drilling down into questions, includes multiple filtering options.
Competence Levels / Machining Center	Analyzes performance at different levels for each machining center, includes the ability to drill down into questions, offers multiple filtering options.
Competence Matrix / Competence Areas	Provides a detailed skill map of performance, with levels in columns and skill areas in rows, all questions and special areas highlighted.
Competence Matrix - Heatmap	Same as the Competence Map –Competence Area tab, but questions are color-coded according to points.
Osaamiskartta - Tasot	A detailed Competence map of performance, with skill areas in columns and levels in rows, all questions and special areas highlighted. Automatically displays the first six skill areas and includes a button for reviewing the rest.

Report Security

The report's security solutions are designed to provide a high level of protection for company data. A multi-layered approach to security ensures that only authorized users can access the data entrusted to them.

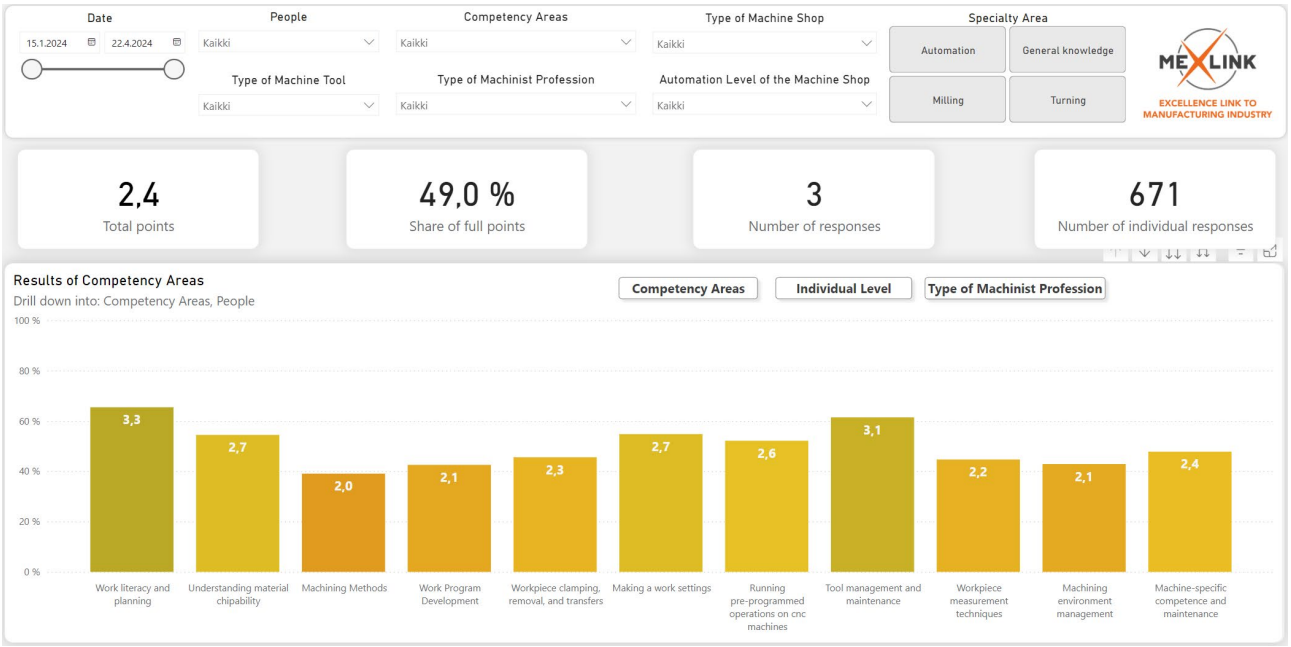
Internal Security in Power BI

The report is in the service provider's own Power BI workspace. Access to the workspace and its reports is limited to certain individuals authorized to handle and analyze the report data. This limited access ensures that sensitive information remains protected and that only authorized users can view or modify the report data. Power BI's security is based on Microsoft's cloud services security infrastructure. This includes comprehensive measures to protect data, such as encryption of data at rest and in transit, multi-factor authentication to verify user identity, and systematic security audits in compliance with security standards.

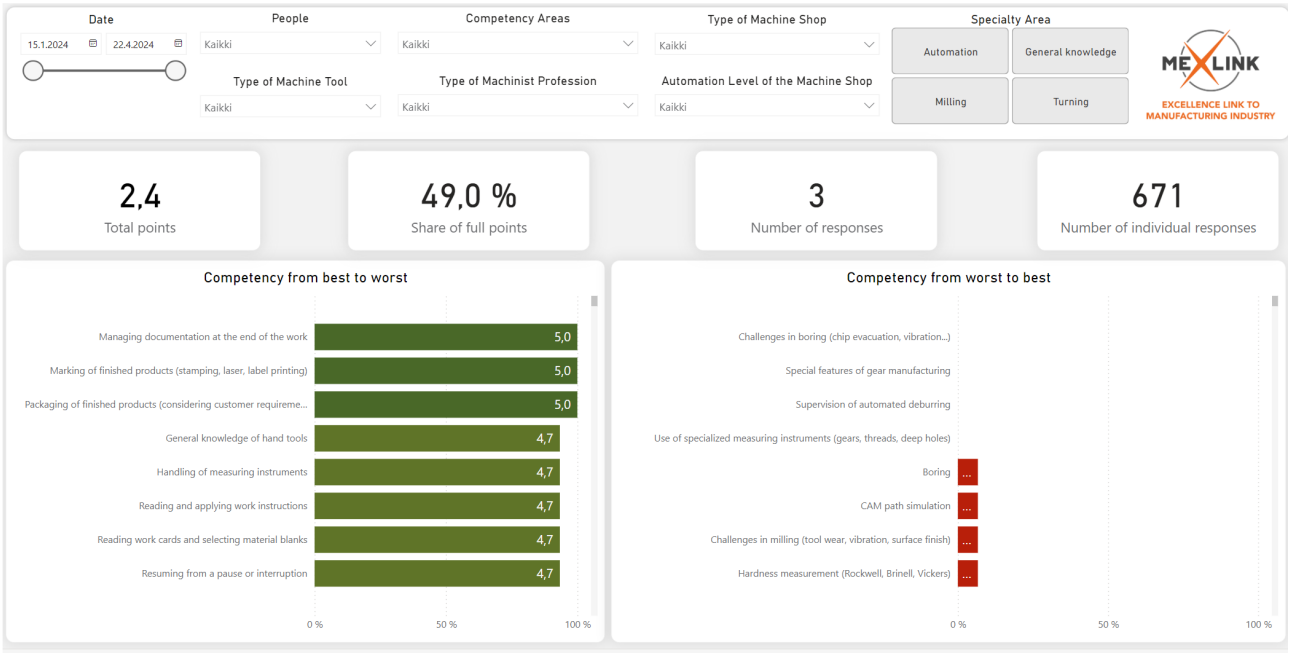
Row-level and User-level Security (RLS)

At the heart of the report's security strategy is row-level and user-level security (RLS). RLS limits data visibility on a per-user and per-row basis so that only users with defined rights can access restricted data. Management is limited to only those individuals authorized by the service provider and a selected external entity responsible for the report's development. It's important to note that flaws in RLS configuration do not lead to widespread data exposure but rather to data invisibility for users. Thus, data remains protected even in case of errors.

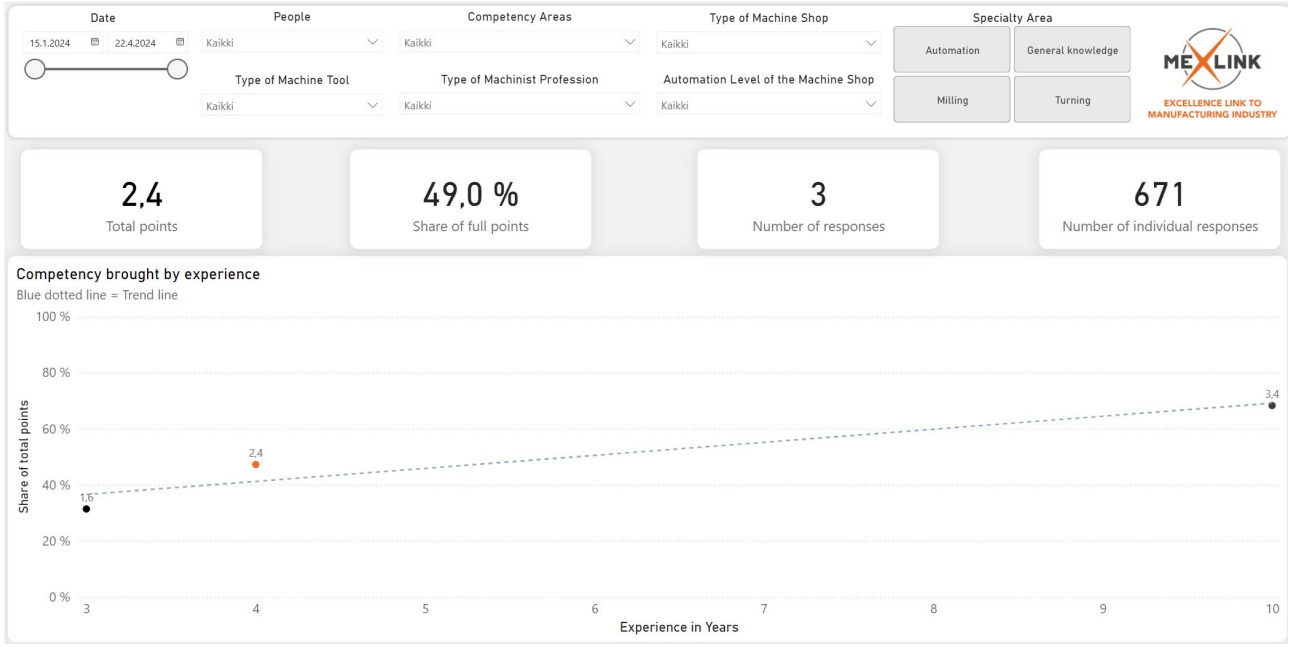
Overview map



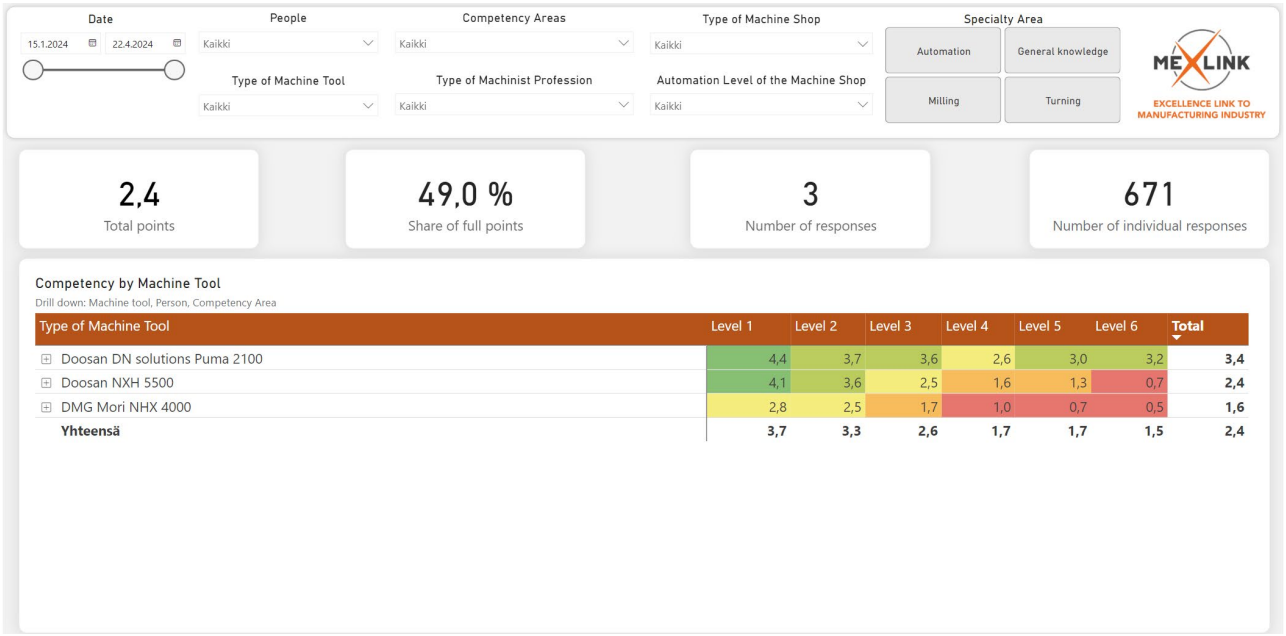
Strengths and weaknesses



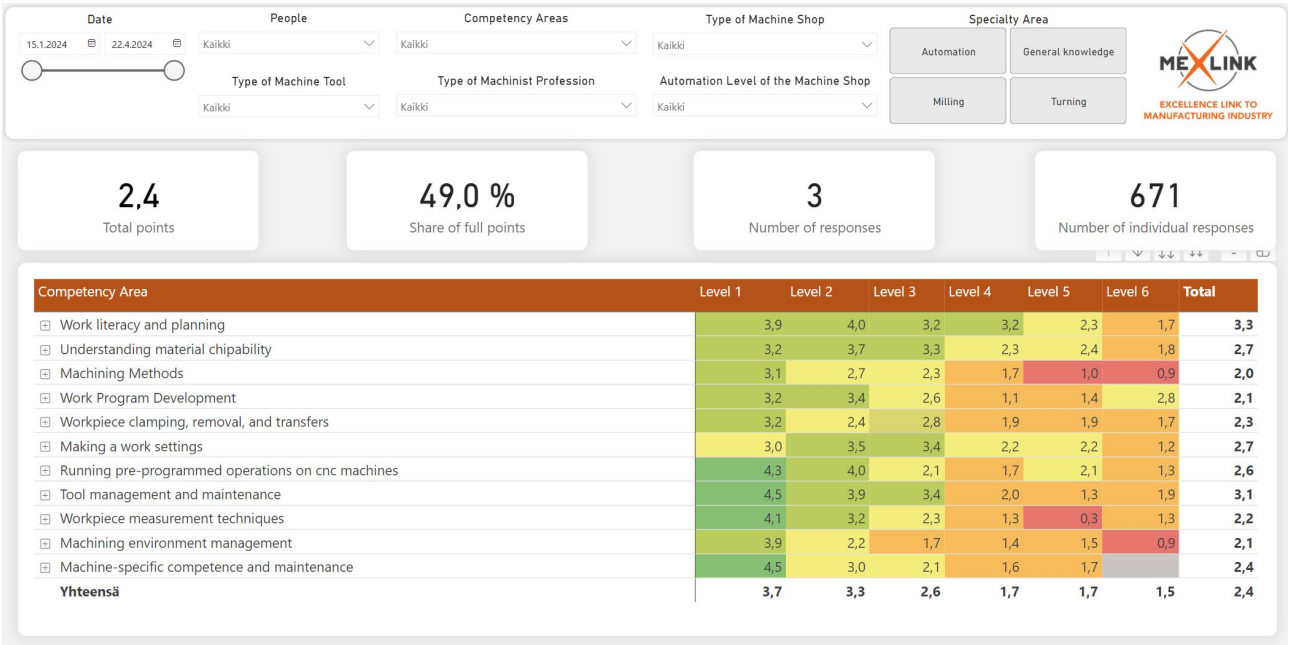
Correlation of experience and competence level



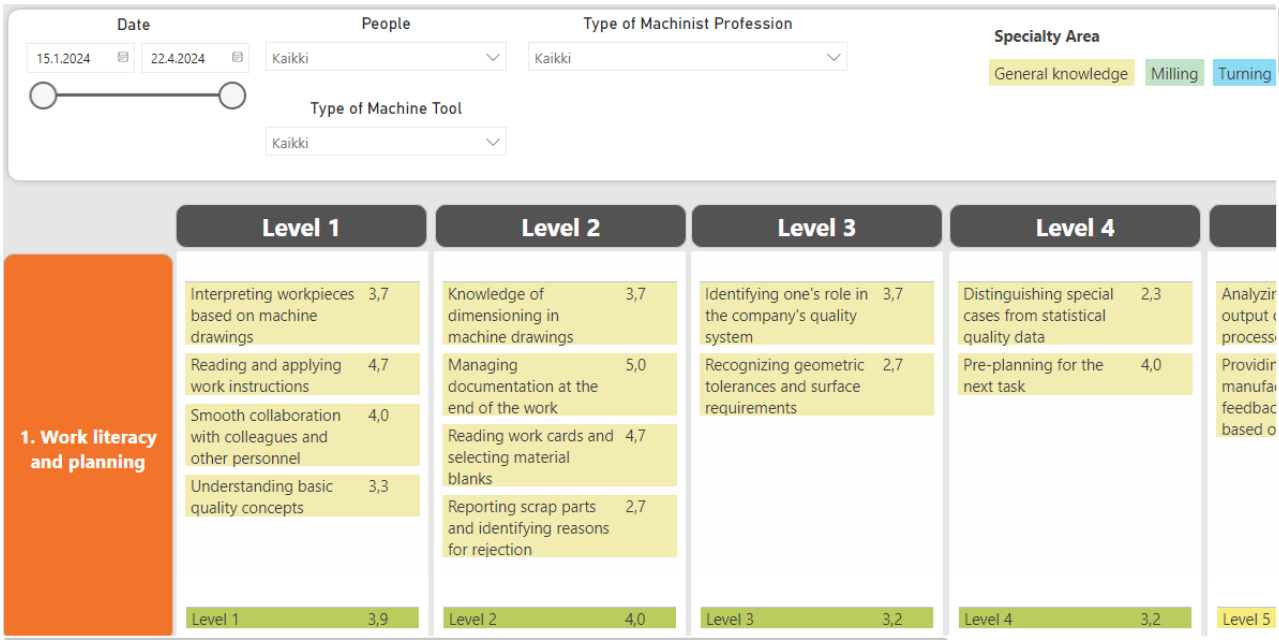
Machining Center view



Competence level distribution – balance by competence areas



Competency Area	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Total
Work literacy and planning	3,9	4,0	3,2	3,2	2,3	1,7	**3,3**
Understanding material chipability	3,2	3,7	3,3	2,3	2,4	1,8	**2,7**
Machining Methods	3,1	2,7	2,3	1,7	1,0	0,9	**2,0**
Work Program Development	3,2	3,4	2,6	1,1	1,4	2,8	**2,1**
Workpiece clamping, removal, and transfers	3,2	2,4	2,8	1,9	1,9	1,7	**2,3**
Making a work settings	3,0	3,5	3,4	2,2	2,2	1,2	**2,7**
Running pre-programmed operations on cnc machines	4,3	4,0	2,1	1,7	2,1	1,3	**2,6**
Tool management and maintenance	4,5	3,9	3,4	2,0	1,3	1,9	**3,1**
Workpiece measurement techniques	4,1	3,2	2,3	1,3	0,3	1,3	**2,2**
Machining environment management	3,9	2,2	1,7	1,4	1,5	0,9	**2,1**
Machine-specific competence and maintenance	4,5	3,0	2,1	1,6	1,7		**2,4**
Yhteensä	**3,7**	**3,3**	**2,6**	**1,7**	**1,7**	**1,5**	**2,4**



The report data security

The security solutions for the report are designed to provide high-level security for corporate data. A multi-layered approach to data security ensures that only authorized users have access to the data entrusted to them.

Internal Security in Power BI

The report is in the service provider's own Power BI workspace. Access to the workspace and the reports it contains is limited to certain individuals who are authorized to handle and analyze the report data. This restricted access ensures that sensitive information remains protected and that only authorized users can view or modify the report data. Power BI's security is based on Microsoft's cloud service security infrastructure. This includes comprehensive measures to protect data, such as encryption of data at rest and in transit, multi-factor authentication to verify user identity, and systematic security audits in accordance with security standards.

Row-level and User-level Security (RLS)

At the heart of the report's security strategy is row-level and user-level security (RLS). RLS restricts data visibility on a per-user and per-row basis so that only users with defined rights have access to restricted data. Management is limited to persons authorized by the service provider and to a selected external party responsible for developing the report.
It is essential to note that if there are deficiencies in the RLS settings, it does not lead to widespread disclosure of information, but rather to the invisibility of data to users. Thus, data remains protected even in case of errors.