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Executive Summary

DIGITRACE's Work Package 2 addresses a practical European competence challenge: small and medium sized enterprises are operating within an increasingly data-driven product environment in which traceability and sustainability are becoming ever more important. At the same time, the material collected across five countries shows that many organisations are not yet able to translate Digital Product Passport (DPP) requirements into operational processes, reliable product data, interoperable systems, and coordinated action across the whole value chain. The project therefore treats competence development as one of the fundamental conditions for DPP readiness, alongside technology, regulation, and organisational change. [P1][P2]

The needs assessment was carried out on the basis of three complementary evidence sources: desk research across the five partner countries, a cross-country competence self-assessment survey, and qualitative focus groups. The desk research provided regulatory, sectoral, and training context and made it possible to identify existing practices, gaps, and needs relating to DPP implementation. The survey, covering 73 responses, then provided a quantitative picture of the declared level of competence and of training priorities. The material from the five focus groups, conducted according to a shared qualitative framework, served to deepen and explain the quantitative results and to identify practical barriers, organisational conditions, and preferred learning formats. A detailed description of the tools used, the scope of the research, and the course of the work is presented in Chapter 2. [P2][S1]

The quantitative data point to a significant competence gap. 73.98% of respondents rated their knowledge of the ESPR requirements (the Ecodesign for Sustainable Products Regulation, establishing a framework for the ecodesign of sustainable products) as absent or basic, while 78.09% indicated an absent or basic ability to determine the DPP implementation deadlines relevant to their sector. 64.39% declared an absent or basic level of competence in using ERP (Enterprise Resource Planning) / PIM (Product Information Management) systems to manage DPP-related product data; the same proportion applied to competence in system and data-flow integration using APIs. 71.24% indicated an absent or basic level of competence in selecting an appropriate digital platform or DPP solution provider. [S1]

The study also shows that the need for competence development is not limited to technical skills. The most highly rated training priorities were: understanding DPP/ESPR and related EU requirements (93.15%), sector-specific DPP requirements (80.82%), strategic planning and investment decisions (76.71%), managing product data in ERP/PIM (75.34%), and sustainability, the circular economy and product impact information, including LCA and PCF (73.97%). [S1]

The focus groups explain why these gaps persist. Across the different countries, participants repeatedly distinguished existing traceability or quality systems from the broader information architecture required by DPP. Food sector companies, for example, have well-developed traceability practices, but these systems were designed primarily for food safety, quality, and product recall purposes, not for life cycle, environmental, and circularity information. Similar patterns were identified in Dutch agriculture and the Bulgarian textile sector. [FG-ES][FG-NL][FG-BG]

A second shared finding is that interoperability and data exchange across organisational boundaries constitute significant barriers. The challenge does not lie solely in collecting data within a single organisation, but in establishing reliable, organised, and verifiable information flows between companies, systems, and successive stages of the value chain. The Norwegian focus group pointed to

the difficulty of verifying information on materials and environmental impact originating from earlier links in the chain, and to the tension between transparency and the protection of trade secrets. [FG-NO][FG-PL] Norway is highlighted here because of a clearly different profile of identified needs and barriers compared with the other countries analysed; this does not mean that the findings from Poland, Spain, Bulgaria, and the Netherlands are disregarded, since they are addressed in the comparative analysis that follows.

Readiness varies. The maturity assessments carried out within the focus groups produced average scores of 3.6 out of 5 in the Netherlands, 2.7 out of 5 in Spain, 2.4 out of 5 in Poland, and 2.1 out of 5 in Bulgaria. These results should not be interpreted as a statistically comparable ranking of countries, since the focus groups were qualitative in nature and the Norwegian report does not contain a comparable aggregate score. The results do, however, show the range of maturity variations observed in the research material. [FG-NL][FG-ES][FG-PL][FG-BG]

The research material justifies a training architecture based on three layers: a shared CORE covering the fundamentals of DPP/ESPR, data, traceability, interoperability, sustainability, and implementation; ROLE pathways for management, ICT/data, production and supply chain, sustainability/compliance, and marketing/sales; and SECTOR modules for the five priority sectors. Participants consistently preferred short introductory content combined with practical workshops, real business cases, demonstrations, work-based learning, mentoring, and the opportunity to work on the organisation's own existing systems. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The report's most important recommendation is therefore not to create a single, uniform DPP course. DIGITRACE should develop a modular, practical, role-adapted learning ecosystem, in which shared European competence requirements are combined with sector-specific applications and pathways corresponding to the organisation's level of maturity. The programme should also support micro-credentials and recognised learning outcomes, in line with the project's assumptions regarding the European Qualifications Framework and micro-credential principles. [P1]

DPP Readiness and Existing Traceability:

In the partner countries analysed, existing traceability should be treated as a foundation for DPP implementation, not as evidence that the organisation is already DPP-ready.

1. Introduction and Project Context

1.1. The DIGITRACE Project

DIGITRACE – Digital Traceability and Compliance for Sustainable SMEs – is an Erasmus+ Alliance for Innovation project (101244175), running for 36 months, from 1 October 2025 to 30 September 2028. Its aim is to strengthen collaboration between educational institutions, vocational education and training providers, and SMEs, so that employees and management staff can acquire the skills and knowledge needed to implement and develop innovations related to Digital Product Passport requirements. The project combines DPP compliance with digital competences, sustainable product management, transparent value chains, and new market opportunities. [P1]

1.2. WP2 – Needs analysis and training programme development

WP2 is led by WSEI University and runs from month 2 to month 24 of the project. Its core activities include a transnational needs analysis to identify general and sector-specific training gaps and regulatory challenges related to DPP compliance; the development of tailored programmes for different SME roles; the integration of European qualification frameworks and standards; market consultations; and the subsequent updating and refinement of modular training programmes and digital learning materials. [P1]

The project documentation identifies five priority sectors: automotive, agriculture, textiles, plastics manufacturing, and the food industry. The needs analysis adopted the following country–sector pairing: Poland–automotive, the Netherlands–agriculture, Bulgaria–textiles, Spain–food/agri-food, and Norway–plastics/composites. This design deliberately combines shared European competence needs with sector-specific applications. [P1][DR-PL][DR-NL][DR-BG][DR-ES][DR-NO]

1. Desk research – Desk research formed the first stage of the work. Partners analysed available information on the regulatory context, the sectoral situation, the level of digitalisation and traceability, existing practices related to product information management, and the available training offer. The analysis was carried out in the partner countries and made it possible to identify both areas common to all of them and needs arising from the specific character of individual sectors. Its results were used to further design the study, including determining the competence areas and professional roles to be covered in subsequent stages.

2. Online Surveys – The second stage was the online survey, the purpose of which was to determine the declared level of competence, the most important gaps, and training needs. The results of the desk research were used to determine the perspective of the professional roles included in the further study, so as not to limit the needs assessment to a single type of position. The survey then made it possible to quantitatively identify needs among representatives of different organisations and roles, and to indicate the areas requiring further exploration in the qualitative study.

3. Validation workshops – **The final stage was organization of the validation workshops in each country. Partners have decided to implement workshops in a form of the focus groups – with unified protocols of the implementation and structure of the final national report.** The aim of this task was to deepen the results obtained from the desk research and the survey. The discussions focused on the practical understanding of Digital Product Passport (DPP) requirements, technology and data needs, competence gaps, sector-specific challenges, organisational readiness, and preferred learning formats. The shared framework and focus group scenario made it possible to collect material that was comparable across the partner countries, while also capturing the specific character of individual sectoral environments. The sequence of activities applied made it possible to move from recognising the context and available data, through the quantitative identification of competence gaps and training needs, to the qualitative deepening of the results and their interpretation in the practice of companies. Combining these sources made it possible to prepare a collective needs assessment, which forms the basis for designing the DIGITRACE training programme and learning pathways.

1.3. Purpose of the collective needs assessment

The purpose of the collective report is to transform the material gathered by the project partners into a coherent European assessment of SME readiness, competence gaps, educational needs, and implications for training programme design. The report is not intended to duplicate the national

reports. Its task is to identify patterns common to all countries, sectoral differences, and the consequences of these findings for the design of DIGITRACE learning pathways. This approach is consistent with the harmonised focus group methodology, designed with cross-country and cross-sector comparability in mind. [P2]

1.4. Scope

The scope of the collective assessment covers the five partner countries: Poland, Spain, Bulgaria, the Netherlands, and Norway, and the project's five priority sectors: automotive, the food/agri-food sector, textiles, agriculture, and plastics and composites. The analysis takes into account the needs of small and medium sized enterprises (SMEs), as well as other relevant ecosystem participants, including educational and training bodies, sector organisations, and technology providers.

The competence scope covers areas relating to regulation, data and technology, traceability and interoperability, sustainability, organisational readiness, and supply chain collaboration. The assessment also takes into account needs relating to learning formats and methods, including practical training, work-based learning, micro-learning, micro-credentials, and competence validation. A scope defined in this way makes it possible to analyse training needs both in the dimension shared across the partner countries and taking into account sectoral and organisational differences.

2. Study methodology, scope and analytical framework

2.1. Study design

The collective assessment uses a mixed-methods approach and source triangulation. The desk research establishes the regulatory, sectoral, and training context; the survey provides a quantitative self-assessment of competence and training demand; while the focus groups make it possible to qualitatively explain barriers, organisational realities, and preferred ways of learning. A harmonised pre-session instrument was also used to prepare the focus groups. [P2][S1]

2.2. Desk research

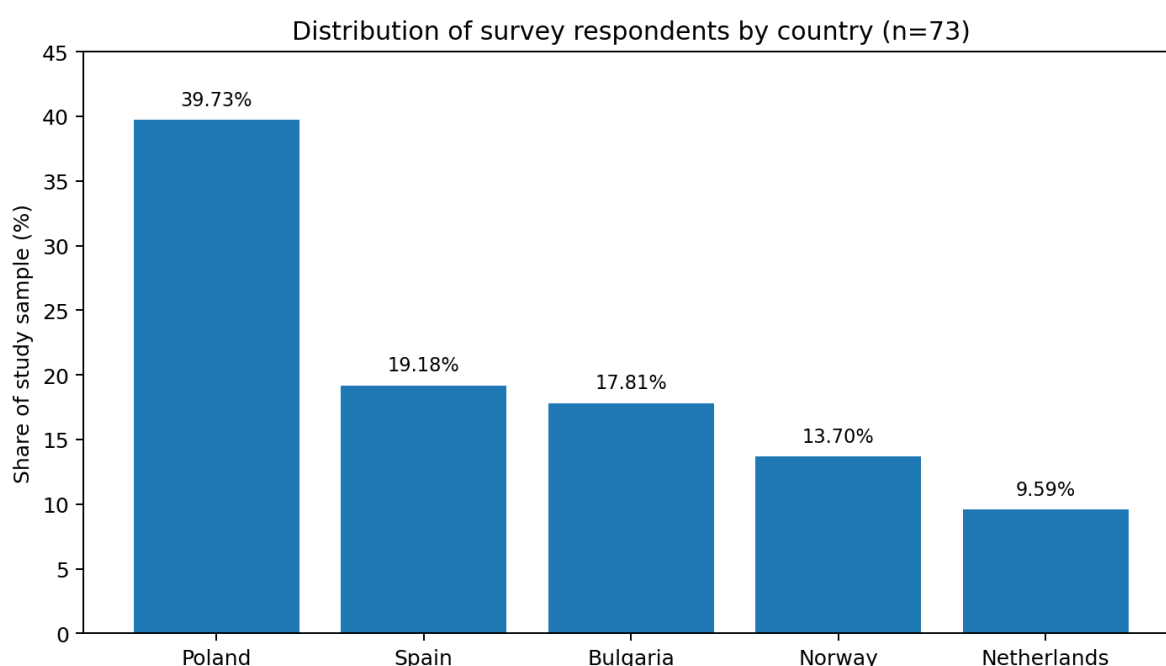
The project partners prepared five national desk research reports. Each report covered the national and sectoral context, relevant European and national initiatives, existing traceability and digitalisation practices, the current training offer, and gaps relevant to DPP implementation. The reports deliberately had a sectoral profile, which allowed the collective analysis to distinguish shared requirements from needs specific to individual sectors. [DR-PL][DR-ES][DR-BG][DR-NL][DR-NO]

2.3. Online Survey

The cross-country competence self-assessment survey comprises 73 responses. The distribution of responses is as follows: Poland – 29 (39.73%), Spain – 14 (19.18%), Bulgaria – 13 (17.81%), Norway – 10 (13.70%), and the Netherlands – 7 (9.59%). The sample covers micro, small, medium, and large organisations, and respondents representing management, purchasing/supply chain, IT/data, production/operations, product development, sales/marketing, and sustainability/compliance/quality. [S1]

Distribution of survey respondents by country (n=73)

Country	Number of respondents = n	Share % of the sample surveyed
Poland	29	39.73%
Spain	14	19.18%
Bulgaria	13	17.81%
Norway	10	13.70%
Netherlands	7	9.59%



Source: DIGITRACE cross-country competence self-assessment survey, n=73 [S1].

The chart shows the structure of the 73 responses obtained in the DIGITRACE cross-country competence self-assessment survey. The largest share of the sample surveyed was accounted for by respondents from Poland (39.73%), followed by Spain (19.18%) and Bulgaria (17.81%). Respondents from Norway accounted for 13.70% of the sample, and from the Netherlands for 9.59%. The distribution of responses reflects the number of responses collected in each country and should not be interpreted as a proportional representation of the company population in those countries. The data is descriptive in nature and serves to illustrate the structure of the sample surveyed. [S1]

2.4. Validation workshops: focus groups

Five national focus group reports were available for collective analysis. The sessions were conducted according to a shared qualitative framework covering DPP/ESPR awareness, technology and data, competence gaps, sector-specific challenges, organisational maturity, training priorities, learning formats, good practices, and quick wins available for implementation. A total of 41 people took part in

the focus groups: 9 in Poland, 7 in Spain, 8 in Bulgaria, 8 in the Netherlands, and 9 in Norway. Participant profiles covered representatives of different professional functions, educational bodies, and sector organisations. [FG-PL][FG-BG][FG-NL][FG-ES][FG-NO]

Country	Sector	Date	Number of Participants Reported
Poland	Automotive	15 July 2026	9
Spain	Food/agri-food	25 June 2026	7
Bulgaria	Textiles	3 July 2026	8
Netherlands	Agriculture	18 June 2026	8
Norway	Plastics/composites	18 June 2026	9

2.5. Analytical framework

For the purpose of synthesising the results, an analytical framework was applied that made it possible to organise the findings according to nine areas of DPP implementation readiness and three competence dimensions relevant to the design of training activities. The nine readiness areas covered: regulatory awareness, organisational readiness, digital and technological readiness, product data readiness, interoperability, supply chain readiness, sustainability and circularity data, traceability, and governance and organisational management. These areas were used to determine in which parts of the organisation and its processes DPP-related needs or barriers arise. [P2]

The three competence dimensions, in turn, made it possible to determine to whom and at what level future development activities should be directed: shared competences related to knowledge and skills needed more broadly within the organisation, role-specific competences related to the responsibilities and tasks of particular professional groups, and sector-specific competences related to requirements and conditions characteristic of individual sectors. This distinction provides a basis for subsequently anchoring further DIGITRACE educational products in the appropriate target groups, without prejudging, at this stage, their final form or division into specific training modules. [P2]

Requirements relating to how learning should take place were analysed separately from the scope of competences. This makes it possible to maintain the distinction between the question of “what needs to be learned?” and the question of “how should it be taught?”, and subsequently to use both types of findings when designing appropriate learning formats and pathways. [P2]

2.6. Data triangulation and interpretation

Data triangulation formed the basis for combining the results obtained from three complementary sources: the desk research, the survey, and the focus groups. Each source performed a different function in the interpretation process. The desk research provided regulatory, national, and sectoral context and made it possible to recognise existing practices, solutions, and gaps. The survey provided a quantitative picture of the declared level of competence and the scale of the needs indicated, while the focus groups made it possible to deepen these findings, explain their practical causes and

consequences, and take into account participants' experience relating to the functioning of their organisations and sectors. [S1][P2]

Conclusions were interpreted by comparing findings across sources, partner countries, and sectors. A finding was treated as a strong comparative conclusion in particular when it was confirmed by more than one data source and occurred in several partner countries. This did not mean that an identical result had to be obtained across all sources or countries. Differences between sources and countries were also analysed as information about the specific character of the sector, the level of organisational maturity, or different conditions affecting the implementation of the Digital Product Passport (DPP). [P2]

In practice, this meant moving from identifying a signal to deepening and interpreting it. If the desk research indicated a particular gap or barrier, its significance could be verified in the survey by assessing the scale of the declared problem, and then explored further during the focus groups by identifying its causes, consequences, and the conditions under which it occurs. Similarly, significant survey results were related back to the qualitative material and to the national and sectoral context, in order to avoid interpreting a single quantitative result in isolation from the conditions under which it was obtained.

Triangulation also served to distinguish between a competence need and the way of meeting it. A result indicating that particular knowledge or a particular skill is needed was analysed as information about the scope of competence, while findings relating to preferred learning formats, practical implementation conditions, and ways of developing competences were used separately when formulating implications for the training programme. This meant that conclusions about what needs to be learned were not automatically equated with a decision about how a given competence should be developed.

The percentages obtained in the survey therefore serve to describe the structure and scale of the declared responses within the sample surveyed, rather than to estimate the level of competence of the entire population of companies in the partner countries. Given the diagnostic nature of the study, the unequal number of responses between countries, and the qualitative character of the focus groups, the report does not attribute statistical representativeness to these samples. The results should be interpreted as diagnostic and comparative material, which, combined with the desk research and the qualitative material, makes it possible to identify recurring patterns, national and sectoral differences, and their consequences for the design of DIGITRACE learning pathways. [S1][P2]

2.7. Methodological limitations

The report's results should be interpreted taking into account the nature of the data sources used and their limitations. The survey was diagnostic in nature and served to identify declared competence needs, not to estimate the level of competence of the entire population of European small and medium sized enterprises (SMEs, small and medium sized enterprises). A total of 73 responses were obtained, and their number was unequal between countries: Poland had the largest share and the Netherlands the smallest. This means that the percentages presented describe the structure and responses of the sample surveyed and should not be interpreted as representative indicators for individual countries. [S1] – DIGITRACE collective competence self-assessment survey, n=73.

An additional limitation of the survey is its self-assessment nature. Respondents assessed their own level of knowledge and skills, so the results reflect the perceived level of competence rather than an

independently verified ability to perform specific tasks. Survey data is therefore used primarily to identify declared gaps and priorities, while its interpretation has been supplemented with the results of the desk research and the qualitative material from the focus groups. [S1][P2] – the focus group methodology and scenario, covering a harmonised qualitative methodology and analytical areas.

The harmonised instrument used before the focus group sessions had a distinct character. Its task was to prepare participants for the discussion and to gather information that could subsequently be explored further during the session. It did not constitute an independent quantitative study and should not be interpreted as an additional survey sample. Its value lay in organising the input material for the qualitative discussion and ensuring a shared point of reference between the partner countries. [P2]

The focus groups were qualitative and exploratory in nature. Their purpose was primarily to explain the practical causes and consequences of the identified gaps, to recognise participants' experience, and to capture the barriers and needs related to DPP implementation. The focus group material is therefore not used to produce statistically generalisable estimates. At the same time, its significance lies in the fact that it makes it possible to interpret the quantitative results in the context of real organisational and sectoral conditions. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO] – focus group report/session codes for Poland, Spain, Bulgaria, the Netherlands, and Norway respectively.

Limitations also apply to comparisons of the level of maturity between countries. The scores presented in the focus group reports are useful for showing the variation observed in the research material, but because of the qualitative nature of the groups they should not be treated as a formal ranking of countries. In the case of Norway, the available material did not contain a comparable aggregate maturity score on the 1 to 5 scale, so no numerical value was assigned to that country. [FG-NL][FG-ES][FG-PL][FG-BG]

The limitations of the individual sources do not, however, mean that the results cannot be used to formulate comparative conclusions. Their value comes from combining different perspectives: the desk research provides national and sectoral context, the survey indicates the scale of the declared gaps within the sample surveyed, the pre-session instrument organises the input material for the qualitative research, and the focus groups make it possible to explain the mechanisms, experiences, and conditions behind the observed results. This way of using the data limits the risk of over-interpreting a single source and is consistent with the triangulation approach adopted in the report. [S1][P2]

3. Comparative findings across countries and sectors

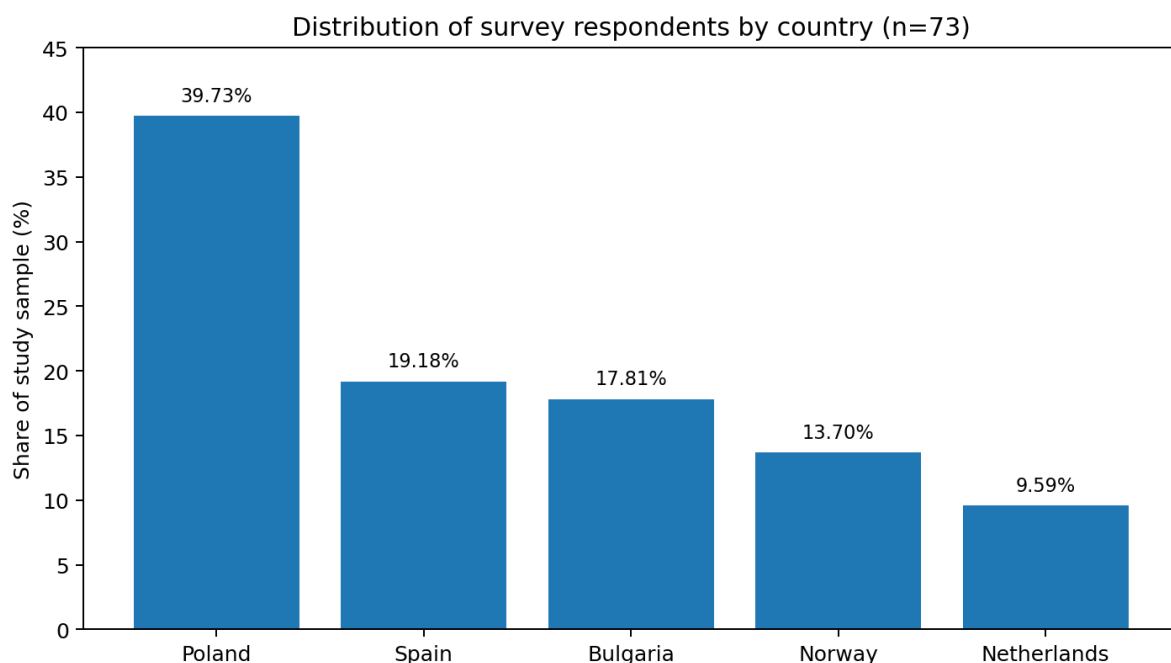
3.1. Awareness and understanding of DPP and ESPR

The quantitative data show that understanding of the regulation is one of the most pronounced competence gaps. 73.98% of respondents indicated an absent or basic knowledge of the ESPR, while 67.13% indicated an absent or basic understanding of the role of DPP in the circular economy and product life cycle management. It is particularly significant that 78.09% of respondents indicated an absent or basic ability to determine the DPP implementation deadlines relevant to their sector. [S1]

Data from the competence self-assessment survey in the partner countries (n=73) show that understanding of the regulation is one of the most pronounced competence gaps. 73.98% of respondents indicated an absent or basic knowledge of the ESPR, while 67.13% indicated an absent or basic understanding of the role of DPP in the circular economy and product life cycle. It is particularly significant that 78.09% of respondents indicated an absent or basic ability to determine the DPP

implementation deadlines relevant to their sector. These results describe the responses of the survey participants and are not a measure of the level of knowledge of the entire population of companies in the partner countries. [S1]

The focus groups then made it possible to deepen and interpret the survey results. Participants generally recognised the growing significance of DPP, but the practical implications of the requirements remained uncertain. In Spain, particularly limited awareness of DPP/ESPR was noted despite strong knowledge of food traceability and quality systems. In the Netherlands, awareness was higher, but participants differed in their understanding of the specific DPP requirements. In Norway, considerable uncertainty was noted as to what DPP actually requires and what the future data obligations would be. In Bulgaria, awareness was present but incomplete and had not yet been translated into organised internal preparations. In Poland, basic but uneven knowledge was noted, with a higher level of awareness found in organisations operating within international value chains. [FG-ES][FG-NL][FG-NO][FG-BG][FG-PL]



Source: DIGITRACE competence self-assessment survey, n=73 [S1].

The focus groups add an important qualitative explanation. Participants generally recognise the growing significance of DPP, but the practical implications of the requirements remain uncertain. Spain showed particularly limited awareness of DPP/ESPR despite strong knowledge of food traceability and quality systems. In the Netherlands, awareness was higher, but participants differed in their understanding of the specific DPP requirements.

The focus groups add an important qualitative explanation. Participants generally recognise the growing significance of DPP, but the practical implications of the requirements remain uncertain. In Spain (food/agri-food sector), particularly limited awareness of DPP/ESPR was noted despite strong knowledge of food traceability and quality systems. In the Netherlands (agriculture), awareness was higher, but participants differed in their understanding of the specific DPP requirements. In Norway (plastics/composites), considerable uncertainty was noted as to what DPP actually requires and what

the future data obligations would be. In Bulgaria (textiles), awareness was present but incomplete and had not yet been translated into organised internal preparations. In Poland (automotive), basic but uneven knowledge was noted, with a higher level of awareness found in organisations operating within international value chains. [FG-ES][FG-NL][FG-NO][FG-BG][FG-PL]

3.2. DPP Is broader than existing traceability

A key shared finding is that existing traceability capability is an important starting point, but does not automatically mean readiness for DPP. In Spain, particularly in the food sector, companies routinely collect information on batches, suppliers, and product flow for food safety, quality, and recall purposes, but these systems generally do not cover the broader environmental information on sustainability and life cycle required by DPP. In the Netherlands, existing traceability and certification systems provide a good starting point, but require further development in terms of interoperability and a broader scope of product information. In Poland, existing traceability solutions were noted, but also their fragmentation and challenges related to data integration. In Bulgaria, traceability is being developed on the basis of data on materials, suppliers, and processes, but challenges remain regarding organising, verifying, and using this data in the broader DPP context. In Norway, the ability to link information on materials and earlier links in the chain with requirements relating to identification, life cycle, and the protection of sensitive information becomes particularly important. This means that in all partner countries there are elements that can form the basis for DPP implementation, but the scope and level of their integration vary. [FG-ES][FG-NL][FG-PL][FG-BG][FG-NO]

Comparative conclusion: existing traceability systems should be treated as a starting point for building DPP readiness, not as its equivalent.

DPP Readiness and Existing Traceability in the DIGITRACE Partner Countries. In the DIGITRACE partner countries, existing traceability should be treated as a foundation for DPP implementation, not as evidence that the organisation is already DPP-ready.

3.3. Organisational readiness

The material shows that DPP readiness depends not only on the level of digitalisation, but also on how change is managed, how responsibility for data and processes is assigned, and the ability to collaborate across organisational functions. In Poland, the absence of a comprehensive DPP implementation strategy was noted, along with an unclear division of responsibility for product data and the need to create an interdisciplinary implementation team. In Spain, in the context of the food sector, the challenge remains translating existing traceability and product information practices into the broader DPP requirements, including those relating to environmental data and the product life cycle. In Bulgaria, in the textile sector, attention was drawn to the need to organise data on materials, suppliers, and processes and to increase the ability to use it within DPP requirements. In the Netherlands, it was emphasised that organisational preparation and competence development are not solely the task of individual companies, but require collaboration between companies, educational institutions, and industry organisations. In Norway, organisations with higher readiness combined DPP preparation with broader digital transformation, management support, an appropriate budget, and cross-functional

collaboration. Taken together, these findings show that the level of organisational readiness differs between countries and sectors, but a shared challenge remains translating DPP requirements into concrete responsibilities, processes, resources, and collaboration within and beyond the organisation. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

3.4. Digital and technological readiness

The study shows that many respondents do not yet feel confident in the systems-related competences needed to operationalise DPP. 64.39% of respondents declare an absent or basic level of competence in using ERP/PIM to manage product data. The same proportion declares an absent or basic level of competence in integrating DPP tools and data flows with existing systems via APIs. 71.24% indicate an absent or basic level of competence in selecting a digital platform or DPP solution provider. [S1]

At the organisational level, existing systems vary considerably. Only 21.92% of respondents report traceability systems operating company-wide. A further 13.70% use them only in selected activities or for selected products, and 20.55% describe their processes as partial or informal. 13.70% are still at the planning stage, 13.70% do not have such a system, and 16.44% are unable to say. [S1]

The picture of digital and technological readiness, however, differs between countries and sectors. In Poland, in the automotive sector, the main challenge is integrating existing systems and data within complex, multi-tier value chains, including linking data on components, batteries, and the product life cycle. In Spain, in the food sector, existing traceability solutions provide a basis for further development, but focus primarily on food safety, quality, and product recall processes. The challenge is extending them to cover sustainability data, the product life cycle, and interoperability. In Bulgaria, in the textile sector, the need was noted to link data on the product, processes, and sustainability across ERP, PLM, PIM, LCA, and supply chain tools. This shows the need to integrate scattered systems and organise data flow. In the Netherlands, the existing digital environment is relatively mature, but an important gap remains cross-organisational interoperability and the ability to exchange data beyond the boundaries of a single company. In Norway, in the plastics and composites sector, obtaining and verifying data on materials, their origin, and environmental impact from earlier links in the value chain is of particular importance, while at the same time taking into account the protection of the company's sensitive information. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The comparison thus shows that differences between countries are not reducible solely to the level of digitalisation. Individual sectors are at different starting points: from the need to integrate existing systems and data, through extending functioning traceability systems, to developing interoperability and data exchange between organisations. A shared challenge remains the ability to link data, systems, and processes in a way that enables DPP to function reliably across the whole value chain. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The survey results confirm that the gap is not only technological but also competence-related: companies need both access to appropriate systems and tools, and the competences to select, integrate, and use them correctly in DPP processes. [S1]

3.5. Product data quality and management

The material consistently shifts the problem from the level of “having data” to the level of “having data that is reliable, organised, and manageable”. The study points to significant gaps in product data systems, supplier data verification, data access, and traceability. 71.24% of respondents declare an

absent or basic level of competence in digitally auditing trading partners, including verifying supplier data and DPP information. 67.13% indicate an absent or basic level of competence in coordinating and collecting relevant sustainability data from upstream and downstream value chain partners. [S1]

The focus groups show the organisational mechanism: companies need a clear assignment of responsibility for collecting, validating, updating, and sharing DPP-related data.

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The focus groups show that the problem of data quality and management takes different forms depending on the country and sector. In Poland, in the automotive sector, the challenge is managing large and complex product portfolios and scattered data originating from multi-tier supply chains. Responsibility for data and its flow between systems and value chain participants needs to be organised. In Spain, in the food sector, the need was noted to improve the quality and availability of supplier data and sustainability information. An important challenge is also extending existing traceability to cover the data needed for broader product information management under DPP. In Bulgaria, in the textile sector, attention was drawn to manual data exchange and limited visibility of information beyond direct partners, which makes efficient verification and use across the whole value chain difficult. In the Netherlands, in the agricultural sector, existing systems and data exchange practices provide a relatively good basis, but ensuring interoperability and the shared use of information by value chain participants remains a challenge. In Norway, in the plastics and composites sector, verifying data on materials and environmental impact originating from earlier links in the value chain is particularly difficult. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The comparison shows that the key problem is not the absence of data as such, but the ability to ensure its quality, currency, responsibility for its maintenance, and reliable exchange between value chain participants. Depending on the country, the starting point is scattered product information, limited digitalisation, manual data exchange, insufficient interoperability, or difficulty verifying information originating from earlier links. A shared challenge remains creating conditions in which data can not only be collected, but also reliably used in DPP processes. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

3.6. Interoperability and data exchange

Interoperability is one of the most strongly confirmed shared barriers in the research material. It does not concern only the technical connection of systems, but also organisations' ability to jointly define, transmit, verify, and use data across the whole value chain.

In Poland, in the automotive sector, the challenge is integrating data originating from multiple systems and levels of the value chain, including ensuring a consistent flow of information between companies. In Spain, in the food sector, existing traceability solutions form a basis for further development, but need to be extended to cover a broader range of product and environmental data and to ensure their exchange between systems and value chain participants. In Bulgaria, in the textile sector, manual data exchange and limited visibility of information beyond direct partners were noted, showing a gap both in system integration and in inter-organisational information flow. In the Netherlands, in the

agricultural sector, the existing digital environment is relatively developed, but interoperability remains a significant challenge, particularly regarding the shared use of data by different value chain participants. In Norway, in the plastics and composites sector, interoperability and data exchange are particularly important because of the need to obtain and verify information from earlier links in the value chain and to ensure an appropriate balance between data transparency and the protection of the company's sensitive information. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The comparison shows that individual countries are at different starting points, but the problem is shared in nature: existing systems and data do not always form a coherent environment enabling their safe and reliable exchange across organisational boundaries. For some sectors, the main challenge remains integrating scattered systems; for others, it is extending existing traceability, reducing manual data exchange, or creating the conditions for cross-organisational interoperability. From a DPP perspective, this means the need to develop not only technical competences, but also shared data standards, responsibility principles, and value chain collaboration procedures. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

Interoperability and Data Flow in the DIGITRACE Partner Countries

In the DIGITRACE partner countries, the key technical challenge is not the storage of product information as such, but establishing reliable, standardised, and interoperable information flows across organisational boundaries.

3.7. Supply chain readiness

Supply chain data is a recurring bottleneck. The study shows that 69.86% of respondents need to develop competences in supplier collaboration and the verification of environmental certificates/declarations; 68.49% indicate a need for competences relating to product carbon footprint and emissions data; and 65.75% need competences in communicating DPP and sustainability information to customers and partners. [S1]

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The focus groups show that supply chain challenges take different forms depending on the country and sector. In Poland, in the automotive sector, large, complex, and international product portfolios were noted, along with significant challenges relating to the storage, flow, and verification of data originating from multiple supplier tiers. In Spain, in the food and agri-food sector, attention was drawn to the uneven level of supplier digitalisation and the inconsistency of ESG information, making it difficult to use in DPP processes. In Bulgaria, in the textile sector, manual data exchange and limited visibility of information beyond direct partners were noted. In the Netherlands, in the agricultural sector, existing solutions and value chain collaboration provide a basis for further development, but shared data exchange and ensuring interoperability between chain participants remain a challenge. In Norway, in the plastics and composites sector, verifying data originating from earlier links in the value chain is particularly difficult, while at the same time it is necessary to reconcile information transparency with commercial confidentiality. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The comparison shows that supply chain readiness depends not only on the technical capability of a single company, but above all on the quality of collaboration and data exchange between its partners. In individual countries, the main barrier is, respectively, the scale and complexity of the supply chain, the uneven level of supplier digitalisation, manual information exchange, the need for interoperable data exchange, or difficulty obtaining and verifying data from earlier links. A shared challenge remains ensuring that data transmitted within the value chain is accessible, reliable, verifiable, and appropriately documented for DPP purposes. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

3.8. Sustainability, circular economy and life cycle data

Product sustainability information is not yet consistently embedded in operational data systems. 64.39% of respondents declare an absent or basic level of competence in product carbon footprint, scope 1/2/3 emissions, and collecting and calculating PCF data. 67.13% declare an absent or basic level of competence in coordinating relevant sustainability data across the whole value chain. Demand is equally strong: 73.97% of respondents identify sustainability, the circular economy, and product impact information as a development priority. [S1]

Product sustainability information is not yet consistently embedded in operational data systems. 64.39% of respondents declare an absent or basic level of competence in product carbon footprint, scope 1/2/3 emissions, and collecting and calculating PCF data. 67.13% declare an absent or basic level of competence in coordinating relevant sustainability data across the whole value chain. Demand is also strong: 73.97% of respondents identify sustainability, the circular economy, and product impact information as a development priority. [S1]

The focus groups show that the significance and level of preparation regarding environmental data and the product life cycle differ between countries and sectors. In Poland, in the automotive sector, sustainability data is recognised as important, but needs to be organised and linked to product information and life cycle data. In Spain, in the food sector, a significant practical gap was noted in the area of ESG and the circular economy, despite relatively developed traceability practices. In Bulgaria, in the textile sector, the ESG and circular economy area was rated as particularly weak; the need to develop competences relating to fibre and material composition, recycled material content, repairability, product end-of-life, and EPR data was noted. In the Netherlands, in the agricultural sector, the significance of sustainability data is growing, and an important direction for development remains integrating this information with existing systems and using data across the whole value chain. In Norway, in the plastics and composites sector, high-quality data on materials and environmental impact is seen not only as an information requirement but also as a potential source of value and competitive advantage. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The comparison shows that countries differ both in their level of preparation and in how they perceive sustainability data. In some sectors, the main challenge remains organising and documenting environmental data; in others, it is integrating it with existing systems and product life cycle information. At the same time, the Norwegian example shows the possibility of treating reliable environmental data as an element of business value rather than solely as a regulatory obligation. A shared challenge remains translating ESG, LCA, PCF, materials, recycling, and product end-of-life information into reliable, usable data within DPP processes. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

3.9. Perceptions of DPP: compliance burden or business opportunity

The material shows that how DPP is perceived depends on the organisation's level of preparation and the specific character of the sector. In less mature environments, DPP is understood primarily as a future compliance obligation requiring organisational preparation and additional expenditure. In more mature ecosystems, a broader perception emerges of DPP as a tool for managing product information, transparency, and value chain collaboration.

In Poland, in the automotive sector, DPP is perceived primarily through the lens of the need to organise product data, take responsibility for information, and prepare the organisation for regulatory requirements. At the same time, the scale and complexity of the value chains point to the potential significance of DPP for better product information management. In Spain, in the food sector, the dominant challenge is translating existing traceability and information management practices into the broader DPP requirements, including environmental and life cycle information. In Bulgaria, in the textile sector, DPP is primarily linked to the need to organise data, increase the transparency of material and supplier information, and prepare the organisation for regulatory requirements. In the Netherlands, in the agricultural sector, DPP is perceived more broadly, as an element of product information transparency, data management, and collaboration across the whole value chain, rather than solely as a compliance obligation. In Norway, in the plastics and composites sector, the possibility of using DPP as a strategic business tool was noted, particularly if a company is able to demonstrate reliable environmental data and information originating from the whole value chain. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The comparison thus shows a shift in perspective from DPP as a regulatory obligation towards DPP as a tool for information management and business value creation. In countries and sectors with a lower level of preparation, the main challenge remains understanding the requirements and preparing the organisation to meet them. In more mature environments, greater importance is attached to data quality, product transparency, value chain collaboration, and the ability to use reliable environmental information in relationships with customers and partners. For the training programme, this means the need to present DPP not only as a compliance requirement, but also as a tool supporting management, collaboration, and business value. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

DPP as a Regulatory and Business Competence in the DIGITRACE Partner Countries

In the DIGITRACE partner countries, DPP-related competences should be presented as the ability to implement the requirements and use them in running the business, not solely as a regulatory compliance competence.

3.10. Maturity picture across partner countries

The maturity assessments presented below come from the qualitative material gathered during the focus groups and relate to the perceived level of preparedness of the environments covered by the study for implementing DPP-related solutions. Numerical scores on a 1 to 5 scale are available for all five DIGITRACE partner countries: the Netherlands, Spain, Poland, Bulgaria, and Norway. In the case of Norway, the value 2.2 out of 5 represents the average of the scores for the five organisational readiness areas indicated in the national focus group report.

Country	Sector	Maturity score indicated in the focus groups (validation workshops)	Interpretation
Netherlands	Agriculture	3.6/5	Transition towards implementation
Spain	Food/agri-food	2.7/5	Early stage of preparation
Poland	Automotive	2.4/5	Early stage of preparation
Bulgaria	Textiles	2.1/5	Early stage of preparation
Norway	Plastics/composites	2.1/5	Early stage of preparation

Interpretation of the results

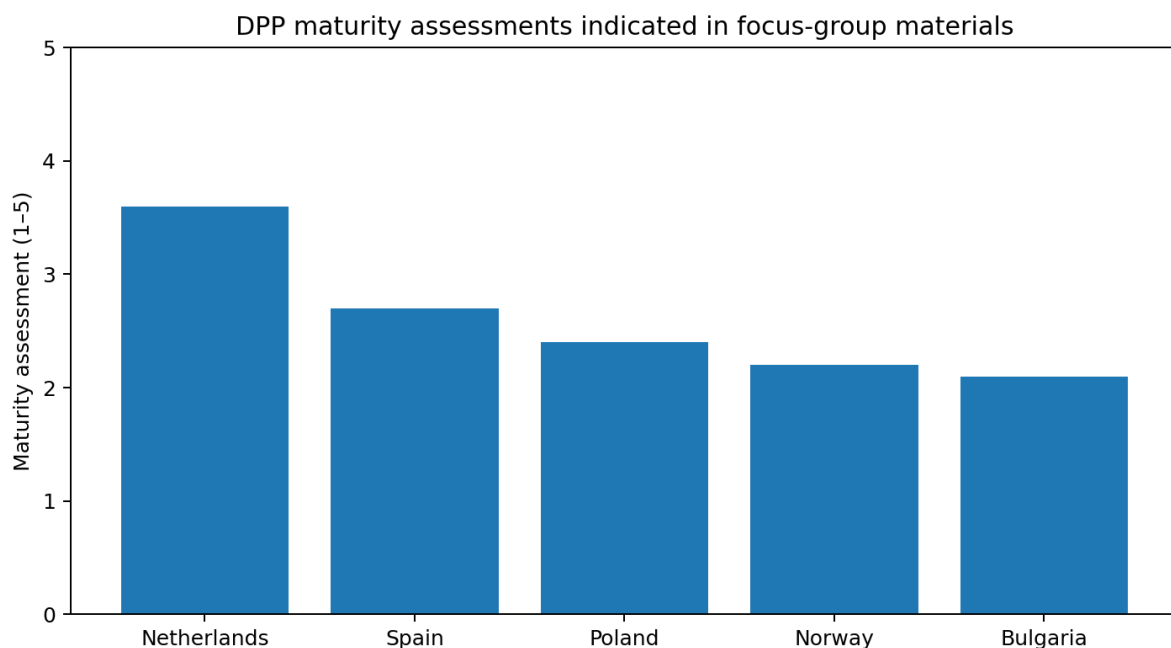
The comparison shows a varied level of preparedness for implementing DPP-related solutions across the countries and sectors analysed. The Netherlands achieved the highest indicated value, 3.6 out of 5, corresponding to a stage of transition towards implementation. Spain (2.7 out of 5), Poland (2.4 out of 5), Norway (2.2 out of 5), and Bulgaria (2.1 out of 5) are in the range corresponding to an early stage of preparation.

In the case of Norway, the average of 2.2 out of 5 results from a very varied situation across the individual areas. The significance of ESG and the circular economy was rated highest, at 3.5 out of 5, while data and interoperability and supply chain readiness each received 1.5 out of 5. Competences were rated at 2.0 out of 5, and regulatory awareness at 2.5 out of 5. This means that the Norwegian plastics and composites sector recognises the strategic significance of circularity-related areas, but still has significant barriers in terms of data, interoperability, competences, and information exchange within the supply chain.

The results also show that the level of maturity is not synonymous with the level of DPP awareness. Individual environments may already have experience with traceability, environmental data, or the circular economy, while not yet having the systems, competences, and processes needed for the practical implementation of DPP. In Norway, the report points to precisely this situation: awareness of the DPP concept is present, but there is considerable uncertainty regarding the practical application of the requirements, the organisation of data, and the exchange of information between companies.

Differences in the declared level of maturity are significant for the design of DIGITRACE training pathways. In environments at an earlier stage of preparation, greater importance attaches to basic competences, building awareness of DPP requirements, organising data and processes, and preparing the organisation for implementation. In more advanced environments, training needs may focus to a greater extent on system and data integration, interoperability, information management across the value chain, and the practical use of DPP in business operations. This means that the results do not point to the need for a single, identical training pathway for all countries and sectors. Rather, they support the design of modular pathways that take into account different levels of readiness and the specific character of target groups. The comparison is diagnostic and comparative in nature and should not be interpreted as a formal ranking of countries or as a statistical measure of the maturity of entire economies or sectors. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The chart shows the maturity scores indicated in the focus group material for the countries for which a comparable score on a 1 to 5 scale was available. A higher value indicates a more advanced stage of preparation for implementing DPP-related solutions, as derived from the qualitative material. The Netherlands achieved the highest indicated value (3.6 out of 5), while Spain (2.7 out of 5), Poland (2.4 out of 5), and Bulgaria (2.1 out of 5) were assessed as being at an earlier stage of preparation. Norway is not presented as a numerical value, since the available material did not contain a comparable aggregate score on a 1 to 5 scale. The results should be treated as an indication of the variation in needs and level of preparation, not as a ranking of countries. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]



Source: national focus group maturity assessments. The results are illustrative in nature and do not constitute a statistical ranking of countries. [FG-NL][FG-ES][FG-PL][FG-BG]

4. Training needs and competence gaps

4.1. Overall profile of competence gaps

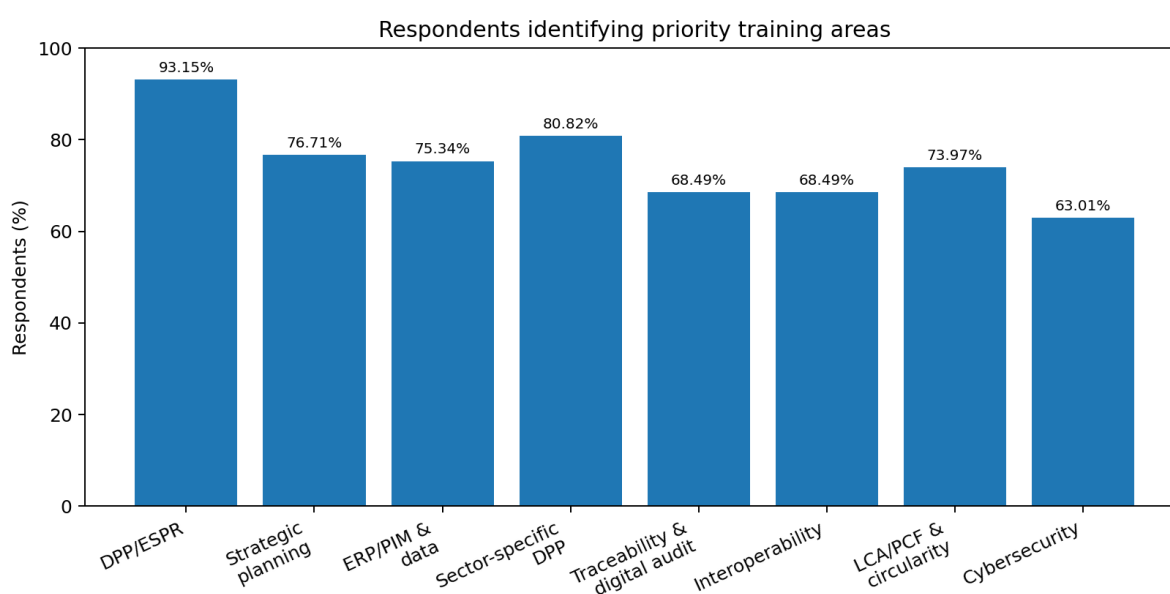
The material points to an entire competence architecture, not a single, isolated training gap. The strongest needs combine regulatory understanding, strategic decision-making, product data management, interoperability, sustainability information, and supply chain coordination. This is consistent with the project's aim of developing programmes for different SME roles, rather than a single, generic course. [P1][S1][P2]

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The table below organises the identified gaps according to the main competence areas and shows their significance for different target groups. The comparison should be read together with the earlier analysis results: not every gap has the same character or requires the same way of developing competence. Some needs are shared and relate to a basic understanding of DPP and regulatory requirements, some are linked to specific professional roles, and some arise from the specific character of sectors and processes occurring within value chains.

The chart presents a synthetic picture of the most important competence gap areas identified in the study. Its purpose is not to create a ranking of “most important professions” or to compare the level of competence between countries, but to show that the needs are multidimensional in nature and require differentiated learning pathways. The results therefore point to the need to combine competences shared across a broad group of recipients with competences assigned to specific roles and competences arising from sectoral specificity.

Consequently, the gap architecture presented forms the basis for further assigning competence needs to target groups and designing appropriate DIGITRACE products and training pathways. This means moving away from a single-programme-for-everyone model towards a solution in which a shared competence base can be supplemented with content corresponding to professional role, sector, and the organisation's level of preparation.



Source: DIGITRACE competence self-assessment survey, n=73 [S1].

Competence Area	Survey Data	Confirmation in the Focus Groups	Priority
Understanding DPP/ESPR Regulation	93.15% identify as a training need; 73.98% declare absent or basic knowledge of ESPR	All countries indicate uncertainty or an uneven level of understanding	Very high
Sector-Specific DPP Requirements	80.82% identify as a need	All five sectors indicate distinct application requirements	Very high

Strategic Planning and Investment	76.71% identify as a need	Poland, Norway, and Bulgaria emphasise the significance of management and organisational governance	Very high
Product Data Management	75.34% identify as a need; 64.39% declare absent or basic level of ERP/PIM competence	Strongly indicated in Poland, Bulgaria, the Netherlands, and Norway	Very high
Sustainability/LCA/PCF/Circularity	73.97% identify as a need; 64.39% declare absent or basic level of PCF competence	Significant gaps in Spain and Bulgaria; a strategic opportunity in Norway	High
Traceability and Digital Auditing	68.49% identify as a need; 71.24% declare absent or basic level of auditing competence	Supply chain verification recurs as a need across different countries	High
Interoperability/API/IoT	68.49% identify as a need; 64.39% declare absent or basic level of integration competence	A major barrier across countries	High
Cybersecurity/Data Access	63.01% identify as a need	Significant, but usually secondary to data and interoperability	Medium-high

4.2. Regulatory and compliance competences

Regulatory and compliance competences should not be treated in the training programme as an end in themselves, limited to knowledge of the ESPR provisions and the basic requirements of the Digital Product Passport (DPP). The study results point to the need to move from regulatory awareness to the ability to apply the requirements operationally. As many as 78.09% of respondents declared an absent or basic level of competence in determining the DPP implementation deadlines relevant to their sector, which points to a gap between knowing that the regulation exists and being able to use it in professional practice. [S1]

From a training programme design perspective, this means competence needs to be built in several successive steps. A participant should first understand what requirements follow from the DPP/ESPR regulation, then be able to interpret them in the context of their own sector, product, process, and professional responsibility, and, in the next step, translate them into organisational action. In practice, this may include recognising the scope of data required for the product, identifying the changes needed in how data is collected and updated, adapting product documentation, and preparing a way of communicating the requirements to supply chain partners.

This approach means that regulatory competences should be designed as a pathway leading from “I know the requirement exists” to “I can determine what it means for my product, process, and role, and what action needs to be taken within the organisation”. Training content should therefore be embedded in sectoral and professional context, rather than presenting the regulation solely as general knowledge. This also makes it possible to link the shared base of regulatory competences with later role- and sector-specific content, in line with the competence architecture adopted in the report. [S1][P2]

4.3. Data and digitalisation competences

The core of technical competences should cover product data structures, data quality, ERP/PIM and related systems, identification carriers, integration/APIs, interoperability, access rights, and cybersecurity. The material shows that training should focus on how systems and processes are linked, rather than on isolated software demonstrations. Among the focus group findings, the need to link data on the product, processes, and sustainability across ERP, PLM, PIM, LCA, and supply chain tools was particularly clearly noted in Bulgaria (textile sector). This finding is an example of the sectoral dimension of the data integration gap, which should be taken into account when designing technical competences. [FG-BG]

4.4. Sustainability and circular economy competences

Learning relating to DPP-linked sustainability should be operational in nature. Participants need to understand which environmental information is relevant, how it is generated, how it can be verified, how it flows through the value chain, and how it can be used responsibly in product communication. The survey and focus groups point to specific needs relating to LCA, PCF, carbon data, recycled material content, reparability, product end-of-life, and circularity. [S1][FG-BG][FG-ES][FG-NO]

Learning relating to DPP-linked sustainability should be operational in nature. Participants need to understand which environmental information is relevant, how it is generated, how it can be verified, how it flows through the value chain, and how to use it responsibly in product communication. The survey indicates demand for competences relating to environmental data, while the focus groups made it possible to explore these needs further, in particular in Bulgaria (textiles), Spain (food/agri-food), and Norway (plastics/composites). The material from these countries pointed, among other things, to the need for competences relating to LCA, PCF, carbon data, recycled material content, reparability, product end-of-life, and circularity. [S1][FG-BG][FG-ES][FG-NO]

4.5. Supply chain and supplier data verification competences

A specific competence need is the ability to obtain, assess, verify, and maintain data received from suppliers. This includes supplier questionnaires, evidentiary requirements, audit logic, data ownership, responsibility for updating, and escalation procedures. This should be treated as a cross-functional competence, spanning purchasing, quality, sustainability, operations, and data/IT. [S1][FG-PL][FG-ES][FG-BG][FG-NO]

A specific competence need is the ability to obtain, assess, verify, and maintain data received from suppliers. This includes supplier questionnaires, evidentiary requirements, audit logic, data ownership, responsibility for updating, and escalation procedures. The study results show that these competences should be treated as cross-functional, since they combine the areas of purchasing, quality, sustainability, operations, and data/IT. The findings from the focus groups in Poland (automotive), Spain (food/agri-food), Bulgaria (textiles), and Norway (plastics/composites) show that managing information from supply chain partners requires not only tools, but also clearly defined responsibilities and data verification procedures. [S1][FG-PL][FG-ES][FG-BG][FG-NO]

4.6. Organisational and managerial competences

Management staff must understand the strategic and financial implications of DPP, assign responsibility, coordinate functions, set investment priorities, and lead organisational change. The result of 83.56%, indicating demand for competences related to the assignment of responsibility, cost management, and funding, confirms that DPP implementation is not solely an IT matter. [S1]

Management staff should understand the strategic and financial implications of DPP, assign responsibility, coordinate functions, set investment priorities, and lead organisational change. In the cross-country competence self-assessment survey, covering 73 respondents from the five DIGITRACE partner countries, 83.56% of respondents indicated demand for competences related to the assignment of responsibility, cost management, and funding. This result shows that preparation for DPP implementation should also cover organisational and managerial competences, rather than being limited to technological aspects. [S1]

4.7. Competence needs by role

The identified competence needs point to the need to differentiate training content not only by level of advancement, but also by the role performed within the organisation. The table below presents seven main groups of roles for which DPP-related implementation needs differ in character. This division reflects different scopes of responsibility: from strategic decisions and compliance management, through data and process management, to obtaining information from suppliers, product development, and customer communication. This does not mean that seven completely separate programmes need to be created; a shared competence base can be supplemented with content and exercises corresponding to the specific character of each role. [P1][S1][P2]

The educational recommendations presented should be treated as a basis for the further design of DIGITRACE training pathways. Their purpose is to translate the identified gaps into practical learning outcomes, so that a participant not only knows the DPP/ESPR requirements, but is able to apply them within the scope of responsibility appropriate to their role.

4.7. Competence needs by role

Role	Main Competence Needs	Recommended Educational Emphasis
Sustainability / Compliance / Quality	ESPR; DPP; ESG; LCA/PCF; environmental data requirements; evidence and declarations; data quality assurance	Regulatory cases; interpreting requirements; evidence validation; ESG/DPP data flow; data quality assessment exercises
Sales / Marketing / Customer Relations	Product transparency; DPP information; environmental communication; value proposition; using reliable data in customer communication	Customer scenarios; reliability of declarations and data; DPP as market information; communicating product value
IT / Digital Systems / Data Management	Data models; ERP/PIM; APIs; interoperability; identification; data access and security	Practical exercises on systems and data; architectural cases; system integration; interoperability lab
General Management / Owners	Interpreting DPP/ESPR; strategy; investment; governance and organisational management; responsibility; business value	Decision-making scenarios; implementation roadmap; costs/benefits; change and responsibility management workshop

Role	Main Competence Needs	Recommended Educational Emphasis
Purchasing / Procurement / Supply Chain	Obtaining and assessing supplier data; evidentiary requirements; data verification; responsibility for updating; collaboration with supply chain partners	Supplier questionnaires; data verification scenarios; escalation procedures; mapping data flow within the supply chain

4.8. Sector-specific competence needs

Sector	Specific Competence Needs	Sources
Automotive (Poland)	Battery/DPP interfaces; component traceability; large product portfolios; life cycle data; complex multi-tier value chains; system integration	Polish desk research and focus group [FGI] [DR-PL][FG-PL]
Food/Agri-food (Spain)	Extending food traceability to cover sustainability and life cycle data; supplier data; ESG/PCF; interoperability; practical compliance	Spanish desk research and focus group [FGI] [DR-ES][FG-ES]
Textiles (Bulgaria)	Fibre/material composition; chemicals; recycled material content; repairability; life cycle/end of life; supplier verification; EPR	Bulgarian desk research and focus group [DR-BG][FG-BG]
Agriculture (Netherlands)	Traceability from the farm to the value chain; sustainability data; interoperability; using existing agricultural information systems; shared data exchange	Dutch desk research and focus group [FGI] [DR-NL][FG-NL]
Plastics/Composites (Norway)	Material composition; additives; recycled material content; identification for products with a long life cycle; verifying data from earlier links in the chain; trade secrets/intellectual property; sector regulatory evidence	Norwegian desk research and focus group [FGI] [DR-NO][FG-NO]

4.9 Implications for the design of training pathways

The comparison shows that the shared competence base relating to DPP, traceability, data management, and sustainability needs to be supplemented with content arising from sectoral specificity. Individual sectors differ not only in the type of information that should be collected and exchanged, but also in the character of their processes, data sources, verification requirements, and the way information is used across the value chain.

In automotive (Poland), particular importance attaches to component traceability, battery- and DPP-related interfaces, managing large product portfolios, life cycle data, and system integration within complex value chains. In the food/agri-food sector (Spain), needs focus on extending existing traceability to cover sustainability and life cycle data, supplier data, ESG/PCF, interoperability, and practical compliance. In the textile sector (Bulgaria), data on fibre and material composition, additives, recycled material content, repairability, life cycle, supplier verification, and EPR requirements are important. In agriculture (the Netherlands), key areas are traceability from farm to the whole value

chain, sustainability data, interoperability, the use of existing information systems, and shared data exchange. In the plastics and composites sector (Norway), particular importance attaches to data on material composition and additives, recycled material content, identifying products with a long life cycle, verifying data from earlier links in the chain, protecting intellectual property information, and sector-specific regulatory evidence.

These differences indicate that DIGITRACE training pathways should have a modular structure. The shared component should provide basic knowledge and competences relating to DPP, regulatory requirements, data, traceability, interoperability, and sustainability, while the sectoral component should translate these issues into the real products, processes, data, and problems characteristic of a given economic environment. This means that a participant should work not only on general DPP examples, but also on cases relating to their sector, for example component traceability in automotive, supplier data in the food sector, material composition and repairability in textiles, data flow in agriculture, or data verification and information protection in the plastics and composites sector.

Combined with the breakdown of target groups by professional role presented in section 4.7, this leads to a model in which the training pathway is constructed at the intersection of three dimensions: the shared competence base, professional role, and sectoral specificity. This approach makes it possible to avoid both a single, overly general programme for all recipients and the creation of completely separate courses for each sector. At the same time, it makes it possible to use the same learning outcomes in different environments, but applying appropriate cases, data, tools, and practical exercises.

5. Training models, learning formats and micro-credentials

5.1. From knowledge transfer to implementation readiness

The strongest convergence between the focus groups concerns the learning format. Participants consistently rejected a training model based primarily on theoretical presentations. They expected practical implementation support, real business cases, sectoral examples, work on existing systems, mentoring, and tools that can be directly applied within SMEs. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO] The conclusions regarding the format and manner of learning result from combining the desk research analysis with the qualitative material from the focus groups. The desk research made it possible to take into account existing sectoral, regulatory, technological, and competence-related conditions, and then to identify the areas requiring translation into practical educational activities. The focus groups supplemented this picture with the experiences and expectations of potential recipients regarding how competences should be developed. [P1][FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The strongest convergence between the focus groups concerns the learning format. Participants consistently rejected a training model based primarily on theoretical presentations. They expected practical implementation support, real business cases, sectoral examples, work on existing systems, mentoring, and tools that can be directly applied within small and medium sized enterprises (SMEs). [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

Consequently, the training programme should be designed not as the transfer of knowledge about DPP, but as a process that prepares the participant to undertake and carry out concrete actions related to DPP implementation within the organisation. Theoretical and regulatory content should form the foundation on which the participant develops the ability to recognise the requirements relevant to

their own product and process, work with data, identify organisational gaps, and take concrete action to prepare the organisation for implementation. This design approach is consistent with the earlier identification of needs by role and sector, and with the conclusion that the shared competence core should be supplemented with content embedded in real professional and sectoral conditions. [P1][P2] DPP as a Practical Implementation Competence

Learning relating to DPP should be practice-based, context-embedded, and linked to real business processes. Regulatory content is necessary, but should form the foundation for implementation, not the end result.

Practical and Contextual DPP Learning in the DIGITRACE Partner Countries

In DIGITRACE partner countries, learning relating to DPP should be practice-based, embedded in professional and sectoral context, and linked to real business processes. Regulatory content is necessary, but should form the foundation for preparing for implementation, not the end result of the learning process.

5.2. Recommended learning architecture

Layer	Purpose	Core Content	Target Group
CORE – shared core	Establishing a uniform, minimum level of DPP-related competence, forming a shared base for participants across all DIGITRACE partner countries	DPP/ESPR; data; traceability; interoperability; sustainability; governance and organisational management	All target groups covered by the programme: management staff and decision-makers; ICT/data/digitalisation; purchasing/procurement/supply chain; production/operations/logistics; product development/engineering/design; sustainability/compliance/quality; marketing/sales/customer relations
ROLE – role-based pathways	Translating shared DPP competences into the responsibilities and tasks appropriate to specific professional roles	Management staff; ICT/data; operations/supply chain; sustainability/compliance; sales/marketing	People performing specific professional functions within SMEs, corresponding to the seven role groups identified in the needs analysis
SECTOR – sector pathways	Applying the shared DPP roles and competences under the real conditions of a given sector	Automotive; food; textiles; agriculture; plastics/composites	Participants assigned to a given sector and performing specific professional roles within it
WORK-BASED – work-based learning	Translating the competences acquired into concrete actions and tasks carried out within the company	Readiness assessment; process mapping; data inventory; implementation roadmap; pilot	SMEs and cross-functional teams, carrying out tasks related to preparing for or implementing DPP

5.3. Learning formats

The recommended learning formats result from combining the desk research with the results of the focus groups conducted in the five DIGITRACE partner countries. The desk research showed that the available forms of competence development relating to digitalisation, traceability, sustainability, and data management vary in scope, level of advancement, and delivery method. At the same time, the analysis pointed to the need to combine regulatory and technological knowledge with the ability to apply it in real company processes. [P1][DR-PL][DR-ES][DR-BG][DR-NL][DR-NO]

The focus group results confirmed this need in all five countries, although its manifestations were linked to the specific character of the sector and the organisation's level of preparation. In Poland, in the automotive sector, the need to work on real processes, product data, and complex supply chain relationships was important. In Spain, in the food and agri-food sector, the practical application of existing traceability systems and their extension to cover sustainability and product life cycle data was significant. In Bulgaria, in the textile sector, the need for practical learning was linked, among other things, to organising data on materials and suppliers, reducing manual information exchange, and developing circular-economy-related competences. In the Netherlands, in the agricultural sector, emphasis was placed on interoperability, value chain collaboration, and the use of existing digital solutions within a broader data exchange environment. In Norway, in the plastics and composites sector, working with data on materials and their environmental impact, verifying it, and using it across the whole value chain was particularly important. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

A shared conclusion from the desk research and the focus groups is therefore the need to move away from a learning model based solely on information transfer, towards a model in which the participant can analyse a problem, practise a solution, and apply it within their organisation. At the same time, the material does not indicate that a single learning format would be appropriate for all countries, sectors, and professional roles. Differences in the level of preparation and in the specific character of processes argue for a modular set of formats that can be combined depending on the training goal, target group, sector, and level of advancement. [P1][P2][FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

Recommended Learning Formats

Short digital or online modules should provide a shared knowledge base on DPP, ESPR, data, traceability, interoperability, and sustainability. Their role is primarily to prepare the participant for further practical work. This format is particularly useful as an element of the shared CORE, which should be available to all target groups.

On-site or live online workshops should serve to solve problems that cannot be effectively mastered through independent study of the material. They may cover interpreting DPP/ESPR requirements, analysing product data, mapping processes, identifying gaps, and preparing implementation actions. For all five countries, the workshop format corresponds to the need to translate knowledge into the problems occurring in real organisations. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

Sector-specific case studies should use realistic scenarios relating to the actual operating conditions of SMEs. Cases should be differentiated for automotive in Poland, the food/agri-food sector in Spain, textiles in Bulgaria, agriculture in the Netherlands, and plastics and composites in Norway. This makes it possible to present the shared DPP requirements through problems that actually occur in a given

environment, including traceability, supplier data, environmental data, interoperability, and value chain information management. [DR-PL][DR-ES][DR-BG][DR-NL][DR-NO][FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

Exercises relating to data, traceability, and interoperability should enable participants to work with product data structures, identifiers, information flows, and examples of data exchange between systems and organisations. Exercises should differ depending on the role: people responsible for IT and data should work on integration and information flows, people from production, purchasing, and logistics on traceability and supplier data, while people responsible for compliance, quality, product development, or management should work on information requirements and responsibility for data. [S1][P2]

Work-based learning should lead to the direct application of competences within the company. Participants can map their own processes, analyse data flow, carry out a preliminary readiness assessment, identify gaps, or prepare elements of an implementation roadmap. This format is particularly important for SMEs, since it makes it possible to link the learning process with a concrete organisational problem and to avoid detaching the training from the company's real needs. [P1][P2]

Mentoring or expert consultations should supplement the modules and workshops in situations where a participant needs support in translating knowledge to their own organisation. These may relate to readiness assessment, interpreting requirements, data quality, process mapping, interoperability, or preparing an implementation roadmap.

Peer learning and experience exchange should enable companies to share solutions, problems, and good practices. This format is particularly significant in areas where DPP implementation depends on collaboration between several value chain participants. It can be used both within a given sector and between partner countries, making it possible to compare ways of dealing with similar challenges.

Simulation or pilot exercises should make it possible to test selected solutions before applying them at full scale. They may involve working with sample or real data, testing information flow, checking system interoperability, or preparing a pilot solution for a selected product or process. This format makes it possible to reduce implementation risk while creating space for learning based on real results.

The set of recommended formats forms a coherent but flexible learning model. Digital modules provide a shared knowledge base, workshops and case studies develop the ability to apply this knowledge, data exercises make it possible to translate it into concrete processes and systems, and work-based learning, mentoring, peer learning, and pilots support the application of competences within the real organisational environment. This approach corresponds both to the shared conclusions arising from the desk research and the focus groups, and to the differences between Poland, Spain, Bulgaria, the Netherlands, and Norway and between the sectors analysed. It makes it possible to maintain a shared European competence base while adapting the way of learning to professional role, sector, and the organisation's level of preparation. [P1][P2][DR-PL][DR-ES][DR-BG][DR-NL][DR-NO][FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

5.4. Micro-learning and continuous knowledge updating

The recommendation regarding the use of micro-learning results from combining the desk research analysis, covering existing training solutions and approaches to competence development, with the

results of the qualitative research conducted in the DIGITRACE partner countries. The needs analysis shows that SMEs operate under conditions of changing regulatory, technological, and sectoral requirements, while having limited time to take part in long training formats. For this reason, the programme should make it possible both to acquire basic knowledge and to subsequently supplement and update it without having to take part in a full course each time.

In the focus group material, the need for short, accessible modules was noted particularly in the context of introducing new requirements and concepts and subsequently moving on to practical learning. In Spain, micro-learning was identified as a useful way of introducing DPP/ESPR competences and keeping knowledge up to date in relation to changes in European requirements. In Bulgaria, the need for short and accessible introductory modules was noted, which should then be supplemented with practical learning. These findings are consistent with the broader conclusion of the needs analysis, according to which the programme should be modular and adapted to different levels of preparation, roles, and sectors. [DR-PL][DR-ES][DR-BG][DR-NL][DR-NO][FG-ES][FG-BG]

Micro-learning should therefore primarily perform a supplementary and updating function, rather than replacing workshops, case work, or learning based on real tasks. Short modules can be used to update regulatory requirements, terminology, technological changes, new ways of managing data, or emerging sectoral requirements. They can also serve to prepare a participant for a workshop or practical task, and as reminder material after training has ended.

In practice, this means the need to design the programme as a sequence of short, independently usable educational units that can be combined into larger modules and pathways. A participant should be able to choose or receive the next module depending on their role, sector, level of competence, and current organisational task. This model makes it possible to combine the shared competence core with role- and sector-specific content and to limit the time burden on participants.

Micro-learning is particularly justified in areas where knowledge changes quickly. In the case of DPP and ESPR, this means the ability to update selected elements of the programme without having to rebuild the entire training pathway. Short updating modules may relate, for example, to regulatory changes, new product data requirements, traceability, interoperability, environmental information, or requirements characteristic of individual sectors.

Micro-learning should therefore be treated as one of the elements of the DIGITRACE delivery model: short digital modules serve to build and update knowledge, while workshops, case studies, mentoring, and workplace-based tasks serve its application. This combination corresponds to the principle recommended in the report that the programme should be both flexible and contextual, short enough to be reconciled with work, but concrete enough to lead to real action within the organisation. [P1][P2]

5.5. Micro-credentials and validation

The project documentation clearly assumes alignment with the European Qualifications Framework and micro-credential principles. The needs assessment supports a modular approach, since SMEs differ significantly in level of maturity, role, and sector. Micro-credentials can therefore serve as building blocks of a flexible learning pathway, rather than forming a single large qualification. [P1]

In DIGITRACE, each micro-credential should specify: the learning outcomes; the target professional role; the expected entry level; the practical task or assessment method; evidence of competence achievement; the workload; and the link to the wider programme. Where justified, learning outcomes should be mapped to the European frameworks already indicated in the WP2 documentation, while

avoiding artificial alignment where a given competence does not genuinely correspond to a given standard.

Micro-credentials should form part of a modular competence-recognition system, rather than replacing the full training programme. This approach is consistent with the project's assumptions regarding the use of the European Qualifications Framework and micro-credential principles, and corresponds to the diversity of SMEs in terms of level of preparation, professional role, and sector. A micro-credential can confirm the achievement of a specific, clearly defined learning outcome and form part of a larger competence pathway. [P1]

Within the recommended CORE–ROLE–SECTOR architecture, micro-credentials can be assigned both to the shared competence core and to selected role or sector pathways. This makes it possible to build flexible learning pathways: a participant can start with the shared DPP foundation and then develop competences corresponding to their professional role, sector, and the specific tasks carried out within the organisation.

Each micro-credential should clearly specify: the learning outcome or outcomes, the target professional role, the expected entry level, the scope and workload, the method of verifying competence achievement, the required evidence, and the link to the wider training programme. Assessment should not be limited to checking knowledge of terminology or regulation. Where the character of the competence allows, it should include a practical task, case analysis, work with data, performance of a specific action, or other reliable confirmation of the ability to apply the competence in the workplace. [P1]

Where justified, learning outcomes should be mapped to the relevant European frameworks and standards indicated in the project documentation. Mapping should serve to ensure transparency and comparability of competences, without artificially assigning learning outcomes to standards that do not correspond to the actual scope of a given competence. [P1]

Micro-credentials designed in this way can support continuous competence updating. Short updating modules can conclude with an appropriate form of validation if they lead to the achievement of a clearly defined learning outcome. This means that updating knowledge does not have to mean repeating the entire programme, and a participant can gradually build a confirmed set of DPP-related competences.

5.6. Delivery principle: flexible but not generic

Flexibility should not mean abandoning context. The material shows that SMEs need learning that is short enough to be reconciled with work, but concrete enough to lead to action. The recommended delivery model should therefore be “modular and contextual”: shared concepts can be delivered digitally, while the work with the highest implementation value should use workshops, cases, mentoring, and tasks relating to a specific organisation. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The programme's flexibility should not mean abandoning professional and sectoral context. The needs analysis shows that SMEs differ in their level of preparation, the roles performed by participants, the character of their activity, and the challenges relating to data, products, and the value chain. At the same time, participants need learning formats that can be reconciled with everyday work and that lead to concrete results applicable within the organisation. [S1][P1][P2]

The recommended delivery model should therefore be modular, contextual, and progressive. Digital modules and micro-learning should primarily provide shared foundational knowledge and make it

possible to update it. Workshops, case studies, and exercises should develop the ability to apply this knowledge within a specific professional role and sector. Tasks based on real work should, in turn, lead the participant to apply competences within their own organisation, for example through a readiness assessment, process mapping, data identification and inventory, information flow analysis, or the preparation of pilot actions. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

This model should allow for different entry points. A participant with basic knowledge can start with modules addressing specific gaps, while a participant requiring broader preparation should go through the shared CORE before starting the pathway corresponding to their role and sector. Subsequent programme elements can be selected depending on the organisation's needs and the participant's scope of responsibility.

At the same time, flexibility should not lead to the creation of a generic programme in which all participants receive an identical set of content. The needs analysis results point to the need to differentiate the programme both by professional role and by sector. The same topic should therefore be presented through different examples and tasks depending on whether the participant is responsible for management, data and digital systems, production and the supply chain, sustainability and compliance, or sales and marketing. Similarly, the cases and data used in training should correspond to the specific character of automotive, the food/agri-food sector, textiles, agriculture, and plastics and composites.

Ultimately, the recommended model should combine four elements: a shared CORE level of competence, ROLE specialisation, SECTOR context, and the application of competences through WORK-BASED LEARNING, that is, learning based on real professional tasks. Micro-learning and micro-credentials should support this model, making it possible to gradually develop, confirm, and update competences. [P1][P2]

A delivery format designed in this way makes it possible to maintain a shared European DPP competence standard, while adapting the way of learning to the participant's level, role, sector, and the organisation's real needs. This is key to achieving the programme's goal: not only increasing knowledge about DPP, but preparing participants to take concrete action related to its application within the company.

6. Recommendations for WP2 and training programme development

6.1. Recommendation 1

Development of a programme based on the CORE–ROLE–SECTOR division

The training programme should be based on the three-layer CORE–ROLE–SECTOR architecture. The shared CORE module should provide all participants with a uniform, minimum level of competence relating to the Digital Product Passport (DPP) and the requirements of the Ecodesign for Sustainable Products Regulation (ESPR). The ROLE layer should translate these shared competences into the tasks and responsibilities appropriate to particular professional roles, while the SECTOR layer should enable competences to be applied under the conditions characteristic of a given sector.

This structure follows from the needs analysis carried out. The desk research covered the national and sectoral context, existing traceability and digitalisation practices, the training offer, and gaps relevant to DPP implementation. The survey and the focus groups then made it possible to determine the

variation in needs by role and sector. [DR-PL][DR-ES][DR-BG][DR-NL][DR-NO][S1][FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The three-layer architecture thus makes it possible to combine a shared European level of competence with differentiating the programme according to professional responsibilities and sectoral specificity. It forms the basis for the further design of modules, role and sector pathways, and practical implementation tasks. [P1]

6.2. Recommendation 2

Base of the programme coming from practical implementation:

Each module should answer a practical implementation question. For example: What data do we need? Where is it currently located? Who is responsible for it? How do we verify information from suppliers? How do we connect systems? How do we protect commercially sensitive information? How do we prepare a first pilot? This approach reflects the recurring expectations of participants regarding practical tools, checklists, and implementation roadmaps. [FG-PL][FG-ES][FG-BG][FG-NO]

Each training module should lead to the application of the knowledge acquired in a concrete organisational action. Learning outcomes should be formulated in a way that enables the participant to answer practical questions related to preparing for and implementing DPP, such as: what data do we need, where is it currently located, who is responsible for its quality and currency, how do we verify information received from suppliers, how do we connect existing systems, how do we protect commercially sensitive information, and how do we prepare a first pilot.

This approach translates competences into actions that can be carried out within the company. It corresponds to the expectations, recurring across the focus groups, regarding practical tools, checklists, real cases, work on existing systems, and implementation roadmaps. [FG-PL][FG-ES][FG-BG][FG-NO]

Consequently, each module should combine a specific learning outcome with a task, example, or tool that enables the participant to apply the competence within their own work environment.

6.3. Recommendation 3

Development of a shared european educational core

The shared European core should provide all participants with basic, comparable knowledge of DPP and ESPR, and then develop the competences needed to apply these requirements in specific areas of company operations. The shared scope should be supplemented with elements depending on the participant's professional role and sectoral specificity.

The division of roles used in the table corresponds to the role groups covered by the DIGITRACE competence survey: management staff; purchasing and supply chain; IT and data; production and operations; product development/engineering/design; sales and marketing; sustainability/compliance/quality. [S1]

Module	Key Learning Outcome	Main Roles
DPP and ESPR fundamentals	Knowledge: familiarity with the concept of the Digital Product Passport (DPP), the regulatory	management staff; purchasing and supply chain;



	logic, and the role and consequences of ESPR implementation. Competences: recognising the basic DPP and ESPR requirements and their significance for the organisation. Application: understanding the role and duties of one's own position in the context of DPP implementation and its consequences for company processes.	IT and data; production and operations; product development/engineering/design; sales and marketing; sustainability/compliance/quality
DPP requirements and sectoral interpretation	Knowledge: familiarity with the DPP requirements relevant to the product and sector and their significance for processes and professional duties. Competences: recognising the requirements relating to one's own area of responsibility and translating them into organisational action. Application: assessing the consequences of DPP requirement implementation for one's own role, processes, and value chain collaboration.	management staff; purchasing and supply chain; IT and data; production and operations; product development/engineering/design; sales and marketing; sustainability/compliance/quality
Product data and data management	Knowledge: familiarity with product data requirements, organising and verifying it, and the principles for assigning responsibility for its quality and currency. Competences: determining the required product data, organising and verifying it, and assigning responsibility for its quality and currency. Application: maintaining data for DPP-related processes.	IT and data; production and operations; product development/engineering/design; sustainability/compliance/quality; purchasing and supply chain
Traceability and identification	Knowledge: familiarity with the requirements for identifying the product and its components and the basic information flows within the value chain. Competences: determining the basic information flows enabling the product to be tracked through the value chain and assessing data completeness. Application: using traceability to ensure the consistency of product information and its flow within the value chain.	Production/operations/logistics; purchasing/supply chain; IT/data/digitalisation; product development/engineering/design
Interoperability and data exchange	Knowledge: familiarity with the role of interfaces, standards, and data exchange mechanisms in DPP-related systems. Competences: determining system integration needs and the conditions for the safe and consistent exchange of information between organisations. Application: recognising interoperability barriers and collaborating on the design of data flows required by DPP.	IT/data/digitalisation; production/operations/logistics; management staff
Supply chain data and verification	Knowledge: familiarity with the types of data required from suppliers and partners and the	Purchasing; supply chain; quality; sustainability



	principles for assessing its reliability, completeness, and currency. Competences: determining the data required from suppliers and partners, assessing its reliability, completeness, and currency, and applying verification principles and data responsibility within the supply chain. Application: ensuring the quality and consistency of data transmitted within the value chain.	
Sustainability, LCA, and PCF data	Knowledge: familiarity with the basic types of environmental information relating to the product and the data needed to document its impact across the whole life cycle. Competences: recognising the required environmental data and assessing its quality and completeness. Application: using sustainability, LCA, and PCF data in DPP-related processes and collaborating on obtaining and verifying it.	Sustainability/compliance/quality; management staff; purchasing and supply chain; production and operations; product development/engineering/design
DPP governance, security, and intellectual property	Knowledge: familiarity with the principles of data access and responsibility for its use, and the risks relating to cybersecurity, the protection of commercially sensitive information, and intellectual property. Competences: determining data access principles, responsibility for its use, and identifying basic information security risks. Application: taking security, information protection, and intellectual property requirements into account in DPP-related processes.	Management staff; IT and data; sustainability/compliance/quality; product development/engineering/design
DPP implementation roadmap for SMEs	Knowledge: familiarity with the key areas of organisational preparation for DPP implementation, covering data, processes, technology, and responsibility. Competences: assessing the organisation's level of readiness for DPP implementation and identifying the most important gaps relating to data, processes, technology, and responsibility. Application: preparing a staged implementation action plan and determining priorities and responsibilities related to DPP implementation.	Management staff; representatives of all role groups involved in the implementation process
DPP as business value	Knowledge: familiarity with the possibilities for using reliable product and environmental data within company operations and its significance for information transparency and business value. Competences: assessing the possibilities for using DPP data to increase information transparency, build business value, and communicate responsibly with customers and partners.	Management staff; sales/marketing/customer relations; sustainability/compliance/quality



	Application: using product and environmental data to support the company's business value, customer and partner relationships, and responsible market communication.	
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6.4. Recommendation 4

Development of a training pathway based on a division by roles:

- **Management pathway:** strategy, governance and organisational management, investment, responsibility, change management, and business value.
- **ICT/data pathway:** data architecture, product data management, APIs, interoperability, identifiers, access control, and cybersecurity.
- **Production/supply chain pathway:** process mapping, traceability, supplier data, validation, and life cycle information.
- **Sustainability/compliance pathway:** ESPR, EPR, ESG, LCA/PCF, environmental evidence, and declarations,
- **Marketing/sales pathway:** product transparency, customer information, sustainability communication, and the responsible use of DPP data.

It is recommended that five main training pathways be developed, corresponding to the key areas of professional responsibility identified in the needs analysis. The pathways should draw on the shared European competence core and then differentiate the scope and manner of learning according to the participant's responsibilities. Individual pathways should not be treated as completely separate programmes. Their scopes partly overlap, since DPP implementation requires collaboration between different organisational functions. The division into pathways follows from the analysis of competence needs and makes it possible to translate the seven role groups used in the survey into five practical training areas. This allows the detailed needs of groups such as purchasing/supply chain, production/operations, or product development to be addressed within the appropriate pathways, without creating an excessively fragmented programme structure. [S1][P1]

Recommended training pathways

Training Pathway	Main Role Groups	Competence Scope and Main Educational Emphasis
1. Management and Decision-Making	Management staff	Strategic significance of DPP; regulatory requirements and consequences; governance and organisational management; responsibility for implementation; investment and costs; change management; assessing organisational readiness; preparing an implementation roadmap; using DPP as a source of business value.
2. ICT, Data, and Digitalisation	IT/data/digitalisation	Product data architecture and quality; data management; traceability; interfaces and APIs; interoperability; system integration; identifiers; access management; information security and cybersecurity.

Training Pathway	Main Role Groups	Competence Scope and Main Educational Emphasis
3. Production, Operations, and Supply Chain	Production/operations/logistics; purchasing/supply chain; product development/engineering/design	Process and data flow mapping; product and component traceability; supplier data; information verification and quality; product life cycle information; value chain collaboration; applying DPP requirements to production and operational processes.
4. Sustainability, Compliance, and Quality	Sustainability/compliance/quality; product development/engineering/design; management staff	ESPR; environmental requirements; ESG; LCA – life cycle assessment; PCF – product carbon footprint; EPR – extended producer responsibility; environmental data and evidence; declarations; data quality; documenting compliance and sectoral requirements.
5. Marketing, Sales, and Customer Relations	Sales/marketing/customer relations; management staff; sustainability/compliance/quality	Product information transparency; using DPP data in communication with customers and partners; communicating environmental information; responsible use of data; the significance of DPP for the value proposition and market relationships.

The five pathways should be delivered on a shared CORE basis, but with the possibility of further differentiating content by sector. This means that a participant starts from the shared level of competence, then develops competences appropriate to their role, and, in the next stage, works on cases, data, and processes characteristic of the sector in which their company operates. This solution makes it possible to maintain a shared European competence standard while adapting the programme to real professional duties and the company's operating conditions.

6.5. Recommendation 5

Development of five sectoral pathways

The needs analysis shows that the shared European DPP competence core should be supplemented with content relating to sectoral specificity. The proposed sector pathways result from combining the findings of the desk research, the survey results, and the focus group findings conducted in the five partner countries. Their purpose is not to create five completely separate programmes, but to translate shared DPP competences into the concrete products, processes, data, environmental requirements, and challenges occurring in individual sectors.

The selection of areas and priorities presented in the table corresponds to the needs identified for the sectors covered by the study: automotive in Poland, food/agri-food in Spain, textiles in Bulgaria, agriculture in the Netherlands, and plastics/composites in Norway. The priorities have been formulated at a sufficiently general level to serve as a basis for designing training modules, while retaining a reference to the real processes and challenges identified in the study. [P1][S1][FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

Sector	Suggested Area of Application	Example Priorities
Automotive	Managing complex value chains and product life cycle data	Battery and DPP interfaces; component identification; multi-tier supplier collaboration; PLM/ERP integration; life cycle and end-of-life product data

Food/Agri-food	Developing traceability and management of life cycle and sustainability data	Supplier data; ESG/PCF; product information; system interoperability; communicating product and environmental information to customers
Textiles	Ensuring material and chemical transparency and supporting product circularity	Fibre and material composition; information on chemical substances; recycled material content; repair and reuse; EPR; supplier data
Agriculture	Using existing digital traceability and certification in value chain data management	Farm-to-value-chain data; sustainability information; interoperability; shared data exchange
Plastics/Composites	Managing material data and traceability across a long product life cycle	Polymers and additives; recycled material content; durable identifiers; verifying data from earlier links in the chain; trade secrets

6.6. Recommendation 6

Introducing an SME readiness pathway

The study results show that SMEs may begin preparing for DPP implementation with different levels of knowledge, experience, and organisational readiness. The training programme should therefore begin with a diagnosis of the participant's entry level, making it possible to select the appropriate scope and level of training. The diagnosis should cover knowledge of the DPP and ESPR fundamentals, understanding of the role of the participant's own position, experience in working with data and processes, and the organisation's degree of preparation for DPP-related action.

Based on the diagnosis result, a participant can be directed to one of three training level categories. The levels do not represent a formal assessment of the company's maturity, but serve to match the scope and intensity of learning to the participant's current competences and experience.

Level	Learning Scope	Typical Outcome
Beginner Level	Basic DPP and ESPR concepts; the significance of regulatory requirements; basic terminology; the role of individual organisational functions in the DPP process; understanding the basic requirements relating to data and traceability.	Determining one's own role in the DPP process and preparing a basic checklist of competence and organisational needs.
Intermediate Level	Practical application of DPP requirements; product data management; traceability; interoperability; supplier data verification; sustainability information; applying requirements within company processes.	Mapping a selected gap in data or a process and preparing an action plan or pilot.
Advanced Level	Designing and refining DPP-related processes; cross-functional management; data and system integration; value chain collaboration; responsibility and risk management; designing solutions adapted to the organisation and sector.	An organisational DPP implementation roadmap and determination of the actions and evidence needed to carry out a pilot.

Such levelling should be used as a mechanism for organising the learning process, not as a ranking of companies. It makes it possible to start training at a level corresponding to the participant's real

competences and to move gradually from basic knowledge, through applying the requirements in practice, to designing and refining DPP-related processes.

6.7. Recommendation 7

Use of real business tools:

- A DPP readiness checklist;
- A product data inventory template;
- A data ownership and responsibility matrix;
- A supplier data request and verification template;
- A traceability process map;
- An interoperability gap checklist;
- A DPP implementation roadmap;
- A sample product data model;
- An environmental data evidence checklist;
- A role-specific action plan;

This recommendation directly reflects participants' demand for practical tools and the Polish focus group's recommendation to simplify the initial information directed at SMEs into clear starting steps and a basic checklist. [FG-PL] The training programme should use simple working tools that the participant can apply directly within their company. Their function is to translate DPP-related knowledge into concrete actions: assessing the current state, organising data, assigning responsibility, identifying gaps, and planning next steps. The tools should be used during exercises, case studies, and tasks based on real company processes, rather than being presented solely as teaching materials.

The recommended set includes:

- a DPP readiness checklist – for an initial assessment of organisational preparation;
- a product data inventory template – to determine what data is available, where it is stored, and what is missing;
- a data ownership and responsibility matrix – to assign responsibility for obtaining, updating, ensuring the quality of, and sharing data;
- a supplier data request and verification template – to organise how information is obtained from and checked with suppliers and partners;
- a traceability process map – to trace the flow of information about the product and its components across the value chain;
- an interoperability gap checklist – to identify problems relating to data exchange and integration between systems;
- a DPP implementation roadmap – to plan the successive stages of organisational preparation;
- a sample product data model – to show the structure and relationships of the data required for a given product or process;
- an environmental data evidence checklist – to organise the information and documents confirming the required environmental data;
- a role-specific action plan – to translate DPP requirements into concrete tasks and responsibilities for a given position.

This set should be adapted to the participant's level, professional role, and sector. At the basic level, the tools can serve primarily to recognise the current state and gaps. At the intermediate level, they should support data and process analysis and the preparation of pilot actions. At the advanced level, they should make it possible to design solutions, responsibilities, and an implementation roadmap.

This recommendation directly addresses the need for practical learning formats identified in the survey and focus groups. The tools should therefore form an integral part of the learning process and, at the same time, remain useful working materials after the training has ended. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO][S1]

6.8. Recommendation 8

Involvement of practitioners as trainers

The training programme should involve practitioners with experience in the areas covered by the individual modules. This follows from the nature of the identified competence needs: participants expect not only knowledge of regulatory requirements, but above all the ability to translate them into data, processes, decisions, and actions carried out within real companies. The involvement of practitioners should therefore strengthen the transition from knowledge to its application within a specific organisational environment. [FG-PL]

The shared CORE module can be delivered primarily by people with competences in DPP, ESPR, data, traceability, and sustainability. For the ROLE pathways, the involvement of practitioners should be linked to participants' professional responsibilities. For example, in modules relating to IT, data, and digitalisation, the involvement of specialists with experience in product data management, system integration, interoperability, or traceability is advisable. In management-related modules, practitioners with experience in change management, process organisation, and decision-making related to implementing digital solutions are needed.

In the SECTOR pathways, practitioners should bring experience directly related to the given industry. Their task is to show how the shared DPP requirements apply to specific products, processes, value chains, and data systems. For example, the production and supply chain module can draw on the experience of a specialist responsible for data and supplier collaboration, while the sector module can be led or co-led by an expert with practical experience in the given sector.

The role of the practitioner should not be limited to presenting their own experience. Practitioners should be engaged primarily to lead case studies, exercises using real or realistic data and processes, analysis of implementation problems, and consultation on tasks prepared by participants. This will make it possible to maintain consistency between the learning outcomes, the defined professional roles, sectoral specificity, and the practical tools recommended in the programme.

6.9. Recommendation 9

Linking learning with implementation

The training programme should combine knowledge acquisition with its application in real or realistic company processes. This follows from the findings of the needs analysis and focus groups, in which particular importance was attached to practical exercises, work on real organisational problems, data analysis, process mapping, and tools that can be used directly within the company. [P1][FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

Each ROLE and SECTOR pathway should therefore include an application task corresponding to the competences of the given professional group and the specific character of the sector. Depending on the participant's level, this may include mapping a product and its data, analysing a selected information flow, identifying gaps in data or traceability, preparing a supplier query, assessing system interoperability, developing an action plan, or preparing a pilot solution for a selected process.

The result of the practical part should be concrete working material that can be used within the organisation, for example a process map, a list of missing data, a responsibility matrix, an action plan, or a pilot design. This approach makes it possible to link learning outcomes to the company's real needs and, at the same time, creates a basis for the further refinement of the training programme. [P1]

In this way, the pilot becomes a natural next stage of the learning process: the participant moves from learning about DPP requirements and their significance for their role, through applying the knowledge in a concrete task, to preparing a solution that can be tested within the organisation.

6.10. Recommendation 10

Use of the Knowledge Hub as a shared knowledge resource

The activities planned under the project provide for the creation of a central Knowledge Hub containing training materials, good practices, and digital tools. The needs assessment supports treating this solution as a living knowledge environment rather than a static document repository: as the DPP environment develops, regulatory updates, sector cases, templates, examples, pilot results, and micro-learning units should be added. [P1]

The project provides for the creation of a Knowledge Hub, which should serve as a shared environment for accessing DPP-related materials, tools, and up-to-date knowledge. The WP2 findings show that the training programme should be based on practical, up-to-date content that can be adapted to changing regulatory requirements and sectoral needs. The Knowledge Hub can therefore form a significant complement to the training programme, providing access to resources used both during training and after it has ended. [P1]

The Knowledge Hub should in particular gather and update materials relating to DPP and ESPR, examples of good practice, sector cases, templates and working tools, materials relating to product and environmental data, examples of processes and interoperability solutions, the results of pilot activities, and short micro-learning units. The scope of resources should correspond to the CORE–ROLE–SECTOR programme structure, so that the user can find both material shared by all participants and content relating to a specific professional role or sector.

The Knowledge Hub should also support the continuous updating of the training programme. Regulatory changes, new sectoral requirements, pilot results, examples of practical solutions, and new materials can be added to the resource and subsequently used to update the training modules. This means the programme will not be treated as a closed set of materials prepared once, but as a solution that develops together with changes in the regulatory, technological, and market environment.

Linking the Knowledge Hub with the training programme in this way will also make it possible to maintain continuity of learning after the training has ended. The participant will be able to return to the materials, use the working tools, update their knowledge, and access materials corresponding to the successive stages of the organisation's preparation for DPP implementation. The Knowledge Hub should thus be an element supporting both the delivery of the training programme and its further use and updating. [P1]

6.11. Recommendation 11

Supporting learning across the whole value chain

DPP-related requirements concern the flow of information between many value chain participants, so the training programme should take into account situations in which carrying out a given task requires collaboration between several functions or organisations. The focus group findings point to the significance of data exchange, collaboration with suppliers and partners, and the need for a better understanding of the dependencies between the individual links in the value chain. This need appeared particularly clearly in the material relating to the Netherlands and Norway. [FG-NL][FG-NO]

In practice, this means incorporating into the programme learning formats that allow participants to analyse the process not only from the perspective of their own organisation or position, but also from the perspective of other value chain participants. These may include joint supplier–customer workshops, exercises on data flow and verification, simulations of collaboration between companies, mapping of the whole value chain, and tasks requiring the agreement of data responsibility between different functions.

This approach should complement the ROLE and SECTOR pathways. The participant develops competences appropriate to their role, but at the same time learns to understand what information they receive from other links in the chain, what data they themselves transmit, and what consequences the quality and completeness of the information transmitted has for subsequent participants. This makes it possible to treat DPP as a solution requiring collaboration across the whole value chain, rather than solely as a task for a single company.

6.12. Recommendation 12

Ensuring continuous regulatory updating

The training programme should take into account the fact that DPP-related requirements will continue to develop as further regulations, sectoral requirements, and solutions relating to the functioning of the DPP system are adopted. For this reason, the programme should be designed as a solution that can be updated, rather than as a closed set of content prepared once. [P1]

Regulatory and sectoral content, terminology, data requirements, technical solutions, and examples of practical DPP application should be updated in particular. At the same time, the stable elements of competence, such as data management, traceability, interoperability, responsibility for data, and implementation management, should remain the permanent core of the programme. This makes it possible to update the elements that are subject to change, without having to rebuild the entire training architecture each time.

An important tool for such updating should be micro-learning, that is, short educational units intended to supplement or refresh specific areas of knowledge. These can be used, among other things, to present regulatory changes, new sectoral requirements, updated terminology, new practical examples, or changes in the way data is collected and exchanged. Supplementing the programme with short updating units makes it possible to keep participants' knowledge current without having to rebuild entire training pathways. [FG-ES][P1]

The updating mechanism should be linked to the Knowledge Hub, so that new materials, examples, and regulatory changes can be gathered, verified, and subsequently used both in training materials

and in micro-learning units. In this way, regulatory updating becomes a permanent element of how the programme functions, rather than a one-off project activity.

7. Conclusions

The collective needs assessment carried out under WP2 shows that SMEs in the partner countries are at different levels of preparation for implementing the Digital Product Passport (DPP), but the basic competence needs are largely shared. Differences between countries and sectors mainly concern the degree of advancement of existing solutions, experience in working with data, and how DPP requirements are perceived. At the same time, the survey results, the desk research, and the focus groups point to recurring needs relating to understanding DPP and ESPR requirements, product data management, traceability, interoperability, environmental data, supply chain collaboration, and organisational preparation for implementation. [P1][S1][P2]

The most important gap therefore does not concern only a lack of knowledge about DPP itself. It concerns the ability to translate regulatory and technical requirements into concrete action within the company. The results point to the need to develop competences enabling participants to determine what data is needed, where it is located, who is responsible for its quality and currency, how it should flow between systems and organisations, and how it can be used to meet regulatory and business requirements. The ability to collaborate between organisational functions and between companies participating in the value chain is also particularly important. [S1][FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

The analysis also confirms that training needs cannot be met by a single universal programme. The shared level of basic DPP competences should be supplemented with pathways corresponding to different professional roles and with sectoral content relating to the real products, processes, data, and requirements of individual industries. The identified needs justify the adoption of the CORE-ROLE-SECTOR architecture: a shared European core, pathways developing competences appropriate to professional responsibility, and modules relating these competences to sectoral specificity.

The study results further point to the need to differentiate participants' entry level. The programme should make it possible to start learning at a level corresponding to the participant's current knowledge and experience, and then lead from a basic understanding of DPP, through the practical application of requirements, to the design and refinement of DPP-related processes. The entry-level diagnosis should serve primarily to properly match the learning pathway, not to formally rank companies.

An important conclusion regarding the way of learning is the need to move away from a training model based mainly on information transfer. Participants need to work on real or realistic company problems, business tools, data, processes, and sector cases. The programme should therefore combine shared regulatory knowledge with practical exercises, the involvement of practitioners, application tasks, and the possibility of preparing pilot solutions. This approach makes it possible to directly link learning outcomes with the organisation's real needs. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

Learning across the whole value chain should also be an important element of the designed solution. DPP requires the flow of information between companies, suppliers, and other ecosystem participants, so competences cannot be developed solely from the perspective of a single organisation. Competences relating to obtaining and verifying data from suppliers, responsibility for data, interoperability, and collaboration between functions and organisations become particularly important. [FG-NL][FG-NO]

Taken as a whole, these findings lead to the conclusion that the training programme should be designed as a practical, modular, and updatable solution. The Knowledge Hub, business tools, micro-learning, and regulatory content updating mechanisms should make it possible to respond to changing requirements and the development of sectoral solutions without having to rebuild the entire programme architecture each time.

Consequently, the WP2 results justify creating a programme that is not limited to conveying knowledge about DPP, but leads the participant from understanding the requirements, through identifying their significance for their own role and sector, to applying the knowledge in company processes. A model constructed in this way corresponds both to the shared European competence needs and to the differences between countries, sectors, and professional roles identified in the study.

7.1. Seven Key Conclusions

1. Conclusion 1

The level of DPP preparation differs between countries and sectors, so the programme should allow for differentiating the entry level

Analysis of the material from the five partner countries shows a clear variation in the level of preparation for DPP implementation. Among the available numerical scores, the highest value was recorded in the Netherlands, at 3.6 out of 5, followed by Spain at 2.7 out of 5, Poland at 2.4 out of 5, and Bulgaria at 2.1 out of 5. In the case of Norway, the focus group material is qualitative in nature and does not contain a comparable aggregate score on the 1 to 5 scale, so no numerical value should be assigned to it.

These differences are significant from the point of view of programme design. They do not justify creating five separate national programmes, but point to the need to differentiate the entry level, examples, cases, and scope of exercises. In the Netherlands, where the focus group indicated a transition towards implementation, greater emphasis can be placed on data integration, interoperability, and the practical application of DPP. In Poland, Spain, and Bulgaria, greater importance attaches to regulatory fundamentals, organising data, preparing the organisation, and building implementation capability. Norway, in turn, brings a particular perspective from the plastics and composites sector, including the significance of environmental data quality, verifying data from earlier links in the chain, and protecting sensitive information.

Conclusion for the programme: a shared European CORE should be maintained, but it should be possible to diagnose the entry level and select the appropriate ROLE and SECTOR modules. Country-specific elements should be limited to content where regulatory or contextual differences genuinely require it. [FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

2. Conclusion 2

DPP awareness is growing, but the programme should focus on translating the regulation into sector and company practice

The quantitative study shows that the greatest difficulties do not concern recognising the concept of DPP itself, but the practical understanding of the requirements and their consequences for a specific company and sector. 73.98% of respondents indicated an absent or basic level of knowledge of ESPR,

67.13% a similarly limited understanding of the role of DPP in the circular economy and product life cycle, and as many as 78.09% an absent or basic ability to identify the DPP implementation deadlines relevant to their sector.

The qualitative material shows differences in this respect. In Spain, limited DPP/ESPR awareness coexists with relatively strong knowledge of traceability and quality systems in the food sector. In the Netherlands, awareness is higher, but differences in understanding the detailed DPP requirements still occur. In Norway, uncertainty was noted regarding the scope of DPP requirements and future data obligations.

Conclusion for the programme: the CORE module should provide the shared DPP and ESPR fundamentals, but further learning should move from regulation to interpreting the requirements for the participant's specific product, sector, process, and position.

3. Conclusion 3

Existing traceability is a starting point, but the programme must extend it to cover product data, the life cycle, and inter-organisational collaboration

The study shows that existing traceability solutions can form an important basis for DPP preparation, but do not automatically ensure readiness for its implementation. This is particularly visible in the food sector in Spain, where existing traceability and quality systems do not cover all the environmental, sustainability, and life cycle information required under the broader DPP approach. A similar significance of traceability as a starting point was noted in agriculture in the Netherlands. [FG-ES][FG-NL]

Conclusion for the programme: participants should not only learn the principles of traceability, but also learn to map data, determine responsibility for its quality and currency, and design information flow between companies. For agriculture and food, greater emphasis should be placed on existing traceability systems and their extension to cover DPP data, while for automotive and plastics/composites, on complex value chains, life cycle data, and verifying information from earlier links. [FG-PL][FG-ES][FG-NL][FG-NO]

4. Conclusion 4

DPP implementation is an organisational and cross-functional challenge, so the programme cannot be directed solely at IT departments

The focus group material shows that DPP readiness depends on how the organisation is managed, how responsibility is divided, data quality, and collaboration between organisational functions. In Poland, the need to organise responsibility for data and create an implementation team was noted. In the Netherlands, it was emphasised that developing DPP implementation capability is a challenge for the whole sector. In Norway, higher organisational readiness was linked to broader digital transformation, management support, and cross-functional collaboration. [FG-PL][FG-NL][FG-NO]

Conclusion for the programme: the programme should cover not only digital and technical competences, but also implementation management, responsibility for data, cross-functional collaboration, purchasing, operations, quality, sustainability, and sales and marketing. DPP should be presented as an organisational task requiring collaboration between many roles, rather than as a technological project carried out by IT.

5. Conclusion 5

A shared European core is needed, but its application should be differentiated by sector

Needs relating to DPP/ESPR regulation, product data, traceability, interoperability, sustainability, the supply chain, and implementation management recur across all five countries. At the same time, the focus groups point to clearly different sectoral problems.

In automotive, complex, multi-tier value chains, life cycle data, and system integration are important. In the food and agri-food sector, supplier data, traceability, environmental information, and customer communication are more significant. In textiles, material composition, chemicals, circularity, and supplier data are particularly important. In agriculture, using existing traceability and certification systems is significant. In the plastics and composites sector, data on materials, verifying data from earlier links in the chain, and balancing transparency with the protection of commercial information become particularly important.

Conclusion for the programme: CORE should be shared by all participants, while the SECTOR modules should use the problems, data, processes, and examples appropriate to a given sector. This differentiation is more justified than creating separate programmes for each country.

6. Conclusion 6

The programme should lead the participant from knowledge to application, taking into account different levels of preparation

The variation in the level of preparation between countries and organisations means that participants should not begin learning on the assumption of an identical level of knowledge. At the same time, the focus group results point to a shared need for practical learning: work on cases, real or realistic data and processes, implementation tools, mentoring, and work-based learning. The project analysis also points to the need to separate shared competences, role-related competences, and sector competences.

Conclusion for the programme: before training begins, it should be possible to diagnose the entry level and select the appropriate pathway. The programme should lead from basic DPP awareness, through the development of role-appropriate competences, to a practical implementation task. In less prepared environments, greater emphasis should be placed on fundamentals, data, and implementation organisation, while in more mature environments, on interoperability, system integration, value chain information management, and the use of DPP as a business tool.

7. Conclusion 7

The most appropriate programme architecture is CORE + ROLE + SECTOR, supported by work-based learning and knowledge updating

Combining the quantitative results, the focus groups, and the national analysis shows that there is no justification for a single, identical training programme for all participants. At the same time, the similarity of basic competence needs justifies creating a shared European core. Differences between professional roles and sectors, on the other hand, point to the need for further differentiation of the programme.

Conclusion for the programme: the recommended architecture should be based on three layers: CORE – shared DPP and ESPR competences; ROLE – competences appropriate to professional responsibility; SECTOR – application of knowledge within a specific sector. The whole should be supplemented with work-based tasks, mentoring, micro-learning, and the Knowledge Hub. This solution makes it possible to maintain a shared European foundation for the programme while responding to the differences between automotive, food, textiles, agriculture, and plastics and composites. The material also shows that DPP should be presented not only as a compliance requirement, but as an implementation and business capability – particularly in more mature environments such as the Netherlands, and in the Norwegian perspective of using reliable environmental and value chain data as a source of market value.

7.2. Significance of the findings for WP2

The results of the collective needs assessment form the basis for designing the WP2 training programme in a way that corresponds both to the shared competence needs identified in all partner countries and to the differences between professional roles, sectors, and participants' level of preparation. This means combining the shared European DPP competence core with content adapted to specific roles and sectors.

The programme should lead the participant from understanding the requirements of the Digital Product Passport (DPP) and the Ecodesign for Sustainable Products Regulation (ESPR), through identifying the significance of these requirements for their own role and organisational processes, to the practical application of the knowledge. Competences relating to product data and its quality, traceability, interoperability, environmental data, collaboration with suppliers and partners, and organising the implementation process are of particular importance.

The identified differences between countries and sectors do not point to the need to create completely separate training programmes. They do, however, justify the use of a flexible CORE–ROLE–SECTOR architecture, in which the shared core provides a uniform minimum level of DPP competence, the ROLE pathways relate to professional responsibilities, and the SECTOR modules make it possible to embed knowledge in the specific character of individual industries. Differences in participants' level of preparation should be additionally addressed through an entry-level diagnosis and appropriate differentiation of learning pathways.

The WP2 results also show that the programme should be practical in nature and capable of further development. In addition to substantive content, it should use sector cases, exercises on data and processes, tools supporting the organisation's preparation for DPP, application tasks, and the possibility of piloting the competences acquired. The Knowledge Hub and micro-learning should, in turn, provide access to updated content, tools, and examples after the basic training has ended.

Seen in this way, the WP2 results are not merely a diagnosis of existing competence gaps. They form a direct basis for determining the programme's architecture, its target groups, the scope of shared and specialist competences, learning formats, and the way the programme is adapted to national and sectoral context.



Annex 1. Country comparison matrix

Dimension	Poland – Automotive	Spain – Food Sector	Bulgaria – Textiles	Netherlands – Agriculture	Norway – Plastics
Regulatory Awareness	Basic/uneven; higher within international value chains	Limited DPP/ESPR awareness despite the food sector's strong regulatory experience	Partial awareness; not yet translated into organised preparations	Moderate awareness; knowledge of specific DPP requirements varies	Growing awareness; uncertainty regarding DPP requirements
Digital/Data Readiness	Existing systems, but scattered data and integration challenges	Strong operational traceability; weaker integration of sustainability/life cycle data	Scattered systems and manual data flows	Relatively mature digital environment; interoperability remains a gap	Varied; strong need for data mapping and interoperability
Supply Chain	Complex multi-tier chains; high data burden	Inconsistent supplier data and ESG information	Limited visibility beyond direct partners	Strong collaboration, but data exchange requires standardisation	Particularly difficult verification of data from earlier links in the chain
Sustainability/Circularity	Important, but requires organised data	Significant practical gap	The weakest maturity area in the focus group (1.7/5)	Growing significance; integration is still developing	A potential source of competitive value
Specific Problem	Scale/complexity and the battery and life cycle context	Traceability ≠ DPP	Data on materials/chemicals/circularity	Using existing systems and ecosystem collaboration	Long product life cycle, intellectual property, and durable identification
Training Implication	Implementation and system/process integration	Regulation + practical extension of traceability	Fundamentals + practical data and supplier management	Interoperability + applied sector cases	Data validation + standards + intellectual property + sectoral implementation

The matrix presents a synthetic comparison of the findings regarding preparation for Digital Product Passport (DPP) implementation in the five partner countries, taking into account the sector analysed in each country: automotive in Poland, the food/agri-food sector in Spain, textiles in Bulgaria, agriculture in the Netherlands, and plastics/composites in Norway. The comparison covers five dimensions relevant to the design of the training programme: regulatory awareness, digital readiness and data quality, supply chain preparation, sustainability/circularity, and problems specific to the given sector.

The purpose of the matrix is not to create a ranking of countries or to directly compare the level of sectoral maturity. The individual values and descriptions come from the national materials prepared under WP2, covering the desk research, the survey results, and the focus group findings. The comparison is intended primarily to show both the areas shared by the partner countries and the differences arising from sectoral specificity, the organisation's level of preparation, and the character of the value chains analysed.

A shared element of all the cases analysed is the need to develop competences relating to understanding DPP requirements, data quality and management, traceability, interoperability, and supply chain collaboration. At the same time, individual sectors require these competences to be embedded differently in practice. In automotive, complex, multi-tier value chains, life cycle data, and system integration are important, among other things; in the food sector, supplier data, sustainability information, and customer communication; in textiles, material composition, chemicals, recycling, and repairability; in agriculture, the use of existing traceability systems and data exchange; while in the plastics and composites sector, data on materials, recycling, earlier links in the chain, and the protection of sensitive information and intellectual property.

The differences presented in the matrix should be treated as grounds for differentiating content and examples within the training programme, not as justification for creating completely separate national programmes. The shared needs point to the validity of a European DPP competence core, while national and sectoral differences justify supplementing it with content related to specific professional roles, sectors, processes, and application examples. This approach corresponds to the CORE-ROLE-SECTOR architecture recommended in the report.



Annex 2. Survey results table

Indicator	Absent/Basic	Good/Expert	Training Demand
Knowledge of ESPR	73.98%	9.59%	DPP/ESPR: 93.15%
Sector-Specific DPP Implementation Deadlines	78.09%	4.11%	Sector-specific DPP: 80.82%
ERP/PIM Competence	64.39%	16.44%	Product data management: 75.34%
API/System Integration	64.39%	15.07%	Interoperability: 68.49%
DPP Platform Selection	71.24%	9.59%	Not asked separately; addressed in the focus groups
CSRD and DPP Data	69.87%	8.22%	Sustainability/circularity/LCA/PCF: 73.97%
PCF Competence	64.39%	19.18%	PCF and emissions data: 68.49%
Digital Supplier Audits	71.24%	10.96%	Traceability/audits: 68.49%
Supplier Sustainability Data	67.13%	13.70%	Supplier collaboration/verification: 69.86%
Cybersecurity	68.50%	15.07%	Cybersecurity: 63.01%

Note: “Absent/basic” covers the aggregated response categories 1 and 2; “Good/expert” covers the aggregated categories 4 and 5. The “training demand” column comes from a separate survey question and should not be interpreted as complementary to the competence assessment result.
[S1]



Annex 3. Role and competences matrix

Competence	Management Staff	ICT/Data	Production/Supply Chain	Sustainability/Compliance	Marketing/Sales
Interpreting DPP/ESPR	High	Medium	Medium	High	Medium
Strategic Planning/Governance and Organisational Management	High	Medium	Medium	Medium	Medium
Product Data Management	High	High	High	High	Medium
Traceability	Medium	High	High	Medium	Medium
Interoperability	Medium	High	High	Medium	Low
Supplier Data Verification	Medium	High	High	High	Low
LCA/PCF/Circularity	High	Medium	Medium	High	Medium
Cybersecurity/Access	Medium	High	Medium	Medium	Low
Change Management	High	Medium	Medium	Medium	Medium
Business Value/DPP Communication	High	Low	Low	Medium	High

The matrix is a synthesis for programme design purposes, based on the role structure used in the project and on the focus group material; it is not a direct survey ranking by professional group.

[P1][P2][FG-PL][FG-ES][FG-BG][FG-NL][FG-NO]

Annex 4. Recommended training programme architecture

Layer	Module Family	Format	Result
CORE – shared core	DPP/ESPR; data; traceability; interoperability; sustainability; governance and organisational management	Micro-learning + workshop	Shared competence baseline
ROLE – role-based pathways	Management staff; ICT/Data; Operations/supply chain; Sustainability/compliance; Sales/marketing	Role-based workshops + cases	Role-specific competences
SECTOR – sector pathways	Automotive; Food; Textiles; Agriculture; Plastics	Sector cases + simulations	Competences applied within the sector
WORK-BASED – work-based learning	Readiness assessment; data mapping; pilot; implementation roadmap	Mentoring consultations + task carried out within the company	Evidence of competence application

The training programme architecture presented follows from the findings of the needs analysis carried out under WP2 and corresponds to the identified variation in participants' level of preparation, their professional roles, and the specific character of the sectors analysed. It is based on a shared CORE, providing all participants with a uniform minimum level of competence relating to the Digital Product Passport (DPP), the requirements of the Ecodesign for Sustainable Products Regulation (ESPR), data, traceability, interoperability, sustainability, and governance and organisational management.

The ROLE layer makes it possible to translate the shared competences into the scope of responsibility of individual professional groups. It covers, among others, management staff, the ICT and data area, operations and the supply chain, sustainability and compliance, and sales and marketing. This means participants receive content relating DPP requirements to the tasks and decisions they actually carry out within the organisation.

The SECTOR layer introduces the industry context identified in the study: automotive, the food/agri-food sector, textiles, agriculture, and plastics and composites. Its task is to show how the shared DPP requirements are applied in relation to specific products, processes, data, and value chains. This makes it possible to take into account the differences revealed in the national analyses and focus groups without creating completely separate programmes for individual countries.

The WORK-BASED layer – work-based learning – combines the acquisition of competences with their application in real or realistic company processes. It covers activities such as readiness assessment, data and process mapping, pilot preparation, and the development of an implementation roadmap. Its result should be concrete material or a solution that the organisation can use, making it possible to move from knowledge to the practical application of competences.

The four layers should be treated as mutually complementary elements of a single model: CORE provides the shared foundation, ROLE determines the application of competences within professional responsibilities, SECTOR embeds them in industry realities, and WORK-BASED makes it possible to apply them in organisational practice. This construction makes it possible to maintain a shared European level of competence while adapting the programme to participants' needs arising from their role, sector, and level of preparation.

Annex 5. Glossary of abbreviations used

List of Abbreviations and Symbols:

For the purpose of ensuring terminological consistency and facilitating interpretation of the report, the most important abbreviations and symbols used in the document are presented below.

Substantive Abbreviations

Abbreviation	Expansion / Meaning
DPP	<i>Digital Product Passport</i>
ESPR	<i>Ecodesign for Sustainable Products Regulation – the regulation establishing a framework for the ecodesign of sustainable products</i>
SME	Small and medium sized enterprise
ERP	<i>Enterprise Resource Planning – enterprise resource planning and management systems</i>
PIM	<i>Product Information Management</i>
API	<i>Application Programming Interface – an interface enabling communication and data exchange between systems</i>
PLM	<i>Product Lifecycle Management</i>
ICT	<i>Information and Communication Technologies</i>
IT	<i>Information Technology</i>
LCA	<i>Life Cycle Assessment</i>
PCF	<i>Product Carbon Footprint</i>
ESG	<i>Environmental, Social and Governance</i>
EPR	<i>Extended Producer Responsibility</i>
CSRD	<i>Corporate Sustainability Reporting Directive</i>

In the report, the abbreviations ERP/PIM are used together to refer to the systems used to manage company data and product information. LCA and PCF refer to life cycle assessment and product carbon footprint respectively. The scope of these competences has been identified as one of the significant areas of training needs.

DIGITRACE training model notation

Notation	Meaning
CORE	The shared European competence core, covering DPP/ESPR fundamentals, data, traceability, interoperability, sustainability, and implementation
ROLE	Competence pathways adapted to specific professional roles within SMEs
SECTOR	Pathways and modules relating DPP competences to the specific character of individual sectors
WORK-BASED	<i>Work-based learning – learning based on work and real organisational actions</i>

The CORE–ROLE–SECTOR model constitutes the training programme architecture recommended in the report: the shared competence core is supplemented by pathways related to professional role and sectoral application.

Annex 6. Sources and documents used in the analysis

Code	Source
P1	P1 – The DIGITRACE project application – source of information on the project's objectives, the scope of WP2, target groups, priority sectors, and the assumptions underlying the training programme.
P2	Focus group assumptions and scenario, 22.05.2026 – harmonised qualitative methodology and analytical areas. Annex 1/ P2 – Focus group assumptions and scenario of 22.05.2026 – harmonised qualitative methodology and analytical areas. Annex 7
S1	DIGITRACE – collective survey report – cross-country competence self-assessment survey, n=73. Annex 2/ S1 – DIGITRACE – collective survey report – cross-country competence self-assessment survey, n=73. Annex 8
DR-PL	Digitrace-WP2-Desk_Research- Poland PL.docx – Poland / desk research for the automotive sector. Annex 9
DR-ES	Digitrace-WP2-Desk_Research- Spain PL.docx – Spain / desk research for the food sector and related sectors. Annex 9
DR-BG	Digitrace-WP2-Desk_Research - Bulgaria PL.docx – Bulgaria / desk research for the textile sector. Annex 11
DR-NL	Digitrace-WP2-Desk_Research - Netherlands PL.docx – Netherlands / desk research for the agricultural sector. Annex 12
DR-NO	Digitrace-WP2-Desk_Research-Norway PL.docx – Norway / desk research for the plastics and composites sector. Annex 13
FG-PL	6. DIGITRACE_national_report_focus_groups Poland WSEI PL.docx – Poland / automotive sector focus group. Annex 14
FG-ES	National_report_focus_groups_SPAIN_PL.docx – Spain / food/agri-food sector focus group. Annex 15
FG-BG	DIGITRACE_national_report_focus_groups_Bulgaria_Textile_PL.docx – Bulgaria / textile sector focus group. Annex 16
FG-NL	Focus group report Netherlands - Agriculture PL.docx – Netherlands / agricultural sector focus group. Annex 17
FG-NO	Focus Group Workshop Report Norway - POLISH.docx – Norway / plastics and composites sector focus group. Annex 18



Empowering SMEs to transform Digital Product Passport compliance into a
competitive advantage

Project number: 101244175

Qualitative research (validation workshops)
– FOCUS GROUP SCENARIO
Beata Janczak, WSEI University

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Document type: Qualitative Inquiry Scenario (FGI)

Intended use: Project partners, moderators, WP2 experts, note takers

Application: Focus group research on the implementation of the Digital Product Passport (DPP)

Document type: Standardized version for use in all partner countries

1. INTRODUCTION

1.1 Project Context

The DIGITRACE project focuses on identifying challenges, competencies and educational needs related to the implementation of the Digital Product Passport (DPP) in line with the assumptions of the ESPR regulation and the digital and environmental transformation of enterprises.

Implementing DPP requires organizations to manage product data, ensure system interoperability, collaborate within the supply chain, be digitally competent, have organizational readiness, and be ESG reporting and traceability oriented.

Focus groups are part of the diagnosis of competency and organizational needs, the results of which will be used to develop the WP2 training program.

2. OBJECTIVES OF THE STUDY

2.1 Main goal

Identification of the level of organizational, technological and competency readiness for the implementation of the Digital Product Passport.

2.2 Specific objectives

The study aims to:

Regulations and awareness:

- assessment of knowledge of DPP and ESPR,
- identification of perceived risks and benefits,
- assessment of the level of organizational awareness.

Technology and data:

- identifying interoperability barriers,
- ERP/PIM/MES systems readiness assessment,
- analysis of data exchange processes,
- assessment of the quality of supplier data.

Competencies:

- identifying competence gaps,
- needs mapping in accordance with DigComp 2.2,
- identifying training needs for various organizational roles.

Education and methodology:

- defining preferred learning methods,
- assessing the importance of micro-credentials,
- identification of expected training results.



3. METHODOLOGICAL ASSUMPTIONS

3.1 Test type

Moderated focus group (FGI).

3.2 Nature of the study

- * qualitative,
- * exploratory,
- * semi-structured.

3.3 Number of participants

Recommended number: 7–10 people

3.4 Participant profile

Recommended group composition:

- representatives of SMEs,
- representatives of large enterprises,
- industry experts,
- management staff,
- IT / digitalization,
- production / logistics,
- ESG / compliance,
- marketing / sales,
- VET/HEI educators,
- business support organizations,
- representatives of administration or regulators.

4. ORGANIZATION OF THE SESSION

4.1 Duration

Total time: 95 minutes

4.2 Organizational roles

a) Moderator – responsible for:

- leading discussions,
- managing group dynamics,
- asking in-depth questions,
- activating participants,
- keeping track of time.

b) Recording person - responsible for:

- taking notes,
- documenting key quotes and observations,
- completing analytical sheets,
- technical support for online meetings,
- photographic documentation (if provided).

4.3 Rules for conducting sessions

The moderator should:

- maintain neutrality,
- avoid suggesting answers,
- take care of the balance of your speech,
- separate opinions from actual practices,
- encourage the provision of examples.

It is important not to judge the participants' statements, to build an atmosphere of safety, to focus on practical experiences, and to avoid the domination of individual people.

5. SESSION SCHEDULE

Time	Module	Range
10 min	Introduction and integration	Project objectives, confidentiality rules, introduction of participants
20 min	BLOCK I	DPP regulations and awareness
25 min	BLOCK II	Technology, data and interoperability
25 min	BLOCK III	Competencies and training needs
10 min	BLOCK IV	Training methodology and competency validation
5 min	Summary	The most important conclusions and conclusion



6. MODERATOR SCENARIO

INTRODUCTION (10 MIN)

The moderator's goal is primarily to create an atmosphere of openness, present the purpose of the study, and explain the rules of the session.

Proposed opening:

"Thank you for participating in the meeting. Today's focus group session is exploratory in nature and addresses the challenges associated with implementing the Digital Product Passport. We are interested in both practical experiences and your opinions regarding organizational, technological, and competency readiness."

Session rules:

- all statements are valid,
- there are no "good" or "bad" answers,
- we care about practical experience,
- each participant has the opportunity to speak freely.

Opening question:

"What does the Digital Product Passport bring to mind for you and what are the biggest challenges you see in your organization today in the context of DPP?"

7. BLOCK I – REGULATIONS AND AWARENESS OF DPP (20 MIN)

Objective: To assess the level of regulatory and organizational awareness.

Main questions:

How do you understand the idea of the Digital Product Passport?

- Is the topic of DPP present in the organization's strategy?*
- Do you perceive DPP more as:*
 - *regulatory obligation,*
 - *organizational risk,*
 - *Cost,*
 - *or a potential competitive advantage?*

What are the biggest concerns about implementing DPP?

Deepening questions:

- Has the organization analyzed the impact of ESPR on business processes?*
- Which departments will be most involved?*
- Are there concerns about disclosing product data?*
- How does an organization define data responsibility?*

8. BLOCK II – TECHNOLOGY AND DATA MANAGEMENT (25 MIN)

Objective - Identify technological barriers and interoperability issues.

AREA A – SYSTEMS AND INFRASTRUCTURE

Opening question:

“ To what extent are the organization’s current systems prepared to handle the data required by DPP?”

Deepening questions:

- a) *Does the organization use ERP, PIM, MES or other product data management systems?*
- b) *Does the current infrastructure enable the integration of environmental data?*
- c) *Is the problem with:*
 - *data structures,*
 - *data quality,*
 - *interoperability,*
 - *or integration between systems*

AREA B – INTEROPERABILITY AND SUPPLY CHAIN

Questions:

What does data exchange with suppliers look like currently?

- a) *Are suppliers ready to provide the data required by the DPP?*
- b) *How does the organization verify the credibility of data?*
- c) *Are there any restrictions related to trade secrets?*

AREA C – DATA MEDIA

Questions:

- a) *What product identification technologies are used today?*
- b) *How does the organization assess the durability of QR codes?*
- c) *Were alternatives analyzed:*
 - *RFID,*
 - *NFC,*
 - *digital watermarking,*
 - *laser marking?*

9. BLOCK III – COMPETENCES AND TRAINING NEEDS (25 MIN)

Objective - Identifying competency gaps and educational needs.

AREA A – MANAGEMENT STAFF

Questions:

- a) *What metrics would prove the business value of DPP?*
- b) *How does the organization assess the potential return on investment?*
- c) *What strategic decisions will be necessary?*

AREA B – PRODUCTION AND LOGISTICS

Questions:

- a) *Where is the greatest risk of errors?*
- b) *What competencies do employees lack?*
- c) *Would implementation require new procedures or technical training?*

AREA C – ESG / MARKETING / SALES

Questions:



- a) *How does the organization plan to communicate data from DPP?*
- b) *What will ESG data verification look like?*
- c) *Do employees understand the concepts of:*
 - *carbon footprint,*
 - *LCA,*
 - *traceability?*

AREA D – DATA LITERACY

Questions:

- a) *Can employees assess data quality?*
- b) *Are there data validation procedures?*
- c) *How does the organization manage data responsibility?*

10. BLOCK IV – TRAINING METHODOLOGY AND VALIDATION (10 MIN)

Objective - Collect recommendations for the WP2 program.

Questions:

- a) *What forms of training are the most effective?*
- b) *Do employees prefer:*
 - *short modules,*
 - *on-site training,*
 - *blended learning,*
 - *learning from real systems?*
- c) *Is there greater value in:*
 - *university certificate,*
 - *micro-credentials,*
 - *practical implementation simulation*
- d) *How important are practical exercises on data and processes?*
 - * *important*
 - * *Never mind*

11. SECTORAL QUESTIONS ("TRIGGERS")

AUTOMOTIVE

1. "How does an organization plan to manage responsibility for keeping product data current throughout the lifecycle of a component or vehicle, especially once the product enters the use and service phase?"
2. "Which areas of interoperability between OEMs, Tier 1–3 suppliers, and service providers do you perceive as the greatest risk to successful DPP implementation?"
3. "Does the current data architecture enable the linking of environmental, material, and service information at the individual component level?"
4. "How does the organization plan to balance the transparency requirements of the DPP with the protection of strategic data and intellectual property?"
5. "Which circularity and end-of-life data will be the most difficult to monitor and update?"

TEXTILES

1. “How does the organization plan to ensure the reliability of data regarding fiber origin, chemical composition, and production processes in the multi-tiered supply chain?”
2. “Which elements of the DPP do you perceive as most problematic in the context of durability, reparability and recyclability of textile products?”
3. “How does the organization intend to update product data in the event of changes in suppliers, material composition, or production processes?”
4. “Do current systems enable the integration of ESG and traceability data between the brand, manufacturer and subcontractors?”
5. “What risks do you see in terms of the quality and reliability of data provided by non-EU suppliers?”

PLASTICS

1. “How does the organization plan to document and verify the share of recycled materials in the product structure?”
2. “Which data on chemical composition, recyclability, or circularity is most difficult to obtain today?”
3. “Do current systems allow for material identification at a level that allows for its further processing and recovery?”
4. “How does the organization plan to manage material data updates when recipes or raw material suppliers change?”
5. “What barriers do you see in standardizing material data between producers, recyclers and suppliers?”

AGRICULTURE

1. “How does the organization plan to ensure the consistency and reliability of data from many dispersed agricultural producers?”
2. “Which environmental or production data will be most challenging to monitor and report under DPP?”
3. “How does the organization assess the readiness of small farms to digitally report data required by the DPP?”
4. “Do current traceability processes enable identification of product origin at every stage of the supply chain?”
5. “How does the organization plan to manage the risk of data inconsistency across multiple providers and intermediaries?”

FOOD / AGRO-FOOD

1. “How does the organization plan to integrate data on food safety, raw material origin, and product environmental footprint?”
2. “Do current systems enable full traceability of product batches in the event of changes in suppliers or production processes?”
3. “Which elements of the DPP do you perceive as the greatest challenge for food producers and processors?”
4. “How does the organization plan to ensure the timeliness and reliability of data transferred between producers, processors and distributors?”
5. “What competencies will be key for employees responsible for product data management and traceability?”

12. SESSION SUMMARY (5 MIN)

Final question: *“What one area should be prioritized in preparing an organization to implement DPP?”*

Moderator's closing - Thank you for your participation and information about the next stages of the project and validation workshops.

13. REPORTING PROCEDURE

After the session, the moderator and note taker prepare a report including:

In section 1 – Participant Profile – specify:

- roles,
- sectors,
- types of organizations.

In section 2 – Qualitative analysis – definition:

- level of consciousness,
- organizational readiness,
- technological barriers,
- interoperability,
- competence gaps.

In section 3 – Sector specificity

Minimum - 3 pages of quality description.

In section 4 – Training priorities

Minimum - 10 recommended training topics.

In section 5 – Good practices and quick wins

The report should indicate:

- positive practices,
- solutions that can be quickly implemented,
- examples of organizational readiness.



Co-funded by
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Empowering SMEs to transform Digital Product Passport compliance into a
competitive advantage

Project number: 101244175

**Collective Report – online questionnaires
Needs assessment scanning – Poland, Spain, Netherlands,
Bulgaria and Norway**

Magda Janiak, WSEI University

1 BASIC INFORMATION

Area	Information
Country	Spain, Poland, Netherlands, Bulgaria, Norway
Project partner	WSEI University + all partners
Data collection period	March-June 2026
Form of the data collection	Online questionnaire
Link	https://ec.europa.eu/eusurvey/runner/4943faaa-e5ac-5ec7-64d0-3047bf3b92da
Person in charge	Beata Janczak/Magda Janiak
Number of participants	73
Represented sector	All sectors presented in the project

2 EXECUTIVE SUMMARY

2.1 Summary Description

This collective report presents the results of the DIGITRACE online self-assessment questionnaire on readiness for Digital Product Passport (DPP) implementation, completed by 73 small and medium sized enterprises across the five partner countries: Poland (39.7%), Spain (19.2%), Bulgaria (17.8%), Norway (13.7%), and the Netherlands (9.6%). Data collection took place between March and June 2026 using the EU Survey platform, the European Commission's official online survey tool, which also served to promote awareness among participating companies of EU-level tools and resources relevant to DPP compliance. Reaching the target groups required extra dissemination effort by all project partners, in order to meet the minimum participation requirement set for the survey, namely at least three respondents from each of the four target role categories in each partner country, for a total of at least 60 respondents overall.

Respondents represented all sectors covered by the project, most notably automotive (34.3%), food (17.8%), textiles and apparel (16.4%), agriculture (11.0%), construction products (6.9%), plastics and packaging (4.1%), and, in smaller numbers, electrical and electronic products, machinery and equipment, and furniture and interiors (1.4% each). Respondents also covered all four target role categories defined for the project, together with additional

supporting roles: general management and ownership (31.5%), sustainability, compliance, and quality (16.4%), sales, marketing, and customer relations (15.1%), production, operations, and logistics (9.6%), purchasing, procurement, and supply chain (8.2%), product development, engineering, and design (8.2%), and IT, digital systems, and data management (6.9%). Companies of all sizes were represented in a fairly even spread, from micro-enterprises to large organisations.

The findings reveal a consistent pattern across countries, sectors, and roles: while over half of the respondents already use some form of traceability tool, most rely on basic solutions such as barcodes, spreadsheets, or batch tracking rather than DPP-ready standards such as GS1 identifiers or system integration via APIs. Self-assessed competency levels are low across nearly all measured areas, most critically in the ability to identify sector-specific DPP implementation deadlines, where 78.1% of respondents reported no or only basic competency. Regulatory understanding of the DPP and its underlying legislation (ESPR) was rated as a training priority by 93.2% of respondents, the highest of any topic surveyed, followed by the assignment of responsibilities, costs, and funding for DPP compliance (83.6%) and sector-specific DPP requirements (80.8%). These results provide the empirical basis for the role-based, sector-differentiated training architecture developed under Work Package 2.

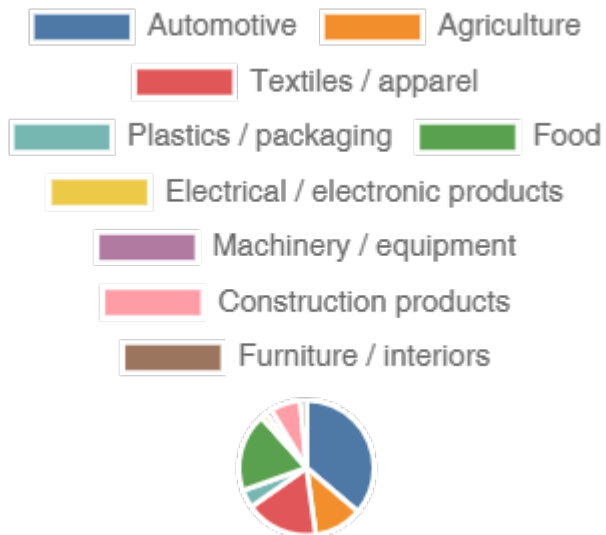
Statistics:

Competency Self-Assessment Form: Readiness for Implementation Digital Product Passport (DPP)

Project: Digital Traceability and Compliance for Sustainable SMEs, no: 101244175, Alliances for Innovation

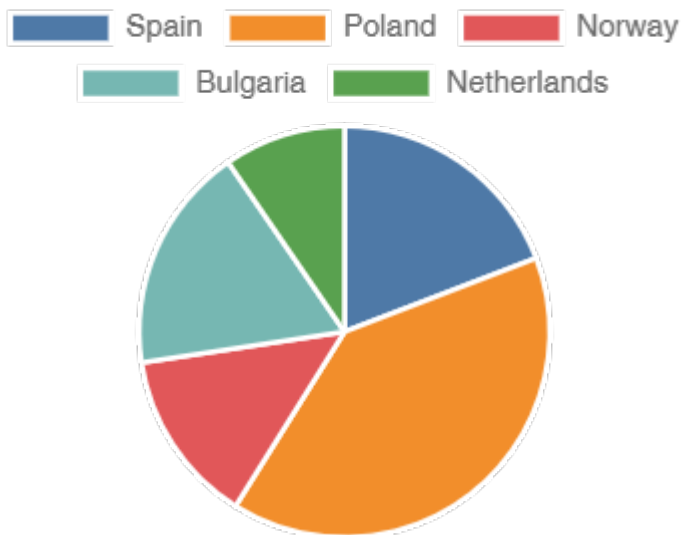
1. Main sector of activity

		Answers	Ratio
Automotive		25	34.25 %
Agriculture		8	10.96 %
Textiles / apparel		12	16.44 %
Plastics / packaging		3	4.11 %
Food		13	17.81 %
Electrical / electronic products		1	1.37 %
Machinery / equipment		1	1.37 %
Construction products		5	6.85 %
Furniture / interiors		1	1.37 %
No Answer		4	5.48 %



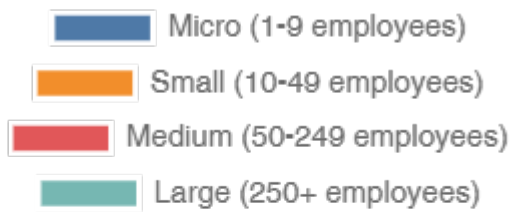
2. Country of main operation

		Answers	Ratio
Spain		14	19.18 %
Poland		29	39.73 %
Norway		10	13.7 %
Bulgaria		13	17.81 %
Netherlands		7	9.59 %
No Answer		0	0 %



3. Company size

		Answers	Ratio
Micro (1-9 employees)		11	15.07 %
Small (10-49 employees)		20	27.4 %
Medium (50-249 employees)		22	30.14 %
Large (250+ employees)		20	27.4 %
No Answer		0	0 %



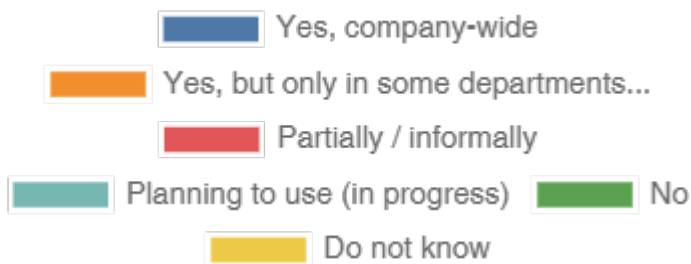
4. Your role in the company

		Answers	Ratio
General management / Owner		23	31.51 %
Purchasing / procurement / supply chain		6	8.22 %
IT / digital systems / data management		5	6.85 %
Production / operations / logistics		7	9.59 %
Product development / engineering / design		6	8.22 %
Sales / marketing / customer relations		11	15.07 %
Sustainability / compliance / quality		12	16.44 %
No Answer		3	4.11 %



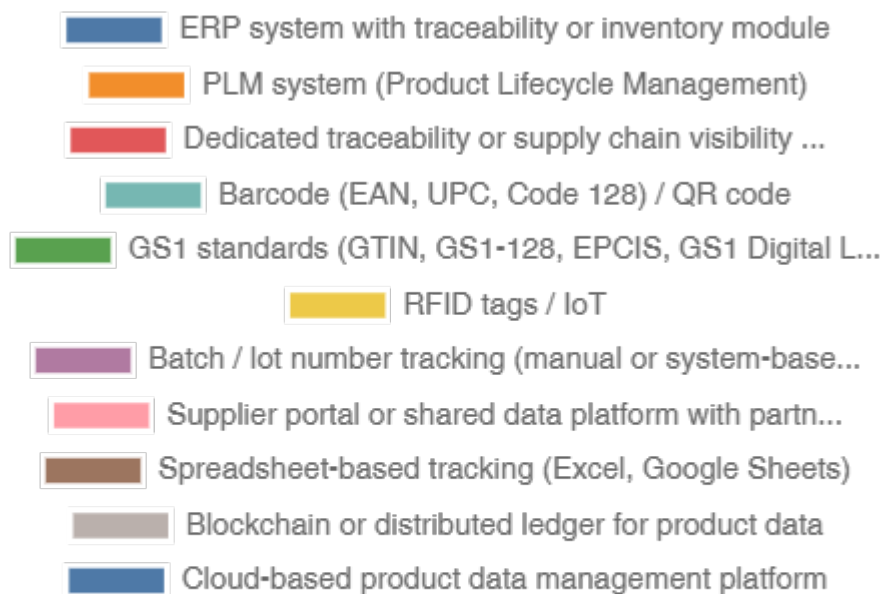
5. Does your company currently use any system or process for traceability?

		Answers	Ratio
Yes, company-wide		16	21.92 %
Yes, but only in some departments/products		10	13.7 %
Partially / informally		15	20.55 %
Planning to use (in progress)		10	13.7 %
No		10	13.7 %
Do not know		12	16.44 %
No Answer		0	0 %



5.1. If yes or partially, which traceability tools or methods are used? Select all that apply.

		Answers	Ratio
ERP system with traceability or inventory module		23	31.51 %
PLM system (Product Lifecycle Management)		5	6.85 %
Dedicated traceability or supply chain visibility platform		3	4.11 %
Barcode (EAN, UPC, Code 128) / QR code		23	31.51 %
GS1 standards (GTIN, GS1-128, EPCIS, GS1 Digital Link)		5	6.85 %
RFID tags / IoT		5	6.85 %
Batch / lot number tracking (manual or system-based)		29	39.73 %
Supplier portal or shared data platform with partners		11	15.07 %
Spreadsheet-based tracking (Excel, Google Sheets)		16	21.92 %
Blockchain or distributed ledger for product data		2	2.74 %
Cloud-based product data management platform		14	19.18 %
No Answer		24	32.88 %



Matrix : Knowledge of the requirements of the Ecodesign for Sustainable Products Regulation (ESPR – EU 2024/1781) and its implications for your business

		Answers	Ratio
1 None		23	31.51 %
2 Basic		31	42.47 %
3 Knowledgeable but need support		12	16.44 %
4 Good		5	6.85 %
5 Expert		2	2.74 %
No Answer		0	0 %

Matrix : Understanding the role of the Digital Product Passport (DPP) in the Circular Economy (CE) model and product lifecycle management

		Answers	Ratio
1 None		24	32.88 %
2 Basic		25	34.25 %
3 Knowledgeable but need support		12	16.44 %
4 Good		9	12.33 %
5 Expert		3	4.11 %
No Answer		0	0 %

Matrix : Ability to identify the cut-off dates and implementation deadlines for DPP entry into force for your specific industry sector

		Answers	Ratio
1 None		32	43.84 %
2 Basic		25	34.25 %
3 Knowledgeable but need support		13	17.81 %
4 Good		3	4.11 %
5 Expert		0	0 %
No Answer		0	0 %

Matrix : Knowledge of the Corporate Sustainability Reporting Directive (CSRD) and how DPP data feeds into sustainability disclosure obligations

		Answers	Ratio
1 None		29	39.73 %
2 Basic		22	30.14 %
3 Knowledgeable but need support		16	21.92 %
4 Good		6	8.22 %
5 Expert		0	0 %
No Answer		0	0 %

Matrix : Ability to assess the financial impact and business opportunities arising from DPP compliance for your organisation

		Answers	Ratio
1 None		27	36.99 %
2 Basic		27	36.99 %
3 Knowledgeable but need support		11	15.07 %
4 Good		5	6.85 %
5 Expert		3	4.11 %
No Answer		0	0 %



Matrix : Knowledge of product identification standards – GTIN (EAN/UPC), QR codes, GS1 Digital Link, RFID tags – and their role in DPP data carriers

		Answers	Ratio
1 None		21	28.77 %
2 Basic		24	32.88 %
3 Knowledgeable but need support		13	17.81 %
4 Good		11	15.07 %
5 Expert		3	4.11 %
No Answer		1	1.37 %

Matrix : Ability to use ERP or PIM (Product Information Management) systems to collect, structure, and manage product data for DPP compliance

		Answers	Ratio
1 None		28	38.36 %
2 Basic		19	26.03 %
3 Knowledgeable but need support		13	17.81 %
4 Good		11	15.07 %
5 Expert		1	1.37 %
No Answer		1	1.37 %

Matrix : Knowledge of data protection rules, access rights management, and GDPR compliance in the context of DPP (who sees what data and under what conditions)

		Answers	Ratio
1 None		21	28.77 %
2 Basic		21	28.77 %
3 Knowledgeable but need support		15	20.55 %
4 Good		13	17.81 %
5 Expert		2	2.74 %
No Answer		1	1.37 %

Matrix : Ability to connect DPP-related tools or data flows with existing company systems (e.g. ERP, CRM, IoT, supply chain systems) Skills in system integration in management systems via APIs

		Answers	Ratio
1 None		29	39.73 %
2 Basic		18	24.66 %
3 Knowledgeable but need support		13	17.81 %
4 Good		11	15.07 %
5 Expert		0	0 %
No Answer		2	2.74 %

Matrix : Ability to evaluate and select a DPP digital platform or Service Provider appropriate for the size and sector of your company

		Answers	Ratio
1 None		31	42.47 %
2 Basic		21	28.77 %
3 Knowledgeable but need support		13	17.81 %
4 Good		6	8.22 %
5 Expert		1	1.37 %
No Answer		1	1.37 %

Matrix : Knowledge of cybersecurity best practices for protecting sensitive product data within DPP systems

		Answers	Ratio
1 None		24	32.88 %
2 Basic		26	35.62 %
3 Knowledgeable but need support		11	15.07 %
4 Good		9	12.33 %
5 Expert		2	2.74 %
No Answer		1	1.37 %

Matrix : Ability to implement and manage digital data carriers (such as QR codes, GS1 Digital Link, RFID) on physical products and packaging .

		Answers	Ratio
1 None		22	30.14 %
2 Basic		23	31.51 %
3 Knowledgeable but need support		17	23.29 %
4 Good		5	6.85 %
5 Expert		5	6.85 %
No Answer		1	1.37 %



Matrix : Ability to verify environmental certificates, declarations of conformity, and sustainability claims received from suppliers

		Answers	Ratio
1 None		19	26.03 %
2 Basic		19	26.03 %
3 Knowledgeable but need support		17	23.29 %
4 Good		11	15.07 %
5 Expert		6	8.22 %
No Answer		1	1.37 %

Matrix : Understanding of the concept of Product Carbon Footprint (PCF), Scope 1/2/3 emissions, and methods for collecting and calculating PCF data

		Answers	Ratio
1 None		23	31.51 %
2 Basic		24	32.88 %
3 Knowledgeable but need support		12	16.44 %
4 Good		12	16.44 %
5 Expert		2	2.74 %
No Answer		0	0 %

Matrix : Readiness and ability to conduct digital audits with trading partners – verifying supplier data quality, traceability, and DPP data submissions

		Answers	Ratio
1 None		26	35.62 %
2 Basic		26	35.62 %
3 Knowledgeable but need support		12	16.44 %
4 Good		7	9.59 %
5 Expert		1	1.37 %
No Answer		1	1.37 %

Matrix : Ability to track, document, and report recycled material content, raw material origin, and end-of-life product data

		Answers	Ratio
1 None		18	24.66 %
2 Basic		31	42.47 %
3 Knowledgeable but need support		11	15.07 %
4 Good		10	13.7 %
5 Expert		3	4.11 %
No Answer		0	0 %

Matrix : Skills in coordinating and collecting DPP-relevant sustainability data from upstream and downstream supply chain partners

		Answers	Ratio
1 None		23	31.51 %
2 Basic		26	35.62 %
3 Knowledgeable but need support		14	19.18 %
4 Good		7	9.59 %
5 Expert		3	4.11 %
No Answer		0	0 %

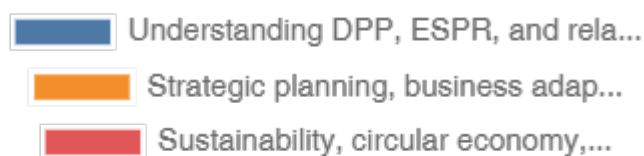
Matrix : Knowledge of Extended Producer Responsibility (EPR) obligations and end-of-life reporting requirements relevant to your sector

		Answers	Ratio
1 None		18	24.66 %
2 Basic		32	43.84 %
3 Knowledgeable but need support		12	16.44 %
4 Good		9	12.33 %
5 Expert		2	2.74 %
No Answer		0	0 %



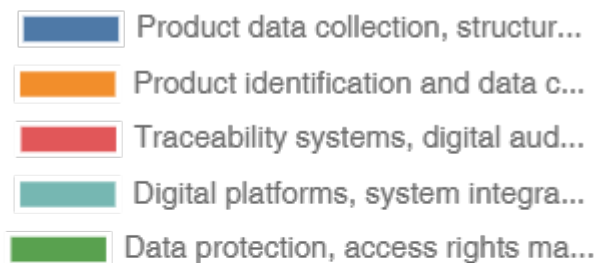
Regulatory and Strategic

		Answers	Ratio
Understanding DPP, ESPR, and related EU regulatory requirements and deadlines		68	93.15 %
Strategic planning, business adaptation, and investment decisions for DPP		56	76.71 %
Sustainability, circular economy, and environmental product information (LCA, PCF)		54	73.97 %
No Answer		0	0 %



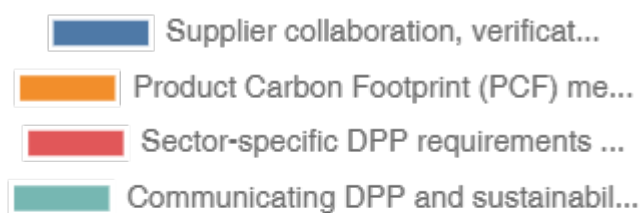
Technical and Digital

		Answers	Ratio
Product data collection, structuring, and management (ERP, PIM systems)		55	75.34 %
Product identification and data carriers (GTIN, GS1, QR codes, RFID)		48	65.75 %
Traceability systems, digital audits, and supply chain data verification		50	68.49 %
Digital platforms, system integration, and data interoperability (APIs, IoT)		50	68.49 %
Data protection, access rights management, and cybersecurity for DPP		46	63.01 %
No Answer		4	5.48 %



Supply Chain and Sector-Specific

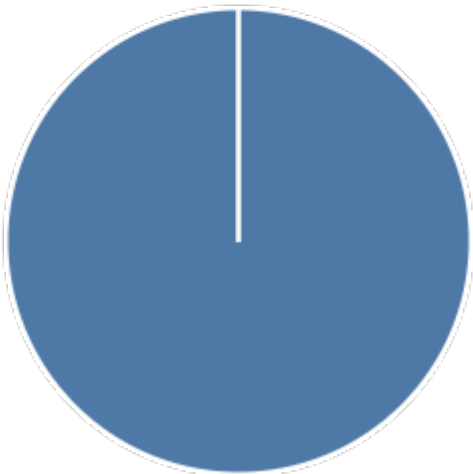
		Answers	Ratio
Supplier collaboration, verification of environmental certificates and declarations		51	69.86 %
Product Carbon Footprint (PCF) measurement and carbon data collection		50	68.49 %
Sector-specific DPP requirements for my industry		59	80.82 %
Communicating DPP and sustainability information to customers and partners		48	65.75 %
No Answer		1	1.37 %



Organisational

		Answers	Ratio
Assigning responsibilities, managing costs, and accessing EU funding for DPP		61	83.56 %
No Answer		12	16.44 %

Assigning responsibilities, manag...





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DIGITRACE

**Digital Traceability Skills for Competitive
and Sustainable Ecosystems**

National DIGITRACE Report – Poland

National DIGITRACE Report: Analysis of Needs and Readiness for DPP

Project: DIGITRACE – Digital Traceability and Compliance for Sustainable SMEs

Country: Poland

Date: 13.03.2026

Prepared by: OIC POLAND Foundation

© DIGITRACE (Digital Traceability Skills for Competitive and Sustainable Ecosystems); Erasmus+ Alliances for Innovation, Project number: 101244175; ERASMUS-EDU-2023-PI-ALL-INNO-EDU-ENTERP

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Education and Culture Executive Agency (EACEA). Neither the European Union nor the granting authority can be held responsible for them.



1. Introduction – National Context

Describe the general context and the sector-specific context assigned to the given country, indicate (preferably in bullet points) the legal regulations concerning the implementation of DPP in the country and the implications for training solutions. Include 3-5 sources per category; prioritize materials post-2024 for the current DPP implementation.

General context:

- Poland operates within an EU regulatory framework for Digital Product Passports (DPP).
- DPP is a core instrument of the EU Green Deal and Circular Economy Action Plan (CEAP).
- Implementation is phased (2024–2030):
 - 2024: adoption of ESPR
 - 2025 - 2027: first delegated acts + sector rollouts
 - 2027: mandatory battery passport

Sector-specific context (automotive):

- The automotive sector is central to DPP implementation, primarily due to:
 - Electrification (EV transition)
 - High environmental impact (materials, lifecycle emissions)
 - Complex global supply chainsAs a result, the EU chose batteries (core EV component) as the first mandatory DPP use case – it is a “pilot architecture” for full vehicle DPP.
- Poland is a major automotive manufacturing hub, strong in battery components, wiring systems, EV supply chains
Poland is the seventh-largest exporter of automotive parts globally and a major European hub for manufacturing cars, commercial vehicles, and lithium-ion batteries. The industry accounts for roughly 8% of Poland's GDP, 11% of its industrial production, and boasts a large, skilled workforce.
- Poland is a key EV battery production and recycling location
- Polish firms are indirectly regulated via EU value chains
- Battery passport acts as “blueprint” for broader DPP rollout across automotive sector

a) EU-Level Initiatives:

- **Ecodesign for Sustainable Products Regulation (ESPR) (EU) 2024/1781** and implementation schedules - Introduces DPP as mandatory system, requires lifecycle product data, enables delegated acts per sector
- Updates to the **Circular Economy Action Plan (CEAP)** - DPP is a core digital enabler of CEAP. Focuses on waste reduction, product circularity (reuse, remanufacturing), transparency in supply chains.



- **Poland's Circular Economy Roadmap**
<https://circulareconomy.europa.eu/platform/en/strategies/polands-circular-economy-roadmap> - Eu-founded programme; promotes sustainable production, new business models, and resource efficiency. Aligns national policy with EU circular economy objectives.
- Digital and Environmentally Friendly Transformation Fund – helps SMEs adopt greener, more sustainable, and digitalized business models, including Industry 4.0, AI, and energy efficiency solutions. Key features include preferential loans with possible partial repayment for investments in eco-friendly technology and digital transformation.
<https://www.gov.pl/web/funds-regional-policy/new-digital-and-environmentally-friendly-transformation-fund-to-support-smes>
- **Poland's National Recovery and Resilience Plan (NRP)** <https://www.gov.pl/web/funds-regional-policy/poland-will-receive-pln-26-billion-from-the-nrp>. Polish financial program utilizing nearly PLN 230 billion (approx. EUR 59.8 billion) from the EU Recovery and Resilience Facility (RRF) to stimulate the economy; Supports digitalisation of public administration and education systems. Includes investments in digital infrastructure, cybersecurity, and digital skills development.
- Europass/EQF micro-credentials framework for green & digital skills - Promote short-cycle certifications for digital & green skills
- DigComp 2.2 framework for developing data/traceability competencies.
- **Battery Regulation (EU) 2023/1542** – establishes the first binding DPP-type requirement; Introduces: Digital Battery Passport, Extended Producer Responsibility (EPR) and mandatory lifecycle data reporting, including carbon footprint disclosure (from 2025), recycled content, and due diligence obligations. Compliance requires a unique identifier for each battery and full traceability throughout the supply chain, with the Battery Passport becoming mandatory from February 2027.

b) National-Level Initiatives:

National digital transformation programs:

- **Strategia Cyfryzacji Polski do 2035 roku** <https://www.gov.pl/web/cyfryzacja/strategia-cyfryzacji-polski-do-2035-roku> - It is a cross-sectoral strategic document, defining the overarching objective of improving citizens' quality of life through digitalisation by 2035. The planned objectives cover a broad spectrum of issues, ranging from horizontal matters, through the sphere of the state and its citizens, to the economy and technological development. The document was developed by the Ministry of Digital Affairs in cooperation with other government administration bodies and with consideration of the proposals of social stakeholders and the business community. Focus



areas include digital infrastructure, ICT workforce development, and digital public services.

- **Cyfrowa Transformacja Rolnictwa** (Digital transformation of farming in Poland) <https://www.gov.pl/web/cyfryzacja/nowe-technologie-w-rolnictwie--podsumowanie-projektu-cyfrowa-transformacja-rolnictwa-w-polsce>
<https://share.google/5ZD3Uyf6AkiddVy18> - IoT and digital technologies modernizing agriculture by improving productivity, sustainability, automation, and decision-making in the sector.

VET/HEI curricula in sustainable development

Polish higher education institutions increasingly integrate sustainability, ESG reporting, circular economy and environmental management into study programmes. These curricula contribute to developing competencies relevant for DPP implementation, including lifecycle analysis, sustainability reporting, and sustainable supply-chain management.

- **Sustainable Development** (Master's Course), University of Warsaw <https://ucbs.uw.edu.pl/en/home/rekrutacja/oferta-studiow/sustainable-development/>
- **Sustainability Management** (BSc programme), Maria Curie-Skłodowska University in Lublin <https://www.umcs.pl/en/about-sustainability-management,27087.htm>
- **Sustainability Analytics and Audit**, VIZJA University in Warsaw (Bachelor, full-time, 3 years [6 semesters], 8700 € tuition fee) <https://vizja.pl/en/specjalizacja/analitka-i-audit-zrownowazonego-rozwoju/>
- **Education for Sustainable Development** – Offshore Wind Energy, UG (online postgraduate studies, 2 semesters [195 hours of classes], total fee: £6,200)
- **Urban Sustainability Studies (YUFE Joint Bachelor)**, Uniwersytet Mikołaja Kopernika w Toruniu https://www.umk.pl/kandydaci/informacje/?id=20250212111036&id_kierunku=294
- <https://doinggood.pl/blog/studia-csr-esg> (spis studiów)

HEI & VET systems in Poland are also increasingly incorporating sustainability, ESG, and circular economy topics into curricula, contributing to the development of foundational competencies relevant for DPP. However, these programmes remain largely general in scope and are not yet fully aligned with the specific operational requirements of DPP, particularly in sectors such as automotive where detailed data and traceability obligations apply.

SME support programs for CE/ESPR compliance (e.g., ERP modernization funding)

- **Krajowy Plan Odbudowy - National Recovery Plan** (KPO) <https://www.kpo.gov.pl/> ; <https://incentione.pl/en/grants-for-the-circular-economy-national-recovery-plan-in-poland-in-2024/> - boost for Small and Medium-sized Enterprises (SMEs) looking to



undergo digital transformation. The program allocates substantial funds for digitalizing industrial processes, adopting Artificial Intelligence (AI), and enhancing cybersecurity.

- **Fundusz Wsparcia Technologii Krytycznych [Critical Technology Support Fund]** <https://www.gov.pl/web/fundusze-regiony/nowy-sposob-finansowania-innowacji-ruszyly-konkursy-z-funduszu-wsparcia-technologii-krytycznych> - programme supporting innovation in digital and clean technologies; technology development and R&D investments.
- **Inno_LAB Granty dla Zielonej Produkcji (PARP)** <https://www.parp.gov.pl/component/grants/grants/inno-lab-granty-dla-zielonej-produkcji> - a programme supporting SMEs in the development of a circular economy. Companies can obtain funding for innovative environmental technologies.
- <https://www.parp.gov.pl/component/grants/grants/gospodarka-o-obiegu-zamknietym-w-mssp>
- **Dig.IT – Digital Transformation Grants for SMEs** <https://digit.arp.pl/> - programme supporting digitalisation projects such as software implementation, automation and digital infrastructure. Grants up to PLN 850,000 with co-financing up to 50%. Includes funding for employee training in digital technologies.

For SMEs, which are strongly represented in the Polish automotive supply chain, training must be particularly application-oriented and supported by public funding mechanisms. In this context, training evolves from a supportive activity into a critical instrument for ensuring regulatory compliance, technological adaptation, and continued participation in EU industrial value chains.

Implications for the training solutions:

The introduction of the Digital Product Passport under the Battery Regulation and the Ecodesign for Sustainable Products Regulation significantly changes competence requirements in the automotive sector. Companies are required not only to manufacture products but also to manage structured product data across the entire lifecycle, making compliance dependent on continuous data management rather than static documentation.

This shift creates demand for integrated competencies combining technical, regulatory, and operational knowledge. Employees must be able to collect, verify, and exchange product data (e.g. material composition, carbon footprint) across complex supply chains. As a result, training needs to move beyond isolated functional approaches and support cross-departmental understanding, particularly between engineering, IT, and compliance.

Training programmes must be closely aligned with implementation requirements. In the automotive sector, this includes practical knowledge related to the Battery Passport, integration with ERP/PLM systems, and management of supplier data. The ability to operationalise regulatory requirements within existing business processes becomes a key learning objective.



For SMEs, the challenge is more significant due to limited resources and expertise. Training solutions should therefore be practical and implementation-oriented, supporting companies in adapting processes and meeting data requirements within supply chains.

Finally, there is a growing role for modular training formats aligned with the European Qualifications Framework and Europass, enabling targeted upskilling in areas such as product data management and lifecycle assessment. Overall, training becomes a critical factor for regulatory compliance and continued participation in the EU automotive market.

2. Comparison of Existing Training Programs

Compare current national/EU training programs according to the assigned sector – min 5 examples, and min 5 examples of the most accessible trainings concerning ESG. If there are more examples, the most relevant will be the most up-to-date solutions. Describe the found training solutions according to the table below.

Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
Automotive industry	Battery passports, tracking of critical raw materials (Li, Co). State of Health (SoH), charging cycles, battery carbon footprint.	Digital Product Passports. A Practical Guide for Entrepreneurs.	Entrepreneurs, business managers, leaders, ESG reporting specialists	https://strefawiedzyp.fr.pl/kursy/cyfrowe-paszporty-produktow-praktyczny-przewodnik-dla-przedsiębiorcow
Automotive industry	Practical ESG obligations, strategy and reporting	2-day open / corporate training (paid)	Business leaders, compliance, sustainability teams	https://www.worklife.edu.pl/szkolenia/esg-od-zera/?utm_source=chatgpt.com
Automotive industry	EV fundamentals, energy storage,	Electromobility – Bachelor's and Master studies –	Students in electronics, automation,	https://www.pw.edu.pl/studia/studia-i-

Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
	electric drives, system control;	full-time, 7 semesters	future EV engineers	stopnia.elektromobilnosc
Automotive industry	Series addressing sustainable development, quality management, regulatory context (CSRD, taxonomy, CBAM)	Online/hybrid workshops with certification	Automotive management, quality & sustainability leads	https://pgm.org.pl/en/training-series-pgm-gk2-leaders-academy-green-quality/?utm_source=chatgpt.com
Automotive industry	lithium-ion batteries	Introduction to lithium-ion batteries (online course, EIT Campus; beginner level; duration: 11 months)	Engineers, technologists, battery specialists	https://eit-campus.eu/course/raw-materials/introduction-to-lithium-ion-batteries
Automotive industry		Electrical Engineering / Electronics – Wrocław University of Science and Technology Bachelor's degree (full-time / part-time)	Students in electrical engineering, automation, battery technology	https://rekrutacja.pwr.edu.pl/wyszukiwarkiunkow-studiow/elektrotechnika-2/
Textiles industry	Transparency of fiber composition, chemical management. SVHC substances,	Textile EPR Masterclass – Extended Producer Responsibility, recycling	Sustainability officers, CSR managers, compliance specialists	https://www.textile-platform.eu/innovation-hub-circular-and-biobased-textiles

Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
	repair/recycling instructions.	technologies, eco-design and circularity in textiles - Masterclass (online & webinars)		
Textile industry	sustainability fundamentals, fiber lifecycle, chemical processes, certifications	Sustainable Textile School –Short course (in-person), conference	Designers, product developers, sustainability practitioners	https://sustainable-textile-school.com/
Textile industry	fiber recycling techniques, lifecycle, reuse, circular economy	RegioGreenTex Going Green Trainings – Sustainable fiber-to-fiber recycling – webinar, online training	SMEs in textile recycling, sustainability consultants	https://www.textile-platform.eu/regiogreen-tex/v/going-green-trainings-6
Textile industry	DPP, EPR, Green Claims, CSRD, chemical compliance,	TESTEX Academy – EU sustainability regulations for textiles - modular online courses	Brands, suppliers, compliance professionals	https://www.testex-fwg.academy/
Agriculture	organic farming systems, sustainable production, soil biology	Organic Agriculture and Food Production - full bachelor's degree programme	Students in agriculture, sustainable food production	https://wrie.sggw.edu.pl/en/wydzial-rolnictwa-i-biologii/studia-na-wydziale/ekologiczne-rolnictwo-i-produkcja-zywnosci/

Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
Agriculture	sustainable farm planning, resource management, climate-smart agriculture	Sustainable Agriculture & Farm Management Training - Live online / face-to-face (interactive training, 5 days)	Farmers, agribusiness managers, agricultural officers	https://trainingcred.com/training-course/sustainable-agriculture-and-farm-management-training
Agriculture	sustainable farming systems, agroecology, food sovereignty training	Agro-Perma-Lab agroecology & permaculture education; Workshops / educator training	Farmers, farm educators, sustainable agriculture trainers	https://agropermalab.org/en/
Plastics industry	Recycled material certification, bioplastics compliance. Share of recycled materials, raw material origin certificates	IMPIB – Polymer materials training (recycling + biodegradable plastics); Online course (scheduled)	Material technologists, production engineers, sustainability experts	https://impib.lukasiewicz.gov.pl/szkolenie-on-line-tworzywa-polimerowe-wlasciwosci-przetworstwo-i-recykling/
Plastics industry	Recyclates use, EU packaging legislation, eco-design	SGS Poland – PPWR & packaging recyclability training - Online workshop (1 day)	Packaging technologists, compliance teams, R&D	https://www.sgs.com/pl-pl/wydarzenia/2026/03/ppwr-a-opakowania-szkolenie
Plastics industry	recycling technologies, regranulation, sorting & material quality	Rolbatch Academy – plastics recycling & processing – webinar	Technicians, recycling plant specialists, process engineers	https://www.rolbatch.eu/pl/pages/szkolenia-recykling-tworzyw-sztucznych



Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
Plastics industry	Recycling technologies, materials engineering, circular economy, sustainable resource management	Recycling Engineering (full time, on-campus studies, laboratory work, project-based learning, industry internships)	Students aspiring to become engineers specialised in sustainable resource management, environmental protection, and innovative recycling solutions.	https://wisie.pollub.pl/kandydaci/kierunki/inzynieria-recyklingu
Electronics	Tracking of mineral supply chain, disassembly instructions. Performance parameters, durability, content of critical raw materials			

3. Recognition and Usability of micro-credentials at national level

Specify how DIGITRACE micro-credentials fit into national recognition systems, ensuring usefulness for upskilling SMEs in DPP compliance. Focus on integration with EQF and practical validation for levels 5-7.

Refer to sources such as needs assessments, reports, and projects on micro-credentials implementation when answering individual questions.



Supporting Questions:

a) Are micro-credentials regulated in national legislation (e.g., specific regulations, lack of regulation, legislative discussions)?

There is a lack of a single, comprehensive law directly regulating micro-credentials; their implementation relies on existing legal frameworks, such as the Integrated Qualifications System (Zintegrowany System Kwalifikacji) and relevant EU and national guidelines.

<https://kwalifikacje.gov.pl/poznaj-mikroposwiadczenia/>

<https://microcredentials.pl/en/we-are-building-a-polish-standard-for-microcredentials>

<https://www.gov.pl/web/edukacja/wytyczne-w-zakresie-stosowania-mikroposwiadczen-w-instytucjach-szkolnictwa-wyzsze-go-i-nauki>

<https://doxychain.beehiiv.com/p/prawo-i-regulacje-a-mikroposwiadczenia>

Projects and expert groups are actively developing standards and piloting micro-credentials, including rules on design, issuance, and quality assurance through the Odznaka + initiative by the Educational Research Institute. OIC POLAND participates in the Odznaka + piloting as an issuer.

b) Does the national qualifications framework (NQF) include micro-credentials and at what EQF level?

Privately and publicly issued qualifications in Poland are mapped to the Polish Qualifications Framework (PRK), which aligns with the EQF across 8 levels.

<https://prk.men.gov.pl/en/1en>

Poland's National Qualifications Framework (PQF / Krajowe Ramy Kwalifikacji) has integrated micro-credentials as part of its short-cycle, modular learning pathways. These are aligned with the European Qualifications Framework (EQF) and typically correspond to EQF levels 4–6, depending on the learning outcomes and complexity of the skills covered.

Micro-credentials are being piloted in Poland through initiatives like Odznaka+ by the Educational Research Institute, which defines standards for design, issuance, and quality assurance, ensuring they can be formally recognized within the NQF.

c) Do higher education/VET institutions recognize micro-credentials from other providers (e.g., companies, NGOs) for degrees or ECTS credits?

The Polish Ministry of National Education taking into account actions at the EU level, established an advisory team on micro-credentials in the field of higher education in 2022. This team developed the General Guidelines for the Application of Micro-Credentials in Higher Education and Research Institutions in Poland ([*Ogólne wytyczne w zakresie stosowania mikropoświadczeń*](#))



[w instytucjach szkolnictwa wyższego i nauki w Polsce](#)). This document has significant practical importance. It confirms that existing regulations in Poland do not pose a barrier and explicitly recommends the adoption of European standards regarding micro-credentials.

However, there is no formal policy at universities or VET institutions in Poland to recognize external micro-credentials. Polish universities and VET schools usually require credits earned *within their own accredited programmes* to count toward degrees (diplomas or certificates). There is no mandatory national regulation that forces institutions to grant ECTS credits automatically for external micro-credentials (e.g., from companies or NGOs). Recognition of external micro-credentials exists in Poland only in limited, institution-specific, or pilot forms.

Individual universities and departments may recognise external credentials as elective or supplementary learning outcomes that can enhance a student's profile or satisfy informal programme requirements, but this is typically decided locally by academic councils or programme directors.

Some higher education institutions are experimenting with micro-credentials issuance and recognition (Opole University of Technology) issued a digital micro-credential via the Odznaka + system pilot - <https://www.ibe.edu.pl/en/news/3512-microcredentials-are-an-opportunity-for-higher-education-institutions-in-poland> ; <https://microcredentials.pl/pierwsza-polska-uczelnia-z-mikroposwiadczeniami-w-aplikacji-odznaka/>

Polish Ministry for Education and Science participates in the MICROBOL Project (Bologna Micro-Credentials). This European initiative explores how existing Bologna tools can be adapted to support micro-credentials delivered by HEIs or in collaboration with them, as well as those issued entirely by companies or non-profit organizations. It also addresses recognition of “open badges” and other modular micro-learning elements that could be formally acknowledged by higher education institutions.

<https://nawa.gov.pl/uznawalnosc/dzialalnosc-osrodka-enic-naric/microbol>

d) Do SMEs recognize employees' micro-credentials in recruitment or promotions?

SME recognition of micro-credentials is emerging but not yet mainstream in recruitment/promotion practices.

e) What benefits have SMEs gained from micro-credentials (e.g., faster training, competence growth, savings)?

SMEs may benefit through faster, modular learning pathways, but tangible documented benefits in Poland are still under development.

Advantages include:

- Shortened recruitment processes – Micro-credentials provide verified evidence of skills, reducing the time and resources needed for multi-stage hiring. ([source](#))



- Targeted skill validation – Unlike traditional diplomas that reflect broad knowledge, micro-credentials certify specific hard and soft skills, giving SMEs confidence in employee competencies.
- Flexibility and accessibility – Employees can earn micro-credentials at any time, online or offline, allowing learning to fit around work, personal commitments, or volunteering.
- Flexible career path building – instead of earning a single general degree, one can gradually accumulate micro-credentials that reflect professional growth
- They precisely define the skills acquired – each certificate corresponds to a specific ability ([source](#))
- Speed and cost efficiency – Micro-credentials are obtained after short learning cycles at lower cost compared with traditional education, supporting continuous upskilling and reskilling.
- Adaptability and lifelong learning – They help employees adapt quickly to market changes, update skills, and follow personalized career paths, enhancing motivation, engagement, and retention ([source](#))
- Reliability and verifiability – Typically issued as digital certificates or badges, micro-credentials provide tamper-proof evidence of actual competencies.
- They are recognized by employers – thanks to their transparency and compliance with industry standards, recruiters can easily verify candidates' qualifications.
- Support for broader workforce development – Micro-credentials allow SMEs to map skills within the company, identify talent for promotion, and integrate learning into strategic workforce planning. ([source](#))

f) Are micro-credentials used in SMEs for upskilling (yes/no, examples)? State barriers (e.g., lack of trust).

Some SMEs are beginning to use short courses and badges as micro-credentials informally. However, wide systematic use is not yet established.

Barriers:

- Regulatory uncertainty – lack of clear legal and organizational frameworks, regulations or standards,
- Limited knowledge – companies may not fully understand micro-credentials or their value.
- Resource constraints – insufficient staff, time, and budget to implement or manage micro-credentials.
- Technology challenges – adopting new IT systems for issuing and tracking credentials.
- Recognition and quality concerns – doubts about acceptance by employers and risk of devaluation.
- Market competition – competing with traditional degrees and large training providers.



<https://ibe.edu.pl/en/news/3106-how-to-build-trust-in-digital-microcredentials>

<https://microcredentials.pl/o-projekcie/>

<https://kwalifikacje.gov.pl/poznaj-mikroposwiadczenia>

4. Practical recommendations for DIGITRACE micro-credentials in Poland (levels 5–7)

Building on the regulatory context, training landscape and micro-credentials environment described above, DIGITRACE micro-credentials aimed at the Polish automotive sector should be designed to fit national recognition mechanisms and the practical needs of SMEs. For maximum national relevance and uptake, DIGITRACE micro-credentials should:

- Be mapped to the Polish Qualifications Framework (PRK) and EQF level descriptors (5–7), so learning outcomes can be benchmarked against existing qualifications and, where relevant, considered for future inclusion in the Integrated Qualifications System (Zintegrowany System Kwalifikacji).
- Be issued as verifiable digital credentials, building on the Odznaka+ pilot infrastructure led by the Educational Research Institute (IBE), in which OIC POLAND already participates as an issuer – this improves trust, portability and employer recognition from the outset.
- Be modular and stackable, allowing learners – particularly employees of SMEs with limited time and budget – to accumulate targeted units rather than committing to long-format study, in line with the national preference for flexible, short-cycle learning pathways.
- Address automotive-specific DPP content directly, including the Battery Passport (unique identifiers, carbon footprint reporting, recycled content, due-diligence obligations), integration of product data with ERP/PLM systems, and management of supplier and material-composition data across the supply chain.
- Be explicitly practice- and implementation-oriented rather than purely theoretical, reflecting the finding that existing HEI/VET sustainability curricula in Poland remain general in scope and are not yet aligned with the operational, data-management requirements of DPP compliance.
- Support cross-departmental learning pathways (engineering, IT, compliance/quality), since DPP compliance depends on continuous, cross-functional data management rather than a single function or role.
- Be positioned to align with, and where possible be co-financed through, existing public support instruments available to Polish SMEs (e.g. Krajowy Plan Odbudowy / National



Recovery Plan, Dig.IT Digital Transformation Grants, the Digital and Environmentally Friendly Transformation Fund), which already earmark funding for digitalisation and staff training.

- Actively build trust and awareness among SMEs, given the identified barriers of regulatory uncertainty, limited knowledge of micro-credentials, and resource constraints – for example through employer-facing communication on how DIGITRACE credentials map to recognised standards and quality assurance criteria.

5. Concluding remarks

Poland occupies a strategically important position for Digital Product Passport implementation in the automotive sector: it is a major European hub for vehicle, component and lithium-ion battery manufacturing, and Polish firms are already indirectly regulated through EU value chains ahead of the Battery Passport becoming mandatory in 2027. This creates both urgency and opportunity for targeted upskilling.

At the same time, a gap remains between general sustainability and ESG education – which is expanding across Polish HEIs and VET providers – and the specific, data-management competencies that DPP compliance requires, particularly for SMEs with limited internal expertise and resources. National training and funding programmes (e.g. KPO, Dig.IT, the Digital and Environmentally Friendly Transformation Fund) demonstrate strong policy support for digitalisation, but few existing offers combine regulatory, technical and operational DPP content in a single, practice-oriented format.

Poland's micro-credentials ecosystem, while not yet governed by dedicated legislation, is actively developing through the Integrated Qualifications System, national guidelines for higher education institutions, and pilot initiatives such as Odznaka+. This provides a workable, if still maturing, framework for the recognition of short, modular learning units at EQF levels 5–7.

DIGITRACE is therefore well positioned to contribute to the Polish automotive SME ecosystem by offering focused, modular, practice-oriented micro-credentials that bridge existing sustainability knowledge with the operational skills needed for Battery Passport and wider DPP compliance – filling a gap that current training and academic programmes do not yet fully address.

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You can use the following as your final reference list in the report:

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DIGITRACE

**Digital Traceability Skills for Competitive
and Sustainable Ecosystems**

Spanish DIGITRACE Report

National DIGITRACE Report: Analysis of Needs and Readiness for DPP
Project: DIGITRACE – Digital Traceability and Compliance for Sustainable SMEs
Country: Spain
Date: 22.04.2026
Prepared by: CEEI Burgos

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1. Introduction – National Context

Describe the general context and the sector-specific context assigned to the given country, indicate (preferably in bullet points) the legal regulations concerning the implementation of DPP in the country and the implications for training solutions. Include 3-5 sources per category; prioritize materials post-2024 for the current DPP implementation.

Country: Spain

Sector focus: Food Industries

Spain provides a highly relevant national context for DIGITRACE because its economy combines a very large SME base with a strong manufacturing and agri-food ecosystem. In the DIGITRACE project rationale, Spain is explicitly identified as a country where SMEs are still insufficiently prepared for Digital Product Passport (DPP) requirements, despite progress in digital transformation. The project also stresses that SMEs need role-specific training, sector-specific support, and stronger collaboration between VET, HEIs and industry to respond effectively to DPP-related compliance and innovation demands.

For Spain, the food industries are particularly strategic. The sector is deeply connected to traceability, origin verification, food safety, packaging, environmental performance, and supply-chain transparency. These are all areas that overlap strongly with the future logic of DPP implementation, even where the precise delegated acts for food are still evolving. From a training perspective, this means Spanish food SMEs will need practical skills in data collection, interoperability, sustainability metrics, compliance documentation, supplier management, and customer-facing communication. This is fully consistent with DIGITRACE's role-based approach for managers, ICT/administrative staff, production and supply-chain staff, and marketing and sales teams.

a) EU-Level Initiatives:

- Ecodesign for Sustainable Products Regulation (ESPR) (EU) 2024/1781 and implementation schedules.

The ESPR establishes the EU framework for ecodesign requirements for sustainable products and formally introduces the Digital Product Passport as a core policy tool for transparency, circularity and legal compliance. For training design, this means Spanish learners need foundational competence in lifecycle data, digital records, product information governance, and sector-specific compliance readiness.

- Updates to the Circular Economy Action Plan (CEAP).



The CEAP remains the policy backbone for product circularity in the EU. It links product design, resource efficiency, reuse, repair, recycling, and better information flows across value chains. For DIGITRACE, CEAP is important because it frames DPP not as a standalone reporting burden, but as part of a broader transition toward circular business models and more transparent product systems.

- Europass/EQF micro-credentials framework for digital skills.

The EU's approach to micro-credentials supports short, flexible, skills-based learning that can be documented with standard elements and used for lifelong learning and employability. This is directly relevant for DIGITRACE because DPP readiness will require short-cycle, stackable upskilling for SME staff rather than only full formal qualification.

- DigComp 2.2 framework for data/traceability competencies.

DigComp provides a reference for digital competence, including information handling, communication, problem-solving and safe technology use. For DPP-related learning, it is especially useful for structuring competencies in data literacy, digital workflows, verification, and platform use. DigComp 2.2 remains relevant, although the Commission and JRC have also now published DigComp 3.0 resources, which shows the framework is continuing to evolve.

b) National-Level Initiatives:

- National digital transformation programs (e.g., Poland: Digital Agriculture Strategy)

Strategy for the Digitalisation of the Agri-food and Rural Sector

Spain has an official national strategy for digitalisation in the agri-food and rural domain, aimed at reducing technical, legislative, economic and training barriers to digital transformation. This is highly relevant to food-industry training because it already creates a policy environment in which traceability, data use, interoperability and digital skills are recognized as priority needs.

PERTE Agroalimentario

Spain's PERTE Agroalimentario is designed to modernise, digitalise and improve the sustainability of the agri-food sector. Public communications around the programme explicitly connect funding with digitalisation, traceability and sustainability, which makes it one of the strongest national policy anchors for DIGITRACE's food-industry focus in Spain.

Observatory of Digitalisation of the Agri-food Sector

Spain has also created an observatory for digitalisation in the agri-food sector, linked to the national strategy and to the Recovery Plan. This is useful for DIGITRACE because it indicates that digital transformation in food chains is not treated as isolated firm-level innovation, but as a monitored policy area with relevance for skills planning and dissemination.



- VET/HEI curricula in sustainable development (e.g., sector-specific courses).

Vocational Education and lifelong learning infrastructure

Spain's national FP platform, TodoFP, provides a structured public gateway to vocational education, specialisation courses, dual VET and competence pathways. This creates a favourable implementation environment for DIGITRACE training modules, especially if they are designed in a modular way and connected to real company practice.

University lifelong learning and micro-credentials

Spain's university system already supports flexible lifelong-learning structures, and the regulatory framework for university teaching has continued to evolve. In parallel, institutions such as UPC are actively offering short-format micro-credentials, while UNED continues to provide permanent education programmes that are highly relevant for sustainability and food systems. This suggests that DIGITRACE micro-credentials can fit credibly within Spain's emerging short-cycle upskilling ecosystem.

- SME support programs for CE/ESPR compliance (e.g., ERP modernization funding).

Implications for training solutions in Spain

For Spain, the main implication is that training should be practical, short-cycle, and immediately usable for SMEs. In food industries especially, the most relevant competencies are likely to include digital traceability, food-law awareness, product and packaging data management, sustainability reporting, supplier information exchange, and communication of verified product claims. DIGITRACE should therefore position its Spanish offer as a bridge between compliance, process improvement, and commercial value creation.

2. Comparison of Existing Training Programs

Compare current national/EU training programs according to the assigned sector – min 5 examples, and min 5 examples of the most accessible trainings concerning ESG. If there are more examples, the most relevant will be the most up-to-date solutions. Describe the found training solutions according to the table below.

Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
Automotive industry	Battery passports, tracking of critical raw materials (Li, Co). State of Health (SoH), charging cycles, battery carbon footprint.	Current training availability is still more fragmented than in food or general ESG. In Spain, the most relevant accessible routes are short-cycle professional training, standards-based sustainability courses, and university micro-credentials linked to mobility digitalisation rather than fully specialised battery-passport programmes. UPC has already deployed micro-credentials for mobility-sector digitalisation, showing a practical route for sectoral upskilling.	Automotive OEM and supplier staff, compliance managers, sustainability officers, digital transformation teams, battery value-chain actors, and VET/HEI educators supporting industrial transition.	UPC School Microcreds; AENOR training catalogue; EU battery-passport sector materials.
Textiles industry	Transparency of fiber composition, chemical management. SVHC substances, repair/recycling instructions.	The sector already has visible event- and workshop-based DPP preparation activity. A strong example is the EU Textiles Product Passport Conference 2026 in Valencia, which explicitly focuses on	Textile and apparel manufacturers, retailers, traceability and compliance	EU Textiles Product Passport Conference; SGS Spain webinars;

Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
		regulation, technology and implementation strategies for DPP in textiles. SGS Spain also offers a webinar on traceability, transparency and DPP solutions for softlines.	teams, recyclers, technology providers, and educators designing sustainability-related content.	AENOR sustainability training.
Agriculture	"Farm to Fork" model, organic certificates. Raw material origin, Product Environmental Footprint (PEF)	Spain already supports agro-rural digital training through agreements published in the BOE under the national digitalisation strategy. At EU/international level, FAO's e-learning academy offers free multilingual certified courses that can complement formal or semi-formal pathways. These are especially useful for broadening access among SMEs and rural actors.	Farm managers, cooperatives, agri-food SMEs, rural innovation actors, extension services, VET providers, and applied-university learners.	MAPA digitalisation strategy / agro-rural training actions; FAO e-learning Academy; EIT Food.
Plastics industry	Recycled material certification, bioplastics	The strongest current offer is standards- and certification-oriented	Packaging producers, plastics	AENOR recycled plastic

Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
	compliance. Share of recycled materials, raw material origin certificates	rather than DPP-specific. AENOR provides traceability and recycled-plastic certification solutions and also offers circular-economy-related training such as Environmental Product Declarations (EPD), which are relevant for plastics-sector readiness because they strengthen lifecycle-data competence.	converters, quality managers, compliance officers, sustainability teams, and technical personnel responsible for materials data.	traceability certification; AENOR EPD/circular economy training.
Food industries	Raw material origin, food safety traceability, supplier data integrity, packaging and legal compliance, sustainability communication, environmental performance, and the integration of digital traceability into food value chains. In Spain,	Spain already has a relatively mature ecosystem of food-related training compared with the other DIGITRACE sectors. AINIA offers professional training and events for the food industry, including a substantial online programme in food legislation. UNED offers permanent-education pathways in Food	Food-industry SME managers, quality and food-safety staff, regulatory affairs teams, production and supply-chain staff, digitalization teams, sustainability officers, and educators involved in VET or HEI food-	AINIA Formación; UNED Formación Permanente; EIT Food Learning Services; FAO e-learning Academy; SGS food traceability training.

Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
	this is the sector with the clearest policy and training relevance for DIGITRACE.	Safety and in Sustainable Food Systems. EIT Food complements this with flexible online education in food systems, innovation and entrepreneurship.	related programmes.	

3. Recognition and Usability of Micro-Credentials at national level

Specify how DIGITRACE micro-credentials fit into national recognition systems, ensuring usefulness for upskilling SMEs in DPP compliance. Focus on integration with EQF and practical validation for levels 5-7. Refer to sources such as needs assessments, reports, and projects on micro-credentials implementation when answering individual questions.

In Spain, micro-credentials are developing quickly, especially in higher education and lifelong learning, but they are still in a transition phase from policy promotion to full system integration. For DIGITRACE, this means micro-credentials can already be used as a practical upskilling tool for SMEs, particularly in DPP-related digital, green and compliance skills, but their formal status depends heavily on the issuing provider and on the recognition, rules applied by each institution. Spain's national framework is therefore best described as partially structured, but not yet fully consolidated.

For DIGITRACE, the best national fit would be to design micro-credentials that are clearly linked to MECU/EQF levels 5–7, with explicit learning outcomes, workload, assessment method, quality assurance and portability through Europass-compatible certification. In practice, this would make them easier to use for SME upskilling in DPP compliance even if they are not yet a fully independent qualification type within Spanish legislation.



Supporting Questions:

a) Are micro-credentials regulated in national legislation (e.g., specific regulations, lack of regulation, legislative discussions)?

Spain does not yet appear to have a single, comprehensive national law that defines micro-credentials as a standalone qualification category within the formal education system. Instead, the current Spanish approach is being built through a combination of EU policy adoption, national implementation initiatives, university-level regulation, quality-assurance guidance, and public funding measures. ANECA has issued a framework document for quality assurance of micro-credentials in the Spanish university system, and the university sector has been working with the national Plan Microcreds since 2023. In parallel, SEPE/FUNDAE have launched public funding schemes for training through “microcréditos” in digital, green and productive-transition skills. This shows that Spain has active implementation and funding mechanisms, but not yet a fully unified legislative regime for recognition across all sectors and providers.

b) Do the national qualifications framework (NQF) include micro-credentials and at what EQF level?

Spain’s NQF for lifelong learning, the MECU, is intended to classify officially accredited qualifications. On that basis, micro-credentials are not automatically embedded as a separate formal qualification category in the national framework. However, Spanish providers are increasingly designing micro-credentials by referencing the relevant qualification level under MECU, EQF and MECES, and several university guidance pages explicitly state that indicating the level of the learning experience is an essential element of a micro-credential. For DIGITRACE, this is particularly useful because the target range can be made explicit: level 5 for advanced VET / higher technician profiles, level 6 for bachelor-equivalent higher education profiles, and level 7 for more advanced managerial or specialist learning comparable to master-level complexity. So, the practical answer is: not formally included as a separate NQF category, but increasingly level-referenced in practice.

c) Do higher education/VET institutions recognize micro-credentials from other providers (e.g., companies, NGOs) for degrees or ECTS credits?

Recognition exists in principle, but it is not automatic and not yet fully harmonized. ANECA states that micro-credentials issued by formal education providers can be recognized through standardized procedures similar to those already used for recognition of learning periods in other systems. At the same time, Spanish university debate has tended to reserve the formal issuing and academic validation role to universities, while allowing companies, NGOs or other actors to collaborate in delivery. This means that a micro-credential from an external provider



may be useful, but its conversion into degree credits or ECTS will usually depend on whether a university accepts it under its own academic procedures. In other words, Spanish HEIs may recognize external learning, but cross-provider ECTS recognition is still selective rather than systemic.

d) Do SMEs recognize employees' micro-credentials in recruitment or promotions?

The evidence suggests that SME recognition is growing, but still uneven and not yet fully institutionalized. Spanish public bodies present micro-credentials as tools directly linked to employability and to the needs of companies and sectors, and university offers are increasingly designed with employers in mind. There are also examples of universities explicitly opening their micro-credentials to professionals, companies and public or private entities through collaboration agreements. However, I have not found strong official evidence showing that Spanish SMEs already use micro-credentials in a systematic, nationwide way as a standard criterion for recruitment or promotion. A cautious formulation for the template would therefore be: recognition by SMEs is emerging, especially in skills-intensive fields, but is not yet standardized across the SME sector.

e) What benefits have SMEs gained from micro-credentials (e.g., faster training, competence growth, savings)?

The main benefits identified in Spain are speed, flexibility, labour-market relevance and lower financial barriers. Public information from SEPE and FUNDAE shows that micro-credentials are being used to support acquisition of new skills for the digital, green and productive transition, and that specific public subsidies are available to reduce training costs. This makes them attractive for SMEs because they allow short, targeted learning without the time and cost burden of full formal programmes. The policy rationale also emphasizes competence growth closely aligned to real employer demand. That said, the Spanish evidence base is still stronger on policy intention and programme design than on large-scale published impact evaluations. So, it is safest to say that the expected and increasingly observed SME benefits are: faster reskilling, targeted competence development, more affordable access to training, and better alignment with immediate business needs.

f) Are micro-credentials used in SMEs for upskilling (yes/no, examples)? State barriers (e.g., lack of trust).

Yes, increasingly, especially through university lifelong-learning units, company-linked training offers, and public upskilling schemes. Spanish universities now have visible micro-credential catalogues, some of them explicitly designed in collaboration with companies or open to



professionals and firms through agreements. Public microcredit funding also supports workers taking short training in digital, green and productive-transition skills, which is highly relevant for DPP readiness. This means micro-credentials are already being used as an upskilling instrument, even if adoption is still at an early and uneven stage.

The main barriers are the following. First, there is no fully unified national recognition regime, which creates uncertainty about portability and trust. Second, academic recognition for ECTS or degree purposes is not automatic, especially when learning comes from non-university providers. Third, employer awareness is still uneven, so many SMEs may value the training itself more than the credential format. Fourth, the credibility of a micro-credential still depends heavily on the brand and quality assurance of the issuing institution. For DIGITRACE, this means that trust will be much stronger if the micro-credentials are issued or co-issued by recognized HEI/VET institutions and clearly mapped to EQF/MECU/MECES levels 5–7.

4. Practical recommendations

Building on the regulatory context (Chapter 1), the training landscape review (Chapter 2) and the assessment of micro-credential recognition in Spain (Chapter 3), DIGITRACE micro-credentials for the Spanish food-industry sector should be designed as follows to maximise national relevance, trust and usability for SMEs:

- Be explicitly level-referenced to EQF/MECU/MECES levels 5–7, since Spanish providers increasingly signal qualification level in practice even though micro-credentials are not yet a separate formal category in the national framework.
- Be issued or co-issued by a recognised HEI/VET institution, following the ANECA quality-assurance approach for university micro-credentials, to maximise credibility with both learners and employers.
- Use Europass-compatible digital certification with clear learning outcomes, workload, and assessment method, to support portability and reduce the recognition uncertainty identified as a national barrier.
- Be modular, short-cycle and stackable, aligned with Spain's Plan Microcreds and SEPE/FUNDAE “microcréditos” funding for digital, green and productive-transition skills, so training can be co-financed and delivered without long time commitments for SME staff.
- Address food-industry-specific DPP content directly: digital traceability, origin verification, food safety documentation, packaging and environmental-performance



data, supplier data exchange, and customer-facing communication of verified product claims.

- Be role-based, following DIGITRACE's approach for managers, ICT/administrative staff, production and supply-chain staff, and marketing and sales teams, so each profile receives targeted rather than generic content.
- Be positioned within existing national policy anchors – the Strategy for the Digitalisation of the Agri-food and Rural Sector, PERTE Agroalimentario, and the Observatory of Digitalisation of the Agri-food Sector – to benefit from existing funding, dissemination channels and policy visibility.
- Actively build employer trust and awareness, since SME recognition of micro-credentials in recruitment or promotion is still emerging and uneven – for example through clear communication of how DIGITRACE credentials map to MECU/EQF/MECES levels and to recognised quality-assurance standards.

5. Conclusions

Spain offers a strong strategic fit for DIGITRACE, combining a very large SME base with a food-industry sector where traceability, origin verification, food safety, packaging and supply-chain transparency are already central business concerns. These are the same competency areas that Digital Product Passport implementation will require, even where sector-specific delegated acts are still evolving, which means Spanish food SMEs are already primed for the kind of training DIGITRACE proposes.

National policy provides a favourable environment: the Strategy for the Digitalisation of the Agri-food and Rural Sector, PERTE Agroalimentario and the sector's digitalisation observatory all treat traceability and digital skills as recognised priorities, while TodoFP and university lifelong-learning offers create credible delivery channels for modular, short-cycle training.

At the same time, Spain's micro-credentials ecosystem remains in a transition phase: there is no single unified legislative regime, ECTS/degree recognition is selective rather than automatic, and employer awareness is still uneven. Credibility therefore depends heavily on the issuing institution and on clear alignment with MECU/EQF/MECES levels 5–7 – both of which DIGITRACE can address directly through its design choices.

Overall, DIGITRACE is well positioned to support Spanish food-industry SMEs by offering practical, role-based, short-cycle micro-credentials that bridge existing sustainability and



digitalisation policy momentum with the specific operational skills needed for DPP readiness – provided they are issued or co-issued by a recognised institution and clearly level-referenced to build the trust that the market does not yet supply on its own.

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DIGITRACE

**Digital Traceability Skills for Competitive
and Sustainable Ecosystems**

Bulgarian DIGITRACE Report

National DIGITRACE Report: Analysis of Needs and Readiness for DPP

Project: DIGITRACE – Digital Traceability and Compliance for Sustainable SMEs

Country: Bulgaria

Date: 28.04 2026

Prepared by: ValueMe

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1. Introduction

1.1 General context

The Bulgarian desk research for the textiles sector is situated within a rapidly evolving European policy environment in which Digital Product Passports (DPPs), ecodesign requirements, and circular economy measures are becoming increasingly relevant for manufacturing SMEs. Regulation (EU) 2024/1781 establishing a framework for ecodesign requirements for sustainable products provides the overarching legal basis for the future deployment of Digital Product Passports across priority product groups placed on the EU market. The Regulation is horizontal in nature and creates the legal architecture through which delegated acts will specify product-specific requirements, including data-related obligations and passport content.https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1754401678206&uri=CELEX%3A32024R1781&utm_source=chatgpt.com

For the textiles ecosystem, the policy direction was already clearly signalled in the EU Strategy for Sustainable and Circular Textiles. The strategy states that by 2030 textile products placed on the EU market should be durable, repairable, recyclable and largely made of recycled fibres, and it identifies the Digital Product Passport as one of the tools that can support this transition. Textiles are also highlighted by the European Commission as a high-impact sector from an environmental perspective, reinforcing the expectation that the sector will face stronger transparency, data and sustainability requirements over time.https://environment.ec.europa.eu/strategy/textiles-strategy_en?utm_source=chatgpt.com

In Bulgaria, these developments are particularly important because the country has a long-standing textile and apparel production base integrated into European supply chains, but it also faces challenges related to SME digitalisation, skills, and investment capacity. The European Commission's 2025 Digital Decade country report for Bulgaria notes that the country still faces challenges in SME digital uptake and digital skills. This is directly relevant to DPP readiness, since Digital Product Passports require structured product data, traceability capacity, and stronger digital processes across value chains.

https://digital-strategy.ec.europa.eu/en/factpages/bulgaria-2025-digital-decade-country-report?utm_source=chatgpt.com

The Bulgarian textile sector also shows signs of economic and structural pressure. National Statistical Institute data reported decreases in textile manufacturing output across several 2024–2025 releases, including a 22.6% year-on-year drop in manufacture of textiles in the November 2024 release and a 10.6% decrease in the August 2025 release. These figures suggest that DPP-



related preparedness will need to be addressed in a context where many companies are already managing cost, competitiveness and transition pressures.

[https://www.nsi.bg/index.php/en/file/25287/IPI SAWDA 2024-11 en VFAFAM9.pdf?utm_source=chatgpt.com](https://www.nsi.bg/index.php/en/file/25287/IPI_SAWDA_2024-11_en_VFAFAM9.pdf?utm_source=chatgpt.com)

Overall, the Bulgarian national context suggests that DPP readiness in the textile sector is still emerging rather than mature. Awareness is growing, partly through business associations, standards bodies and public events, but sector-specific operational preparedness remains uneven. Bulgarian SMEs are therefore likely to need targeted support that combines regulatory awareness, practical digital traceability skills, sustainability literacy and accessible implementation guidance.

https://www.infobusiness.bcci.bg/rabotna-grupa-digitalen-produktov-pasport.html?utm_source=chatgpt.com

1.2 Sector-specific context: textiles in Bulgaria

The Bulgarian textiles and apparel sector remains relevant for employment, subcontracting and export-oriented production, but it is also highly exposed to transition pressures related to sustainability, circularity, digitalisation and supply-chain transparency. The sector includes a large number of SMEs and smaller manufacturers, many of which are embedded in outsourced production chains and may not yet have fully developed internal systems for advanced product data management, material traceability or sustainability reporting. This matters because DPP implementation in textiles is likely to require structured information on fibre composition, the presence of substances of concern, repair and recycling information, and supply-chain-related data.

https://www.europarl.europa.eu/RegData/etudes/STUD/2024/757808/EPRS_STU%282024%29_757808_EN.pdf?utm_source=chatgpt.com

The Bulgarian discussion around DPPs is no longer purely theoretical. In 2024 and 2025, Bulgarian stakeholders such as GS1 Bulgaria, the Bulgarian Chamber of Commerce and Industry, the Bulgarian Institute for Standardization and business-oriented information channels organised or supported information sessions on the Digital Product Passport. One Bulgarian business event summary reported that 29% of participants were actively preparing for DPP and 54% were informed but had not yet started preparing, indicating both awareness and a substantial implementation gap. The same source also noted the use of GS1 identifiers such as GTIN, which is relevant because traceability and interoperable identification standards are likely to be fundamental building blocks for DPP implementation.



https://www.infobusiness.bcci.bg/tsifrov-produktov-pasport-tspp-iziskvaniya-standartizatsiya-i-praktiki.html?utm_source=chatgpt.com

Textiles are explicitly among the product groups discussed in Bulgarian DPP information sessions. GS1 Bulgaria's public communication on the topic states that more than 30 categories of goods marketed in the EU will fall under the DPP requirement, including textiles and apparel. This is highly relevant for Bulgarian textile SMEs because it confirms that the sector is within the scope of current business awareness efforts and future compliance expectations. https://www.gs1bg.org/en/2024/08/14/%D1%81%D0%B5%D1%81%D0%B8%D1%8F/?utm_source=chatgpt.com

At the same time, Bulgaria is beginning to build sectoral structures linked to circular textiles and textile waste management. Organisations such as the Bulgarian Association Circular Textile (BACT) and the Association for Textile Recycling (ATR) reflect an increasing national focus on separate collection, reuse, recycling and circular value creation in textile flows. These organisations are not DPP providers as such, but they are important indicators that the Bulgarian textile ecosystem is gradually developing the institutional and practical vocabulary needed for circularity-related transitions.

https://bact.bg/en/?utm_source=chatgpt.com

In addition, Bulgarian academic and sector dialogue is increasingly addressing sustainability in textiles. Sofia University hosted an international conference in 2025 on opportunities for sustainable development in the European textile industry, including sustainable supply chains, the role of small textile producers, and practical sustainability solutions. The National Textile Conference 2025 also included topics such as textile management, marketing, sustainability and innovations in textile education. These examples show that the skills agenda around sustainability in textiles is growing, although it is still broader than a dedicated DPP implementation agenda.

https://www.uni-sofia.bg/index.php/eng/the_university/faculties/faculty_of_economics_and_business_administration/news/international_conference_discusses_opportunities_for_sustainable_development_in_the_european_textile_industry?utm_source=chatgpt.com

Taken together, the evidence suggests that the Bulgarian textile sector is among the sectors likely to be significantly affected by DPP requirements. The main reasons are its integration into EU value chains, the likely future requirement for product-level transparency, the growing circular economy policy pressure on textiles, and the current gap between awareness and implementation capacity.

https://environment.ec.europa.eu/strategy/textiles-strategy_en?utm_source=chatgpt.com



1.3 EU-level initiatives

The following EU-level initiatives are particularly relevant for analysing Bulgarian readiness for DPP in the textile sector:

- **Ecodesign for Sustainable Products Regulation (ESPR), Regulation (EU) 2024/1781.** This is the central legislative framework for future ecodesign requirements and DPP implementation across selected product groups. It creates the legal basis for product-specific delegated acts and data-related obligations. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1754401678206&uri=CELEX%3A32024R1781&utm_source=chatgpt.com
- **EU Strategy for Sustainable and Circular Textiles.** This strategy explicitly identifies textiles as a priority ecosystem and foresees the introduction of Digital Product Passports to improve transparency, circularity and consumer information. https://environment.ec.europa.eu/strategy/textiles-strategy_en?utm_source=chatgpt.com
- **Circular Economy Action Plan (CEAP).** The 2020 CEAP is one of the main building blocks of the European Green Deal and addresses the full life cycle of products, including design, waste prevention and circularity. https://environment.ec.europa.eu/strategy/circular-economy_en?utm_source=chatgpt.com
- **DigComp 2.2.** Although not sector-specific, DigComp 2.2 provides an important competence reference point for data handling, digital literacy, problem solving and information management, all of which are relevant to DPP-related upskilling. https://publications.jrc.ec.europa.eu/repository/handle/JRC128415?utm_source=chatgpt.com
- **European approach to micro-credentials and European Digital Credentials for Learning.** These instruments are relevant for DIGITRACE because they provide a European policy and technical framework for issuing short, transparent and portable learning credentials that could support DPP-related SME upskilling. https://education.ec.europa.eu/education-levels/higher-education/micro-credentials?utm_source=chatgpt.com

1.4 National-level initiatives

At national level, Bulgaria does not yet appear to have a dedicated national programme specifically focused on textile-sector DPP readiness. However, several policy and institutional developments are relevant:



- **Digital Bulgaria 2025.** This national programme includes the digitalisation of Bulgarian industrial sectors and the development of digital competences, which provides a supportive macro-policy environment for future DPP-related capability building. https://www.mtc.government.bg/en/category/85/national-program-digital-bulgaria-2025-and-road-map-its-implementation-are-adopted-cm-decision-no73005-12-2019?utm_source=chatgpt.com
- **SME support and business support structures.** The Bulgarian Small and Medium Enterprises Promotion Agency supports SME development through information, training, advisory and access-to-market services, which may provide enabling structures for later DPP-related dissemination and capacity building. https://www.mig.government.bg/finansova-podkrepa-za-biznesa/?lang=en&utm_source=chatgpt.com
- **National VET and lifelong learning structures.** NAVET remains central to vocational training, validation of prior learning, and qualification-related discussions, including participation in projects dealing with micro-credentials and green skills. https://www.navet.government.bg/eng/project-green-micro-credentials-pathways-upskill-and-reskilling-low-skilled-adults-for-lifelong-learning-project-no-101087539-greenmicred-pathways/?utm_source=chatgpt.com
- **Standards and traceability ecosystem.** GS1 Bulgaria, BCCI and Bulgarian standardisation actors are already actively discussing DPP-related traceability standards and interoperability. This is especially important for textile companies because the operational side of DPP implementation is likely to depend on reliable product identification, event-based traceability data and standardised information exchange. https://www.infobusiness.bcci.bg/rabotna-grupa-digitalen-produktov-pasport.html?utm_source=chatgpt.com
- **Sector sustainability and circularity organisations.** BACT, ATR and Bulgarian Fashion Association-related initiatives are strengthening the ecosystem around circular textiles, recycling, sustainability-oriented education and sector modernisation. https://bact.bg/en/?utm_source=chatgpt.com

1.5 Implications for training solutions

The reviewed context suggests five main implications for training design in DIGITRACE for Bulgaria's textile sector.

First, Bulgarian textile SMEs need **introductory but practical** learning formats, because awareness is increasing, yet implementation appears limited and uneven. https://www.infobusiness.bcci.bg/tsifrov-produktov-pasport-tspp-iziskvaniya-standartizatsiya-i-praktiki.html?utm_source=chatgpt.com



Second, the training offer should combine **regulatory understanding and operational readiness**. Companies need not only to understand why DPP matters, but also how to organise product data, material information, identifiers and internal workflows. https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1754401678206&uri=CELEX%3A32024R1781&utm_source=chatgpt.com

Third, role differentiation is important. Textile managers, administrative staff, production teams, compliance staff and digital/IT staff are unlikely to need identical content. This supports the logic of modular and role-specific training.

Fourth, Bulgarian solutions should be **SME-friendly and implementation-oriented**, because many businesses in the sector are smaller firms under cost pressure and may not have in-house sustainability or digital traceability specialists.

Fifth, sector-specific examples from textiles are essential. Generic ESG or digital skills training is useful but insufficient on its own; the DIGITRACE curriculum should translate circularity, traceability and transparency requirements into textile-sector use cases and realistic business processes. https://www.europarl.europa.eu/RegData/etudes/STUD/2024/757808/EPRS_STU%282024%29757808_EN.pdf?utm_source=chatgpt.com

2. Comparison of Existing Training Programs

2.1 Overview

The Bulgarian review indicates that there are still relatively few training offers explicitly dedicated to **Digital Product Passports in textiles**. However, there is a broader and growing landscape of training and learning opportunities related to **sustainable textiles, circularity, green entrepreneurship, recycling, ESG and digital/sustainability transition**. For the purposes of DIGITRACE, these are relevant because they show the current skills ecosystem that Bulgarian textile SMEs can access and they reveal where direct DPP-oriented capacity building is still missing.

2.2 Sector-relevant training solutions (Textiles)

Sector	Thematic scope	Training mode / type of programme	Target group	Links



Textiles industry	Sustainable supply chains in textiles; role of small producers; environmental sustainability in the sector	International conference / knowledge-sharing event	Textile SMEs, academics, sustainability professionals, policymakers	Sofia University international conference on sustainable development in the European textile industry https://www.uni-sofia.bg/index.php/eng/the_university/faculties/faculty_of_economics_and_business_administration/news/international_conference_discusses_opportunities_for_sustainable_development_in_the_european_textile_industry?utm_source=chatgpt.com
Textiles industry	Circular textile policies; implementation of European textile circularity policies	Workshop / academy format	Textile companies, sector organisations, circular economy actors	VERDE Academy workshop via Bulgarian Fashion Association
Textiles industry	Sustainable innovation, green entrepreneurship, labour market skills, sustainability in fashion/textiles	VET-oriented project learning resources / learning center	Students, graduates, VET providers, SMEs, fashion/textile professionals	FEA-VEE Learning Center and project materials https://www.bgfa.eu/verdein-med-project-analyzes-european-textile-circularity-policies-in-its-first-verde-academy-workshop/?utm_source=chatgpt.com



Textiles industry	Green transition in TCLF; open and online training; blended training; work-based learning; new green roles	Erasmus+ training project / blended learning	Learners, VET actors, textile/clothing/leather/footwear professionals, SMEs	SiT Project – Sustainability in TCLF https://feavee.eu/learning-center/?utm_source=chatgpt.com
Textiles industry	Textile management, marketing, sustainability, innovations in textile education	National conference / sector professional event	Textile engineers, business participants, researchers, education providers	XXVII National Textile Conference 2025 https://tok.fnts.bg/en/invitation-for-xxvii-national-textile-conference-2025/?utm_source=chatgpt.com

Analytical comment on sector-relevant trainings

The current textile-related learning landscape accessible to Bulgarian stakeholders is broad enough to support awareness raising, but it remains fragmented. Several available initiatives focus on sustainability, circularity, green entrepreneurship and innovation in the textile and fashion ecosystem, yet they do not appear to constitute a mature national offer for operational DPP implementation.

A notable strength is that Bulgarian organisations and partner-linked initiatives are already engaging with relevant themes such as circular textile policy, work-based learning, sustainability in TCLF, and green entrepreneurship. This creates a foundation on which DIGITRACE can build. At the same time, a key gap remains: there is still limited evidence of structured Bulgarian training that directly teaches textile SMEs how to prepare product-level data, organise traceability information, align with future DPP obligations, and translate sustainability requirements into business processes.

2.3 Accessible ESG-related trainings

Sector	Thematic scope	Training mode / type of programme	Target group	Links

Cross-sector / ESG	ESG management, reporting, energy and climate policy, circular economy, sustainable finance, human rights	National qualification programme / blended format	Sustainability specialists, managers, companies	ESG Academy https://www.esgacademy.bg/?utm_source=chatgpt.com
Cross-sector / ESG	Sustainable management, ESG strategy, reporting and auditing, climate adaptation, human rights in business, sustainable finance	Certification programme	Professionals, companies, managers	Sofia University ESG Academy – Fall 2025 edition https://www.uni-sofia.bg/index.php/eng/the_university/faculties/faculty_of_economics_and_business_administration/news/the_new_edition_of_the_esg_academy_fall_2025_is_now_open_for_enrollment?utm_source=chatgpt.com
Cross-sector / ESG	Structured introduction to sustainable management and current regulations	Certification training	Professionals with initial or developing sustainability interest	Sustainability 2025 certification training, Sofia University https://cleantech.bg/en/project/sustainability-academy-bulgaria/?utm_source=chatgpt.com



Cross-sector / ESG	Free online sustainability courses; practical advice for alignment with EU regulations	Online learning platform	Micro, small and medium enterprises	Sustainability Academy Bulgaria https://cleantech.bg/en/project/sustainability-academy-bulgaria/?utm_source=chatgpt.com
Cross-sector / ESG	Sustainability professionalisation and national expert ecosystem	Association-linked learning ecosystem / networked training environment	Sustainability professionals, companies, experts	Sustainability Specialists Association / linked ESG Academy ecosystem https://www.ssa.bg/en/?utm_source=chatgpt.com

Analytical comment on ESG trainings

The Bulgarian ESG training landscape is more visible and structured than the textile-specific DPP training landscape. This is important because DPP readiness does not depend only on traceability or product data skills; it also depends on broader competencies in sustainability governance, reporting logic, regulatory awareness and organisational transformation. In that sense, accessible ESG programmes can serve as preparatory pathways for SMEs before they move toward more technical DPP-related upskilling.

https://www.esgacademy.bg/?utm_source=chatgpt.com

However, these ESG offers are mostly cross-sector and do not appear to provide textile-specific or DPP-specific implementation training. They are therefore useful but insufficient substitutes for DIGITRACE-type learning. This supports the case for a dedicated programme that links sustainability, compliance, traceability and product data management specifically for textile SMEs. https://www.uni-sofia.bg/index.php/eng/the_university/faculties/faculty_of_economics_and_business_administration/news/certification_training_sustainability_2025?utm_source=chatgpt.com



2.4 Main findings from the training comparison

The comparison of available programmes points to five main conclusions.

First, Bulgaria already has a small but relevant ecosystem of sustainability-oriented learning offers that can support the DIGITRACE agenda indirectly. https://www.esgacademy.bg/?utm_source=chatgpt.com

Second, the textiles ecosystem also has sector-relevant initiatives, but they are dispersed across projects, conferences, associations and learning centers rather than embedded in a mainstream, nationally visible DPP skills pathway. https://www.uni-sofia.bg/index.php/eng/the_university/faculties/faculty_of_economics_and_business_administration/news/international_conference_discusses_opportunities_for_sustainable_development_in_the_european_textile_industry?utm_source=chatgpt.com

Third, current offers appear stronger on **awareness, sustainability and innovation** than on **technical traceability implementation**. https://fea-vee.eu/learning-center/?utm_source=chatgpt.com

Fourth, the training supply suggests that Bulgarian SMEs may currently be more likely to encounter general ESG and circularity content than practical guidance on textile product data, identifiers, traceability architecture and DPP readiness planning. https://fea-vee.eu/learning-center/?utm_source=chatgpt.com

Fifth, the gap between existing learning offers and likely future compliance needs justifies the development of DIGITRACE micro-credentials and short modular learning pathways tailored to SME roles in the textile sector. https://education.ec.europa.eu/education-levels/higher-education/micro-credentials?utm_source=chatgpt.com

3. Recognition and Usability of Micro-Credentials at National Level

3.1 General framing

In Bulgaria, micro-credentials are becoming more visible in policy, project and expert discussions, but they do not yet appear to be fully embedded as a stable and widely implemented national category across the entire formal education and labour market system. The most relevant Bulgarian context is therefore a transitional one: the country has an established qualifications framework and validation-related structures, and it participates in



projects dealing with micro-credentials and recognition of non-formal and informal learning, but systematic large-scale use remains limited. https://www.navet.government.bg/eng/project-green-micro-credentials-pathways-upskill-and-reskilling-low-skilled-adults-for-lifelong-learning-project-no-101087539-greenmicred-pathways/?utm_source=chatgpt.com

a) Are micro-credentials regulated in national legislation?

There is currently no strong evidence that Bulgaria has a fully separate and comprehensive legislative regime dedicated exclusively to micro-credentials as a standalone category across the education system. At the same time, micro-credentials are clearly present in the Bulgarian policy conversation. NAVET has published materials on the European approach to micro-credentials and has participated in projects such as GreenMiCred Pathways. Bulgarian documentation also points to the relevance of recognising skills acquired through non-formal and informal pathways. This indicates a policy opening rather than a fully consolidated legal framework. https://www.navet.government.bg/eng/project-green-micro-credentials-pathways-upskill-and-reskilling-low-skilled-adults-for-lifelong-learning-project-no-101087539-greenmicred-pathways/?utm_source=chatgpt.com

b) Does the national qualifications framework (NQF) include micro-credentials and at what EQF level?

Bulgaria has an eight-level national qualifications framework linked to the EQF. However, available evidence suggests that micro-credentials are not yet clearly established as a distinct and systematically embedded element of the Bulgarian NQF in the same way as formal qualifications. Instead, Bulgaria's framework and validation practices create conditions that could support micro-credential use, especially where learning outcomes, recognition and EQF referencing are clearly defined. For DIGITRACE, the most relevant levels are EQF 5–7, where upskilling for technical, managerial and compliance-oriented SME roles would be most meaningful. https://www.cedefop.europa.eu/en/tools/timeline-vet-policies-europe/search/28057?utm_source=chatgpt.com

c) Do higher education/VET institutions recognize micro-credentials from other providers (e.g. companies, NGOs) for degrees or ECTS credits?

The evidence available does not suggest that Bulgaria has a strong, nationwide and standardised system through which higher education or VET institutions systematically recognise micro-credentials issued by external providers for degree progression or ECTS credit transfer. Recognition appears to be more uneven and context-specific. However, the broader European policy direction and Bulgarian engagement with validation of prior learning and recognition of non-formal learning suggest that future recognition pathways are possible, especially where quality assurance, transparent learning outcomes and trusted issuers are in



place. https://www.navet.government.bg/bg/media/accreditation-strategy-guide-final-version.pdf?utm_source=chatgpt.com

d) Do SMEs recognize employees' micro-credentials in recruitment or promotions?

There is limited direct national evidence showing that Bulgarian SMEs systematically use micro-credentials in recruitment or promotion decisions. It is more accurate to say that Bulgarian employers are likely to value short, practical and directly relevant training, but formal recognition of micro-credentials as a distinct hiring or promotion signal does not yet appear widespread. This is consistent with a labour market in which shorter forms of upskilling are becoming more relevant, but trust, visibility and standardisation are still developing. https://www.navet.government.bg/bg/media/accreditation-strategy-guide-final-version.pdf?utm_source=chatgpt.com

e) What benefits have SMEs gained from micro-credentials (e.g. faster training, competence growth, savings)?

For Bulgaria, the available evidence supports a cautious interpretation: the potential benefits of micro-credentials for SMEs are clear, even if broad national proof of large-scale realised benefits remains limited. These benefits include faster and more targeted upskilling, better responsiveness to changing skills demands, recognition of learning acquired outside formal degree programmes, and lower training burdens compared with longer traditional pathways. NAVET's strategic materials explicitly describe micro-credentials as useful for validating skills from workplace learning and online courses and for supporting mobility and adaptability. This makes them particularly relevant for fast-evolving areas such as DPP readiness, traceability and green transition skills.

f) Are micro-credentials used in SMEs for upskilling (yes/no, examples)? State barriers.

Micro-credentials appear to be **emerging but not yet mainstream** in Bulgarian SME upskilling. Their use is more visible in policy pilots, project environments and sectoral innovation discussions than in widely institutionalised labour market practice. In other words, the Bulgarian environment is promising for future use, but uptake still seems limited and fragmented. https://www.navet.government.bg/bg/media/accreditation-strategy-guide-final-version.pdf?utm_source=chatgpt.com

The main barriers are likely to include:

- limited formal recognition and regulatory clarity;
- insufficient awareness among SMEs;
- weak common understanding of what micro-credentials represent;



- uneven trust in non-traditional credentials;
- fragmented provider landscape;
- limited linkage to recruitment, promotion and qualification systems;
- the continued dominance of traditional certificates and formal qualifications in employer practice.

4. Relevance of DIGITRACE micro-credentials for Bulgaria

Despite these barriers, DIGITRACE micro-credentials could have strong relevance and practical usefulness in Bulgaria if they are designed carefully. Their value would increase if they are:

- based on clear learning outcomes;
- linked to real SME job roles;
- aligned with EQF logic and European transparency principles;
- validated through credible delivery and assessment processes;
- issued in interoperable digital formats, such as European Digital Credentials for Learning where appropriate.

For the Bulgarian textile sector specifically, this approach would be highly suitable because companies are likely to need short, focused and practical learning units rather than long formal programmes. Micro-credentials could therefore support targeted upskilling in areas such as textile product data, material traceability, sustainability compliance, chemical and composition transparency, repair and recycling information, and DPP-related workflow organisation. https://europass.europa.eu/en/european-digital-credentials?utm_source=chatgpt.com

5. Concluding remarks

The Bulgarian textiles sector is likely to be significantly affected by the transition toward Digital Product Passports, yet current readiness appears partial and uneven. Awareness is increasing through EU policy developments, Bulgarian standards and chamber-led discussions, and sustainability-oriented sector initiatives. At the same time, the existing national training ecosystem remains more developed in general ESG and sustainability content than in operational DPP implementation for textiles.

The main barriers for Bulgarian textile SMEs are likely to include limited implementation capacity, uneven digital maturity, limited access to textile-specific DPP guidance, and gaps in data, traceability and compliance-related skills. The sector therefore needs practical, modular and role-based training support. DIGITRACE is well positioned to respond to this need by



creating micro-credential-based learning pathways that bridge sustainability, digital readiness and compliance in a way that is accessible and meaningful for Bulgarian SMEs.

6. Source list for the reference section

You can use the following as your final reference list in the report:

- Regulation (EU) 2024/1781 establishing a framework for the setting of ecodesign requirements for sustainable products.
- European Commission, Sustainable and Circular Textiles Strategy.
- European Commission, Circular Economy Action Plan.
- European Commission / JRC, DigComp 2.2.
- European Commission / Europass, European approach to micro-credentials and European Digital Credentials for Learning.
- National Statistical Institute of Bulgaria, Industrial Production Indices releases.
- GS1 Bulgaria and BCCI materials on Digital Product Passport.
- NAVET Bulgaria materials on micro-credentials and validation.
- Sofia University and sector training/event materials.
- Bulgarian Fashion Association, FEA-VEE, SiT, BACT and ATR materials.



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DIGITRACE

**Digital Traceability Skills for Competitive
and Sustainable Ecosystems**

Dutch DIGITRACE Report

National DIGITRACE Report: Analysis of Needs and Readiness for DPP
Project: DIGITRACE – Digital Traceability and Compliance for Sustainable SMEs
Country: The Netherlands
Date: 30.04 2026
Prepared by: LIDI Smart Solutions

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1. Introduction

1.1 General context

The Netherlands has a strong reputation when it comes to digital development within the European Union. Over the past years, it has built a solid infrastructure and a business environment where digital tools are widely used, especially among SMEs. According to Statistics Netherlands (CBS), the number of SMEs has grown significantly, reaching more than 1.5 million in 2024. Much of this growth is linked to the increase in self-employed professionals. These businesses are mainly active in sectors such as services, agriculture, logistics, and retail, which together form the backbone of the Dutch economy.

The Netherlands is one of the world's leading agricultural exporters, with a highly competitive agri-food sector that plays a significant role in the national economy. According to the Dutch government, the agricultural and horticultural sectors account for around 10% of the Dutch economy and employment when the broader agri-food complex – including food processing and trade – is taken into account. Dutch agriculture is globally recognised for its innovation in precision farming, greenhouse horticulture, dairy, and supply chain management. This combination of digital maturity and agricultural leadership makes the Netherlands a strong testing ground for Digital Product Passport (DPP) implementation, particularly in the agriculture sector.

Even with this strong digital position, many Dutch SMEs are still not fully prepared for upcoming requirements like Digital Product Passports. In practice, businesses often struggle with things like upgrading their IT systems, handling and sharing data across the supply chain, and covering the costs of these changes. Smaller companies, in particular, can find it difficult to keep up, especially when standards are still evolving and not always aligned across sectors.

1.2 Sector-specific context: textiles in the Netherlands

The Dutch agricultural sector is characterised by its high degree of intensification, technological adoption, and export orientation. The Netherlands leads globally in areas such as greenhouse horticulture, precision farming, livestock management, and agri-food logistics. Key subsectors include dairy, arable farming, horticulture, floriculture, and food processing.

For DPP implementation, the agricultural sector presents a distinctive situation. Unlike textiles or batteries, agriculture and food products are currently excluded from the scope of the Ecodesign for Sustainable Products Regulation (ESPR) as food and feed fall under separate EU regulations (e.g. General Food Law, Farm to Fork Strategy). However, the DPP concept has strong relevance for Dutch agriculture through several indirect pathways:

- **Farm-to-fork traceability:** The EU Farm to Fork Strategy calls for enhanced transparency across the food supply chain, including digital traceability of raw materials, inputs, and



environmental impacts. Dutch agricultural SMEs are increasingly required to document sustainability credentials for export markets.

- **Agricultural inputs and machinery:** Farm equipment, fertilisers, and packaging materials may fall under ESPR product categories in future work plans, requiring data on material composition, recyclability, and environmental footprint.
- **Product Environmental Footprint (PEF):** The EU is developing standardised methods for calculating the environmental footprint of food products, which will require structured product data comparable to DPP requirements.
- **Organic and sustainability certifications:** Dutch farmers are already managing increasing volumes of compliance documentation for schemes such as GlobalG.A.P., SKAL organic certification, and Planet Proof labels. DPP infrastructure could streamline and digitise these processes.

1.3 EU-level initiatives

Ecodesign for Sustainable Products Regulation (ESPR), Regulation (EU) 2024/1781. The ESPR is the central legislative framework for DPP. It establishes the legal basis for product-specific delegated acts and data-related obligations. The first ESPR Work Plan (2025–2030) prioritises textiles, furniture, tyres, mattresses, iron/steel, and aluminium. Agriculture is not directly covered in this first wave, but agricultural equipment and packaging may be included in subsequent work plans. The Commission’s public consultation on DPP technical standards launched in April 2025 is relevant for all sectors.

EU Farm to Fork Strategy. This strategy aims to make EU food systems fair, healthy, and environmentally friendly. It calls for enhanced traceability, sustainability labelling, and digital tools for food supply chain transparency. Though not a DPP regulation per se, it creates a parallel demand for the same data competencies.

Circular Economy Action Plan (CEAP). The CEAP (2020) remains a cornerstone of EU circular economy policy, with initiatives covering product lifecycle, waste prevention, and resource efficiency. The DPP is positioned as a “data backbone” for CEAP implementation.

DigComp 2.2 / 3.0 framework. The European Commission’s framework for digital competences provides reference points for data handling, digital literacy, and information management – all relevant for DPP-related upskilling.

European approach to micro-credentials and European Digital Credentials for Learning. The EU Council recommendation (June 2022) provides a common definition and standard elements for micro-credentials, supporting transparent, quality-assured, and portable learning. The Europass digital credentials infrastructure enables verifiable digital qualifications.



1.4 National-level initiatives

Centre of Excellence for Digital Product Passport (CoE-DPP). Announced in February 2025 at the Data Sharing Festival and formally operational from 24 March 2025, the CoE-DPP operates under the umbrella of the Centre of Excellence for Data Sharing & Cloud (CoE-DSC). It is funded by the Dutch Ministry of Economic Affairs and Climate and coordinated by TNO. The CoE-DPP serves as the central Dutch point for all DPP information and developments, working closely with GS1 Netherlands on data standards and interoperability. In July 2025, GS1 and TNO formalised a new partnership within the CoE-DPP. The initiative emphasises cross-sectoral cooperation and has published a DPP Landscape Scan and DPP Adoption Pulse report mapping the Dutch ecosystem (coe-dpp.nl).

Dutch Digitalisation Strategy. The Netherlands consistently ranks among the top EU countries in digital readiness, with over 98% broadband coverage and strong positions in connectivity, digital public services, and business digitalisation. The national strategy focuses on accelerating digital transition in the SME sector, promoting digital innovation and skills, creating conditions for effective digital markets, and maintaining secure digital infrastructure. These priorities align with the data and digital competencies required for DPP.

National Circular Economy Programme (NPCE) 2023–2030. The Dutch government has set the target of a fully circular economy by 2050, with a 50% reduction in primary raw material use by 2030. The NPCE is implemented in cooperation with the Ministries of Economic Affairs, Agriculture, and Infrastructure. The “Versnellingshuis Nederland Circulair!” (Circular Economy Accelerator) supports SMEs with knowledge, network partners, and financing for circular transition. The CIRCO Tracks programme offers three-day sector-specific workshops for companies to enhance circular practices.

NWO Research Programme on Digital Product Passports. The Dutch Research Council (NWO) has launched a dedicated 2-year research programme on DPP application in practice, aimed at researchers from universities of applied sciences together with practice partners. This demonstrates emerging Dutch academic engagement with DPP.

TNO and Data Spaces Support Centre (DSSC). TNO, the Netherlands Organisation for Applied Scientific Research, together with European partners within the DSSC, has developed a standardised blueprint and toolbox for data sharing – directly relevant to the interoperability requirements of DPP systems.

RVO (Netherlands Enterprise Agency). RVO provides various support programmes for SME digitalisation and sustainability, including vouchers, advisory services, and financing instruments for innovation and green transition.

1.5 Implications for training solutions



The Dutch context suggests four main implications for DIGITRACE training design in the agriculture sector:

- First, Dutch agricultural SMEs need training that bridges the gap between their already strong digital foundations and the specific data management, traceability, and compliance skills required by future DPP-type obligations.
- Second, training should combine regulatory understanding (ESPR, Farm to Fork, PEF) with practical data management skills – product data structuring, identifier systems, supply chain data exchange, and sustainability documentation.
- Third, role differentiation matters. Farm managers, ICT staff, production/supply chain workers, and marketing/sales teams in agricultural SMEs require different depth and focus in their training.
- Fourth, the existence of national initiatives like CoE-DPP, CIRCO Tracks, and NWO research programmes provides a supportive ecosystem on which DIGITRACE can build.

2. Comparison of Existing Training Programs

There are quite a few training programmes available in the Netherlands that focus on agriculture, sustainability, and food systems. However, when looking more closely, most of them do not really address the specific skills needed for Digital Product Passports. They tend to focus more on general topics like sustainability or ESG reporting, rather than on practical things such as managing product data or setting up traceability systems. This creates a noticeable gap, especially for SMEs that will need these skills in the near future.

2.1 Sector-relevant training solutions (Agriculture)

Sector	Thematic scope	Training mode / type of programme	Target group	Links
Agriculture	Sustainable farming, lighthouse farm concept, nature-inclusive agriculture	HEI blended course + field trip (certificate)	Farming professionals, sustainability roles, agri-SMEs	https://www.wur.nl/en/education-programm...



Agriculture	Agri-food systems, biotechnology, supply chain sustainability	Summer school (12 days, blended)	Students, entrepreneurs, industry representatives	https://www.wur.nl/en/education/for-professionals/programmes-and-courses/summer-school-biotechnology-agriculture-and-food
Agriculture	Horticulture & business management, international food & agribusiness	HEI Bachelor (4 years, full-time)	Students, future agribusiness professionals	https://www.has.nl/en...
Agriculture	Vertical farming: crop production, LED cultivation, sustainability assessment	Blended course (4 weeks, 60 hours, certificate)	Professional growers, tech developers, breeders	https://www.wur.nl/en/how/course-vertic...
Agriculture	Greenhouse horticulture: climate, crop physiology, resource efficiency	Summer school (10 days intensive)	PhD students, professionals, scientists	https://www.wur.nl/en/education/for-prof...

2.2 Accessible ESG-related trainings

Sector	Thematic scope	Training mode / type of programme	Target group	Links



Cross-sector / ESG	ESG governance: CSRD, CSDDD, sustainable finance, supply chains	Multi-day programme (workshops + case studies)	SME managers, compliance, sustainability professionals	https://www.iccwbo.nl/esg-governance-training-2025
Cross-sector / ESG	ESG strategy, reporting, regulations (custom learning paths)	Blended (e-learning + workshops, tailored)	SME teams, managers, sustainability officers	https://www.pwc.nl/en/pwc-academy/our-esg-training-offer.html
Cross-sector / ESG	ESG fundamentals, GHG emissions, sustainability auditing	Online / classroom / blended courses	SMEs, compliance teams, consultants	https://www.sgs.com/en-nl/services/esg-t...
Cross-sector / ESG	Corporate Governance and Sustainability (ESG)	Summer school (Utrecht, 5 days)	Bachelor/Master students, young professionals	https://utrechtsummerschool.nl/courses/law/corporate-governance-and-sustainability-esg
Cross-sector / ESG	Circular economy for SMEs, CIRCO Tracks (sector-specific workshops)	3-day programme (sector-specific, practical)	SMEs across sectors	https://www.circonl.nl/circo-tracks/
Cross-sector / ESG	ESG laws and regulations for	Online and classroom training	Compliance officers, financial sector, managers	https://www.ministryofcompliance.nl/



	financial sector and business			en/courses/esg-awareness/
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2.3 Accessible ESG-related trainings

Looking at the available training programmes, a few things become clear. First, the Netherlands already has a strong educational base in agriculture, with institutions like Wageningen University and HAS Green Academy offering high-quality programmes. At the same time, there are also many courses related to ESG and sustainability, often provided by universities or private organisations.

However, there is still something missing. None of the existing programmes really focus on how Digital Product Passports would work in practice, especially for agricultural SMEs. Most courses stay on a more general or strategic level and do not go into detail about things like data standardisation, interoperability, or traceability systems.

Because of this, there is an opportunity for DIGITRACE to fill that gap by offering more practical and targeted training that connects sustainability knowledge with real implementation skills.

3. Recognition and Usability of Micro-Credentials at National Level

The following assessment focuses on how DIGITRACE micro-credentials can fit into Dutch national recognition systems, ensuring usefulness for upskilling agricultural SMEs in DPP compliance, with a focus on EQF levels 5–7.

a) Are micro-credentials regulated in national legislation?

The Netherlands does not have a single, dedicated law exclusively governing micro-credentials. However, the Dutch policy and institutional environment is more advanced than many EU countries in accommodating them. The NLQF (Nederlands Kwalificatieraamwerk) has been open to non-formal qualifications since its inception, and the National Coordination Point NLQF (NCP-NLQF) actively registers non-formal qualifications – including partial qualifications and micro-credentials. According to CEDEFOP (2024), 71 non-formal qualifications were included in the NLQF in 2023 and 2024, bringing the total to 279 by February 2025. The Netherlands is also part of a cross-ministerial working group piloting framework changes to further integrate micro-credentials. CINOP, the organisation managing NLQF registrations, expects to receive 60–65



applications for the levelling of qualifications in 2025, as reported in the EQF Advisory Group meeting documentation (June 2025).

b) Does the national qualifications framework (NQF) include micro-credentials and at what EQF level?

The NLQF has eight levels plus an entry level, aligned to the EQF. It covers both government-regulated qualifications (formal education) and non-regulated qualifications (private/labour market). Micro-credentials can be positioned within the NLQF when they meet the registration criteria: clear learning outcomes, quality-assured assessment, and a relevant qualification owner. The NLQF levels most relevant for DIGITRACE are: Level 5 (Associate Degree / higher vocational level), Level 6 (Bachelor's level), and Level 7 (Master's level). The NLQF is distinctive in its openness to non-formal and international qualifications, which provides a relatively accessible pathway for DIGITRACE micro-credentials to gain formal level indication.

c) Do higher education/VET institutions recognize micro-credentials from other providers?

Dutch higher education and VET institutions do not automatically grant ECTS credits for externally issued micro-credentials. However, the Netherlands has a well-established tradition of validation of prior learning (EVC – Erkennen van Verworven Competenties), which provides a mechanism for recognising learning acquired outside formal programmes. Individual institutions, particularly universities of applied sciences (hogescholen), may recognise external credentials on a case-by-case basis, especially when the micro-credential has clear learning outcomes and is aligned with programme-level descriptors. The Accreditation Organisation of the Netherlands and Flanders (NVAO) oversees quality assurance in higher education and provides the framework within which such recognition can occur. For DIGITRACE, collaboration with accredited Dutch institutions would significantly strengthen the pathway to formal recognition.

d) Do SMEs recognize employees' micro-credentials in recruitment or promotions?

Dutch SMEs are generally pragmatic about skills recognition. Employer recognition of micro-credentials is emerging but not yet mainstream. In the Netherlands, practical skills and demonstrated competence tend to carry weight in recruitment, particularly in the agricultural sector where hands-on expertise is valued. However, formal widespread recognition of micro-credentials as a distinct hiring or promotion signal is still developing. The NLQF's efforts to increase visibility and the growing employer familiarity with short, modular certifications are gradually improving this situation. Effective communication about the NLQF remains a key challenge, as many stakeholders do not yet fully understand how the framework can benefit them.



e) What benefits have SMEs gained from micro-credentials?

In the Netherlands, there is not a lot of concrete data yet on how micro-credentials are being used specifically in agriculture. Still, based on broader European trends, they seem to offer some clear advantages. They allow people to learn specific skills in a shorter time and can be more flexible than full degree programmes. For SMEs, this can be useful because employees can upskill without taking long breaks from work. This is especially relevant in agriculture, where work is often seasonal and time is limited.

f) Are micro-credentials used in SMEs for upskilling? State barriers.

Micro-credentials are beginning to be used in Dutch SMEs for upskilling, particularly through short professional development courses, industry certifications, and online learning platforms. The Dutch context is more advanced than many EU countries due to the NLQF's openness and the strong adult learning culture. However, systematic large-scale adoption is not yet established.

At the same time, there are still some challenges when it comes to using micro-credentials in SMEs. Many smaller businesses are simply not familiar with the concept yet, or they are unsure how valuable these credentials really are. It can also be difficult to compare different courses, since there is no single standard. On top of that, limited budgets and time constraints can make it harder for SMEs to invest in training. In some rural areas, access to digital learning tools can also be an issue. The main barriers are likely to include:

4. Practical recommendations for DIGITRACE micro-credentials in the Netherlands (levels 5–7)

For DIGITRACE micro-credentials to have maximum national benefit for Dutch agricultural SMEs, they should:

- Be designed with clear learning outcomes mapped to NLQF/EQF level descriptors (5–7), enabling potential future registration in the NLQF.
- Use verifiable digital credentials (e.g. Europass/EDC format) to maximise portability and employer trust.
- Be modular and stackable, reflecting the Dutch policy preference for flexible, combinable learning units.
- Address agriculture-specific DPP content: farm-to-fork data management, sustainability labelling, PEF methodology, traceability identifiers, and supply chain data integration.



5. Concluding remarks

Overall, the Dutch agricultural sector has a good starting point when it comes to preparing for Digital Product Passports. It already benefits from strong digital infrastructure and a well-developed education system. At the same time, there is still a gap between general sustainability knowledge and the more practical skills needed for DPP implementation. This is where initiatives like DIGITRACE can play an important role by offering focused, flexible training that helps SMEs move from theory to actual practice.

The establishment of the Centre of Excellence for Digital Product Passport (CoE-DPP) in 2025 signals growing Dutch institutional commitment to DPP implementation, but practical SME-level training remains a gap. The NLQF's relative openness to micro-credentials and the Netherlands' strong adult learning culture provide a favourable environment for DIGITRACE interventions.

DIGITRACE is therefore well-positioned to contribute to the Dutch agricultural SME ecosystem by providing targeted, modular, role-based training that bridges sustainability knowledge with practical DPP readiness – filling a gap that existing programmes do not yet address.

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DIGITRACE

**Digital Traceability Skills for Competitive
and Sustainable Ecosystems**

Norwegian DIGITRACE Report

National DIGITRACE Report: Analysis of Needs and Readiness for DPP

Project: DIGITRACE – Digital Traceability and Compliance for Sustainable SMEs

Country: Norway

Date: 21.04 2026

Prepared by: Prios Kompetanse AS

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1. Introduction – National Context

This desk research fills in the questions in DIGITRACE WP2 for Norway, with the main emphasis on plastics, but with status and relevance also for the other sectors included in DIGITRACE.

The status and assessments are written based on the situation as of 30.03.2026. For regulatory requirements and timelines, emphasis has been placed on newer sources, i.e. after 2024 and on primary sources where available, such as the European Commission's work plan¹ and Norwegian authority sources such as the EEA Memorandum, legislative text, directorate and consultation pages.

Important Norwegian institutions in the material are: The Norwegian Environment Agency ([link](#)), the Norwegian Water Resources and Energy Directorate (NVE - [link](#)), the Norwegian Digitalisation Agency (Digdir - [link](#)), the Norwegian Directorate for Higher Education and Skills (HK-dir - [link](#)) and NOKUT ([link](#)).

Norway is closely linked to the EU's regulatory development for products through the EEA, and the DPP will in practice affect Norwegian companies when they sell to the EU/EEA market, import products that are covered, or are part of value chains that must provide data to manufacturers/importers. DPP becomes a core element of the new EU framework for sustainable products through the Ecodesign Regulation (ESPR)¹.

A key Norwegian move is that Norway has already established a separate legal basis that will be able to incorporate and enforce new product requirements from the EU: **The Act on Sustainable Products and Value Chains** (in force from 01.07.2024). The purpose of the Act is to promote sustainable products and value chains, and is justified by the fact that a strengthened product framework is being developed in the EU within the circular economy policy².

At the same time, Norwegian government sources point out that the ESPR itself (EU 2024/1781) **was not incorporated into the EEA and Norwegian law** on the status pages that were available (including NVE's status page from 2025). In practice, this means that many Norwegian companies have to deal with requirements in the EU market before full Norwegian incorporation, and that the need for expertise (data, traceability, product requirements, documentation) therefore comes early³.

a) EU-Level Initiatives:

- Ecodesign for Sustainable Products Regulation (ESPR) (EU) 2024/1781 and implementation schedules.
The ESPR establishes a framework where ecodesign requirements are set through delegated legal acts. The European Commission's Work Plan for 2025-2030 explains that ecodesign requirements can cover both performance (e.g. durability, spare parts, minimum recycled content) and product information, and that product information should mainly be made available through the Digital Product Passport (DPP) – or through



alternative digital systems that provide equivalent information (e.g. EPREL for energy-labelled products)¹.

The work plan also specifies some DPP principles that are directly relevant to education: DPP should enable "need-to-know" data access for businesses, consumers and governments, and be based on open, non-proprietary international standards. The content of the DPP is specified in product-specific delegated acts (and any other relevant legislation) and may include, among other things, information on material composition, substances of concern, and instructions for safe use, recycling and disposal¹.

The same work plan provides a basis for planning sector-specific competence: The first work plan (2025–2030) contains four "final products" (textiles/apparel, furniture, tires, mattresses), two "intermediate products" (iron/steel, aluminium), and two horizontal measures. It also describes a setup with a mid-term review in 2028 to provide predictability.

For training, it is also relevant that Norwegian standardisation environments point out that DPP will require new technologies and processes in product development and value chains⁴.

- Updates to the Circular Economy Action Plan (CEAP).
The EU's Circular Economy Action Plan (CEAP, 2020) remains a "cornerstone" of the EU's circular economy policy and points in particular to measures across the entire product lifecycle, including product design, waste prevention and better utilisation of resources in the economy⁵.

In the period after 2020, several CEAP packages and related initiatives have been introduced that set the framework for DPP and competence needs in companies, such as work with packaging/packaging waste, right to repair, and strengthened consumer information (including digital solutions and more standardized product information). This is important because the DPP in practice becomes a "data backbone" that will make such instruments possible to enforce and use in the market⁶.

In parallel, Norway has launched its own action plan for the circular economy (2024–2025). It explicitly points to restructuring in several value chains (including plastics and food) and that new regulations are being developed through the EU/EEA cooperation⁷.

- Europass/EQF micro-credentials framework for digital skills.
At the EU level, two basic pillars are important for DIGITRACE's micro-credentials:
 - The EU Council's recommendation (16.06.2022) provides a common European definition and standard elements for micro-credentials. It points out that micro-credentials should be transparent, quality-assured and be able to be described in a way that makes them comparable and recognisable across countries and sector⁸.



- At the same time, Europass's system for European Digital Credentials for Learning (EDC) is relevant as a "technical format": EDCs are verifiable digital qualifications that can cover everything from diplomas to certificates and micro-credentials, and the European Commission provides infrastructure for issuing, storing, sharing and verifying such digital qualifications⁹.
- DigComp 3.0, framework for data/traceability competencies.
The recently released DigComp 3.0 (the European Commission's Common Framework for Digital Competences) provides an updated set of examples of knowledge, skills and attitudes that can be used when creating learning outcome descriptions for digital skills. Although DigComp is a general framework, it is useful for DPP because DPP requires practical digital skills related to information management, data, sharing, security and understanding of digital systems in value chains¹⁰.

b) National-Level Initiatives:

- National digital transformation programs
The national digitalisation strategy "The digital Norway of the future – 2024 – 2030" sets the direction for digitalisation in Norway towards 2030 and emphasises, among other things, data utilisation, data sharing and governance/coordination across sectors¹⁴.

Digdir also follows up the strategy with indicators for the business sector's data use and data-driven innovation (e.g. measurement points for the proportion of enterprises that use data from the public sector). Such frameworks are relevant because the DPP assumes that companies are able to handle data in a structured way and share data with the right recipients¹⁵.

- VET/HEI curricula in sustainable development (e.g., sector-specific courses).
On the Norwegian side, there is a clear policy track for more flexible and work-oriented education, particularly in higher vocational education (tertiary vocational school). In Meld. St. 11 (2024–2025), micro-credentials are described as documentation of qualifications obtained through a quality-assured, short and flexible educational programme – and as an EU-inspired instrument for making competence enhancement more accessible¹⁶.

This is relevant for DIGITRACE because the DPP/ESPR competence needs are typically "rapidly growing" and interdisciplinary (regulations, data, material knowledge, process, quality), and therefore fit well with short, modular courses that can be built up ("stackability"). The Directorate of Higher Education also describes mini-qualifications/micro-courses as short, targeted and flexible courses with few credits that can be combined into larger units¹⁷.

- SME support programs for CE/ESPR compliance.
Norway has several broad policy instruments that can be used to support SMEs in restructuring and skills development that indirectly cover DPP/ESPR needs:



- The tripartite industry programme for skills development is a collaboration between the state and the social partners, with the aim of increased participation in skills development in selected industries, and sets up short and relevant education programmes that can be combined with work¹⁸.
- Kompetansepluss Arbeid provides grants for training in basic skills, including digital skills, in working life. This can be a "first step" for many SMEs before moving into more advanced DPP training¹⁹.
- The Green Platform (Research Council of Norway/Innovation Norway/Siva) is a major innovation instrument for the green transition in the business sector, and relevant for companies that need to develop new solutions for data, traceability, material flow and documentation. For SMEs the role in such programs will be to fill minor roles²⁰.
- In the plastics area, there are also separate funding streams aimed at reduced plastic use and a more circular plastics economy that can be linked to pilots and training/implementation²¹.

Sector-specific status: Plastics and other DIGITRACE sectors

Below is a practical "status of the industries in the table", with an emphasis on what drives DPP requirements, what is the nearest time horizon, and what it means for training.

Sector	Nearest regulatory drivers (EU/Norway)	DPP/Traceability Status as of 2026	Typical SME Training Needs
Plastic	Norwegian circular economy policy with plastics as a clear area; producer responsibility for packaging/beverage packaging and extended producer responsibility for certain single-use plastic products²². The EU Directive on drinking water and for food contact materials³² are also important drivers because they set strict requirements for the traceability of chemicals and material building blocks. Here there are developed positive lists that one must document that all the building blocks of the product's materials are on the positive lists. The EVL Directive (End-of-Life Vehicles)³³ sets requirements for recycled content of plastics, where a certain amount of this must come from the automotive industry.	The DPP comes primarily through ESPR and product-specific delegated acts. Plastic as a material is included in many product groups, but plastic "as a separate product group" is not among the first priorities in the ESPR work plan 2025–2030. Nevertheless, DPP expertise comes early, because plastics companies are often subcontractors to textiles, furniture, electronics and packaging, and must provide composition data, chemicals and recycling information¹.	Data on polymer/material mixtures, additives and substances of concern, mass balance, customer/supplier requirements, traceability in production, and documentation into customers' DPP¹.
Textiles	Textiles are prioritised in the ESPR Work Plan 2025–2030. Norway is investigating/preparing extended producer responsibility for textiles and stricter frameworks for collection/processing^{on 1} October.	High probability of early DPP-relevant phasing-in, since textiles are in the first wave in the work plan. National players also point out that the ESPR has provisions that affect the textile sector (e.g. related to the handling of unsold goods).	Data model for material content (fiber blends), chemicals, supply chain, repair/maintenance, and link between ERP/PLM and DPP.
Automotive	Strong DPP driver via battery regulations: The EU Battery Regulation describes a digital battery passport for industrial and	Although cars are not a priority in the first ESPR work plan, battery passports will serve as the "first operational DPP" in many value chains, and will reach players in the EV and battery value chain	DPP practices at the component level: unique identifiers, QR/data carriers, access management, operation of data throughout the

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Sector	Nearest regulatory drivers (EU/Norway)	DPP/Traceability Status as of 2026	Typical SME Training Needs
	electric car batteries with requirements from February 2027 ²³ .	(importers, workshops, recyclers, logistics companies) on 23 April.	life cycle (service, "second life", waste).
Agriculture	Primarily indirectly via machines/equipment that may be covered by ecodesign requirements, and via increased digitalization in Norway. The first ESPR work plan does not specifically point to agricultural equipment ¹ .	DPP under ESPR may be included in later work plans and via product groups that affect equipment/machines or input factors. As of 2026, agriculture-related SMEs should first and foremost build general data and traceability skills that can be reused.	Data flow, master data, traceability in warehouses/logistics, easy integration with requirements from supply chains (machine suppliers, spare parts) ¹⁵ .
Food	ESPR has exceptions (food/feed, etc.). At the same time, the food industry already has strong traceability requirements through other regulations, but not as DPP under ESPR ²⁴ .	DPP as a concept can inspire (standardized digital product info), but ESPR-DPP is basically not a "food passport". For DIGITRACE, this means that the food track in Norway should be more about transferable traceability expertise than direct ESPR requirements.	Data standards, traceability, quality system and documentation, but with adaptation to food regulations and existing industry solutions.

2. Comparison of Existing Training Programs

Norway offers a wide range of training programmes in sustainability, circular economy, and value chain management, particularly through universities and continuing education schemes. These programmes provide strong theoretical and strategic foundations, including lifecycle thinking, circular business models, and sustainable supply chain management. However, there is a clear gap in training related to the operational implementation of Digital Product Passports, especially in relation to structured product data, interoperability, and SME-oriented practical application. Existing programmes tend to focus on conceptual sustainability rather than the digital and technical competencies required to implement EU DPP requirements in practice.

Sector	Thematic scope	Training mode, type of programmes (studies/courses, online, face to face)	Target group	Links
Automotive industry	Battery systems, sustainability in transport, lifecycle thinking	HEI courses (Bachelor/Master), EVU modules	Engineers, mobility sector, SMEs	https://www.ntnu.edu
Automotive industry	Circular economy, battery recycling, critical materials	Research-based training, seminars	Industry professionals, sustainability roles	https://www.sintef.no
Textiles industry	Sustainable textiles, circular design, material lifecycle	HEI courses + workshops	Designers, SMEs, production companies	https://www.oslomet.no
Textiles industry	Chemical management, environmental compliance (REACH-like topics)	Industry courses, seminars	Industry professionals	https://www.norskindustri.no
Agriculture	Farm-to-Fork, sustainable food systems, resource management	HEI courses + VET (practical training)	Farmers, agri-SMEs, students	https://www.nmbu.no
Agriculture	Organic certification, sustainable production methods	VET + advisory training	Farmers, cooperatives	https://www.debio.no

Agriculture	Sustainable farming, circular bioeconomy	VET + apprenticeships	Students, agri-sector SMEs	https://www.maere.vgs.no
Food / aquaculture	Sustainable food production, traceability in value chains	VET + practical training	Aquaculture and food SMEs	https://www.val.vgs.no
Plastics industry	Recycling systems, circular plastics, material efficiency	Industry training, webinars	Manufacturing SMEs, production staff	https://www.norskindustri.no
Plastics industry	Bioplastics, sustainable materials, industrial processes	HEI + research-based training	Product developers, engineers	https://www.sintef.no
Electronics	Sustainable electronics, lifecycle and durability	HEI courses	Engineers, product developers	https://www.ntnu.edu
Electronics	Critical raw materials, supply chain transparency	Research training, seminars	Industry, policy actors	https://www.sintef.no
Cross-sector (ESG)	ESG reporting (CSRD), sustainability strategy	EVU courses (online/part-time)	Managers, SMEs	https://www.bi.no
Cross-sector (ESG)	Climate accounting, carbon footprint	Online/self-paced courses	SMEs, consultants	https://www.miljodirektoratet.no
Cross-sector (ESG)	Circular economy for SMEs	Workshops + online modules	SMEs across sectors	https://www.innovasjon norge.no
Cross-sector (ESG)	Ethical trade, supply chain transparency	Courses + webinars	Procurement, SMEs	https://www.etiskhandel.no
Cross-sector (VET)	Sustainability in vocational trades (construction, industry)	VET + apprenticeship	Skilled workers, SMEs	https://www.udir.no



Cross-sector	Supply chain management and digitalisation	HEI EVU course (7.5 ECTS)	Logistics roles, SMEs	https://www.ntnu.no
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3. Recognition and Usability of micro-credentials at national level

Specify how DIGITRACE micro-credentials fit into national recognition systems, ensuring usefulness for upskilling SMEs in DPP compliance. Focus on integration with EQF and practical validation for levels 5-7. Refer to sources such as needs assessments, reports, and projects on micro-credentials implementation when answering individual questions.

In Norway, it is important to distinguish between:

Formal education with credits (accredited courses/offers in vocational schools, universities/colleges), which can be placed in NKR and thus linked to EQF²⁵.

Non-formal training (courses from industry, suppliers, NGOs, internal academies), which must be recognised more often through practice (employers' trust, industry schemes) or through validation/prior learning assessment²⁶.

In Norway, DIGITRACE micro-credentials can have the most "use-value" for SMEs when they:

- (1) are described with learning outcomes and assessment,
- (2) can be linked to NKR/EQF level (5-7) through level-adapted learning outcomes, and
- (3) are given a digital, verifiable form (e.g. through Europass digital credentials)⁹.

Supporting Questions:

a) Are micro-credentials regulated in national legislation (e.g., specific regulations, lack of regulation, legislative discussions)?

Norwegian politics refers to micro-credentials (often as mini-qualifications) more clearly in recent years, but the picture indicates that this is still a field of development and not a "fully regulated" system across sectors. In Meld. St. 11 (2024–2025) refers to micro-credentials as EU-inspired documentation of short, flexible and quality-assured learning programmes²⁷.

Fafo's review of Scandinavian responses also concludes that the recommendation to establish systems for micro-credentials has not been followed up to a great extent, even though there are individual projects and measures²⁸.

In practice, this means for DIGITRACE in Norway that micro-credentials should be designed so that they can work within existing educational and working life frameworks (credits where possible, and otherwise clear quality/content).

b) Does the national qualifications framework (NQF) include micro-credentials and at what EQF level?

The NQF has levels 2–8 and is linked to the EQF as a European framework to make qualifications comparable²⁵.

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Micro-credentials are not established as a separate "qualification type" in NQF, but can be placed indirectly if they are given as formal, accredited courses/offers with learning outcomes and credits that are appropriate to a certain level. This is in line with the fact that micro-credentials in the EU and the Nordic countries are often understood as smaller units that can be built together ("stackability")¹⁷.

For DIGITRACE levels 5–7 in Norway, a clear "mapping" to NKR descriptors²⁵ is recommended: Level 5: typical vocational school/higher vocational level (shorter and practice-oriented).

Level 6: Bachelor's-level learning outcomes.

Level 7: master's-level learning outcomes.

c) Do higher education/VET institutions recognize micro-credentials from other providers (e.g., companies, NGOs) for degrees or ECTS credits?

There are no clear signs in the sources that Norwegian educational institutions generally provide automatic ECTS for micro-credentials from external providers (such as companies/NGOs). The Norwegian system for validating non-formal and informal learning ("assessment of prior learning") is nevertheless well established in the formal education sector, and uses learning outcomes in formal curricula/programme descriptions as a reference point. The result can provide formal recognition when it is issued by the same institutions as formal qualifications²⁶.

For DIGITRACE, this means in practice:

1. If the micro-credential is issued in collaboration with accredited institutions (vocational school/university college) and with credits, the path to ECTS/recognition is much shorter¹⁷.
2. If the micro-credential is issued outside formal education, it should still be designed so that it can be used as documentation in prior learning assessment (clear learning outcomes, assessment criteria, scope)²⁶.

d) Do SMEs recognize employees' micro-credentials in recruitment or promotions?

The documentation indicates that Norway is in an early phase where micro-credentials are primarily built as an ecosystem, and where employer recognition is one of the major keys. NHO refers to micro-credentials as a tool for documenting quality-assured learning outcomes and contributing to better competence management in enterprises and refers to collaboration with several actors on micro-credentials²⁹.

At the same time, FAFO points out that the introduction as a "system" is limited and that there are dilemmas and scepticism, which in practice often translates into uneven use in recruitment/promotion across industries²⁸.

A realistic conclusion for Norway as of 2026 is therefore: Micro-credentials are used and discussed, but "standard recognition in recruitment" is not documented as a widely established pattern across the SME market. The value often lies first in internal competence management and documentation, and can later have stronger recruitment value when format, quality and recognizability become more standardised²⁹.



e) What benefits have SMEs gained from micro-credentials (e.g., faster training, competence growth, savings)?

In a Nordic context, micro-credentials and small study units are described as a tool for targeted competence enhancement at work, often as blended learning, and with the purpose of strengthening employees in the job situation and reducing the risk of job loss. A significant proportion of the offers in the period discussed in the Nordic report were related to the green transition on 30 June.

At a more general level, the EU framework points out that micro-credentials should support flexible and inclusive learning pathways, with a standardised way of describing content that can build trust and recognition³¹.

For Norway, the benefits for SMEs can therefore be summarised as: Faster and more precise training, better documentation of competence, and easier modulation of larger competence pathways, but with the proviso that the effect depends heavily on quality and employer relevance³⁰.

f) Are micro-credentials used in SMEs for upskilling (yes/no, examples)? State barriers (e.g., lack of trust).

Yes, but so far mostly in the form of pilots, industry-specific offers and module-based short races. The Nordic survey describes that Norway has offers in smaller units (e.g. 5 ECTS) developed under HK-dir and tripartite sector programmes, aimed at employees for competence enhancement on 30 October.

HK-dir also describes mini-qualifications/micro-courses as short courses with credits and the opportunity to build them together, which shows that "modular logic" is in the process of being operationalised in Norwegian policy instrument use¹⁷.

The barriers that recur in the sources are mainly: Trust and recognition: Micro-credentials must be recognised by employers, and Fafo points out that there is greater support for the problem description than for micro-credentials as a solution, i.e. that implementation meets with scepticism²⁸. Fragmentation and quality: Without clear standard elements, assessment and quality assurance, micro-credentials can become "many different course certificates" that are difficult to compare. The EU framework is designed precisely to build quality and comparability⁸. Portability to formal education: Norway has an assessment of prior learning, but ECTS recognition often requires that learning outcomes can be assessed against formal study plans and that institutions actually have processes/capacity²⁶.

Practical recommendation for DIGITRACE micro-credentials in Norway (levels 5-7)

In order for DIGITRACE micro-credentials to be of high national benefit to SMEs that need to increase DPP/ESPR competence, the sources point to a "best practice" package:

Learning outcomes and assessment must be explicit and linked to level descriptions (NKR/EQF), especially for levels 5–7²⁵.



Micromodules should be designed as "stackable" and be able to be combined into larger units, in line with the Norwegian description of microcourses/mini-qualifications¹⁷.

Digital issuance should use verifiable digital qualifications (Europass/EDC), as this increases shareability and reduces friction in recruitment, internal HR processes and possible future accreditation⁹.

To strengthen the "employer value", the micro-credentials should reflect DPP requirements in the work plan: data format/standards, material composition and substances of concern, access management and information sharing in value chains. This is directly reflected in the European Commission's description of the DPP as a system based on standards, and that content is specified in delegated acts¹.

4. Practical recommendations

Chapter 3 already identifies a core "best practice" package for DIGITRACE micro-credentials in Norway – explicit NKR/EQF-linked learning outcomes, stackable micromodules, and verifiable digital issuance through Europass/EDC. Building on this and on the plastics-sector status described in Chapter 1, the following additional recommendations are proposed to maximise national relevance, trust and usability for Norwegian SMEs:

- Prioritise plastics-sector content that reflects the specific SME training needs identified in Chapter 1: polymer/material mixture data, additives and substances of concern, mass balance, customer/supplier documentation requirements, and traceability in production.
- Design DIGITRACE credentials so they can be issued in collaboration with accredited institutions (vocational schools, university colleges), since this is the shortest practical path to future ECTS/NKR credit recognition, while also ensuring credentials issued outside formal education remain usable as documentation for prior-learning assessment ("realkompetansevurdering").
- Anchor the offer to existing funding and delivery channels rather than building a standalone scheme: the tripartite industry programme for skills development, Kompetansepluss Arbeid for foundational digital skills, and the Green Platform for more advanced green-transition innovation needs.
- Address the EEA implementation gap directly in the curriculum: since ESPR (EU 2024/1781) has not yet been incorporated into Norwegian/EEA law while the national Act on Sustainable Products and Value Chains is already in force, SMEs need explicit guidance on which obligations already apply nationally versus which follow once EU delegated acts are incorporated.
- Build in explicit quality-assurance and comparability elements (clear learning outcomes, assessment criteria, scope/workload) to counter the fragmentation and trust barriers



identified by Fafo and NHO, so that DIGITRACE credentials are not perceived as “just another course certificate.”

- Design a level-5–7 progression pathway rather than isolated modules: level 5 content oriented to practice-based higher vocational profiles, level 6 to bachelor-equivalent competence, and level 7 to master-level, specialist or managerial learning outcomes, consistent with NKR descriptors.

Extend early plastics-sector learning outcomes so they transfer to adjacent sectors, since Norwegian plastics SMEs are frequently subcontractors to textiles, furniture, electronics and packaging value chains that will face DPP requirements earlier under the ESPR work plan

5. Conclusions

Norway presents a distinctive national context for DIGITRACE: through the EEA, Norwegian companies are already exposed to EU product requirements even though the ESPR itself has not yet been formally incorporated into Norwegian law. The national Act on Sustainable Products and Value Chains, in force since mid-2024, shows that Norway is building its own legal capacity to enforce comparable requirements, which means DPP-relevant competence needs arrive early rather than waiting for full EU incorporation.

For the plastics sector specifically, DPP obligations are not yet a first-wave priority under the ESPR work plan, but plastics SMEs are structurally exposed through their role as subcontractors to textiles, furniture, electronics and packaging value chains – sectors that are prioritised earlier. This makes transferable data, traceability and documentation skills more valuable than narrow, plastics-only compliance training.

Norway's micro-credentials ecosystem is still developing: mini-qualifications and micro-courses are increasingly described in national policy (Meld. St. 11, HK-dir), and instruments such as the tripartite skills programme, Kompetansepluss Arbeid and the Green Platform already provide delivery and funding channels. However, formal recognition remains uneven – there is no automatic ECTS recognition for external providers, and Fafo's review points to persistent scepticism and limited systemic follow-up of micro-credential recommendations.

DIGITRACE is therefore well positioned to add value in Norway by offering plastics-sector-relevant, level-referenced (NKR/EQF 5–7) micro-credentials that are digitally verifiable, ideally co-issued with accredited institutions, and explicitly designed to remain usable as prior-learning documentation where formal credit recognition is not yet available – bridging Norway's early regulatory exposure with its still-maturing micro-credentials recognition system.



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Empowering SMEs to transform Digital Product Passport compliance into a competitive advantage

Project number: 101244175

FOCUS GROUP – NATIONAL REPORT - Poland

Beata Janczak, WSEI University



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1 REPORTING TEMPLATE

1.1 BASIC INFORMATION

Area	Information
Country	Poland
Project partner	Lublin Academy of Economics and Technology
Focus date	15/07/2026
Form of meeting	Stationary / Online / Hybrid
Moderator	Beata Małgorzata Janczak
The person taking notes	Anna Maciąg
Number of participants	12
Represented sector	Automotive
Session duration	90 min

On 15 July 2026, a focus group was conducted online with stakeholders representing the Polish automotive sector and the related business and expert community. The focus group forms part of the second research component envisaged in the Work Package 2 methodology, alongside the online survey and the desk research, and was intended to deepen and validate the findings collected during the survey stage. In line with the methodological arrangements agreed at the project kick-off meeting (26–27 February 2026), national focus groups were expected to comprise between 7 and 10 participants; the Polish focus group involved 12 participants, clearly exceeding the envisaged threshold, which increased the diversity of perspectives represented at the cost of somewhat reduced depth of individual discussion within a single session.

Representatives of the following organisations took part in the meeting: Inter Cars, the Association of Distributors and Manufacturers of Automotive Parts (SDCM), AROKS Group, Lubelska Akademia WSEI (two people), Avant, the Polish Investment and Trade Agency (PAIH), Heckman (two people), Backseat, Optimal Poland, and Fundacja I2, together with an independent environmental, social, and governance (ESG) expert and two self-employed individuals.

2 PARTICIPANT PROFILE Group structure:

Participant's role	Number of people
Management staff	6
IT / Digitalization	1
Production / Logistics	2
ESG / Compliance	3
Marketing / Sales	1
VET/HEI education	2
Industry organizations	3
Other	0

The group comprised 12 people in total and was clearly dominated by management staff (6 people, one third of the group), which ensured a strong strategic and decision-making perspective in the discussion on DPP implementation. The second largest categories were industry organisations and the ESG/compliance area (3 people each), reflecting the meeting's focus on regulatory requirements and sector readiness. Production/logistics (2 people) and VET/HEI education (2 people) added an operational and educational perspective, while IT/digitalisation and marketing/sales were represented by only one person each, marking a notable gap relative to the four target roles defined in the Work Package 2 methodology, particularly in the area of digital and data competences, where the online survey results identified some of the largest competency gaps.

3 EXECUTIVE SUMMARY

The focus group in Poland, organised by WSEI University brought together representatives from manufacturing companies, the automotive parts distribution sector, the aviation industry, academia, vocational education and trainings representative and business support institutions. The diverse profile of participants allowed for the exploration of the perspectives of organizations at various stages of preparation for implementing the Digital Product Passport (DPP). The discussion included both entities that had already begun analyzing regulatory *requirements* and were planning implementation activities, as well as organizations for which DPP remains a new area requiring knowledge and competency development.

The discussion indicated that awareness of the importance of the Digital Product Passport is steadily increasing, yet the level of preparedness among organizations remains varied. Participants from the automotive industry and companies operating in international supply chains demonstrated the highest level of familiarity with the topic. Representatives of other sectors, however, expressed a need to acquire knowledge regarding both the regulations themselves and the practical aspects of their implementation. Business support institutions noted that the topic of the Digital Product Passport is only just beginning to emerge in business contacts and is not yet a common subject of consultation. The most important conclusion from the study is that participants believed that implementing DPP will be primarily an organizational and technological challenge. The discussion focused on the high costs of adapting IT infrastructure, the need to integrate multiple data management systems, ensure interoperability between supply chain partners, and organize processes that enable full product traceability. Representatives of large organizations, in particular, emphasized the scale of the problem resulting from managing millions of product indexes and the need to collect and update data from multiple sources.

At the same time, participants unanimously indicated that despite the high costs of implementing DPP, it can bring tangible benefits to organizations. Among the most frequently cited benefits were increased transparency of product information, improved data management quality, better component traceability, and the ability to build a competitive advantage by streamlining product lifecycle management processes. However, these benefits are perceived as long-term and dependent on proper organizational preparation by companies.

Another significant finding of the study was the identification of significant competency gaps. Participants unanimously emphasized that effective DPP implementation will require the development of competencies in data management, product traceability, system interoperability, regulatory requirements, and supply chain collaboration. At the same time, they indicated that practical industry training, including workshops, case studies, work with real-world IT systems, and mentoring by experts experienced in DPP implementation, will be of greatest value.

Research proposal:

The results of the focus group indicate that most participating organizations are in the process of preparing to implement the Digital Product Passport. The level of readiness is strongly dependent on the specific industry, the company's level of digitalization, and the role it plays in the supply chain. Participants agreed that the successful implementation will depend not only on the development of appropriate technological solutions, but primarily on building employee competencies, standardizing

data management processes, and developing practical training programs tailored to the needs of specific economic sectors.

4 LEVEL OF AWARENESS OF DPP AND REGULATIONS - assessment of the level of knowledge:

During the focus groups one of the key elements was the investigation of the level of awareness of DPP and other regulations: ESPR, ESG, traceability, regulatory requirements in the sector. The aim of this part of the study was to determine the level of knowledge of the Digital Product Passport (DPP) idea, awareness of European regulations and the perception of the impact of new requirements on the functioning of enterprises.

The analysis covers both the participants' level of knowledge and their assessment of the potential benefits, risks and organizational consequences resulting from the implementation of DPP.

Key observations from the focus group session:

1. Participants' level of awareness (Qualitative description)
2. Dominant organizational concerns (eg, costs, interoperability, data liability, trade secrets)
3. Perceiving DPP, eg as a regulatory obligation, risk, competitive advantage, element of an ESG strategy.

4.1 Participants' level of awareness

The analysis of participants' statements indicates a varied level of knowledge regarding the Digital Product Passport, depending primarily on the specificity of the industry represented and the place of the organization in the European supply chains.

The highest levels of awareness were demonstrated by representatives of the automotive sector and companies operating in international supply chains. These organizations are already conducting analyses of the impact of new regulations on their business processes, identifying potential risks, and preparing for the changes resulting from the implementation of DPP. For them, this issue is no longer solely a regulatory concept, but a component of strategic planning.

Representatives from other industries, however, declared that knowledge about DPP is still limited. They pointed to the need for a better understanding of both the regulations themselves and the practical consequences of their implementation for businesses. Representatives of business environment institutions, in particular, emphasized that entrepreneurs are only just beginning to take an interest in this topic, and questions about DPP arise relatively rarely.

4.2. The organization's top concerns

The discussion showed that the participants perceive the implementation of the Digital Product Passport primarily as a complex organizational undertaking.

The most frequently mentioned concerns were:

1. high costs of implementing new solutions,
2. the need to collect and maintain huge amounts of product data,
3. responsibility for the quality and timeliness of information,
4. integration of many existing European regulations,

5. organization of cooperation between supply chain participants,
6. ensuring interoperability between IT systems.

Representatives of large organizations in particular emphasized that the biggest challenge will not be data acquisition itself, but its long-term management and ensuring the consistency of information from many suppliers and business partners.

The uncertainty surrounding the relationship between the DPP and other applicable European regulations was also repeatedly highlighted. Participants emphasized the need for greater clarity regarding legal requirements and practical guidelines for their application.

4.2 Perception of the Digital Product Passport

Despite numerous concerns, participants did not perceive the DPP as just another administrative obligation. The analysis of the statements allows us to distinguish three dominant ways of perceiving the Digital Product Passport.

1. **Regulatory obligation:** DPP was most often perceived as a consequence of new European Union regulations, to which companies will have to adapt regardless of their organizational readiness. In this context, participants primarily emphasized the need to ensure compliance with regulations and prepare organizations for new obligations.

2. **Organizational challenge:** The second dominant theme was the scale of organizational change. Participants emphasized that implementing DPP requires restructuring information management processes, collaboration between departments, and appointing individuals responsible for product data management. In many organizations, this requires the creation of new competencies and new organizational roles.

3. **A chance to increase competitiveness:** At the same time, most participants recognized the potential benefits of implementing DPP. The most frequently cited benefits included:

- a) increasing product transparency;
- b) better traceability of components;
- c) organizing data management processes,
- d) improving the quality of cooperation with business partners,
- e) the opportunity to build a competitive advantage on the European market.

However, these benefits were perceived as a long-term effect, requiring prior organizational and technological investment.

Research conclusions:

The analysis indicated that the level of awareness regarding the Digital Product Passport varies significantly across economic sectors. Organizations operating in industries covered by previous product traceability regulations demonstrate a higher level of preparedness and a better understanding of the implications of implementing the Digital Product Passport.

At the same time, the vast majority of participants perceive DPP as an inevitable direction of change stemming from European Union policy. Implementing new requirements is primarily associated with the need to develop organizational competencies, streamline data management processes, and prepare companies to operate in more integrated and transparent supply chains.

The study also shows that, despite initial concerns, entrepreneurs see the potential of DPP as a tool that increases market transparency and supports the development of long-term competitive advantage, provided that appropriate educational and organizational support is provided.

5 Technology, data and interoperability - assessment of the organization's technology readiness.

Purpose of analysis:

The goal of this part of the study was to assess the level of preparedness of organizations to implement the Digital Product Passport from the perspective of technological infrastructure, data management, and supply chain collaboration. The analysis focused on the technical capabilities of enterprises, the identification of implementation barriers, and the degree of interoperability of the systems used.

5.1 Systems and infrastructure

Key Findings (Qualitative Description)

Indicated barriers:

Area	Description of the problem
ERP	Most enterprises use ERP systems to support core business processes, but current solutions are not prepared to support the requirements of the Digital Product Passport. The main barriers relate to the need to expand functionality, integrate with other systems, and ensure product data consistency. The high costs of adapting existing systems were also cited.
PIM	Product information management is fragmented across various organizational departments. Data is stored in multiple locations and often lacks a single owner. Participants emphasized the need to organize data, ensure its quality, and create a coherent product information management model spanning the entire product lifecycle.
MES	Manufacturing companies already have solutions in place to support production processes, but integrating them with DPP requirements will require expanding the scope of data collected and ensuring traceability of information throughout all stages of production. Combining production data with information from suppliers and business partners also poses a challenge.
API/ integration	One of the most frequently cited barriers is the lack of interoperability between systems used by enterprises and supply chain participants. Organizations emphasized the need to create secure data exchange mechanisms and integrate multiple existing IT solutions. The lack of uniform standards for information transfer also remains a problem.
Traceability	Participants agreed that ensuring full product traceability will be one of the greatest challenges in implementing DPP. Difficulties include obtaining reliable data from all supply chain participants, maintaining its accuracy, and ensuring the

Area	Description of the problem
	traceability of the product and its components throughout its lifecycle. Organizations in the aerospace and automotive sectors have experience in this area, but they also anticipate the need to further develop their solutions.
ESG data	Participants indicated that one of the greatest challenges will be acquiring, verifying, and updating environmental and sustainability data from suppliers and business partners. The lack of standards for collecting ESG information, the varying quality of data, and difficulties integrating it with existing company systems remain issues. According to participants, effective implementation of DPP will require streamlining ESG data management processes and ensuring their reliability, completeness, and the ability to share them throughout the supply chain.

The analysis indicates that most organizations have IT solutions in place to support core business processes. However, participants unanimously emphasized that the current infrastructure was not designed with the requirements of the Digital Product Passport in mind and, in many cases, will require significant expansion or integration.

The greatest challenges lie with companies operating in extensive, international supply chains. Organizations managing millions of product indices indicated that implementing DPP would require redesigning existing IT systems, creating new data repositories, and ensuring continuous information exchange across multiple platforms and business partners.

Participants pointed out that the currently used ERP systems, solutions supporting product information management and production process tracking systems can form the basis for future solutions, but their functionality will require expansion with new mechanisms for traceability, data integration and automatic information exchange.

The most frequently highlighted infrastructure limitation was not the IT systems themselves, but the costs of their adaptation, integration and subsequent maintenance.

5.2 Data management

In the area of data management, participants indicated that the biggest problem is not the lack of information, but its dispersion across many departments of the company.

Product data is currently created by various organizational units, including purchasing, production, logistics, sales, and service. This information is often independent of each other and is not analyzed as a single, coherent set of data describing the entire product lifecycle. According to the participants, implementing a DPP will require the creation of a unified data management model encompassing the entire product lifecycle.

At the same time, it was noted that effective implementation of the Digital Product Passport will require appointing individuals responsible for overseeing data quality, completeness, and updating.

Information management was identified as one of the key organizational processes determining the success of the Digital Product Passport implementation.

5.3 Supply chain

Results from the Polish focus group indicate that the supply chain is one of the key areas determining companies' readiness to implement the Digital Product Passport (DPP). Participants emphasised that preparing a single enterprise will not be sufficient if it is unable to obtain, verify, and use reliable data from suppliers and other business partners.

Particular importance attaches to the quality, completeness, timeliness, and consistency of data provided by external entities. Participants noted that a company may be held accountable for information originating from other organisations; therefore, merely obtaining data is not enough. It is also necessary to define rules for their verification, updating, and responsibility for their quality.

- **Varying levels of digitalisation among partners**

A significant challenge is the varying level of digitalisation of enterprises participating in the supply chain. In the automotive sector, this is especially important due to the extensive and international connections between manufacturers, component suppliers, and other business partners. Interoperability therefore requires not only the integration of systems within the enterprise, but also efficient information exchange between organisations.

Participants pointed out that product data are generated in many places within the organisation and are linked to information from various supply chain participants. For companies with a large number of products and components, the challenge becomes not only collecting data, but also their long-term maintenance, updating, and clear assignment of responsibility for their quality.

- **Quality and reliability of supplier data**

One of the most important issues is ensuring the reliability of data obtained from suppliers. Participants highlighted the need to specify what information should be required from individual partners, in what format it should be provided, and who should be responsible for its accuracy and timeliness.

In practice, this means the need to create consistent rules for managing supplier data and mechanisms to identify missing, inconsistent, or outdated information. This problem is particularly significant for products and components whose data are obtained from multiple sources and must then be integrated with the company's systems.

- **Interoperability and data exchange in the supply chain**

Participants indicated that data exchange between companies is one of the key challenges related to DPP implementation. Differences in the way information is collected and transmitted can hinder their integration and increase the share of manual processes.

In the automotive sector, particular importance attaches to ensuring a continuous flow of information on components, their origin, identification, and subsequent stages of the production process. Existing company experience in traceability constitutes an important starting point, but it needs to be expanded to cover a broader range of data and exchange mechanisms aligned with DPP requirements.

- **Cooperation and responsibility in the supply chain**

DPP implementation therefore requires viewing the supply chain as a shared information-exchange system, rather than merely a set of independent processes of individual companies. Defining roles and responsibilities for data, principles of cooperation with suppliers, and procedures for handling missing or inconsistent information will be crucial.

From the perspective of the automotive sector, an important asset is companies' existing experience in product and component traceability. However, this does not equate to full readiness for DPP implementation. Existing solutions require further development in terms of data scope, quality, system integration, and information exchange among supply chain participants.

- **Readiness assessment**

In the Polish focus group, readiness in the area of the supply chain was assessed at 3/5. This rating indicates that there is a foundation for further preparation, but also significant development needs, primarily related to the quality and availability of supplier data and the standardisation of information exchange.

- **Conclusion from the analysis**

The supply chain should be treated as one of the critical elements in preparing automotive sector companies for DPP implementation. The greatest challenge is ensuring a consistent and reliable flow of data across the entire supply chain, covering their completeness, quality, timeliness, and reliability, as well as clearly defined responsibility for their maintenance. This means it is necessary to develop both solutions supporting data exchange and integration, and organisational processes governing cooperation with suppliers and other business partners.

From the perspective of training needs, this implies the need to develop competencies in:

- identifying data sources in the supply chain,
- specifying information required from suppliers and partners,
- assessing the quality, completeness, and reliability of external data,
- organising data exchange between companies,
- ensuring interoperability of systems and data formats,
- defining responsibility for data,
- identifying missing and inconsistent information,
- extending existing traceability processes to meet DPP requirements.

5.4 Most frequently reported problems:

The analysis of participants' statements allowed us to identify the most important technological barriers related to the implementation of the Digital Product Passport.

The most frequently mentioned were:

- a) high costs of modernizing IT infrastructure;
- b) data dispersion between multiple organizational systems;
- c) lack of uniform standards for exchanging information with business partners;
- d) the need to integrate many existing IT systems;
- e) difficulties in ensuring full traceability of products in extensive supply chains;

- f) the need to create new data repositories and mechanisms for their ongoing updating;
- g) the need to adapt devices in logistics and warehousing to new methods of product identification;
- h) lack of sufficient organizational resources responsible for product data management.

Key observations:

The study indicates that most companies have the basic technological resources to begin preparing for DPP implementation. At the same time, the current infrastructure was designed to support current business processes, rather than comprehensively manage information across the entire product lifecycle. The biggest challenge is not purchasing individual IT systems, but creating a coherent environment that integrates data from multiple sources and ensures their interoperability throughout the entire supply chain.

Research conclusions: The analysis indicates that the technological readiness of enterprises to implement the Digital Product Passport varies and is strongly dependent on the organization's level of digitalization and its role in the supply chain. Organizations operating in highly regulated sectors have solutions that provide a solid foundation for further development, but they also anticipate the need for significant investment.

The most important challenges remain system integration, standardizing data management, and ensuring interoperability between business partners. The study results clearly indicate that effective DPP implementation will require the simultaneous development of technological infrastructure, information management processes, and collaboration across the entire enterprise ecosystem.

6 COMPETENCIES AND TRAINING NEEDS - Identification of competency gaps related to DPP.

Purpose of analysis:

The aim of the analysis was to identify competencies currently lacking in organizations preparing to implement the Digital Product Passport and to identify areas requiring educational support. The analysis encompasses both technical and organizational competencies and identifies employee groups that should receive priority training.

6.1 The most important competency gaps:

About the area	Gap level
Data management	Low / Medium / High
Literacy date	Low / Medium / High
ESG	Low / Medium / High
Interoperability	Low / Medium / High
Cybersecurity	Low / Medium / High

About the area	Gap level
Traceability	Low / Medium / High

Analysis of the discussions indicates that participants did not perceive the primary problem as a lack of individual technical skills. They were much more likely to point to the organization's lack of comprehensive preparation to manage the new responsibilities resulting from the implementation of DPP. The most frequently identified competency gaps included:

- a) **Data Management – high level of gap:** The biggest challenge proved to be the ability to collect, organize, verify, and update product data from multiple sources. Participants emphasized that data already exists within organizations, but it is dispersed across departments and does not form a single, coherent information system.
- b) **Knowledge of European regulations – high level of gap:** Entrepreneurs indicated the need for a better understanding of the obligations arising from the DPP and the links between the new requirements and other European Union regulations. The need for practical interpretation of the regulations and their application to the daily operations of businesses proved particularly important.
- c) **System interoperability – high gap level:** Participants emphasized that effective DPP implementation will require collaboration between multiple IT systems and partners across the supply chain. Competencies related to data integration and data flow management were identified as key areas for development.
- d) **Product Traceability – high level of vulnerability:** While some sectors have experience with component traceability, most participants indicated that implementing full product traceability in line with GPP requirements will require new organizational and process competencies.
- e) **Cybersecurity – medium vulnerability level:** Cybersecurity wasn't a dominant topic of discussion, but participants repeatedly emphasized the need to securely manage large amounts of data and be accountable for sharing it with business partners. Based on this, this area was assessed as requiring development, although it wasn't identified as a priority.

6.2 Competencies by role

The analysis showed that competency needs vary depending on the function performed in the organization.

- a) **Management staff:** The greatest need for management is to understand the strategic consequences of DPP implementation, investment planning, change management and coordination of activities between individual departments of the company.
- b) **Production and logistics departments:** Employees responsible for production and logistics will require the development of competencies related to product traceability, information flow management and data documentation at every stage of the product life cycle.

- c) **IT and digitization departments:** The biggest challenge for IT specialists will be integrating existing systems, ensuring interoperability and creating an environment enabling the secure collection and exchange of data between business partners.
- d) **Purchasing, sales and product management:** Participants repeatedly emphasized that Product Managers and those responsible for supplier collaboration will play a key role in acquiring product data. At the same time, it was noted that for many of them, these will be completely new responsibilities requiring appropriate preparation.
- e) **Marketing and communication:** Currently, competencies related to the use of DPP in market communications are poorly developed. Participants indicated that end customers are not yet showing much interest in the Digital Product Passport, but in the future, it may become a key element in building competitive advantage and brand trust.

6.3 DigComp 2.2 Mapping

The competency needs analysis conducted during the focus group was supplemented with a reference to the DigComp 2.2 framework, the European Digital Competence Framework. Applying this reference makes it possible to organise the identified needs not only in relation to the technologies used in implementing the Digital Product Passport, but above all in relation to the competences that employees and organisations need to develop in order to use data effectively, collaborate digitally, and respond to new organisational and regulatory requirements.

The mapping was carried out on the basis of a qualitative analysis of participants' statements and observations. It does not constitute a quantitative assessment of the level of competence across the population of companies. Its purpose is to identify those competence areas that emerged in the discussion as particularly relevant, in the context of DPP implementation, from the perspective of organisational and employee readiness.

The results indicate that the greatest development need concerns data management and critical evaluation of data, as well as the ability to exchange information and collaborate with other actors in the digital supply chain. Competences related to cybersecurity were present in the discussion, primarily in the context of data protection and secure data sharing, but were not identified as one of the main competence gaps. At the same time, significant importance was attached to problem-solving skills and to the ability to adapt company processes to changing requirements.

Competence	Observations
1. Data management	The largest identified competency gap. Companies indicated the need to develop skills in collecting, organizing, verifying, and updating product data, as well as managing it throughout the product lifecycle.
2. Critical evaluation of data	Participants emphasized the need to assess the quality, completeness and reliability of data obtained from suppliers and to ensure compliance of information with regulatory requirements

Competence	Observations
3. Digital collaboration	There is a high need to develop competencies related to data exchange between enterprises and effective digital cooperation in supply chains.
4. Cybersecurity	The topic came up sporadically. The primary focus was on the need to securely share and protect product data, but it wasn't seen as a major competency gap.
5. Troubleshooting	Participants indicated the need to develop problem-solving skills related to DPP implementation, business process adaptation and integration of new solutions with existing enterprise systems.

6.3.1. Data Management

Data management was identified as the largest competence gap. Participants pointed to the need to develop skills related to the systematic collection, organisation, verification, and updating of product data, as well as to managing this data throughout the entire product life cycle. The problem becomes particularly significant in organisations with a large number of products, indexes, and data sources.

The discussion highlighted that preparing data for DPP purposes cannot be treated as a one-off action carried out before the solution is implemented. Data will require ongoing maintenance, updating, and consistency assurance. For companies managing a large number of products, this also implies the need to organise responsibility for data and the way it flows between the different departments of the organisation. A conclusion from the discussion is therefore the need to develop not only the technical skill of operating systems, but above all the competence of organisational management of product information.

6.3.2. Critical Evaluation of Data

The second important area is the ability to critically evaluate the quality and reliability of data. Participants emphasised the need to verify information received from suppliers and business partners in terms of its quality, completeness, and reliability, and to ensure its compliance with regulatory requirements. This competence becomes particularly significant in the case of DPP, since a company may be responsible for information that partly originates outside its own systems and processes. This requires the ability to recognise gaps in data, identify inconsistencies, and assess whether the information received can be used as a reliable basis for further reporting or for sharing within the value chain. The focus group results thus indicate that data literacy cannot be limited to the ability to read data. It should also include the ability to ask the right questions about its source, quality, completeness, and compliance with requirements.

6.3.3. Digital Collaboration

The third area is digital collaboration, understood primarily as the ability to exchange data and information effectively between companies. Participants pointed to a high demand for competences related to data exchange between organisations and digital collaboration within supply chains.

The importance of this competence stems from the fact that DPP is not a solution operating solely within a single organisation. Product-related data may be created, supplemented, and used by multiple participants in the value chain. Employees must therefore understand not only their own processes, but also the principles of collaboration and information exchange with suppliers, customers, and other business partners.

The focus group material also pointed to the need for better interoperability of existing systems, in order to enable standardised information exchange. In practice, this means that the development of digital competences should also include the ability to work in a multi-organisational environment, in which data must be transferred between different systems, entities, and processes.

6.3.4. Cybersecurity

Cybersecurity emerged in the discussion primarily in the context of the secure storage, sharing, and protection of product data.

At the same time, participants did not identify this area as one of the main competence gaps. Compared with data management, data evaluation, and digital collaboration, cybersecurity had a more supplementary character. This does not, however, mean that this competence is unimportant. In the context of DPP, data security is an essential element for trust in the entire information exchange system. Competences in this area should therefore primarily include awareness of the risks associated with sharing product data, the principles of secure access to information, and responsible handling of data passed on to business partners. The focus group results nonetheless suggest that cybersecurity should be treated as a component of a broader programme of digital competences related to DPP, rather than as its sole or dominant area.

6.3.5. Problem Solving

The fifth area is problem solving, related to the ability to respond to problems arising during DPP implementation and to adapt existing business processes. Participants pointed to the need to develop skills enabling organisations to adapt business processes to changing legal and technological requirements and to integrate new solutions with the company's existing systems. In this sense, problem solving should not be understood solely as a technical competence. It also includes the ability to identify the source of a problem, assess its impact on the business process, collaborate across departments, and select the appropriate solution. This is particularly important for companies that will need to adapt their existing processes to new requirements without completely replacing their current infrastructure. This competence therefore combines a digital, organisational, and process-related dimension.

Problem solving:

Organisations expect competences enabling them to adapt business processes to changing regulatory and technological requirements.

Key Observations

The research results show that the greatest barrier to DPP implementation is not a lack of technology, but insufficient competence preparation within organisations. Participants repeatedly emphasised the need to designate people responsible for managing product data and to create new organisational roles related to coordinating the implementation process. At the same time, it was noted that effective implementation will require collaboration across many departments of the company, not only IT specialists.

Research Conclusions

The mapping shows that the competence needs related to DPP implementation are not focused solely on technology. The greatest importance lies with competences that enable a company to manage information consciously, assess its quality, collaborate with partners, and adapt processes to new requirements. It is particularly important to link three areas: data management, critical evaluation of data, and digital collaboration. Data must not only be collected, but also properly evaluated and then effectively used in the exchange of information with other participants in the value chain. The focus group results also point to the organisational character of the identified gaps. Participants emphasised the need to designate people responsible for managing product data and coordinating the DPP implementation process, as well as the need for collaboration across many departments of the company, not only IT specialists.

Ultimately, the DigComp 2.2 mapping leads to the conclusion that competence preparation for DPP should be interdisciplinary in nature. It encompasses technical, informational, organisational, and digital-collaboration competences. This is consistent with the broader focus group finding that effective DPP implementation will require the development of competences in data management, traceability, interoperability, regulatory requirements, and supply chain collaboration.

Consequently, the DigComp 2.2 mapping confirms that the DPP competence development programme should combine knowledge of data and regulation with the practical ability to collaborate, solve problems, and apply these competences in the company's real-world processes.

The analysis carried out indicates that companies' training needs are interdisciplinary in nature and encompass both technical and organisational competences. The training with the greatest significance for effective DPP implementation will be that which develops skills in data management, interpretation of regulatory requirements, ensuring system interoperability, and organising supply chain collaboration.

The research also indicates that educational activities should be adapted to the specific characteristics of individual industries and to the roles performed by employees. Universal training programmes will not be sufficient to prepare organisations for the implementation of the Digital Product Passport.

7 SECTOR SPECIFICITY - description of challenges specific to the sector represented by the participants.

7.1 Characteristics of the Automotive Market in Poland

The automotive sector is one of the industries in which the implementation of the Digital Product Passport will have particularly wide-ranging organisational, technological, and competence-related consequences. This results from the high level of product complexity, multi-tier supply chains,

the large number of components involved, and the need to ensure product-related information not only at the manufacturing stage, but also throughout the subsequent phases of the product's life cycle. In the Polish context, the significance of the sector is further linked to its strong integration into European and global value chains. Poland specialises, among other things, in the manufacturing of automotive components, wiring systems, and components and batteries related to electromobility. At the same time, Polish companies are often participants in supply chains where data and compliance requirements are shaped by larger manufacturers and customers operating on the European market. The specific nature of the sector means that DPP cannot be treated as a single IT solution. It requires linking data originating from multiple systems, processes, and entities involved in the creation and use of the product. The development of electromobility is of particular significance in this context. Batteries constitute one of the first areas in which the requirements of the digital passport are taking on practical significance. The Polish desk research indicated that the battery passport may serve as an important reference point for the wider preparation of the automotive sector for DPP.

One of the fundamental challenges of the automotive sector is ensuring continuity of traceability of a component or product throughout its entire life cycle. In the case of a vehicle or its components, data is created at multiple stages: from the sourcing of raw materials and materials, through component manufacturing, assembly, distribution, and use, to servicing, repair, reuse, dismantling, and the management of the product at the end of its use.

Traceability must therefore not be limited to the ability to establish which supplier a given component originates from. It should make it possible to link the product or component identifier with information on its origin, materials, manufacturing process, performance parameters, service history, and, where required, the further handling of the product after the end of its use. This aspect was directly reflected in the focus group scenario for the automotive sector, which asked, among other things, about responsibility for keeping product data up to date after a component or vehicle enters the use and servicing phase.

One of the most characteristic challenges of the automotive sector is the multi-tier structure of the supply chain. Product-related information may be created and updated by vehicle manufacturers, Tier 1, Tier 2, and Tier 3 suppliers, manufacturers of materials and components, logistics operators, service providers, and companies involved in recycling or end-of-life product management. In such an environment, the effectiveness of DPP will depend on the ability to exchange information between organisations using different systems, standards, and procedures.

In the automotive sector, it is particularly important to link product data with supplier data. The final product is the result of the work of many entities, which means that a company further down the supply chain may need information that it does not itself generate. This applies, among other things, to materials, components, technical parameters, environmental information, the origin of raw materials, and data related to the end of the product's life.

Responsibility for data is of particular importance in this respect. In companies participating in complex supply chains, it will be necessary to determine who is responsible for data at each stage, and who is responsible for keeping it up to date after a change of supplier, component, or manufacturing process. This is precisely why the automotive sector study included a question on responsibility for keeping data up to date throughout the entire life cycle of a component or vehicle.

The second important dimension of the sector's specific character concerns data related to the environmental impact of the product and its life cycle. In the automotive sector, the significance of this data is growing alongside the development of electromobility and the increasing importance of

recycled materials, environmental footprint, resource efficiency, and the possibility of reusing and recycling components. In practice, this means the need to combine technical and production information with environmental data. For vehicle components, this data may include, among other things, information on materials, the origin of raw materials, manufacturing processes, environmental parameters, and possibilities for the further use of the product. The automotive scenario explicitly included a question on the possibility of linking environmental, material, and service-related information at the level of a single component.

The end-of-life phase also represents a significant challenge. The data needed to assess the possibility of reuse, repair, dismantling, or recycling must be available sufficiently in advance and must remain up to date. This requires not only technology, but also a change in the way product data is thought about, moving from information needed primarily for production to information managed throughout the entire product life cycle.

Electromobility increases the significance of DPP in the automotive sector, since the battery is a product of high material, technical, and environmental complexity, while at the same time requiring detailed information covering its entire life cycle. The Polish desk research pointed to the importance of data concerning, among other things, critical raw materials, battery state of health, charging cycles, and carbon footprint. From a competence perspective, this means the need to combine regulatory, technological, environmental, and data-related knowledge. Employees cannot operate solely within their existing specialisations. Greater collaboration will be required between engineering, IT, quality, purchasing, ESG, and regulatory compliance. The desk research explicitly indicates that training for the automotive sector should support cross-departmental understanding, in particular between engineering, IT, and compliance, and should include practical knowledge of the Battery Passport, ERP/PLM integration, and supplier data management.

The specific nature of the automotive sector also involves the need to find a balance between information transparency and the protection of the company's strategic data. Data exchange within DPP does not automatically mean that all information must be disclosed to all participants in the value chain. Issues of confidentiality, intellectual property, technological data, and information constituting a competitive advantage remain important for companies.

This issue was directly reflected in the sector-specific questions addressed to automotive participants: how to balance DPP transparency requirements with the protection of strategic data and intellectual property. This implies the need to develop competences not only in data transmission itself, but also in understanding the principles of access to information, responsibility for data, and secure collaboration with business partners.

The automotive sector in Poland is already aware that technological challenges are closely linked to organisational preparedness. Polish companies already use systems supporting business processes, but adapting them to DPP requirements will require integration, data organisation, and ensuring consistency of information. In the case of ERP systems, this raises, among other things, the need to extend functionality, integrate with other systems, and bear the costs of adaptation. The main challenge does not lie solely in purchasing new technologies. It is necessary to establish responsibility for data, define roles, and ensure collaboration across multiple departments of the company.

The specific nature of the automotive sector points to the need to develop competences that go beyond classic IT competences. The most important areas include:

- product data management throughout the entire life cycle;
- traceability of components and products;

- interoperability of systems and data exchange between OEMs and Tier 1 to 3 suppliers;
- management of supplier data;
- integration of technical, material, environmental, and service-related data;
- understanding of the Battery Passport and its significance for the wider preparation of the sector;
- management of ESG data and life cycle-related information;
- competences related to circularity, reuse, repair, and recycling;
- security and responsibility for shared data;
- the ability to adapt existing processes and systems to new requirements.

Sector Conclusion

The analysis of the automotive sector shows that DPP should be understood as a change in the way information is managed across the entire automotive ecosystem, rather than as a single digital solution implemented by the manufacturer. The greatest challenge lies in linking data generated at different stages of the product life cycle, within different organisations, and across different systems. Particular importance therefore attaches to traceability, interoperability, the quality of supplier data, responsibility for data, environmental information and circularity, and collaboration between OEMs, suppliers, and service providers. The Polish perspective further indicates that the automotive sector has a relatively high level of DPP awareness compared with the other sectors represented in the study, but awareness alone does not yet mean full implementation readiness. Participants from the automotive sector were among the groups with the highest level of DPP awareness and had already analysed the impact of the regulation on their business processes.

Objective of the Analysis

The objective of the analysis was to identify the challenges associated with the implementation of the Digital Product Passport (DPP) that are particularly relevant from the perspective of the sector represented by the participants of the Polish focus group, namely the automotive sector. The analysis focused on the traceability of products and components, system interoperability, product data and supplier data, ESG and circular economy aspects, technological readiness, and the competence readiness of organisations. The analysis was qualitative in nature and was carried out on the basis of the statements, experiences, and assessments of the focus group participants. Particular attention was paid to those elements of DPP implementation that may constitute a significant challenge for companies operating within complex supply chains and using extensive product information management systems.

7.2 Sector related elements of the training programmes

7.2.1 Traceability of Products and Components

Traceability was identified as one of the key areas of challenge related to DPP implementation. Focus group participants emphasised that ensuring full traceability requires not only the ability to establish the origin of a product or component, but also maintaining reliable and up-to-date

information throughout the entire product life cycle. A particular challenge lies in obtaining data from all participants in the supply chain and ensuring its consistency. In the case of the automotive sector, the significance of this problem is heightened by the large number of components and the multi-tier collaboration between companies. Participants indicated that the automotive sector already has experience in component traceability. This does not, however, mean full readiness for DPP requirements. Existing solutions will need to be further developed, so that traceability covers the product and its components throughout the entire life cycle and is linked to appropriate data quality and currency. From a competence perspective, this means the need to develop skills related to documenting the flow of information, managing identification data, and taking responsibility for keeping it up to date.

7.2.2 Interoperability

Interoperability was identified as one of the areas with the greatest gap in organisations' preparedness for DPP. Participants emphasised the need for multiple IT systems to work together and for data to be exchanged between companies participating in the supply chain. The problem concerns both systems used within the organisation and communication with business partners. In companies, product data is often scattered across different systems and departments, which makes it difficult to ensure consistency. At the same time, existing ERP systems require adaptation and integration with other solutions. Participants indicated that effective DPP implementation will require competences related to data integration, managing data flow, and ensuring interoperability between the systems of the company and its business partners. For the automotive sector, interoperability is of particular importance due to companies operating within extensive and international supply chains. This means the need to develop not only technical competences, but also the ability to organise the flow of information between different entities.

7.2.3 Product Data

One of the most important challenges identified during the focus group is the management of product data. Participants pointed to the need to collect, organise, verify, and update large volumes of data. The problem of ensuring the consistency of information originating from multiple sources becomes particularly significant. For companies with a large number of products and components, the challenge lies not in the collection of data itself, but in its long-term maintenance and the clear assignment of responsibility for its quality and currency. Participants pointed to the scale of the problem resulting from the need to manage a large number of product indexes and data originating from multiple sources. DPP implementation therefore requires organising the way product information is managed and establishing responsibility for data at each stage of the process.

7.2.4 Supplier Data and Supply Chain Collaboration

The focus group results indicate that obtaining reliable data from suppliers and business partners is a significant challenge. Participants emphasised that a company may be responsible for data originating from other organisations. In such a situation, it is necessary not only to obtain the information, but also to assess its quality, completeness, and reliability, and to ensure compliance with regulatory requirements. This problem is particularly significant for the automotive sector due to the multi-tier nature of its supply chains. The quality of information provided by one participant can affect the ability

of subsequent entities to manage data correctly. The study indicated that one of the greatest challenges will be ensuring the consistency of information originating from multiple suppliers and business partners. This means the need to develop competences covering both the management of supplier relationships and the assessment of data quality, the assignment of responsibility for its provision, and the organisation of information flow.

7.2.5 ESG

The focus group also drew attention to environmental and sustainability data. Participants indicated that obtaining, verifying, and updating ESG data received from suppliers and business partners will be a significant challenge. The problem lies in the absence of uniform methods for collecting such information and the need to ensure its reliability. The organisational maturity assessment confirmed this area as requiring development. ESG and the circular economy were rated at a level of 2 out of 5, with participants pointing to the need to organise the way ESG data is collected, verified, and managed. The identified need therefore does not concern only familiarity with ESG concepts, but above all the organisation's ability to obtain and manage reliable environmental data within its own processes and in collaboration with partners.

7.2.6 Circular Economy

In the context of the automotive sector, the circular economy was linked primarily to the need to manage information throughout the entire product life cycle. Participants indicated that traceability should cover the product and its components through successive stages of the life cycle. This means that data should not be treated solely as an element of the production process, but as a resource also used in later stages of the product's existence. From a DPP perspective, this means the need to ensure continuity of information and the ability to update it as changes occur to the product, its components, or processes. This requires appropriate procedures, responsibility for data, and collaboration between successive participants in the value chain. At the same time, the focus group material does not allow for a detailed specification of concrete solutions regarding the reuse, repair, or recycling of individual components. Conclusions in this respect should therefore remain at the level of the need, indicated by participants, to manage information throughout the entire product life cycle.

7.2.7 Technological Readiness

The assessment of technological readiness pointed to significant limitations related to existing IT infrastructure. Most companies use ERP systems, but current solutions are not fully prepared for DPP requirements. The barriers identified include the need to extend functionality, integrate with other systems, ensure consistency of product data, and bear the costs of adapting existing solutions. At the same time, the management of product information is often scattered across different departments and locations within the organisation. The absence of a clearly defined data owner increases the risk of inconsistency and makes it more difficult to prepare the organisation for DPP. The rating of "Data and Interoperability" at a level of 2 out of 5 confirms that this is one of the least well-prepared organisational areas. As a result, the challenge does not lie solely in implementing new technology, but above all in adapting the existing technological environment to new requirements concerning data and its exchange.

7.2.8 Competence Readiness

The focus group analysis indicates that technological preparation must be complemented by the development of employee competences. Participants identified significant gaps in data management, product traceability, interoperability, and the practical implementation of DPP.

These needs concern different professional groups. Management staff primarily need to understand the strategic consequences of DPP, investment planning, and change management. Production and logistics require competences related to traceability and information flow. IT specialists need competences in system integration and interoperability, while those responsible for purchasing and supplier collaboration will play an important role in obtaining product data.

The results therefore clearly indicate that DPP implementation cannot be treated as a task for the IT department alone. It is a process that spans multiple organisational functions and requires collaboration between them.

7.2.9 Significance of the sector's specific character for companies' DPP Preparedness

The analysis of the Polish focus group shows that the automotive sector is at a relatively more advanced stage of preparation than some of the other sectors represented in the study. Automotive representatives demonstrated a high level of DPP awareness and are already analysing the impact of the regulation on the operations of their organisations. At the same time, the sector faces a particularly complex challenge related to linking existing traceability systems, scattered product data, information from suppliers, and interoperability requirements. The most important conclusion of the analysis is therefore that, in the case of the automotive sector, what is needed is not simply raising awareness of DPP itself. Of greater importance is translating knowledge into practical organisational preparedness for implementation. This is confirmed by the results of the focus group as a whole: participants pointed primarily to the need for practical implementation of DPP requirements, management of product data, organisation of information flow, interoperability, and traceability of products and components. At the same time, they emphasised that training should answer the question of "how to implement DPP in practice", rather than being limited to presenting the regulation.

Workshops based on real company examples, case studies, good practices, expert mentoring, and work on real business processes and product data are preferred.

Final Conclusion

The analysis of the automotive sector's specific character shows that its main challenges related to DPP centre on traceability, data quality and continuity, system interoperability, and information exchange within the supply chain. The sector already has experience in traceability, but full preparedness for DPP requires extending existing solutions and developing organisational and process-related competences.

From the perspective of designing educational activities, this means the need to move away from general informational training towards practical, sector-adapted activities that develop the ability to manage data, integrate systems, collaborate with suppliers, and organise processes related to DPP. Participants also indicated that the programme should be adapted to the specific character of the

industry, the size of the company, its level of maturity, the scope of participants' responsibilities, and the organisation's role in the supply chain.

Key Observations

The analysis carried out indicates that companies do not expect further informational training. Their needs centre on acquiring practical skills enabling them to plan and carry out DPP implementation under specific organisational conditions.

Participants repeatedly emphasised that the greatest value lies in the experience of other companies and the opportunity for direct collaboration with experts who have practical implementation experience. The educational programme should therefore support not only the transfer of knowledge, but also the building of collaboration and the exchange of experience between companies.

Research Conclusions

The study results indicate that the future training programme should focus on developing the practical competences necessary for implementing the Digital Product Passport. Moving away from a model based on the transfer of theoretical knowledge towards workshops, case analyses, and work with real business processes will be of key importance.

At the same time, the analysis confirms the need to design educational activities that take into account the specific character of industries and the roles performed by participants. Such an approach will increase the usefulness of the training programme and will make it possible to better prepare companies for the implementation of DPP requirements.

8 DPP ORGANIZATIONAL MATURITY ASSESSMENT

Assessment results

The organisational maturity assessment was carried out in order to determine the stage of preparation for Digital Product Passport implementation reached by the organisations represented by the focus group participants, and to identify which areas require further development. The assessment complements the earlier qualitative analysis. Its purpose was not merely to determine the general level of readiness of companies, but to identify the areas in which the greatest differences occur between awareness of the need for DPP implementation and the organisation's actual ability to carry it out in practice. Participants assessed organisational readiness in five key areas: regulatory awareness, data management and interoperability, competences, ESG and the circular economy, and supply chain readiness. The 1 to 5 scale used made it possible to compare the individual areas and determine their relative level of preparation. The average score was 2.4 out of 5, corresponding to an early stage of preparation. This result indicates that organisations already have a basic awareness of the significance of DPP and recognise the most important challenges, but their ability to carry out comprehensive implementation requires further development. Of particular significance is the difference between regulatory awareness, rated at 3 out of 5, and data and interoperability together with competences, which received a rating of 2 out of 5. This shows that companies are beginning to understand why DPP will matter, but need greater support in translating requirements into practical organisational and technological action. A similar gap is observed in the area of ESG and the circular economy, rated at 2 out of 5. Supply chain readiness, by contrast, was rated at 3 out of 5, indicating a

relatively higher awareness of the importance of collaboration with partners, while problems relating to the quality and exchange of supplier data persist. The maturity assessment results should be interpreted together with the statements made by the focus group participants. The numerical score alone does not reveal the nature of the problems identified. Only by combining the quantitative assessment with the qualitative analysis is it possible to determine what kind of competences, knowledge, tools, and forms of support companies need at the present stage of preparation.

For this reason, the remainder of the chapter focuses on translating the diagnostic results into directions for designing the DIGITRACE training programme under WP2. The recommendations do not constitute a general catalogue of training topics, but instead follow directly from the needs indicated by participants: the need for practical preparation for DPP implementation, work on real cases and processes, adaptation of the programme to the specific character of companies, and ensuring that the knowledge acquired can be applied in practice.

Area	Rating 1–5	Comment
Regulatory awareness	3	Participants indicated a basic understanding of DPP requirements, but the level of knowledge varied. Companies operating in international supply chains demonstrated the highest awareness.
Data and interoperability	2	The biggest challenges concern data management, data quality, system integration and ensuring interoperability between supply chain partners.
Competencies	2	Significant competency gaps have been identified in data management, product traceability, and the practical implementation of DPP requirements. Organizations primarily expect practical training.
ESG and circularity	2	Participants recognize the importance of ESG in the context of DPP , but point out the need to organize the way it is acquired, verified and managed.
Supply chain	3	Organizations are aware of the importance of cooperation in the supply chain, but they also point out the difficulties associated with obtaining reliable data from suppliers and ensuring uniform standards for information exchange.

Final result

Average rating: 2.4/5

Interpretation of readiness level:

Result	Interpretation
1.0–1.9	Very low level of readiness
2.0–2.9	Early stage of preparations
3.0–3.9	An organization in transition
4.0–4.5	Advanced preparation
4.6–5.0	High DPP maturity

Purpose of analysis:

The purpose of this section of the report is to present recommendations for the training program being developed as part of the DIGITRACE project.

The recommendations were formulated based on analysis of focus group participants' responses and reflect the actual needs of companies preparing to implement the Digital Product Passport (DPP). Their goal is to identify directions for designing educational activities that will have the greatest practical value for companies representing various industries.

8.1. Training program assumptions

The analysis of the discussion conducted within the focus group indicates that companies preparing for Digital Product Passport implementation need a programme oriented primarily towards the practical preparation of the organisation for implementation, rather than solely towards conveying knowledge of the regulation and basic DPP-related concepts. Participants indicated that awareness of regulatory requirements alone is not sufficient for a company to be capable of beginning the implementation process. Requirements need to be translated into concrete actions relating to data, processes, IT systems, organisational responsibility, and collaboration with suppliers and other business partners. The maturity assessment results confirm this gap: at an average readiness level of 2.4 out of 5, regulatory awareness was rated relatively higher, while lower scores were obtained in the areas of data and interoperability, competences, and ESG and the circular economy.

The programme should respond to the actual implementation process

The identified needs indicate that the training programme should be structured around the process of preparing a company for DPP, rather than around the catalogue of regulations itself.

By the end of the programme, a participant should be able not only to explain what DPP is, but above all to answer practical questions such as:

- what requirements apply to their company and product;
- what product data is needed and where it is currently located;
- who within the organisation is responsible for particular data;
- how to assess the quality, completeness, and reliability of data;

- what information should be expected from suppliers and partners;
- how the company's current systems can be used or adapted;
- what interoperability problems may arise;
- what organisational processes require change;
- what competences are needed by particular groups of employees;
- how to plan the next stages of preparing the company for DPP.

This approach corresponds to the focus group results, in which participants pointed to the need for practical implementation of DPP requirements, management of product data, organisation of information flow, interoperability, and traceability of products and components.

The programme should combine the strategic, organisational, and operational levels

A further underlying principle should be the combination of three perspectives on company preparation. The strategic level should enable management staff to understand the consequences of DPP for the company's operating model, investments, processes, and collaboration with partners.

The organisational level should focus on responsibility for data, the organisation of collaboration between departments, process mapping, and preparing the company for change. The operational level should address concrete actions relating to product data, traceability, IT systems, information exchange, and collaboration with suppliers. This distribution is particularly important because focus group participants did not view DPP as a task solely for IT departments. They pointed to the need for collaboration across multiple organisational functions and for designating people responsible for managing product data and coordinating the implementation process.

The programme should be modular and allow for different participation pathways

The study results indicate that companies' needs vary depending on sector, company size, level of digital maturity, and the role of the participant within the organisation and the supply chain.

The programme should therefore not assume that every participant must follow exactly the same educational pathway.

A common element should be a foundation module, providing a shared understanding of DPP, regulatory requirements, product data, and the principles of traceability. Participants should then have the opportunity to select or deepen the areas that correspond to their role and their organisation's needs, such as data management, interoperability, supplier collaboration, ESG, or change management. This approach is consistent with the need, clearly indicated by participants, to adapt the programme to the specific character of the industry, company size, level of organisational maturity, the scope of the participant's responsibilities, and the company's role in the supply chain.

The programme should be based on "learning by doing"

One of the most important principles arising from the focus group is a move away from a training model based primarily on lectures and the transfer of information.

Participants pointed to the particular value of:

- real company cases;
- implementation examples;
- work on real business processes;
- analysis of product data;

- exercises related to traceability;
- examples of system integration;
- solving real problems arising during implementation;
- exchange of experience between companies;
- support from experts with practical experience.

This means that knowledge should be directly linked to action. Every theoretical element should lead to its application in a specific company context. For example, after the section on data, a participant should be able to identify the sources of product data within their own organisation, determine who owns them, and point out the most important gaps. After the module on interoperability, they should be able to identify the systems that will need to exchange information and the main integration barriers.

The programme should lead from diagnosis to an action plan

An important underlying principle of the programme should be enabling the company to move from recognising the problem to preparing a concrete plan for further action. This means the programme should support companies in moving through successive stages: awareness of requirements → diagnosis of the current state → identification of gaps → determination of needs → planning of changes → preparation for implementation.

Education understood in this way avoids a situation in which a participant finishes the training with more knowledge, but without knowing what specifically to do upon returning to the company.

The programme should take into account different levels of company maturity

The average readiness score of 2.4 out of 5 indicates that organisations are at a relatively early stage of preparation, but this does not mean that all companies are at an identical level.

The programme should therefore make it possible to begin work at a level corresponding to the organisation's current situation. Companies that are only just building DPP awareness need help organising the basics. More advanced organisations, on the other hand, should be given the opportunity to move directly to issues relating to data integration, interoperability, supplier collaboration, or the preparation of specific implementation processes. This will make it possible to avoid both an overly general programme for more advanced organisations and excessive burden on companies that are only just beginning their preparations.

The programme should combine technical and organisational competences. The focus group analysis shows that effective DPP implementation requires a combination of digital, process-related, regulatory, and organisational competences. Preparing IT specialists alone is not sufficient. Competences are also needed among those responsible for product data, production, logistics, purchasing, quality, compliance, ESG, and company management. The programme should therefore develop not only the ability to use technology, but also the capacity for decision-making, cross-departmental collaboration, change management, data evaluation, and problem solving.

The programme should be sector-differentiated. One of the key conclusions of the study is that a completely uniform programme cannot be applied to all companies. The common foundations of DPP

should be supplemented with examples and cases specific to individual sectors. For the automotive sector, particular importance attaches to component traceability, supplier data, system interoperability, and information management within a complex supply chain. In other sectors, priorities may differ. This approach will make it possible to maintain a shared European competence standard, while at the same time giving companies the opportunity to relate the knowledge to the real conditions of their own operations.

The programme should ensure the transfer of knowledge into the organisation. A final important principle is ensuring that the outcome of participation in the training is not merely the knowledge of a single employee. DPP implementation requires organisational change, and participants should therefore be prepared to transfer the knowledge gained to their own teams and processes. In this context, working materials, diagnostic tools, checklists, process examples, and the possibility of consulting experts after the training has ended are all significant. Participants pointed to the value of mentoring and expert support continuing even after the training concludes.

Summary of the Programme's underlying principles

Based on the focus group results, the DIGITRACE training programme should therefore be:

- practical – focused on the real process of DPP implementation;
- modular – allowing content to be tailored to the participant's role and needs;
- sector-based – drawing on cases and problems characteristic of specific industries;
- multi-level – meeting the needs of management staff, specialists, and those responsible for operational implementation;
- action-based – using exercises, cases, and work on real processes;
- interdisciplinary – combining regulation, data, technology, processes, and organisational competences;
- implementation-oriented – guiding the participant from a diagnosis of the current state to the determination of next steps;
- supported by experts – ensuring the possibility of consultation and the practical application of knowledge.

8.2. Key thematic areas of the programme

Based on the participants' statements, the following educational priorities were identified:

8.2.1 Module 1. DPP, Regulation, and Company Obligations

The starting point should be knowledge of ESPR, DPP, and the obligations of the company, presented in a practical manner.

Participants pointed to the need to understand not only the regulations themselves, but above all their translation into company operations: what requirements will apply to a specific product, what information will be required, who will be responsible for preparing it, and what changes may be needed within the organisation.

Competence outcome: the participant should be able to translate regulatory requirements into the basic obligations and actions of their own company.

8.2.2 Module 2. Product Data Management

This should be one of the main modules of the programme, since data management was identified as one of the greatest competence gaps.

The scope should cover:

- identification of data sources;
- mapping of product data;
- data quality, completeness, and currency;
- responsibility for data;
- obtaining data from suppliers;
- data management throughout the product life cycle;
- preparing data for DPP.

It is very important here to move from theory to work on a real company example.

8.2.3 Module 3. Traceability and Interoperability

This module should combine two problems that appeared together in the study: product traceability and the ability of systems to exchange information.

Scope:

- identification of the product and its components;
- information flow throughout the life cycle;
- mapping the traceability process;
- system integration;
- interoperability;
- data exchange with partners;
- identifying technological gaps.

8.2.4 Module 4. Supply Chain and Supplier Data

Here the focus is on what cannot be resolved solely within the company itself.

The participant should understand:

- how to determine the data required from suppliers;
- how to assess the quality of external data;
- how to organise its exchange;
- how to determine responsibility for data;
- how to proceed in the case of missing information;
- how to prepare partners for the new requirements.

This should be a particularly important module for companies operating as suppliers within larger value chains.

8.2.5 Module 5. ESG, Circularity, and Environmental Data

This module should show how environmental data becomes part of product information.

Scope:

- ESG data relevant to the product;
- sources of environmental data;
- data verification;
- materials and their origin;
- the product life cycle;
- reuse, repair, and recycling;
- linking DPP with the circular economy.

This follows directly from the low rating of the ESG and circularity area, at 2 out of 5.

8.2.6 Module 6. Implementation Organisation and Change Management

This module should translate DPP into the organisation of the company's work:

- roles and responsibilities;
- data owner;
- collaboration between departments;
- change management;
- identifying risks;
- implementation planning;
- preparing a roadmap.

8.3. Preferred training delivery model

The training programme is designed around a blended learning model in which introductory materials, basic regulatory issues, and selected preparatory content are delivered online. This allows participants to acquire foundational knowledge at their own pace before attending face-to-face sessions. However, the core of the educational process is workshop-based, ensuring that theoretical knowledge is directly translated into practical skills and organisational actions. Rather than traditional lectures, the training is structured around interactive workshops that begin with concrete company problems. Each session is anchored in real-life challenges such as how to prepare data for a specific product, how to determine who is responsible for the data, how to identify the gap between the ERP system and DPP requirements, or how to prepare data requirements for a supplier. This problem-driven approach enables participants to immediately apply concepts to their own organisational context, fostering deeper understanding and actionable outcomes.

Case studies are tailored to the specific characteristics of each industry. In the automotive sector, for example, workshops may focus on the data flow related to a specific component, tracing its journey through the supply chain. In other sectors, case studies may be based on different product models and supply chain configurations. This ensures relevance and allows participants to work with scenarios that closely mirror their operational reality.

Each major module concludes with a practical task that participants carry out in relation to their own organisation. For the data module, participants create a company data map. In the traceability module, they develop a traceability map. The supplier module requires the compilation of a list of data required from suppliers, while the organisational module involves drafting a preliminary implementation roadmap. These tasks reinforce learning and produce tangible outputs that can be used directly within the participant's company.

Focus group participants highlighted the value of expert support after the formal training ends. To address this, the programme incorporates a structured mentoring and follow-up component. The cycle begins with the delivery of core content and workshop activities, followed by an implementation task in which participants apply learning to their organisation. Experts then provide feedback and guidance through consultations, enabling participants to refine their solutions based on expert input. This iterative process continues as participants progress to subsequent modules or advanced implementation steps, ensuring sustained engagement, continuous improvement, and a higher likelihood of successful DPP implementation.

This design combines flexibility through online preparatory materials with depth and practicality through workshops, sector-specific cases, and hands-on tasks, while embedding long-term support via mentoring to maximise impact and organisational readiness.

8.4. Adapting the program to the needs of enterprises

The programme should be differentiated along at least five dimensions:

1. Sector – Different cases and data will be relevant for automotive than for textiles, food, plastics, or agriculture.

2. Company size – Small and medium sized enterprises should not receive a programme designed in the same way as for a large organisation with extensive IT, compliance, and ESG departments.

3. Organisational maturity – With a score of 2.4 out of 5, not all participants start from the same point. We can therefore distinguish: a foundation pathway → an implementation pathway → an advanced pathway.

4. Participant's role – Different competences are needed by:

management,

IT,

production,

logistics,

purchasing,

ESG,

compliance,

the person responsible for the product or data.

The programme should therefore have a common core plus functional modules or pathways.

Key observations:

The survey results indicate that companies expect a training program focused on the practical aspects of implementing the Digital Product Passport. Participants repeatedly emphasized the greatest value of training delivered by experts with implementation experience and the opportunity to analyze real-world cases from their own industry.

At the same time, attention was drawn to the need to provide support also after the training has been completed, which can make it easier for companies to implement the acquired knowledge in practice.

Research conclusions:

The analysis conducted within the focus group indicates that an effective training programme for the DIGITRACE project should go beyond providing knowledge about regulations and focus on practical preparation of companies for implementing DPP.

The program should be modular, taking into account the diversity of industries, organizational levels, and participants' roles. Practical workshops, case study analysis, mentoring, and opportunities to work with real-world processes and systems used in enterprises will be key. This approach best meets the needs identified during the study and provides a solid foundation for developing the DIGITRACE project's WP2 training program.

9 TRAINING PRIORITIES

The results of the organisational maturity assessment, together with the analysis of the focus group participants' statements, indicate that companies preparing for Digital Product Passport implementation are at different stages of readiness. The average maturity score of 2.4 out of 5 points to an early stage of preparation. At the same time, the qualitative analysis shows that companies already have a basic awareness of the significance of DPP, and their greatest needs relate to translating this knowledge into concrete organisational, process-related, and technological action.

Training priorities should therefore not be understood as a simple catalogue of topics to be covered during training. Their purpose is to identify the competence areas of greatest importance for moving a company from awareness of the requirements to practical readiness for DPP implementation.

The priorities were determined by combining three elements of the diagnosis: the results of the organisational maturity assessment, the identified competence gaps, and the educational needs indicated directly by participants. This approach maintains continuity between the diagnosis presented in Chapter 8 and the design of the training programme.

Chapter 8 set out the underlying principles and the construction of the programme, while the present chapter answers the question of which areas should be given the highest priority within the programme, and for which groups of participants they are particularly relevant.

Priorities should be treated hierarchically. The first five areas form the core of the recommended programme, while ESG, the circular economy, and cybersecurity should be included as supporting, cross-cutting areas, with scope adapted to the specific character of the sector and the participant's role.

9.1. Key Training Priorities

Training priorities:

1. Practical preparation of the company for DPP implementation

Target group: Management staff, company owners, project managers, implementation leaders

Rationale from the study: Participants indicated the need to translate DPP requirements into concrete company actions and to prepare practically for beginning and organising the implementation process.

2. Product data management and data quality

Target group: Product managers, quality, production, logistics, and purchasing and IT departments, people responsible for data

Rationale from the study: Data management was identified as one of the greatest gaps. The problem concerns the completeness, currency, quality, reliability of, and responsibility for, product data.

3. Interoperability, data exchange, and supply chain collaboration

Target group: IT specialists, logistics, purchasing, people responsible for suppliers and business partners

Rationale from the study: Participants pointed to difficulties related to integrating existing systems and ensuring effective data exchange between companies.

4. Product traceability and management of information throughout the product life cycle

Target group: Production, logistics, quality, compliance, product managers

Rationale from the study: Traceability was identified as one of the key conditions for effective DPP implementation. There is a need to develop the ability to link data to a product or component and to maintain information throughout the successive stages of its life cycle.

5. Change management and organisational preparation for DPP

Target group: Management staff, department heads, transformation leaders, people responsible for implementation

Rationale from the study: DPP implementation requires changes that go beyond technology, including defining roles and responsibilities, collaboration between departments, and preparing employees for new ways of working.

9.2. Priority 1 – Practical Preparation of the Company for DPP Implementation

The first and overarching priority should be translating knowledge of DPP into a practical process of company preparation.

The focus group results indicate that participants do not expect a programme limited to presenting the regulation. Above all, they need an answer to the question of how to translate DPP requirements into actions taken within a specific organisation.

The scope of this priority should include:

- recognising the company's obligations;
- identifying the products and processes covered by the requirements;
- assessing the current level of preparation;
- identifying the main gaps;
- determining responsibility;
- establishing the sequence of actions;
- preparing a basic implementation roadmap.

The aim is therefore not to repeat regulatory knowledge, but to develop the competence of translating regulatory requirements into organisational decisions and actions.

This is particularly important given the average maturity level rated at 2.4 out of 5. Companies are aware of the direction of change, but need support in moving from awareness to action.

9.3. Priority 2 – Product data management and data quality

The second priority is the development of competences related to product data management, since this area was identified as one of the greatest gaps.

The programme should develop the company's ability to:

- identify the data required for the product;
- determine the sources of this data;
- assess its completeness and quality;
- verify information received from partners;
- determine data owners;
- ensure the currency of information;
- manage data throughout the entire product life cycle.

Responsibility for data is of particular importance. Participants indicated that the problem lies not only in the absence of information, but also in its fragmentation and the lack of a clear determination of who is responsible for its quality and currency.

This priority should be practical in nature. The outcome of the training should be to enable the participant to recognise the sources of product data within their own organisation, identify responsibility for the data, and identify the main gaps in its quality and availability.

9.4. Priority 3 – Interoperability, data exchange, and supply Chain collaboration

The third priority is the development of the ability to exchange data effectively between systems and organisations.

The diagnosis results pointed to problems related to integrating existing systems and ensuring interoperability. For companies operating within supply chains, the problem additionally includes the need to obtain and verify information from other entities.

Training should therefore cover not only the technical side of interoperability, but also the organisation of information flow:

- what data is needed;
- who should provide it;
- at what point it should be available;
- how to assess its quality;
- how to ensure its consistency;
- how to identify problems arising at the interface between different systems and organisations.

This priority is particularly relevant for people responsible for IT, logistics, purchasing, data, and supplier relations.

9.5. Priority 4 – Traceability and the Product Life Cycle

The fourth priority is the traceability of products and components and the management of information throughout the entire product life cycle. The focus group results indicate that companies need the ability to link information to a specific product or component and to ensure the continuity of this information through the successive stages of its life cycle. For the automotive sector, this is particularly important, since sector representatives already have experience in component traceability, but indicated the need to further develop existing solutions in line with DPP requirements.

This priority should cover:

- the principles of identifying products and components;

- linking the identifier to product information;
- the flow of data between successive stages of the life cycle;
- responsibility for updating data;
- identifying gaps in existing traceability processes;
- the use of data at successive stages of the product's life.

9.6. Priority 5 – Change management and organisational preparation

The fifth priority concerns the organisational dimension of DPP implementation.

The study results show that DPP should not be treated as a technological project carried out solely by the IT department. Implementation requires collaboration across multiple organisational functions, the determination of responsibility for data, and the preparation of employees for new processes.

Training should therefore develop competences related to:

- planning change;
- determining roles and responsibilities;
- cross-departmental collaboration;
- identifying implementation barriers;
- communicating change;
- managing risk;
- monitoring implementation progress.

This priority is cross-cutting in nature. Even well-prepared data and systems will not ensure effective implementation if the organisation is not prepared to work with the new processes.

9.7. Supporting Priorities

In addition to the five main priorities, the analysis points to the need to include two supporting areas in the programme.

ESG and the circular economy

The area of ESG and the circular economy was rated at 2 out of 5, indicating the need for further development of competences related to obtaining, verifying, and managing environmental data.

The programme should in particular include:

- environmental data relating to the product;
- sources of ESG data;
- the quality and verification of information;
- data on materials;
- information on the product life cycle;
- the significance of data for reuse, repair, and recycling.

There are, however, no grounds, on the basis of the focus group alone, to treat ESG and circularity as one of the dominant, standalone directions of the entire programme. The scope should be adapted to the specific character of the sector and the product.

Cybersecurity and responsible data sharing

Cybersecurity should be included as a cross-cutting area, particularly in the context of the secure exchange and protection of product data.

It was not identified in the study as one of the main competence gaps, and it is therefore not recommended to treat it as a separate, first-level priority. It should instead accompany the modules relating to data, interoperability, and collaboration with partners.

9.8. Priorities by target group

The identified priorities should be differentiated according to the participant's role within the organisation. Not all employees involved in the DPP implementation process will need the same scope of competences.

Target group	Most important priorities
Management staff and company owners	Practical preparation for DPP, implementation planning, change management
Product managers and people responsible for data	Product data, data quality, traceability, product life cycle
IT and people responsible for digitalisation	Interoperability, system integration, data exchange, security
Production and quality	Traceability, product data, information quality, processes
Logistics and purchasing	Supplier data, information exchange, traceability, supply chain
ESG, sustainability, compliance	Regulatory requirements, environmental data, ESG, circularity
Implementation leaders and project teams	Integration of all areas, process and change management

This approach makes it possible to maintain a common core for the programme, while at the same time avoiding a situation in which all participants receive an identical scope of knowledge regardless of their function.

9.9. Hierarchy of training priorities

On the basis of the focus group results, the following hierarchy can be adopted:

Priority 1 – Practical preparation of the company for DPP implementation

Priority 2 – Product data management and data quality

Priority 3 – Interoperability, data exchange, and supply chain collaboration

Priority 4 – Product traceability and life cycle management

Priority 5 – Change management and organisational preparation for DPP

Supporting areas: ESG and the circular economy, and cybersecurity and responsible data sharing.

This hierarchy reflects not only the topics indicated by participants, but also the results of the organisational maturity assessment. The highest priority is given to those areas where a high need for practical support coincides with a clear gap between the current level of preparation and the requirements associated with DPP implementation.

Research Conclusions

The analysis indicates that training priorities should be structured around the company's ability to actually implement DPP, rather than solely around the transfer of knowledge about the regulation.

The greatest importance attaches to competences related to product data management, ensuring data quality, traceability, interoperability, and organising collaboration with suppliers and business partners. In parallel, it is necessary to develop the organisational competences needed to carry out the change process. The five main priorities should form the core of the DIGITRACE training programme, while ESG, the circular economy, and cybersecurity should be incorporated in a cross-cutting manner, adapted to the needs of individual sectors and participant groups.

An important conclusion is also the need to maintain a connection between the training content and the company's actual implementation process. The participant should not only acquire knowledge, but also gain the ability to use it to diagnose their own organisation, identify gaps, and plan next steps.

In this sense, the training priorities represent a direct translation of the diagnostic results presented in Chapter 8 into requirements for the WP2 training programme. Chapter 8 defined what the programme should look like, while Chapter 9 indicates which competences and thematic areas should receive the highest priority within it, and to which participant groups they should be directed.

The ultimate goal of the programme should not be simply to increase participants' knowledge of DPP, but to increase companies' ability to take concrete action in preparing for the implementation of the Digital Product Passport.

10 RECOMMENDATIONS FOR WP2

Purpose of analysis:

The aim of the analysis was to identify solutions that, according to participants, can help companies begin preparing for the implementation of the Digital Product Passport. Unlike activities requiring long-term investments, this section focuses on initiatives that can be implemented in the short term and best practices that support building organizational readiness.

Conclusions:

One of the most recurring themes during the discussions was the importance of data quality. Participants emphasized that many companies already possess a significant amount of product information, but it is dispersed across various departments and systems.

The first step in preparing for the implementation of DPP is to review available data, identify its owners, and organize the way it is collected and updated. Such activities can begin even before the implementation of new IT tools.

The focus group results indicate that preparing companies for Digital Product Passport implementation requires not only the transfer of knowledge about the regulation, but above all the development of practical competences enabling companies to apply this knowledge in real business processes. The average level of organisational maturity, rated at 2.4 out of 5, points to an early stage

of preparation. At the same time, the analysis of educational needs showed that participants primarily expect practical ways of translating DPP requirements into data management, product traceability, system interoperability, supplier collaboration, and the organisation of the implementation process. The recommended WP2 model should therefore be structured as a flexible competence-development pathway, combining a shared knowledge foundation with practical workplace-based learning and the possibility of obtaining formal confirmation of the competences acquired. The recommendations set out below relate directly to the forms of education indicated in the WP2 assumptions: micro-learning, work-based learning, micro-credentials, practical exercises, and implementation simulations.

11 GOOD PRACTICES AND QUICK WINS

11.1. Introduction

The analysis carried out during the Polish focus group indicates that companies are not starting their preparations for the Digital Product Passport from zero. Many organisations already have solutions, processes, and experience in place that can serve as a foundation for further DPP preparation. This applies in particular to companies with experience in the traceability of products and components, documentation management, operating within international supply chains, and using IT systems that support business processes.

At the same time, the study results show that existing solutions are often scattered and do not yet form a coherent model of organisational preparation for DPP. In the short term, therefore, the greatest value may come from organising actions that do not require an immediate, comprehensive technological transformation.

In this context, "quick wins" should be understood as actions that can be started using the company's existing resources, which help to reduce the most important gaps and create a foundation for further implementation.

11.2. Good practices identified during the focus group

Using existing systems instead of starting the transformation from scratch

Participants indicated that companies already have systems supporting basic business processes. This applies in particular to organisations operating within more developed supply chains. A good practice is therefore to begin preparations with an inventory of existing solutions, followed by determining which of them can be used to support DPP requirements. This approach makes it possible to reduce the risk of premature technological investment and to first determine the actual gap between the current state and the requirements.

Building on existing traceability mechanisms

In the automotive sector, participants pointed to existing experience with the traceability of products and components. This is a significant starting resource for DPP preparation. Rather than creating entirely new processes, companies can begin by analysing already functioning traceability mechanisms and determining which information is already being collected, which can be used, and what data is

missing from a DPP perspective. This approach makes it possible to gradually extend existing processes rather than replacing them entirely.

Assigning responsibility for product data

One of the most significant problems identified during the study was the fragmentation of data and the absence of a clear assignment of responsibility. A good practice is therefore to designate a person or team within the organisation responsible for coordinating DPP-related product data. This does not necessarily mean creating a new position immediately. At the first stage, it may simply involve formally assigning responsibility to an existing employee or team. This makes it possible to organise the flow of information and reduce the risk of a situation in which individual departments hold fragments of information but no one is responsible for the whole.

Collaboration between departments

Participants emphasised that preparation for DPP should not be carried out by the IT department alone. A good practice is to create an interdisciplinary team or working group, including, depending on the specific character of the company, representatives from production, quality, IT, logistics, purchasing, compliance, and ESG. This approach makes it possible to view DPP not as a technological project, but as a change encompassing data, processes, responsibility, and relationships with business partners.

Starting with a specific product or process

The study results point to the need for a practical approach to company preparation. A good practice can be to begin the analysis with a single representative product, component, or process, rather than attempting to analyse the entire organisation at once. This makes it possible to trace:
product → data → data sources → responsibility → suppliers → systems → information flow → gaps.
This approach enables the company to identify problems within a controlled scope and later extend the solution to further products.

Using supplier collaboration to improve data quality

For companies operating within complex supply chains, collaboration with suppliers is an important element of DPP preparation.

A good practice is to begin by determining the minimum set of information the company needs to obtain from suppliers, and establishing how it should be transmitted and verified.

This makes it possible to gradually build shared information exchange standards, without having to wait for a complete system-level solution.

11.3. Quick Wins: solutions that can be implemented quickly

Based on the focus group results, the following actions can be identified, which companies can begin without waiting for full technological implementation.

Quick Win	What Can Be Done	Expected Result
1. Designating a data owner	Appoint a person responsible for coordinating DPP-related product data	Clear responsibility and a first point of contact within the organisation
2. Product data map	Identify the most important data, its sources, owners, and storage locations	An initial picture of the current state and visible gaps
3. Analysis of a single product	Select a representative product or component and analyse it from a DPP perspective	Practical recognition of problems without having to analyse the entire portfolio
4. Traceability map	Trace the flow of information relating to a selected product or component	Identification of points where data is lost, duplicated, or unavailable
5. List of data required from suppliers	Determine the information the company needs to obtain from key suppliers	A first organised standard for information collaboration
6. Data quality assessment	Check a selected group of data for completeness, currency, and reliability	Identification of the most important quality gaps
7. System map	Identify the systems involved in creating, storing, and transmitting product data	Initial identification of interoperability problems
8. DPP team	Set up a small interdisciplinary team responsible for preparing the organisation	Coordination of actions across departments
9. List of competence gaps	Determine which competences are missing among particular groups of employees	A basis for directing employees to the appropriate educational pathways
10. Preliminary roadmap	Based on the diagnosis carried out, determine the most important actions, their sequence, and responsibility	A first practical plan for the company's further preparation

11.4. Quick Wins in the automotive sector

Given the representation of the automotive sector in the Polish focus group, actions that can be embedded within existing production processes and supply chains are of particular importance. For automotive companies, it can be considered particularly useful to start with a single component or product for which data on identification, origin, quality, and flow within the supply chain already exists.

On this basis, a simplified analysis can be carried out:

component → supplier → supplier data → identification → production → company systems → customer → subsequent stages of the life cycle.

Such an exercise makes it possible to simultaneously identify:

- missing data;
- problems with information quality;
- points requiring system integration;

- problems in communication with suppliers;
- ambiguities regarding responsibility for data;
- employees' competence needs.

In a sector where some companies already have developed traceability mechanisms, particular value can be found in extending existing traceability practices to cover the broader scope of product data and its exchange required under DPP.

Conclusions

The analysis of good practices and quick wins indicates that companies can begin preparing for DPP even before implementing the target technological solutions.

At the initial stage, the greatest value lies in organising actions: identifying data, determining responsibility, analysing existing systems and processes, using functioning traceability mechanisms, and organising collaboration with suppliers.

An important conclusion is also that quick wins should not be treated as an alternative to full DPP implementation. Their role is to reduce uncertainty, reveal gaps, prepare the organisation, and create a foundation for subsequent investment and organisational decisions.

From the WP2 perspective, it is particularly valuable to use these actions as elements of work-based learning and practical exercises, since they make it possible to link competence development with companies' real problems.

The most effective way to begin preparing for DPP is to make use of what the company already has, to organise existing data and processes, and to gradually identify and close gaps, rather than starting the transformation with a complete overhaul of systems.

12 FINAL CONCLUSIONS

The focus group conducted in Poland made it possible to determine the level of preparedness of companies for the implementation of the Digital Product Passport, to identify the most important competence and organisational gaps, and to determine the educational needs of companies, with particular attention to the automotive sector.

The results of the analysis indicate that companies do not question the direction of the changes associated with DPP, but most of them are still at the stage of preparation and of recognising the consequences of the new requirements. The average organisational maturity score was 2.4 out of 5, corresponding, on the scale adopted, to an early stage of preparation.

At the same time, the study showed that companies already have certain resources, experience, and solutions that can be used as a starting point. Existing IT systems, experience in the traceability of products and components, operating within supply chains, and growing awareness of the importance of data quality are of particular significance.

The most important challenge is therefore not starting the process from scratch, but organising existing resources and translating knowledge of DPP into coherent organisational, process-related, and competence-related action.

Key Observations

1. Companies are aware of the direction of change, but are not yet fully prepared for its practical implementation

Focus group participants demonstrated a basic awareness of the significance of DPP and the associated regulatory changes. The level of this awareness, however, varied. A higher level of preparedness was shown primarily by companies operating within international supply chains and organisations with prior experience in traceability and product information management. At the same time, regulatory awareness does not yet translate sufficiently into operational readiness.

2. The greatest gap concerns data management

Product data management was identified as one of the most important problems. Companies hold significant data resources, but these are often:

- scattered across different systems;
- collected by different departments;
- of varying quality;
- managed inconsistently;
- obtained from multiple sources;
- partly dependent on information provided by partners.

The problem is therefore not merely access to data, but the organisation's ability to ensure its completeness, quality, currency, reliability, and responsibility for its maintenance.

3. DPP is perceived as an organisational, not solely a technological, change

One of the most important conclusions of the study is the need to move away from treating DPP as a project carried out solely by IT departments. Implementation will require collaboration between production, quality, logistics, purchasing, IT, compliance, ESG, and management staff. The determination of roles, responsibilities, and data owners, as well as the creation of mechanisms for collaboration between departments, becomes particularly important.

4. The supply chain will be one of the key elements for successful implementation

A company is not able to ensure the completeness of product information based solely on data held within its own organisation. In many cases, it will be necessary to obtain data from suppliers and other business partners. Participants pointed to problems related to the quality, completeness, and consistency of information received from outside the organisation. This means that preparation for DPP must cover not only the company's internal processes, but also the way information exchange is organised throughout the entire supply chain.

5. The automotive sector possesses important starting resources

For the automotive sector, an important asset is companies' existing experience in the traceability of products and components. This does not, however, mean full readiness for DPP. Existing solutions require further development in terms of the scope of data, its quality, system integration, and the exchange of information between participants in the supply chain. For the automotive sector, training making use of real cases relating to components, suppliers, traceability, and data flow will therefore be particularly valuable.

Main Barriers

Based on the analysis carried out, the following main barriers to companies' preparation for the Digital Product Passport (DPP) can be identified. In many cases, DPP-related activities are currently exploratory in nature and are not yet part of a comprehensive implementation strategy, reflecting an absence of a holistic approach to organisational preparation. Product data are often fragmented, held across different systems, departments, and sources, which makes it difficult to create a coherent picture of product-related information. Existing systems do not always ensure smooth exchange of information within the organisation or between the company and its partners, indicating low interoperability. Missing, outdated, or inconsistent information may limit the company's ability to meet future product data requirements, highlighting persistent problems with data quality and completeness. Organisations frequently lack a clearly defined owner of product data or clear responsibility for its currency and quality, which undermines accountability. Gaps in practical competences concern not only regulatory knowledge, but above all the ability to translate DPP requirements into processes, data, systems, and organisational action. The complexity of supply chains further complicates preparation, as the company is dependent on the quality and availability of data provided by other organisations, increasing the overall complexity of the DPP implementation process. Finally, participants pointed to the need to incur significant expenditure related to adapting infrastructure, systems, processes, and employee competences, underscoring the substantial costs and resources required for transformation.

12.1. Key conclusion regarding educational needs

The analysis indicates that companies need, above all, competences enabling the application of knowledge, not merely an increased level of awareness. The educational programme should therefore develop the participant's ability to:

recognise requirements → identify data → assess gaps → plan actions → collaborate with suppliers
→ organise change → prepare the company for implementation.

For this reason, the recommended WP2 model should make use of:

- micro-learning – to deliver foundational knowledge;
- work-based learning – to work on the company's real problems;
- practical exercises – to develop operational competences;
- implementation simulations – to practise the entire process;
- micro-credentials – to confirm specific learning outcomes.

This approach is a direct consequence of the needs identified during the study.

12.2. Conclusions for the WP2 Training Programme

Based on the overall analysis of the Polish focus group, it is recommended that the WP2 programme:

1. Be practical – focused on companies' real problems.
2. Be modular – allowing content to be selected according to the participant's role and the organisation's level of maturity.
3. Be sector-differentiated – making use of cases corresponding to the specific character of individual industries, in particular automotive.

4. Combine knowledge and action – every significant element of knowledge should lead to practical application.
5. Make use of work-based learning – part of the educational process should take place directly within the participant's company.
6. Make use of implementation simulations – participants should have the opportunity to practise the process of preparing the company for DPP.
7. Lead to measurable outcomes – the participant should conclude a given stage of education with a concrete result, such as a data map, a gap analysis, or an element of an implementation plan.
8. Make use of micro-credentials – confirming the achievement of specific learning outcomes, rather than mere participation.

12.3. Final Conclusion

The Polish focus group shows that companies are aware of the significance of the changes ahead, possess some of the necessary resources and experience, but still need support in moving from regulatory awareness to practical implementation readiness. The greatest challenges concern the management of product data, its quality and availability, interoperability, traceability, supply chain collaboration, and preparing the organisation and its employees for change. At the same time, companies should not be treated as organisations starting the transformation from scratch. In many cases, they already have systems, processes, and experience that can serve as a basis for further action. The key task is to identify these resources, organise them, and determine which gaps need to be filled. The most important conclusion of the study is therefore the need to move away from an educational model based primarily on the transfer of information, towards implementation-oriented education. The WP2 programme should enable companies to move from:

"I know what DPP is"

to:

"I know what my company needs, I know what data I need, I know where my gaps are, and I am able to plan the next steps."

This approach best corresponds to the identified level of company maturity, the specific character of the sector represented by Poland, and the competence needs revealed during the study.

The ultimate outcome of the WP2 educational activities should be an increase in companies' actual ability to prepare for and implement DPP, not merely an increase in the level of knowledge about the solution itself.



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FOCUS GROUP – NATIONAL REPORT SPAIN

Irene Montejano, University Isabel I



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1 BASIC INFORMATION

Area	Information
Country	Spain
Project partner	University Isabel I
Focus date	25 th June 2026
Form of meeting	Stationary
Moderator	Irene Montejano
The person taking notes	Marta Aguilar
Number of participants	7
Represented sector	Food/Agro food
Session duration	95 minutes

2 PARTICIPANT PROFILE

Participant's role	Number of people
Management staff	2
IT / Digitalization	1
Production / Logistics	2
ESG / Compliance	1
Marketing / Sales	0
VET/HEI education	0
Industry organizations	1

Participant's role	Number of people
Other	0

3 EXECUTIVE SUMMARY

The national focus group brought together seven representatives from the Spanish food and agri-food sector in Castilla y León, including SMEs involved in food production, agricultural supply and processing activities, as well as representatives from sectoral organizations. To complement the focus group discussion and enrich the qualitative evidence, additional qualitative input was gathered through a follow-up interview with an SME operating in the meat processing sector. Together, these activities explored the sector's current level of preparedness for the implementation of the Digital Product Passport (DPP), focusing on regulatory awareness, technological readiness, data management practices and competency needs.

One of the main findings was the very limited awareness of the Digital Product Passport and the Ecodesign for Sustainable Products Regulation (ESPR). Although participants were highly familiar with traceability, food safety requirements and quality management systems, most had little or no previous knowledge of the DPP itself. The discussion revealed that existing traceability systems are often perceived as equivalent to the DPP, while in practice they address only part of the information that will be required under the future European framework. At the same time, once the concept and its objectives were explained, participants showed considerable interest in understanding its implications and recognised its potential relevance for future regulatory compliance and competitiveness within European markets.

The findings also indicate that the food and agri-food sector starts from a relatively strong position in terms of operational traceability. Many participating companies are already accustomed to complying with demanding food safety, quality assurance and product certification schemes. Existing quality management systems, batch traceability procedures and supplier monitoring practices therefore provide a valuable foundation for future DPP implementation. However, these systems are primarily designed to support food safety and regulatory compliance rather than the broader sustainability, circularity and product lifecycle information expected under the DPP.

Participants identified several barriers that may hinder implementation. The most significant challenge highlighted during the discussions was the limited understanding of future DPP and ESPR requirements, together with the lack of practical guidance on how these requirements should be implemented within SMEs. While technological challenges such as supplier data availability, interoperability between existing systems and access to sustainability-related information were also identified, participants emphasized that a clearer understanding of the regulatory framework should be the first step towards successful implementation.

The discussion highlighted a clear demand for practical guidance rather than theoretical information. Participants expressed interest in training covering the DPP and ESPR framework, ESG reporting, carbon footprint measurement, data governance, interoperability standards and supply chain collaboration. Practical implementation roadmaps, sector-specific case studies and tools adapted to SMEs were considered particularly valuable.

Overall, the qualitative evidence suggests that the main challenge for the sector is not a lack of willingness to adopt the Digital Product Passport, but rather limited awareness, uncertainty regarding future requirements and the need for practical support to bridge the gap between existing traceability systems and the broader regulatory, data and sustainability requirements of the Digital Product Passport.

4 LEVEL OF AWARENESS OF DPP AND REGULATIONS

This section summarizes participants' level of awareness and understanding of the main concepts associated with the Digital Product Passport, including the DPP itself, the Ecodesign for Sustainable Products Regulation (ESPR), ESG principles, traceability practices and future regulatory requirements. The analysis also explores how participants perceive the potential impact of these concepts on their organizations.

Key observations from the focus group session:

1. Participants' level of awareness

Awareness of the Digital Product Passport was generally very limited. This limited awareness was consistently associated with uncertainty about the practical implications of the future regulatory framework. Participants expressed the need for clearer information on DPP and ESPR requirements before addressing the technological aspects of implementation.

At the same time, participants demonstrated strong familiarity with traceability systems, food safety regulations and quality management practices. Many companies already operate under demanding certification schemes and quality standards, requiring robust traceability procedures throughout the production process. However, most participants had little or no previous knowledge of the DPP or the ESPR before participating in the DIGITRACE activities.

During the discussion, it became evident that many participants initially associated the DPP with existing traceability obligations. However, they also recognised that the future framework requires a much broader range of product, sustainability and lifecycle information than current traceability systems provide. Additional qualitative evidence collected after the focus group reinforced this finding, suggesting that the main challenge is not resistance to adoption but limited awareness of future regulatory requirements and the need for practical implementation guidance.

2. Dominant organizational concerns:

- Implementation costs
- Need for staff training and upskilling
- Additional administrative burden
- Lack of supplier readiness
- Data responsibility and ownership
- Integration of data from multiple sources
- Confidentiality of commercial information

3. Perceiving DPP, e.g. as a regulatory obligation, risk, competitive advantage, element of an ESG strategy.

Participants perceived the Digital Product Passport as both a future regulatory requirement and a potential business opportunity. While concerns focused on the need to better understand future DPP and ESPR requirements and the practical implications for their organizations, participants also recognised opportunities associated with greater supply chain transparency, improved communication with customers and stronger alignment with future European sustainability objectives. Some participants highlighted its potential to strengthen competitiveness in European and international markets, particularly as sustainability and digital traceability become increasingly important for market access.

Overall, the discussion indicated that companies are open to the implementation of the DPP, provided they receive sufficient guidance, practical tools and implementation support to understand and meet future requirements.

5 TECHNOLOGY, DATA AND INTEROPERABILITY

This section examines the technological readiness of participating organizations to support the future implementation of the Digital Product Passport. It focuses on existing digital systems, data management practices, interoperability and the technological challenges associated with collecting and exchanging DPP-related information.

5.1 Systems and infrastructure

Key Findings

Most companies use ERP systems for inventory, purchasing and production planning. However, these systems are rarely integrated with environmental reporting tools.

Indicated barriers:

Area	Description of the problem
ERP	Systems available but limited environmental data functionality.
PIM	Dedicated Product Information Management (PIM) systems were not commonly reported among participating organizations, particularly among SMEs.
MES	Present only in larger organizations.
API / integration	Limited integration between internal and external systems.
Traceability	Strong internal traceability but weak supplier interoperability.
ESG data	Strong internal traceability but weak supplier interoperability.

5.2 Data management

The person completing the report should identify key problems: e.g. data quality, data dispersion, lack of standardization, lack of interoperability, lack of data governance.

- Data stored in different systems
- Excel-based reporting
- Lack of standardized supplier information
- Inconsistent data quality
- Limited governance procedures

Participants reported that large amounts of operational data are already collected within their organizations, particularly for food safety, quality assurance and traceability purposes. However, these data are often distributed across different systems, spreadsheets or manual records, making integration and standardized data exchange a significant challenge for future DPP implementation.

5.3 Supply chain

Participants reported that supplier readiness varies considerably across the agri-food value chain. While larger suppliers generally provide more structured digital information, smaller suppliers often continue to rely on manual documentation, spreadsheets or email-based data exchange. This creates inconsistencies in data quality and standardization, making it more difficult to collect the reliable and interoperable information required for future DPP implementation. Participants agreed that successful implementation will depend not only on the digital maturity of individual companies but also on the preparedness of their suppliers and other supply chain partners.

5.4 Most frequently reported problems

Participants identified several recurring challenges that may hinder the effective implementation of the Digital Product Passport. These issues were consistently mentioned across the discussion and reflect both technological and organizational barriers faced by SMEs in the agri-food sector.

- Lack of standardized supplier data
- Limited understanding of future DPP and ESPR requirements
- Lack of practical guidance and implementation support
- Poor data quality and consistency
- Low digital maturity of suppliers
- Difficulties integrating existing systems
- Lack of ESG and sustainability-related information

6 COMPETENCIES AND TRAINING NEEDS

The discussions revealed that competency gaps extend beyond digital skills alone. Participants consistently highlighted the need to better understand the future DPP and ESPR framework, together with practical guidance on how these requirements can be implemented within SMEs. While organizations generally demonstrated solid experience in traceability, food safety and quality

management, they identified significant knowledge gaps regarding the broader sustainability, lifecycle and regulatory dimensions introduced by the Digital Product Passport. Consequently, participants expressed a strong demand for training that combines regulatory awareness with practical implementation guidance, enabling companies to build on their existing traceability systems while preparing for future DPP requirements.

6.1 The most important competency gaps

About the area	Gap level
Regulatory knowledge	High
Practical implementation skills	High
Data management	High
Data literacy	High
ESG and sustainability reporting	High
Interoperability	High
Cybersecurity	Medium
Traceability	Low

The low gap identified in traceability reflects the sector's existing experience with food safety, quality assurance and certification requirements. By contrast, the largest gaps relate to understanding the DPP and ESPR framework, translating regulatory requirements into operational actions, managing sustainability-related data and ensuring interoperability across systems and supply chain partners.

6.2 Competencies by role

Although several competency needs are common across organizations, participants highlighted different priorities depending on employees' roles and responsibilities. The following overview summarizes the main competency needs identified for each functional area involved in future DPP implementation.

Management Staff

Need a better understanding of the DPP and ESPR regulatory framework, its business implications, investment planning, regulatory developments and sustainability strategies. Managers should also be able to lead organizational change, coordinate cross-functional implementation and support strategic decision-making related to DPP adoption.

Production/Logistics

Need competencies related to data capture, process monitoring, traceability integration and the collection of additional sustainability and lifecycle information required by the DPP. Particular attention should be given to improving data quality, ensuring consistent information throughout the production process and facilitating data exchange across the supply chain.

IT / Digitalization

Need knowledge of interoperability standards, APIs, data governance, system integration and secure data exchange. Competencies should focus on integrating DPP-related information within existing digital systems while ensuring data reliability, interoperability and cybersecurity across the supply chain.

Marketing / ESG / Sales

Need competencies in ESG communication, sustainability reporting, customer information management and the communication of DPP-related value to customers and business partners. This includes understanding how digital product information can support transparency, regulatory compliance, market differentiation and customer trust.

6.3 DigComp 2.2 Mapping

The competency needs identified during the discussions can also be interpreted in relation to the DigComp 2.2 framework. Although participants demonstrated varying levels of digital maturity, the mapping highlights several competency areas that will require further development to support effective DPP implementation.

Competence	Observations
Information and data literacy	Limited awareness of DPP and ESPR requirements highlights the need to strengthen competencies in identifying, understanding, evaluating and managing regulatory and sustainability-related information.
Data management	Moderate capability, with significant room for improvement in managing sustainability and DPP-related data.
Critical evaluation of data	Limited experience in assessing, validating and integrating data from multiple internal and external sources.
Digital collaboration	Structured digital collaboration and standardized information exchange across the supply chain remain limited.
Cybersecurity	Basic awareness is generally present, although stronger competencies will be needed as digital data exchange increases.

Competence	Observations
Problem solving	Organizations demonstrate operational problem-solving capabilities but require additional competencies to address DPP implementation challenges and digital transformation processes.

7 SECTOR SPECIFICITY - description of challenges specific to the sector represented by the participants.

The focus group revealed several characteristics that are specific to the food and agri-food sector and that are likely to influence the future implementation of the Digital Product Passport (DPP). Participants represented different stages of the agri-food value chain, including agricultural suppliers, food processors, producers and sectoral organizations. Despite differences in size and level of digitalization, participants shared a number of common challenges related to regulatory awareness, traceability, supplier data, interoperability, sustainability reporting and organizational readiness.

One of the strongest findings was the relatively high level of experience with traceability systems. Unlike many other sectors, food companies have been working with traceability requirements for many years due to food safety legislation, quality standards and customer requirements. Participants explained that they routinely collect information related to production batches, raw materials, suppliers and product movements. Traceability is therefore perceived as a normal part of daily operations rather than a new requirement. These existing quality management and traceability practices provide a solid operational foundation for future DPP implementation.

However, the discussion highlighted an important distinction between traditional food traceability and the concept of the Digital Product Passport. Existing traceability systems are mainly designed to guarantee food safety, support audits and facilitate product recalls when necessary. Participants acknowledged that these systems generally do not capture the wider range of environmental, sustainability and lifecycle information expected within the DPP framework. Several participants highlighted that the main challenge is not the collection of operational data itself, but understanding how existing traceability systems should evolve to accommodate the broader regulatory, sustainability and lifecycle information required by the DPP. Participants consistently expressed the need for clearer guidance regarding future DPP and EPR requirements and their practical implementation within SMEs.

Supplier data emerged as one of the most significant challenges discussed during the session. Participants repeatedly emphasized that the quality and availability of information often depends on the digital maturity of suppliers. While larger suppliers are generally able to provide structured documentation and digital records, smaller producers frequently continue to rely on spreadsheets, email communication or paper-based documentation. This creates difficulties when organizations attempt to consolidate information across the supply chain.

Representatives of agricultural organizations highlighted the diversity of actors involved in agri-food supply chains. Many agricultural products pass through several intermediaries before reaching

processing companies. In addition, seasonal production patterns, changing suppliers and differences in production methods create additional complexity. Participants agreed that obtaining reliable and standardized information from all actors in the supply chain remains one of the biggest obstacles to future DPP implementation. This reinforces the need for coordinated implementation across the entire value chain rather than isolated actions at company level.

The issue of interoperability was closely linked to supplier data management. Most participants reported using some form of digital system, particularly ERP solutions for production planning, purchasing, inventory management or quality control. Nevertheless, the degree of digital integration varies considerably across organizations. Larger and more technologically advanced companies have implemented multiple digital tools, while smaller organizations often rely on simpler solutions and manual procedures.

Participants explained that even when internal systems function adequately, significant challenges arise when information needs to be exchanged externally. Data formats differ between suppliers, customers and business partners, requiring manual intervention and data transformation. Several participants described situations in which information is transferred using spreadsheets, email attachments or custom templates created for individual customers. As a result, data exchange processes are often inefficient and prone to errors.

Another recurring topic was the limited use of specialized systems for product information management. While ERP systems are relatively common, participants reported little experience with dedicated PIM platforms or advanced digital product information systems. Consequently, many organizations lack centralized repositories for sustainability, environmental and product lifecycle information. Participants indicated that significant investments may be required to establish the technological infrastructure needed to support future DPP requirements.

Environmental and ESG-related information was identified as one of the weakest areas across the sector. Although participants recognized the growing importance of sustainability, very few organizations currently calculate product-level carbon footprints or conduct detailed lifecycle assessments. Environmental information is often collected only when required by specific customers or certification schemes. Several participants admitted that they have limited understanding of the methodologies used to calculate environmental indicators and are uncertain about future reporting expectations. This uncertainty was linked not only to technical methodologies but also to limited knowledge of future regulatory expectations and the practical steps required to prepare for compliance.

Participants also expressed concerns regarding the resources that may be required to collect, validate and maintain ESG-related information. Smaller organizations in particular reported limited internal capacity and a lack of specialized staff. The discussion suggested that environmental reporting remains at an early stage of development within many agri-food SMEs, despite increasing market and regulatory pressure.

Circularity was another area where participants demonstrated varying levels of understanding. While some companies have already implemented initiatives related to waste reduction, recycling or resource efficiency, these activities are not usually connected to broader circular economy strategies. Participants generally associated circularity with practical operational improvements rather than with formal sustainability reporting frameworks. This indicates that additional awareness-building and training may be required before organizations can fully integrate circular economy principles into DPP-related processes.

The focus group also explored organizational competencies and readiness. Participants agreed that their organizations possess strong operational expertise in areas such as food safety, quality management and traceability. These competencies provide an important foundation for future DPP implementation. However, significant gaps were identified in understanding the future DPP and ESPR framework, as well as in ESG reporting, sustainability metrics, digital data management and interoperability standards.

Several participants noted that employees responsible for quality and production frequently have to manage increasing amounts of information without receiving additional training. As regulatory requirements become more complex, organizations may need to develop new competencies related to data governance, environmental reporting and digital collaboration. Participants emphasized that future training initiatives should prioritize practical implementation through sector-specific examples, implementation roadmaps and tools that can be directly applied within SMEs, rather than focusing exclusively on theoretical concepts.

Overall, the discussion suggests that the food and agri-food sector is not starting from zero in relation to the Digital Product Passport. Existing traceability systems, quality management procedures and supplier monitoring practices provide a valuable foundation for future DPP implementation. Nevertheless, companies will need to progressively adapt these existing systems to incorporate the broader regulatory, sustainability and lifecycle information introduced by the DPP.

The findings indicate that the main barriers are not related to a lack of willingness to adopt the Digital Product Passport, but rather to limited awareness of future regulatory requirements, the complexity of collecting reliable data across fragmented supply chains, the limited availability of ESG-related information, varying levels of digital maturity among suppliers and the need for practical implementation guidance. Successful implementation of the DPP in the agri-food sector will therefore require coordinated efforts involving producers, processors, suppliers, technology providers, industry organizations and public authorities.

8 DPP ORGANIZATIONAL MATURITY ASSESSMENT

Assessment results:

Area	Rating 1–5	Comment
Regulatory awareness	2.5	Limited awareness of the DPP and ESPR, despite strong familiarity with existing traceability and food safety requirements.
Data and interoperability	3.0	Existing digital systems provide a solid foundation, but interoperability and standardized data exchange across the supply chain remain limited.

Area	Rating 1–5	Comment
Competencies	3.0	Strong operational expertise, but important gaps remain in DPP regulatory knowledge, ESG reporting and digital competencies.
ESG and circularity	2.0	Limited practical implementation of ESG reporting, carbon footprint measurement and lifecycle assessment methodologies.
Supply chain	3.0	Well-established traceability practices, but inconsistent supplier data and varying digital maturity remain significant challenges.

Average rating: 2.7

The maturity assessment confirms the qualitative findings obtained during the focus group discussions. While the sector demonstrates relatively mature traceability practices and a moderate level of digitalization, overall preparedness for the Digital Product Passport remains at an early stage. The principal limitations are associated with regulatory awareness, ESG-related competencies and the practical implementation of future DPP requirements rather than with a lack of willingness to adopt the new framework.

Interpretation of readiness level:

Result	Interpretation
1.0–1.9	Very low level of DPP preparedness
2.0–2.9	Early stage of DPP preparedness
3.0–3.9	Transition towards DPP implementation
4.0–4.5	Advanced level of DPP preparedness
4.6–5.0	High level of DPP maturity

With an average score of 2.7, the Spanish agri-food sector can be considered to be at an early stage of DPP preparedness. Although companies benefit from well-established traceability and quality management systems, further progress will depend on strengthening regulatory awareness, ESG-related competencies and the practical implementation of DPP requirements.

9 TRAINING PRIORITIES

Based on the competency gaps identified throughout the focus group discussions, the following training priorities are recommended to support the progressive implementation of the Digital Product Passport within the Spanish agri-food sector.

No.	Training topic	Target group	Justification
1.	Understanding the DPP and ESR regulatory framework	Management, Quality, Compliance	Very limited awareness of the DPP and ESR was identified as the principal barrier to implementation.
2.	Practical implementation of the DPP in SMEs	Management, Operations, Quality	Companies requested practical guidance, implementation roadmaps and sector-specific case studies rather than theoretical information.
3.	Data management and governance	Quality, IT, Operations	Reliable data management will be essential to support DPP requirements and ensure data consistency across organizations.
4.	ESG reporting and sustainability indicators	ESG, Quality, Management	Significant competency gaps were identified in ESG reporting and sustainability-related information management.
5.	Carbon footprint measurement and environmental data	ESG, Sustainability, Quality	Environmental indicators and lifecycle information are currently among the least developed areas.
6.	Interoperability and digital data exchange	IT, Operations	Existing digital systems require improved interoperability to facilitate standardized information exchange.
7.	Supply chain collaboration and information sharing	Management, Procurement, Operations	Successful DPP implementation depends on coordinated information exchange across the value chain.
8.	Digital tools supporting DPP implementation	IT, Quality, Management	Organizations require practical knowledge of digital solutions that support DPP implementation and integration.

Participants identified a clear need for practical, business-oriented training that combines regulatory understanding with operational implementation. Rather than focusing exclusively on digital tools, organizations expressed interest in developing the knowledge and competencies required to understand the DPP framework and progressively integrate its requirements into existing business processes.

The proposed sequence reflects the implementation pathway identified during the discussions, rather than the relative importance of each competency area. Participants indicated that companies first need to understand the future DPP and ESR requirements before developing the technical and organizational capabilities needed for effective implementation. Consequently, training activities should prioritize practical implementation through real-life case studies, sector-specific examples and implementation roadmaps adapted to SMEs. Participants emphasized the value of practical guidance and actionable tools that can be directly applied within their organizations.

10 RECOMMENDATIONS FOR WP2

Training formats

Training activities should combine short theoretical modules with practical workshops that allow participants to progressively apply DPP concepts within their own organizational context. Flexible delivery formats adapted to SMEs will facilitate participation while supporting the gradual implementation of DPP requirements. Whenever possible, learning activities should be based on real business scenarios from the agri-food sector.

Micro-learning

Micro-learning is particularly suitable for introducing regulatory concepts, raising awareness of the DPP and ESR framework and providing regular updates as European requirements continue to evolve. Short learning units can help SMEs remain informed without requiring extensive time commitments and can support continuous learning throughout the implementation process.

Work-based learning

Work-based learning should focus on real company cases, allowing participants to analyse their own processes, identify implementation gaps and develop practical DPP implementation plans. Sector-specific examples should be prioritised to maximise relevance and ensure that learning outcomes can be directly transferred into daily business operations.

Micro-credentials

Micro-credentials are considered particularly valuable when linked to practical competencies such as regulatory compliance, ESG reporting, data governance, interoperability and digital product information management. Modular certification can also support continuous professional development as DPP requirements evolve over time.

Practical exercises and implementation simulations

Simulation exercises should replicate realistic implementation scenarios, including supplier data collection, interoperability challenges, ESG data reporting and digital product information management. Practical implementation roadmaps and step-by-step exercises would help SMEs test DPP processes before deploying them within their own organizations.

11 GOOD PRACTICES AND QUICK WINS

Good practices identified during the focus group

The discussions identified several existing practices that already provide a valuable foundation for future DPP implementation within the Spanish agri-food sector:

- Existing batch traceability systems supporting food safety and product monitoring.
- Well-established quality management systems providing structured operational procedures.
- Supplier audit and quality assurance processes already integrated into business operations.
- Food safety documentation and regulatory compliance practices that facilitate product traceability.
- Existing collaboration between quality, production and logistics teams in managing operational and traceability information.

Solutions that can be quickly implemented (Quick Wins)

Participants identified several actions that could be implemented rapidly, particularly by SMEs, without requiring major technological investments:

- Organise internal awareness sessions introducing the DPP and ESPR framework.
- Develop standardized supplier questionnaires to facilitate the collection of DPP-related information.
- Improve internal data quality procedures before introducing new digital tools.
- Create simple ESG and sustainability data collection templates adapted to SMEs.
- Identify existing traceability information that can already contribute to future DPP requirements.
- Map current digital systems and identify interoperability gaps before investing in additional technologies.

Overall, these good practices and quick wins demonstrate that many organizations already possess important elements required for future DPP implementation. Rather than replacing existing systems, early actions should focus on strengthening regulatory awareness, improving data quality and progressively extending current traceability practices to incorporate the broader sustainability and lifecycle information required by the Digital Product Passport.

12 FINAL CONCLUSIONS

Most important observations

The Spanish agri-food sector demonstrates a strong operational foundation for future DPP implementation thanks to its well-established traceability systems, food safety procedures and quality management practices. However, overall preparedness remains at an early stage due to limited awareness of the Digital Product Passport and the Ecodesign for Sustainable Products Regulation (ESPR). The main challenge is not the willingness to adopt the DPP, but understanding how existing systems should progressively evolve to incorporate broader sustainability, regulatory and lifecycle information requirements.

Overall, the findings suggest that awareness-raising should precede digital transformation efforts, enabling companies to build upon existing traceability and quality management systems rather than replacing them.

The biggest barriers

The principal barriers identified during the focus group relate to limited awareness of future DPP and ESPR requirements, inconsistent supplier data, varying levels of digital maturity across supply chains and the limited availability of ESG-related information. Participants also highlighted the lack of practical implementation guidance as a major obstacle, particularly for SMEs with limited internal resources. These findings suggest that organizational readiness and regulatory understanding currently represent greater challenges than the technological aspects of implementation.

The most important needs of the organization

Organizations require practical, business-oriented support that combines regulatory understanding with operational implementation. Priority needs include training on the DPP and ESPR framework, data governance, ESG reporting, interoperability, supplier collaboration and practical implementation methodologies. Participants consistently emphasized the importance of sector-specific case studies, implementation roadmaps and practical tools that can be directly applied within SMEs to facilitate the gradual adoption of DPP requirements.

Contribution to the DIGITRACE project

The findings of the national focus group provide a solid evidence base for the next stages of the DIGITRACE project. The competency gaps, training priorities and implementation challenges identified through the discussions will directly support the design of training materials, learning activities and capacity-building resources tailored to the needs of SMEs operating in the Spanish agri-food sector.



Empowering SMEs to transform Digital Product Passport compliance into a
competitive advantage

Project number: 101244175

FOCUS GROUP – NATIONAL REPORT BULGARIA

Svetoslava Pavlova, Chamber of Commerce and Industry -
Stara Zagora



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1 REPORTING TEMPLATE

1.1 BASIC INFORMATION

Area	Information
Country	Bulgaria
Project partner	Chamber of Commerce and Industry - Stara Zagora
Focus date	03.07.2026
Form of meeting	Stationary
Moderator	Svetoslava Pavlova
The person taking notes	Svetoslava Panayotova
Number of participants	8
Represented sector	Textile
Session duration	2 hours

2 PARTICIPANT PROFILE Group structure:

Participant's role	Number of people
Management staff	2
IT / Digitalization	1
Production / Logistics	1
ESG / Compliance	1

Participant's role	Number of people
Marketing / Sales	2
VET/HEI education	0
Industry organizations	1
Other	0

3 EXECUTIVE SUMMARY

The findings from the Bulgarian textile-sector validation workshop indicate that participating companies are at an **early to moderate and uneven stage of DPP readiness**. Awareness of the Digital Product Passport (DPP) and related future regulatory requirements exists across the sample, but in most cases it remains partial and has not yet been translated into structured internal preparation. While several companies are still at an introductory stage, others already demonstrate some operational elements that could support future DPP implementation, such as ERP-supported data collection, client-platform reporting and internal production-stage traceability. This suggests that the sector is not starting from zero, but from a mixed baseline with significant differences in maturity between companies.

At present, DPP is perceived primarily as a **compliance-related challenge**, an additional cost and a potential operational burden, rather than as a fully understood strategic tool for improving traceability, transparency, circularity and credible sustainability communication. At the same time, some responses indicate an emerging recognition that DPP may also support stronger customer trust, better product-data organization, improved supply-chain visibility and future competitive positioning.

From a technological and organizational perspective, overall readiness remains limited. Product and production data are often dispersed across spreadsheets, internal files, customer platforms and non-integrated software environments rather than managed through fully structured and interoperable systems. Even where stronger internal digital practices exist, important weaknesses remain in supplier-data reliability, lifecycle-related content, ESG and circularity information, and the governance of externally sourced data. The broader challenge is therefore not only internal digitisation, but the ability to transform fragmented product, supplier and process information into structured, reliable, shareable and updateable lifecycle data.

The main barriers identified across the company responses include:

- fragmented and inconsistently structured data;
- low visibility beyond direct suppliers;
- limited interoperability between systems and departments;
- unclear data ownership and update responsibilities;
- weak validation of supplier and subcontractor information;
- confidentiality concerns related to sensitive business information and data sharing;
- administrative burden linked to collecting and maintaining additional data;
- limited readiness to manage broader sustainability, circularity and end-of-life information.

These barriers are particularly relevant in the textile sector, where multi-tier supply chains, subcontracted production, changing material inputs and externally controlled data flows make traceability and validation especially difficult.

The most significant capability gaps concern:

- data governance and structured product-data management;
- validation and reliability of supplier data;
- ESG, circularity, durability, repairability and end-of-life information;
- internal coordination between departments and functions;
- practical understanding of traceability, carbon footprint, LCA and data accountability.

The responses also show that DPP readiness should not be assessed only in terms of whether companies already possess some product information. It should be understood more broadly as the ability to manage the right information at the right level of detail, with clear responsibilities, appropriate access rules and the capacity to update and use that information across the product lifecycle. In this sense, the sample reflects **uneven readiness**, with some firms showing stronger operational foundations, but with the sector as a whole still far from advanced DPP preparedness.

From a training perspective, the strongest needs relate to **practical implementation rather than general awareness alone**. Companies need support in understanding what data is required for DPP, how to map available and missing information, how to organize internal responsibilities, how to collect and validate supplier data, and how to build at least a basic level of interoperability and governance capacity. The evidence therefore supports a phased approach to training and readiness-building, with priority given to practical, role-based and company-oriented learning formats such as short modules, case-based learning, blended learning and hands-on workshops.

The main training priorities emerging from the analysis are:

1. understanding DPP-related data requirements for textile products;
2. organizing internal processes, roles and responsibilities;
3. improving data exchange, supplier-data collection and verification across the supply chain;
4. strengthening interoperability between systems and departments;
5. building practical capacity for circularity, sustainability and lifecycle-related information management.

Overall, the findings suggest that for textile companies, DPP readiness is not only a matter of compliance. It is a test of whether product data, supplier data, internal responsibilities and digital systems are sufficiently mature to support traceability, circularity and credible sustainability information across the product lifecycle.

4 LEVEL OF AWARENESS OF DPP AND REGULATIONS - assessment of the level of knowledge:

The company responses indicate a **low to medium and uneven level of awareness** of the Digital Product Passport (DPP) and its future implications for textile products. Across the sample, awareness remains mostly at a general and introductory stage. Most companies are familiar with the concept in broad terms or have at least encountered key related topics such as traceability, ESG, ESPR or future regulatory requirements. However, this awareness is not yet consistently translated into structured internal preparation or a clear operational understanding of what DPP implementation would require in practice.

The responses suggest that, in most cases, DPP has not yet been systematically embedded into internal company discussions, planning or cross-departmental coordination. At the same time, the sample also shows **variation in the level of preparedness**. While several companies remain at an early stage of awareness and still need basic orientation, others demonstrate a somewhat stronger practical understanding of traceability processes, product data handling or digital reporting requirements. This indicates that the sector should not be seen as uniformly unprepared, but rather as showing **mixed levels of awareness and readiness**.

Overall, respondents do not yet demonstrate a consistently strong practical understanding of how DPP may affect:

- product data requirements;
- traceability across the value chain;
- supplier and subcontractor information;
- ESG and sustainability-related reporting;
- data ownership and update responsibilities ;
- or internal organizational coordination.

Dominant organizational concerns

The responses show that the most frequently emerging concerns across the sample are:

- implementation and compliance costs;
- supplier-data quality, completeness and reliability;
- fragmented data and lack of structured information management;
- limited interoperability between systems and departments;
- insufficient internal competencies and practical know-how;
- uncertainty regarding future regulatory and client requirements;
- concerns related to sensitive business information, confidentiality and data sharing.

These concerns suggest that companies do not perceive the challenge only as regulatory, but also as operational, organizational and strategic.

Perception of DPP

Across the sample, DPP is still perceived primarily as:

- a regulatory obligation;
- a business and compliance risk;
- or an additional operational and financial burden.

At the same time, the responses also indicate that some companies are beginning to recognise DPP as a potential opportunity to strengthen:

- trust and transparency;
- internal data management and traceability;
- customer and partner communication;
- and future competitive positioning.

This suggests that the prevailing perception is still compliance-driven, but not exclusively so. The sample points to an emerging shift from seeing DPP only as a burden toward recognizing that it may also become an enabling tool for transparency, circularity and business differentiation.

Key observations from the focus group session

1. Participants' level of awareness

Awareness across the sample is generally low to medium and remains uneven. Companies are usually familiar with the concept at a basic level, but most are not yet at the stage of structured preparation or implementation planning.

2. Dominant organizational concerns

The main concerns relate to costs, fragmented or unreliable supplier data, weak interoperability, limited internal competencies, uncertainty about future requirements, data liability and the protection of confidential business information.

3. Perception of DPP

DPP is still seen mainly as a regulatory obligation or operational burden. However, some responses also show that companies increasingly associate it with traceability, transparency, ESG positioning and potential competitive advantage.

The responses show that, even where companies do not yet have a detailed understanding of DPP, they already connect the topic with several broader issues that are relevant to their business. Most often, DPP is associated with:

- future European regulatory requirements, especially under ESPR;
- traceability of products, materials and suppliers;
- management and sharing of product data;

- ESG and sustainability-related information;
- expectations from clients, business partners and the market for greater transparency and documentation.

5 TECHNOLOGY, DATA AND INTEROPERABILITY - assessment of the organization's technology readiness.

5.1 Systems and infrastructure

Key Findings (Qualitative Description)

The company responses indicate that the current technological landscape in the sample is mixed, fragmented and only partially prepared for DPP-related requirements. Most firms use a combination of spreadsheets, internal files, company-specific software, ERP modules, client platforms and other digital tools to manage product and production information. However, in most cases these tools do not yet function as part of a fully integrated and interoperable data environment.

This suggests that the main challenge is not the total absence of digital systems, but the fact that data is often stored across disconnected environments, with limited standardization, partial reusability and weak integration between internal functions and external actors. As a result, existing systems may support some aspects of product identification, production tracking or client reporting, but they are not yet consistently capable of supporting the broader DPP logic, which requires structured, reliable, shareable and updateable lifecycle information.

From a textile-sector perspective, technology readiness should therefore be assessed not only by the presence of digital tools, but by whether companies are able to connect and govern data across product development, sourcing, production, quality, compliance, sustainability and external reporting processes. The responses show that some companies already have stronger operational elements in place, including ERP-supported data collection, reporting to customer platforms and internal traceability across production stages. This is an important finding, as it suggests that implementation support can build on existing practices in part of the sample.

At the same time, even where such stronger internal practices exist, broader DPP readiness remains constrained by several factors: limited interoperability between systems, dependence on externally provided supplier or client data, lack of structured lifecycle information, weak product-level sustainability data and uncertainty regarding who owns, validates and updates externally sourced information.

Overall, the responses suggest that the sample reflects partial digital readiness with uneven maturity across companies. Some firms already possess relevant operational building blocks, but these are not yet sufficient to support a fully governed and interoperable DPP-ready data environment.

Indicated barriers:

Area	Description of the problem
ERP	Some companies report using ERP-supported processes, but ERP is not yet consistently established across the sample as a reliable and central backbone for DPP-relevant product, supplier and lifecycle data management. In several cases, ERP use appears partial or focused on specific operational needs rather than full product-data governance.
PIM / PLM	There is limited evidence of structured Product Information Management or Product Lifecycle Management systems being used in a way that supports reusable, lifecycle-oriented DPP data. Product information is often managed through internal files, client requirements or isolated software solutions rather than through a unified structured product-data environment.
MES	There is no strong evidence of Manufacturing Execution Systems being widely used for DPP-ready traceability processes. Although some firms demonstrate internal production-stage tracking, this does not appear to be consistently supported by dedicated MES-type environments across the sample.
API / integration	Data exchange appears largely manual or semi-manual. There is little evidence of automated API-based integration between internal systems or with suppliers and external partners. This limits the ability to update, validate and reuse data efficiently across the value chain.
Traceability	Traceability exists in part of the sample, especially in internal production processes, but it is not yet consistently structured at the level likely to be required for DPP. In particular, traceability beyond direct suppliers or beyond internal manufacturing stages remains limited.
Supplier / external data flows	One of the main barriers is dependence on externally provided data from suppliers, subcontractors or clients. Even where internal systems are stronger, firms often do not fully control the quality, completeness or update frequency of upstream data.

Area	Description of the problem
ESG data	ESG-related data remains one of the weakest areas in the sample. Companies do not yet appear to have robust and consistently structured systems for collecting and connecting energy, water, carbon footprint, circularity or broader sustainability indicators at product level in a DPP-ready form. This remains one of the weakest infrastructure areas, especially where product-level sustainability data must be generated and connected to product records.
Data governance	A recurring weakness concerns the governance of data: it is often unclear who is responsible for collecting, validating, updating and sharing DPP-relevant data internally and across lifecycle stages. This becomes even more problematic where information originates outside the company.
Lifecycle-related content	Current systems are generally more focused on production and client reporting than on broader lifecycle information. Data related to durability, repairability, recyclability, end-of-life treatment and circularity is still limited, incomplete or not integrated into existing data structures.

5.2 Data management

The company responses indicate that the main data-management challenge is not the total absence of data, but the limited ability to manage data in a way that is structured, reliable, reusable and ready for DPP-related requirements. Across the sample, companies appear to possess at least part of the relevant product and process information, especially regarding product composition, suppliers, production stages, client requirements and selected compliance-related documents. However, this information is often dispersed across different files, departments, software tools or external platforms and is not yet managed through a consistent and governed data framework.

A recurring issue in the responses is data dispersion. Information is frequently spread across spreadsheets, internal records, client systems, supplier documents and department-specific files, which makes it difficult to maintain consistency and to use the same data across multiple purposes. This fragmentation also limits the company's ability to reuse information for traceability, compliance, sustainability reporting and future DPP-related processes.

A second important challenge concerns data quality and reliability. Even where data exists, it is not always complete, consistent or easy to verify. This is particularly relevant for supplier- and subcontractor-related information, where the company may depend on externally provided inputs

that are only partially documented, difficult to validate or not updated regularly. As a result, the issue is not only whether data is available, but whether it can be trusted and maintained over time.

The responses also point to low standardisation as a major constraint. Information is often collected and stored in formats that reflect operational or client-specific needs rather than a broader structured product-data logic. This makes comparison, integration and sharing more difficult and reduces the usefulness of existing data for future DPP implementation. In practical terms, companies may hold some of the right information, but not in a sufficiently harmonised, structured or interoperable form.

Another key weakness is limited data governance. In many cases, it remains unclear who owns specific types of data, who is responsible for checking and validating it, who updates it when suppliers, materials or processes change, and how this information should be shared internally or externally. The responses suggest that this problem becomes even more significant where the data originates outside the company, for example from suppliers, subcontractors or clients. This means that DPP readiness is limited not only by technical structure, but also by uncertainty over responsibility for managing data across the value chain.

The findings further show that companies generally have stronger data availability in areas such as:

- product composition;
- supplier relationships;
- internal production stages;
- customer or client specifications;
- selected compliance-related documents and certificates.

By contrast, the weakest areas are more often related to:

- ESG and sustainability-related data;
- carbon footprint and lifecycle-based information;
- durability, repairability and circularity-related attributes;
- recycling and end-of-life data;
- consistently validated supplier data;
- and broader lifecycle tracking beyond immediate production and delivery processes.

From a DPP perspective, this is important because the required data is not limited to a narrow set of product attributes. DPP-related information is broader and more lifecycle-oriented and may include product description, composition, supply chain, transport, documentation, environmental and social information, circularity, health and safety aspects, granularity, quantity, after-sales events and end-of-life information. For this reason, readiness should not be assessed only by asking whether some product data exists, but by examining whether companies can manage a wider set of information categories in a structured and updateable way.

A useful way to interpret the responses is through four data-readiness dimensions:

- granularity - whether the data exists only at a general level or can be linked to batch, production stage or individual product level;
- level of detail - whether the information is sufficiently precise to support traceability and decision-making;
- reliability - whether the data is only declared, internally documented or externally verified;
- completeness - whether the relevant information is fully available across the necessary lifecycle stages and actors.

The responses suggest weaknesses across all four dimensions. Data is often partial, stored at a low or inconsistent level of granularity, not always systematically documented and not embedded in a governed update process. This means that the central data-management challenge for the participating textile companies is the transition from fragmented operational data toward structured lifecycle data that can be reused, shared, updated and trusted in a DPP context.

Overall, the findings suggest that improving data management for DPP will require not only better systems, but also clearer internal rules, stronger validation practices, better supplier-data routines and a more consistent approach to structuring and governing product-related information across the organization.

5.3 Supply chain

The company responses indicate that the supply chain is one of the most critical and most difficult readiness areas for future DPP implementation in the textile sector. Across the sample, supply-chain-related information remains one of the weakest and least controlled parts of the overall data environment. This is particularly important in textiles, where the value chain is multi-tiered and often involves a wide range of actors, including raw-material suppliers, yarn and fabric producers, dyeing and finishing facilities, subcontractors, garment manufacturers, brands and clients.

The responses show that data exchange with suppliers and external partners is still, in most cases, manual, document-based, spreadsheet-based or ad hoc rather than systematic. Even where companies have stronger internal production tracking or reporting practices, upstream supply-chain information is often less structured, less reliable and more difficult to validate. This means that the main challenge is not only whether supplier information exists, but whether it can be obtained in a consistent, verifiable and updateable form.

A recurring issue is the limited confidence in supplier data, especially in relation to:

- origin of fibres and raw materials;
- chemical composition and treatments;
- processing stages and production inputs;
- environmental or sustainability-related claims;
- and certifications or declarations provided by external actors.

The responses suggest that verification of supplier information is carried out only partially. In some cases, companies rely on certificates, customer requirements, scheme-specific traceability systems or internal plausibility checks where possible. However, validation is often still informal, incomplete or dependent on the documentation made available by upstream partners. This reduces the company's ability to ensure that externally sourced data is sufficiently robust for future DPP-related use.

Another important finding is that the supply-chain challenge is shaped not only by the complexity of textile production, but also by the company's position within the value chain. In several cases, firms depend on customers or suppliers for key information about materials, processes or compliance attributes. This limits their direct control over data quality, completeness and update frequency. As a result, the main bottleneck is not only internal digitisation, but also the company's dependence on externally provided data, especially where clients influence sourcing decisions and suppliers provide only part of the traceability evidence needed.

The responses also highlight barriers that are typical for textile supply chains:

- difficulty in tracking information beyond direct suppliers;
- limited visibility into upstream tiers;
- differences in reporting practices between partners;
- lower standardisation of external data;
- language, capacity and resource barriers in upstream supply chains;
- administrative burden linked to collecting and maintaining supplier information;
- and concerns related to the confidentiality of supply-chain relationships and commercially sensitive information.

These findings suggest that supply-chain readiness should not be assessed only by whether a company knows the names of its suppliers or has access to some certificates. Rather, it should be assessed by whether the company can obtain **structured, reliable, sufficiently detailed and maintainable information** on fibre origin, production stages, chemical treatments, certifications and other DPP-relevant attributes across a changing supply network.

Overall, the responses confirm that the supply chain remains one of the main constraints on DPP readiness in the textile sector. Even where internal processes are more advanced, the lack of strong supplier-data routines, weak validation mechanisms and dependence on externally controlled information continue to limit broader readiness for traceability, circularity and lifecycle-based data management.

5.4 Most frequently reported problems:

The most frequently emerging problems from the current sample are:

- low awareness and insufficient internal discussion;
- fragmented product data;
- poor or missing interoperability between systems;

- lack of clear data ownership;
- limited supplier integration;
- low confidence in external data reliability;
- difficulty collecting ESG and circularity-related data;
- internal skills gaps;
- weak validation processes.

The broader textile-sector evidence suggests that the most frequently reported problems are not limited to missing data alone. They also include:

- the complexity of tracing products across multiple production tiers;
- low standardisation of information;
- high effort required for manual data collection;
- uncertainty about data reliability;
- difficulties integrating information from different systems;
- confidentiality concerns related to supply-chain disclosure;
- and limited ability to translate complex technical data into understandable outputs for different user groups.

Overall, these findings suggest that the most frequently reported problems should be understood as a combination of weak data structure, weak governance, weak supplier-data control and limited interoperability. The central issue is therefore not simply whether digital tools exist, but whether companies can manage DPP-related information as a governed, interoperable and role-sensitive lifecycle data system.

6 COMPETENCIES AND TRAINING NEEDS - Identification of competency gaps related to DPP.

6.1 The most important competency gaps:

About the area	Gap level
Data management	High
Literacy date	High
ESG	High
Interoperability	Medium to High
Cybersecurity	Medium

About the area	Gap level
Traceability	High

The strongest gaps concern practical understanding of:

- what data will be needed for DPP in the textile sector;
- how product, supplier and lifecycle data should be structured and governed;
- how supplier and subcontractor data should be checked, validated and maintained;
- how traceability, ESG and sustainability-related concepts should be translated into operational practice;
- how roles and responsibilities should be distributed between departments;
- how existing systems can support DPP-related processes without relying only on manual workarounds.

Management staff

Management needs a clearer understanding of the regulatory implications, business impact, implementation costs, responsibilities, and the strategic importance of DPP. Decision-makers also need better visibility on how data readiness and supply-chain transparency affect competitiveness and compliance.

Production / Logistics

Although underrepresented in the current survey sample, the needs emerging indirectly from the responses suggest expected competency gaps in production traceability, batch-level data, process updates, supplier changes and operational handling of DPP-related data.

IT / Digitalization

The current evidence suggests a need for stronger capacities in structuring product data, integrating systems, organizing reusable data flows and supporting reliable data exchange between internal systems and external partners.

Marketing / ESG / Sales

These roles are likely to need support in understanding what product information can be communicated externally, how to support transparency claims, and how sustainability-related product information should be interpreted and used responsibly.

6.2 DigComp 2.2 Mapping

Competence	Observations
Data management	High deficit. Companies report fragmented, partially unstructured and inconsistently maintained data.

Competence	Observations
	There is limited evidence of structured governance and reusable digital product data processes.
Critical evaluation of data	High deficit. Supplier and subcontractor data is not always complete, reliable or easy to verify. Firms need stronger skills in assessing data quality, consistency and credibility.
Digital collaboration	Medium to high deficit. Data exchange between departments and with suppliers remains largely manual and insufficiently integrated. Collaboration appears uneven and not yet supported by mature digital workflows.
Cybersecurity	Medium deficit. Companies are aware of confidentiality, trade secret and sensitive business information issues, but practical readiness for role-based access and controlled data sharing is still limited.
Troubleshooting	Medium to high deficit. Companies recognize risks and likely problem areas, but do not yet demonstrate strong capabilities for systematically detecting, correcting and updating DPP-related data issues.

7 SECTOR SPECIFICITY - description of challenges specific to the sector represented by the participants.

The textile sector presents a particularly demanding context for DPP implementation because product-related information is distributed across many actors, production stages and geographies. Unlike simpler supply chains, textile value chains often involve multiple tiers ranging from fibre production and yarn processing to weaving or knitting, dyeing, finishing, assembly, distribution, use and end-of-life. As a result, readiness for DPP in this sector should not be interpreted only as a technical or compliance issue, but as a broader challenge of coordination, transparency, governance and data reliability across the value chain.

The company responses strongly confirm that supplier-related information is one of the most difficult readiness areas in the textile sector. This is especially relevant for:

- fibre origin;
- mixed-material composition;
- chemical treatments and coatings;
- subcontracted production stages;
- sustainability-related declarations;
- durability, repairability and recyclability information.

These areas are particularly difficult because companies often depend on data provided by suppliers, subcontractors or clients, and therefore do not always have full control over the completeness, reliability or update frequency of the information. This means that textile-sector readiness for DPP depends not only on internal data availability, but also on the ability to obtain, validate and maintain supplier-related information across a changing multi-tier chain.

Another important sector-specific feature is that many textile companies are not starting from zero. The responses suggest that firms often already hold at least part of the data that could be relevant for DPP, especially in areas such as product composition, internal production stages, selected supplier information, customer requirements and compliance-related documentation. However, much weaker maturity is visible in data areas related to:

- product durability;
- repair-related attributes;
- recycling pathways;
- end-of-life handling;
- ESG and sustainability metrics linked to specific products;
- lifecycle-based information beyond immediate production and delivery processes.

This creates a characteristic readiness gap for the textile sector: companies may already manage certain types of operational or compliance-related data, but are not yet in a position to produce a robust DPP without substantial improvements in data governance, supplier engagement, interoperability and internal competencies.

The responses also suggest that traceability in the textile sector is not simply a technical matter. It is closely linked to:

- supplier relationships;
- internal ownership of data;
- trust in external information;
- available system infrastructure;
- and the ability of staff to interpret, validate and update data over time.

This is particularly relevant in textile chains where suppliers may change, materials may vary, subcontracting may occur across several stages, and customer requirements may shape how information is collected and reported. In such a context, traceability cannot be treated only as a matter

of marking or identifying the product; it depends on the broader ability of the company to connect product, process and partner-related information in a structured and governed way.

A further sector-specific challenge concerns interoperability and data maturity. The responses indicate that some companies already have stronger operational elements in place, such as ERP-supported data collection, client-platform reporting and internal production-stage traceability. However, these stronger practices remain uneven across the sample and do not fully resolve broader DPP challenges. The textile sector therefore shows a pattern of mixed readiness, where some operational building blocks already exist, but are not yet connected into a consistent lifecycle-oriented data environment.

Circularity is another area where the textile sector presents specific difficulties. Durability, repairability and recyclability are highly relevant for future DPP use, but they are also difficult to define, measure and maintain consistently across different product types and over time. End-of-life management in textiles depends heavily on better information for sorting, reuse, repair and recycling, yet these downstream activities are currently constrained by insufficient access to detailed product composition, process information and treatment-relevant attributes. This means that DPP could create significant value for the textile sector, but only if the underlying data ecosystem becomes more structured, reliable and interoperable.

The responses also show that confidentiality and commercial sensitivity are particularly important in this sector. Supply-chain information may be considered commercially sensitive, especially where firms rely on exclusive relationships, specialized suppliers, client-driven sourcing models or confidential production arrangements. For this reason, DPP implementation in textiles cannot be approached as a purely transparency-driven exercise. It must balance transparency, circularity and compliance objectives with business confidentiality, role-based access and realistic implementation effort.

Overall, the textile sector can be described as a sector where DPP implementation is highly relevant but operationally demanding. The main readiness dimensions emerging from the company responses are:

- supplier-data validation;
- product-data structuring;
- interoperability between systems and actors;
- governance of updates and responsibilities;
- lifecycle and circularity-related information management;
- and the practical ability of staff to manage DPP-related requirements across functions.

These dimensions should be treated as the most important sector-specific areas for both further analysis and the design of future training and support measures.

8 DPP ORGANIZATIONAL MATURITY ASSESSMENT

Assessment results

Area	Rating 1–5	Comment
Regulatory awareness	2.3	Basic awareness exists across the sample, and some companies have already discussed DPP internally or received initial orientation. However, understanding is still partial and has not yet been translated into structured preparation or company-wide planning.
Data and interoperability	2.4	Relevant product and production data is partially available, and some companies already use ERP-supported processes, client platforms or internal traceability practices. However, data remains fragmented, weakly standardised and not sufficiently integrated across systems or lifecycle stages.
Competencies	2.1	Significant competency gaps remain across management, data handling, supplier validation, sustainability-related data and traceability. At the same time, the sample shows some stronger operational capacity in production and reporting, which slightly improves the overall picture.
ESG and circularity	1.7	This is the weakest area, especially regarding carbon footprint, durability, repairability, recyclability and end-of-life information. ESG-related data is still limited and not yet managed in a product-level DPP-ready form.
Supply chain	2.0	Supplier dependence, manual exchange, limited visibility beyond direct partners

Area	Rating 1–5	Comment
		and low confidence in external data quality continue to create major readiness barriers. Even where internal systems are stronger, upstream supplier data remains difficult to verify and maintain.

Final result

Average rating: 2.1

Interpretation of readiness level:

Result	Interpretation
1.0–1.9	Very low level of readiness
2.0–2.9	Early stage of preparations
3.0–3.9	An organization in transition
4.0–4.5	Advanced preparation
4.6–5.0	High DPP maturity

9 TRAINING PRIORITIES

Key recommended training areas:

The focus group findings, indicate that training priorities should go beyond general awareness and focus on practical implementation. Since many companies are still at an early stage of DPP readiness, training should begin with a realistic understanding of what DPP means for textile businesses in operational terms: which data is needed, where it sits, who owns it, how it is validated, how it is updated and how it can be used by different stakeholders across the product lifecycle.

No.	Training topic	Target group	Justification
1.	DPP fundamentals for textile companies	Management, quality, compliance, operations, sales	Companies need a practical understanding of what DPP is, why it matters for textiles, and how it relates to traceability, transparency, circularity and competitiveness. The introduction to DPP, which covers what a passport is, why it is emerging now, textile-specific pressures, traceability complexity and the consumer transparency gap.
2.	Textile product data and DPP content	Product teams, quality, technical staff, IT/data roles	Firms need guidance on what product, process and lifecycle information may be relevant for DPP, including composition, supply chain, documentation, environmental impact, circularity and end-of-life information. The strategic purpose and data content, which covers ESPR requirements, indicative textile data categories, static vs dynamic data, and the four variables of data quality: granularity, detail, reliability and completeness.
3.	Supply-chain traceability and supplier-data collection	Supply chain, procurement, quality, compliance, management	Supplier and subcontractor data are one of the main readiness bottlenecks in textiles, especially across multi-tier and non-EU supply chains. Explicitly focused on how to get data out of suppliers, how to pilot without disrupting the product calendar, and how DPP implementation is grounded in the reality of textile supply chains.
4.	Data governance, responsibilities and update rules	Management, IT, compliance, supply chain, quality	Companies need to clarify who collects, validates, updates and shares DPP-related data internally and across lifecycle stages. This module is on stakeholders, roles and data access, and on data governance and infrastructure, which cover stakeholder maps, legal responsibility, data contributors and consumers, ownership, security, evidence logic and governance planning.)

No.	Training topic	Target group	Justification
5.	Interoperability and digital systems for DPP	IT, digitalization, operations, management	DPP readiness depends on the ability to connect product, process and sustainability data across systems such as ERP, PLM, PIM, LCA tools and supply-chain software. The training should covers DPP architecture, hybrid architecture, the EU registry, the responsible economic operator, three layers of interoperability and the standards that allow passports to communicate.
6.	Regulatory framework and compliance landscape	Management, compliance, sustainability, legal, operations	Companies need clarity on the wider regulatory framework surrounding DPP, including ESPR, EPR, consumer information rules, environmental claims and implementation timelines, so they can understand how DPP fits into broader compliance and business planning. - Dedicated regulatory training covering ESPR, EPR, the Empowering Consumers Directive, environmental claims substantiation, how regulations interlock, official milestones and projected timelines. This is useful because many companies need clarity not only on DPP itself but on the wider legal architecture around it.
7.	Building the business case for DPP	Top management, sustainability leaders, commercial managers	Companies need support in understanding how DPP can create business value beyond compliance, including stronger transparency, better customer trust, competitive differentiation and the benefits of early preparation. This directly supports the focus group need to frame DPP as more than cost or burden.
8.	Implementation planning for large companies and SMEs	Management, project leaders, SMEs, operational teams	Companies need practical guidance on how to implement DPP step by step, especially where readiness is low, including phased rollout, risk management, internal change, validation and realistic roadmaps for SMEs. Dedicated implementation training covering phased implementation, risk, change, validation,

No.	Training topic	Target group	Justification
			circularity leverage, and a specific SME implementation guide with a roadmap and toolkit. This is very relevant for the focus group report, especially where readiness is low and SMEs need practical sequencing.
9.	Global standards and international interoperability	IT, compliance, sourcing, management	Companies need to understand how DPP connects to international interoperability, EU standardization work and non-EU developments, especially when operating with global suppliers and partners outside the European Union. This is highly relevant for textile companies working with global suppliers and non-EU partners.
10.	Technology landscape and provider selection	IT, management, procurement, consultants	Companies need guidance on how to assess the DPP solutions market, understand different provider types and choose tools that match their business priorities without creating unnecessary dependency or vendor lock-in. Vendor-neutral guide to the solutions market, how to read provider categories and how to match provider types to company priorities. This is important because companies often need guidance not only on what DPP is, but how to choose appropriate tools without vendor lock-in.

10 RECOMMENDATIONS FOR WP2

The training programme for the textile sector in Bulgaria should be practical, phased and adapted to the differing maturity levels of participating companies. The responses indicate that some SMEs require a basic understanding of DPP and its implications, while others would benefit more from implementation-oriented support linked to existing systems and operational processes.

The programme should therefore:

- begin with short and accessible foundation modules;
- combine these with practical workshops and case-based learning;

- use real textile-sector examples;
- provide role-specific learning pathways where appropriate;
- and include cross-functional activities that reflect company realities.

Recommended training forms

Training should combine:

- short modular sessions;
- blended learning;
- practical workshops;
- company-based exercises;
- and guided implementation activities.

Micro-learning

Micro-learning is recommended for introductory topics such as DPP concepts, regulatory context, traceability logic and data responsibilities. It should serve as an entry point and be followed by more practical training.

Work-based learning

Work-based learning should be a core element of the programme. Relevant activities may include:

- mapping available and missing data;
- reviewing supplier-data practices;
- identifying internal responsibilities;
- and testing readiness on a selected product or product group.

Micro-credentials

Micro-credentials may be included as a supporting element, particularly where formal recognition of acquired knowledge is valued. However, they should complement practical training rather than drive participation on their own.

Practical exercises

The programme should include practical exercises on:

- product-data mapping;
- supplier-data validation;
- internal data ownership;
- risk identification;
- and simple interoperability or readiness reviews.

Implementation simulations

Implementation simulations are recommended to help companies test realistic scenarios, such as missing supplier data, changes in materials or suppliers, and updating DPP-related information across departments.

Overall recommendation

The training programme should be designed as **phased, practical, role-based and suitable for companies with limited time and resources**. Its main objective should be to help textile companies build the foundations of DPP readiness through stronger data management, supplier-data routines, internal coordination and gradual preparation for more advanced implementation requirements.

11 GOOD PRACTICES AND QUICK WINS

The company responses reveal a limited but relevant set of existing good practices that may serve as a foundation for future DPP preparation. These include:

- collection of basic product composition and selected supplier information;
- use of certificates, declarations or recognized schemes as partial validation tools;
- application of product identification methods such as QR codes, serial numbers, batch numbers, RFID, Data Matrix or similar solutions;
- and in some cases, internal digital practices supporting production-stage traceability or customer reporting.

Although these practices are not yet sufficient for full DPP readiness, they indicate that some operational building blocks already exist within the sample.

Quick wins – solutions that can be implemented in the short term

The following actions appear realistic for short-term implementation:

- prepare an internal overview of DPP-relevant data already available in the company;
- identify the main missing, unreliable or supplier-dependent data categories;
- assign internal responsibility for data collection, validation and updating;
- map the main supplier-data sources and the weakest points in external data flows;
- pilot one product or product category for an internal DPP-readiness review;
- introduce a simple shared structure for storing and updating product-related data more consistently;
- and begin targeted awareness-building for management and cross-functional teams.

These measures would not require full system transformation, but could significantly improve initial readiness and support more structured preparation for future DPP-related requirements.

12 FINAL CONCLUSIONS

The focus group findings indicate that the participating textile companies are at an early to moderate and uneven stage of readiness for the Digital Product Passport. Awareness of the topic exists across the participants, but in most cases it remains partial and has not yet been translated into structured internal preparation, clear data governance or coordinated implementation planning.

The analysis shows that the main barriers are not limited to regulation itself. The most significant constraints relate to fragmented product and supplier data, limited interoperability between systems, unclear responsibility for data ownership and updating, weak validation of external information, and insufficient maturity in ESG, circularity and lifecycle-related data. These challenges are particularly important in the textile sector, where multi-tier supply chains, subcontracted processes and changing material inputs make traceability and data continuity more difficult.

At the same time, the responses also show that some participants already possess useful operational building blocks, such as internal production traceability, ERP-supported processes, customer reporting routines or existing product identification methods. This suggests that the participating companies are not starting from zero, but from a mixed baseline in which some participants already have elements that can support further DPP preparation.

Overall, the findings confirm that DPP readiness in the textile sector should be understood as a combination of:

- regulatory awareness;
- structured and reliable product data;
- validated supplier information;
- internal governance and role clarity;
- interoperability between systems;
- and the practical ability to manage lifecycle and circularity-related information.

The main conclusion for future action is that participants will benefit most from phased, practical and role-based support. Immediate priorities should include strengthening data management, improving supplier-data routines, clarifying internal responsibilities and building a more consistent understanding of DPP requirements across departments. In this sense, the focus group confirms that successful preparation for DPP in the textile sector will depend not only on technology, but also on coordination, capabilities and realistic implementation steps within the company and across the value chain.



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Empowering SMEs to transform Digital Product Passport compliance into a competitive advantage

Project number: 101244175

FOCUS GROUP – NATIONAL REPORT NETHERLANDS

Yvor Broer, In Dialogue



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1 BASIC INFORMATION

Area	Information
Country	Netherlands
Project partner	In Dialogue
Focus date	18 th June 2026
Form of meeting	Stationary
Moderator	Yvor Broer
The person taking notes	Sarie Donk
Number of participants	8
Represented sector	Agriculture
Session duration	3 hours

2 PARTICIPANT PROFILE Group structure:

Participant's role	Number of people
Management staff	2
IT / Digitalization	0
Production / Logistics	1
ESG / Compliance	0
Marketing / Sales	1

Participant's role	Number of people
VET/HEI education	2
Industry organizations	2
Other	0

The Dutch focus group deliberately brought together organisations representing different parts of the agricultural ecosystem rather than focusing exclusively on primary producers. The objective was to explore how the introduction of the Digital Product Passport (DPP) may influence the entire agricultural value chain and what knowledge and competencies will be required across the sector.

The participants represented vocational education (Yuverta), higher education (Inholland University of Applied Sciences), the Chamber of Commerce, Glastuinbouw Nederland, agricultural SMEs, larger agricultural businesses and an organisation specialised in agricultural waste and recycling. This composition enabled discussions from educational, production, business support and value-chain perspectives.

Unlike many implementation-oriented workshops, the discussions were not limited to organisational readiness. Participants repeatedly considered how different actors within the agricultural sector can contribute to preparing the sector for DPP implementation. Educational institutions discussed their future role in preparing new professionals, sector organisations reflected on knowledge dissemination, while businesses focused on the practical implications for production, traceability and data management.

The diversity of perspectives resulted in discussions that went beyond individual organisational challenges and increasingly focused on cooperation, knowledge exchange and coordinated sector development.

3 EXECUTIVE SUMMARY

The Dutch focus group formed part of the DIGITRACE needs assessment and explored the future implementation of the Digital Product Passport (DPP) from the perspective of the agricultural ecosystems. Rather than concentrating exclusively on the readiness of individual organisations, the workshop examined how businesses, educational institutions and sector organisations can jointly prepare the Dutch agricultural sector for the transition towards Digital Product Passports.

Participants generally recognised that Dutch agriculture already possesses several important building blocks for future DPP implementation. Existing traceability systems, certification schemes, quality assurance procedures and digital registration systems provide a strong foundation compared with many other sectors. However, participants also recognised that DPP requires a broader approach to

digital product information, including lifecycle information, sustainability data, interoperability between organisations and improved exchange of information throughout the value chain.

Awareness of the Digital Product Passport itself differed between participants. Most participants were familiar with traceability, certification and quality management, but less familiar with the broader ambitions of the Ecodesign for Sustainable Products Regulation (ESPR) and the role of DPP within future European sustainability policy. During the discussions, participants increasingly recognised that DPP should not be viewed simply as another reporting obligation but as a new way of organising product information throughout the product lifecycle.

The workshop identified several important challenges. Participants highlighted uncertainty regarding future legal requirements, differences in digital maturity between organisations, the complexity of collecting reliable supplier data and concerns regarding interoperability between existing systems. Participants also expressed concerns that SMEs and primary producers may experience difficulties if implementation results in additional administrative burdens without sufficient practical support.

An important conclusion emerging from the workshop was that successful DPP implementation will depend not only on technological solutions but also on cooperation throughout the agricultural networks. Educational institutions, sector organisations and business support organisations all have important roles in supporting knowledge development, dissemination of good practices and competence development.

Participants therefore expressed a strong preference for practical educational approaches, including case-based learning, demonstrations, implementation examples and cooperation between education and practice. Future training should help organisations integrate DPP into existing agricultural processes rather than presenting it as an isolated regulatory requirement.

Overall, the workshop suggests that the Dutch agricultural sector is well positioned to build upon existing strengths. The principal challenge is not starting from zero, but connecting existing knowledge, digital systems and sector cooperation into an integrated agricultural value chain capable of supporting future Digital Product Passport implementation.

4 LEVEL OF AWARENESS OF DPP AND REGULATIONS - assessment of the level of knowledge:

The focus group explored participants' awareness of the Digital Product Passport (DPP), the Ecodesign for Sustainable Products Regulation (ESPR), ESG principles, traceability and future European sustainability requirements. Because participants represented different parts of the agricultural ecosystem, awareness varied according to organisational role and previous involvement with European policy developments.

Participants' level of awareness

Participants generally demonstrated a high level of familiarity with traceability, certification and quality assurance within Dutch agriculture. Most organisations already work with structured product registration, supply chain documentation and sector-specific certification systems. These existing practices were widely recognised as an important foundation for future DPP implementation.

Knowledge of the Digital Product Passport itself was generally less developed. While several participants were already following European developments surrounding ESPR and DPP, others mainly associated the concept with existing traceability systems. Throughout the workshop, discussions gradually shifted from viewing DPP as another compliance requirement towards understanding it as a broader framework for managing product information, sustainability data and digital cooperation throughout agricultural value chains.

Dominant organisational concerns

The discussion identified several recurring concerns:

- uncertainty regarding future European legislation;
- practical implementation within SMEs;
- interoperability between existing digital systems;
- responsibilities for collecting and maintaining reliable product information;
- administrative burden for producers;
- protection of commercially sensitive information;
- differences in digital maturity throughout the value chain.

Participants repeatedly emphasised that future implementation should build upon existing agricultural information systems wherever possible, rather than creating parallel administrative processes.

Perception of DPP

Although DPP was initially viewed mainly as a future regulatory requirement, the discussion gradually revealed a broader perspective. Participants increasingly recognised opportunities for improving transparency, strengthening cooperation within agricultural value chains, supporting sustainability objectives and creating more consistent product information.

Across the different stakeholder groups, an important observation emerged: successful implementation will require cooperation between businesses, educational institutions, sector organisations and business support organisations. Participants therefore viewed competence development as a sector challenge rather than the responsibility of individual organisations alone.

5 TECHNOLOGY, DATA AND INTEROPERABILITY - assessment of the organization's technology readiness.

The discussions demonstrated that participating organisations generally operate in a digitally mature agricultural environment. Most organisations already use digital systems to support production planning, traceability, certification, customer communication or administrative processes. However, the workshop also highlighted that these existing systems have largely been developed to serve organisational or sector-specific purposes rather than the broader interoperability requirements introduced by the Digital Product Passport.

Participants recognised that future DPP implementation will depend less on introducing entirely new digital systems and more on connecting existing systems, improving data quality and establishing common standards for exchanging product information throughout agricultural value chains.

An important observation was that technology readiness differs not only between organisations but also between different parts of the agricultural ecosystem. Larger organisations generally possess more advanced digital infrastructures, whereas SMEs often rely on combinations of existing business software, spreadsheets and sector-specific applications. Educational institutions and sector organisations highlighted that these differences should be considered when developing future training programmes.

Overall, participants considered technology to be an enabling factor rather than the main challenge. The greatest barriers were perceived to be interoperability, data governance and cooperation between organisations rather than the availability of digital tools themselves.

5.1 Systems and infrastructure

Participants indicated that many organisations already use digital tools supporting production, quality assurance and traceability. These systems provide a solid basis for future DPP implementation but currently operate largely as separate information environments.

Indicated barriers:

Area	Description of the problem
ERP	Widely used within larger organisations, but not always connected with sustainability or lifecycle information. SMEs often use simpler administrative systems.
PIM	Dedicated Product Information Management systems were generally not common. Product information is frequently distributed across different systems or departments.
MES	Used in some production environments, particularly larger organisations, but less common among SMEs.
API / integration	Limited inter-operability between existing systems and between organisations within the value/ product chain.
Traceability	Strong traceability already exists for food safety, certification and quality assurance, but

Area	Description of the problem
	additional lifecycle information required by DPP is not yet systematically available. Less traceability in e.g. horticulture and technology providers (e.g. green house building industry)
ESG data	Sustainability information is increasingly collected, but often separately from operational product information.

5.2 Data management

The discussions showed that data management represents one of the most important challenges for future DPP implementation.

Participants explained that relevant information already exists in many organisations, but is often stored in different software systems, databases or spreadsheets. As a result, information cannot always be exchanged efficiently between departments or external partners.

Rather than creating entirely new datasets, participants considered it more important to improve the structure, quality and governance of existing information. Questions concerning data ownership, responsibilities for updating information and validation of externally supplied data were repeatedly identified as areas requiring further development.

Educational institutions also observed that future professionals will increasingly require competencies in data management alongside traditional agricultural knowledge.

5.3 Supply chain

The workshop came to conclude that successful implementation of DPP will depend on cooperation throughout the agricultural value chain.

Participants recognised that many Dutch agricultural supply chains already maintain close relationships between producers, suppliers, traders and customers. Nevertheless, differences in digital maturity remain considerable. Larger organisations often possess more structured digital processes than SMEs, while information exchange between different organisations frequently depends upon existing contractual arrangements or sector-specific systems.

Focus group participants therefore concluded that interoperability should not be regarded purely as a technical issue. Equally important are common standards, clear agreements regarding data sharing and trust between organisations participating in the same supply chain.

The discussions also highlighted the important role that sector organisations can play in facilitating common approaches and supporting SMEs during implementation.

5.4 Most frequently reported problems:

Across the discussions, participants repeatedly identified several barriers that may hinder successful implementation of the Digital Product Passport:

- uncertainty regarding future technical requirements;
- limited interoperability between existing information systems;
- variety in basic knowledge on DPP, between different businesses/ organisations/ actors in this sector;
- inconsistent data structures between organisations;
- varying digital knowledge and maturity throughout the agricultural value chain;
- difficulties obtaining reliable supplier information;
- uncertainty regarding ownership and governance of product data;
- concerns about protecting commercially sensitive information;
- additional administrative workload, particularly for SMEs and primary producers;
- although Dutch horticulture is already highly digitalised, participants recognised that existing information systems are not yet fully prepared to exchange the broader lifecycle and sustainability data required for the Digital Product Passport.

Overall, participants considered these challenges manageable, provided implementation is accompanied by practical guidance, sector cooperation and targeted educational support.

6 COMPETENCIES AND TRAINING NEEDS - Identification of competency gaps related to DPP.

The focus group discussions demonstrated that the competency gaps related to the Digital Product Passport extend well beyond technical or digital skills. Participants recognised that DPP introduces new ways of collecting, managing and sharing product information throughout agricultural value chains. This requires not only technological capabilities but also organisational understanding, collaboration and a shared interpretation of future European requirements.

Participants emphasised that many organisations already possess valuable experience in traceability, certification and quality management. However, these existing competencies need to be expanded to include lifecycle thinking, sustainability reporting, interoperability and digital collaboration across organisational boundaries.

An important observation emerging from the discussions was that competency development should not focus exclusively on businesses. Educational institutions, sector organisations and business support organisations all have a role in supporting the transition towards DPP implementation. Future educational programmes should therefore combine technical knowledge with practical implementation examples and encourage cooperation between different stakeholders within the agricultural sector.

6.1 The most important competency gaps:

About the area	Gap level
Data management	Medium
Literacy date	Medium
ESG	Medium - High
Interoperability	High
Cybersecurity	Low - Medium
Traceability	Low

Although participants generally demonstrated good knowledge of existing traceability systems, they identified important competency gaps regarding interoperability, sustainability information and the practical implications of DPP legislation.

The strongest educational needs related to understanding how existing agricultural data can be transformed into interoperable Digital Product Passport information rather than creating completely new administrative systems.

Participants also recognised that organisations will increasingly require competencies in data governance, validation of supplier information and collaboration throughout the agricultural value chain.

6.2 Competencies by role

Management staff

Management will require a strategic understanding of DPP and its implications for organisational development, investment decisions and cooperation throughout the value chain. Participants indicated that managers should be able to translate future regulatory developments into practical organisational strategies while balancing compliance with operational efficiency.

Production / Logistics

Participants considered production and logistics staff to play a central role in collecting and maintaining reliable product information. Future competencies should therefore focus on consistent data collection, traceability, documentation and understanding how operational information contributes to the Digital Product Passport throughout the product lifecycle.

IT / Digitalisation

Although no dedicated IT specialists participated in the workshop, the discussions highlighted the importance of professionals capable of connecting existing information systems, improving interoperability and supporting reliable exchange of product information between organisations. Participants recognised that these competencies may increasingly become available through external service providers rather than within every agricultural organisation.

Marketing / Sales / ESG

Participants recognised that customer expectations regarding sustainability and transparency are increasing. Staff responsible for marketing, sales and sustainability therefore require a better understanding of DPP, ESG reporting and the communication of reliable product information to customers and supply chain partners.

Educational institutions also highlighted the importance of preparing future graduates with these competencies before they enter the labour market.

6.3 DigComp 2.2 Mapping

Competence	Observations
Data management	Participants recognised increasing importance of organising, maintaining and updating reliable product information throughout the product lifecycle.
Critical evaluation of data	Organisations require stronger competencies in validating supplier information, assessing data quality and ensuring consistency between different information sources.
Digital collaboration	Good DPP implementation will depend upon effective cooperation between businesses, educational institutions, suppliers and sector organisations.
Cybersecurity	Participants recognised that secure handling of commercially sensitive information remains important, although cybersecurity itself was not considered the principal challenge.
Troubleshooting	Organisations will increasingly require practical capabilities to solve interoperability problems and integrate new DPP requirements into existing and upcoming digital environments.

Participants also emphasised that competency development should start before professionals enter the labour market. The presence of both vocational and higher education institutions in the focus

group highlighted the important role that education can play in preparing future graduates for the Digital Product Passport. At the same time, continuing professional development will remain essential for the existing workforce. Participants therefore considered lifelong learning, cooperation between education and industry, and practical learning approaches to be important conditions for successful DPP implementation across the agricultural value chain/ sector.

7 SECTOR SPECIFICITY - description of challenges specific to the sector represented by the participants.

The Dutch agricultural sector is characterised by a high degree of specialisation, innovation and international orientation. Many organisations already operate within complex value chains involving producers, suppliers, traders, retailers, certification bodies and knowledge institutions. Consequently, many of the building blocks required for the Digital Product Passport (DPP), including traceability, product registration and quality assurance, are already present within the sector.

The focus group discussions demonstrated that the principal challenge is therefore not introducing digital information management from scratch, but adapting and connecting existing systems to meet the broader objectives of the Digital Product Passport. Participants recognised that DPP requires organisations to move beyond operational traceability towards integrated lifecycle information, sustainability data and digital information exchange across the value chain.

Existing strengths

Participants agreed that Dutch agriculture starts from a relatively favourable position. Existing certification schemes, quality assurance systems and traceability procedures already require organisations to collect and manage considerable amounts of product information. These practices provide a strong foundation for future DPP implementation.

The discussions also highlighted the relatively advanced level of digitalisation in parts of Dutch horticulture. Production management systems, registration software and certification procedures already support the collection of operational and product-related information. However, participants recognised that these systems were primarily developed for operational management, quality assurance and customer requirements rather than for exchanging the broader lifecycle and sustainability information required under DPP.

Another important strength identified during the workshop was the tradition of cooperation within Dutch agriculture. Businesses, educational institutions, industry organisations and business support organisations already work together on innovation, knowledge transfer and professional development. Participants considered this collaborative environment an important advantage for supporting future DPP implementation.

Remaining challenges

Despite these strengths, participants identified several challenges that will influence future DPP implementation.

Digital maturity differs considerably between organisations and networks. While larger businesses often have more advanced digital infrastructures, SMEs and primary producers frequently rely on less

integrated information systems. Participants therefore emphasised that future DPP solutions should remain practical and accessible for organisations with different levels of digital readiness.

Inter-operability was identified as one of the most important challenges. Collecting information within individual organisations was generally considered less problematic than exchanging reliable information between organisations throughout the value chain. Participants highlighted the need for common standards, clear responsibilities and greater confidence in the quality of shared information.

Participants also recognised that the Digital Product Passport introduces a broader understanding of product information. Existing agricultural systems mainly focus on production, quality and traceability, whereas DPP also requires information related to sustainability, circularity and product lifecycle performance.

Educational implications

The discussions consistently highlighted that successful DPP implementation depends not only on technology but also on people and organisations. Participants considered competence development essential for enabling organisations to understand new requirements, adapt existing processes and cooperate more effectively throughout the value chain.

The presence of both vocational and higher education institutions reinforced the importance of integrating DPP-related competencies into agricultural education. Participants also recognised the need for continuing professional development to support the existing workforce. Practical learning approaches, including case studies, demonstrations and collaboration between education and businesses, were considered particularly valuable for translating European policy into everyday agricultural practice.

8 DPP ORGANIZATIONAL MATURITY ASSESSMENT

Assessment results

Area	Rating 1–5	Comment
Regulatory awareness	3.5	Participants were generally aware of upcoming European developments, although knowledge of specific DPP and ESRP requirements differed between organisations.
Data and interoperability	3.5	Existing digital systems and traceability practices provide a good foundation, but interoperability between organisations and systems requires further development.
Competencies	3.5	Participants demonstrated strong sector knowledge, but recognised the need for additional competencies in DPP, sustainability, interoperability and data governance.

Area	Rating 1–5	Comment
ESG and circularity	3.5	Sustainability is becoming increasingly important within Dutch agriculture, although the integration of ESG information into operational data systems remains at an early stage.
Supply chain	4	Strong cooperation already exists throughout many agricultural value chains, providing favourable conditions for future DPP implementation. Further alignment on data exchange will still be required.

Final result

Average rating: 3.6

Interpretation of readiness level:

Result	Interpretation
1.0–1.9	<i>Very low level of readiness</i>
2.0–2.9	<i>Early stage of preparations</i>
3.0–3.9	<u>An organization in transition</u>
4.0–4.5	<i>Advanced preparation</i>
4.6–5.0	<i>High DPP maturity</i>

9 TRAINING PRIORITIES

Key recommended training areas:

No.	Training topic	Target group	Justification
1.	Introduction to the Digital Product Passport and ESPR	Managers, SMEs, sector organisations	To develop a common understanding of future European requirements and

No.	Training topic	Target group	Justification
			their implications for Dutch agriculture.
2.	Data management and interoperability	Operational staff, IT specialists, managers	To improve the quality, organisation and exchange of product information across the agricultural value chain.
3.	Practical implementation of DPP in agriculture	Businesses, VET and HE institutions, SMEs	To translate European requirements into practical agricultural applications using real-life examples and case studies.
4.	Cooperation and data sharing across the value chain	Businesses, industry organisations, business support organisations	To strengthen collaboration and establish common approaches to exchanging reliable product information.

10 RECOMMENDATIONS FOR WP2

Future training should adopt a practical and modular approach, allowing participants to combine different learning units depending on their role and previous experience. Participants preferred learning activities that combine theoretical understanding with practical application.

The following recommendations emerged from the discussions:

- develop short, modular learning units that can be combined into flexible learning pathways;
- use practical examples and case studies from the agricultural sector;
- include implementation scenarios that demonstrate how DPP requirements can be integrated into existing business processes;
- combine online learning with interactive workshops and peer learning;
- develop micro-credentials for specific DPP competencies;
- encourage cooperation between educational institutions, businesses and sector organisations in the delivery of training.

11 GOOD PRACTICES AND QUICK WINS

Good practices identified during the focus group

Participants identified several existing practices that can support future DPP implementation.

The Dutch agricultural sector already benefits from well-established traceability systems, certification schemes and quality assurance procedures. These existing structures provide an important starting point for developing Digital Product Passport solutions.

Another strength identified during the workshop was the close cooperation between businesses, educational institutions and sector organisations. Participants considered this collaborative approach an important asset for sharing knowledge, testing new approaches and supporting organisations during implementation.

Quick wins

Participants identified several actions that could be implemented in the short term:

- increase awareness of DPP through sector-specific information sessions;
- develop practical guidance explaining the relationship between existing traceability systems and DPP;
- organise pilot projects involving businesses, educational institutions and sector organisations;
- encourage organisations to review existing product data and identify information gaps;
- develop practical educational materials based on Dutch agricultural examples.

12 FINAL CONCLUSIONS

The workshop demonstrated that the Dutch agricultural sector is well positioned to prepare for the Digital Product Passport. Existing strengths, including traceability, certification systems, digitalisation and close cooperation throughout the value chain, provide a solid foundation for future implementation.

Rather than introducing entirely new ways of working, participants considered the main challenge to be connecting existing systems, knowledge and organisations into an integrated approach that supports Digital Product Passport requirements.

The discussions identified several important barriers, including differences in digital maturity between organisations, limited interoperability between information systems, uncertainty regarding future European requirements and the availability of reliable product information throughout the value chain.

Participants also highlighted the need to ensure that future implementation remains feasible for SMEs and does not create unnecessary administrative burdens.

Participants identified a strong need for practical guidance, competence development and cooperation throughout the agricultural ecosystem.

Future educational activities should not only explain the Digital Product Passport but also demonstrate how it can be integrated into existing agricultural practices. Particular attention should be given to

interoperability, sustainability information, data governance and collaboration throughout the value chain.

By building on existing strengths and continuing to invest in practical education and cooperation, the Dutch agricultural sector is well placed to support the successful implementation of DPP in the coming years.



Empowering SMEs to transform Digital Product Passport compliance into a competitive advantage

Project number: 101244175

FOCUS GROUP – NATIONAL REPORT - Norway

Vidar Nyhammer, Bie Andersen
Norwegian Circular Materials Technology



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1 BASIC INFORMATION

Area	Information
Country	Norway
Project partner	Norwegian Circular Materials Technology
Focus date	18-06-2026
Form of meeting	Online
Moderator	Vidar Nyhammer
The person taking notes	Bie Andersen
Number of participants	11
Represented sector	Plastics
Session duration	1,5 hours

2 PARTICIPANT PROFILE Group structure:

To ensure high relevance across the entire value chain, NCMT invited a broad spectrum of representatives to the focus group and validation workshop. Participants represented various tiers of the plastics and composites value chain, ranging from raw material distributors to waste management and recycling organizations, as well as academia and technology providers.

Participant's role	Number of people
Management staff	1
IT / Digitalization	2
Production / Logistics	0
ESG / Compliance	3
Marketing / Sales	1
VET/HEI education	1

Participant's role	Number of people
Industry organizations	1
Other	0

0

3 EXECUTIVE SUMMARY

This document constitutes the National Report for Norway under the European DIGITRACE project, funded by the Erasmus+ program. The overarching goal of the project is to prepare small and medium-sized enterprises (SMEs), vocational education and training providers (VET), and higher education institutions (HEIs) for the implementation of the EU's upcoming Digital Product Passport (DPP) requirements. This report summarizes the findings from the qualitative focus group and validation workshop conducted in Norway on June 18, 2026.

The introduction of the DPP represents a fundamental shift in how product data is collected, structured, and shared across value chains. For the plastics and composites industry—characterized by complex chemical formulations, long-lived products, and heavily guarded trade secrets—the challenges are significant. The focus group revealed a widespread regulatory uncertainty and 'chaos' surrounding the requirements, but also a growing recognition that value chain data will become a decisive competitive factor in the future circular economy. This report identifies critical technological barriers, competence gaps, and organizational hurdles, and proposes concrete training priorities and strategic 'quick wins' for the sector.

The Norwegian plastics and composites sector faces significant uncertainty regarding Digital Product Passport (DPP) requirements, characterized by fragmented data systems and concerns over intellectual property. Key barriers include the extreme longevity of industrial plastics—requiring tracking technology that lasts up to 100 years—and deep, opaque supply chains that complicate data validation. While awareness is growing, many SMEs lack the resources for implementation. Readiness is highest in organizations that integrate DPP into broader digital transformation strategies. Essential training needs center on data management, regulatory compliance (ESPR), and interoperability standards to turn these challenges into a competitive market advantage.

4 LEVEL OF AWARENESS OF DPP AND REGULATIONS - assessment of the level of knowledge:

Participants' level of awareness

The level of awareness regarding the Digital Product Passport (DPP) within the Norwegian plastics and composites industry is characterized by conceptual understanding but deep execution-level confusion. While the term 'Digital Product Passport' is widely recognized, participants describe the current

environment as chaotic with a significant lack of clarity. Companies find that they receive different answers from experts and regulatory advisory bodies every time they inquire about specific data models and obligations. This lack of certainty has caused initial industry interest to fade, and engagement has dropped as companies wait for concrete regulatory mandates.

Dominant Organizational Concerns

The primary concern centered on upstream data liability and data verification. Manufacturers of final plastic components feel they cannot legally or practically validate material declarations received from multi-tiered global supply chains, especially when raw materials are sourced outside the EU (e.g., from China or the US). A second major friction point is the exposure of intellectual property. The competitiveness of plastic and composite producers relies heavily on custom polymer blends and chemical additives that give products unique characteristics like UV resistance or elasticity. There is high resistance to sharing this proprietary data on an open platform. Lastly, the cost of compliance and the lack of structured internal ownership (i.e., who is responsible for the passport within the firm) are major administrative concerns.

Perception of the DPP:

Currently, the DPP is perceived primarily as a strict, coming regulatory obligation driven by the EU's Ecodesign for Sustainable Products Regulation (ESPR). However, forward-looking companies are beginning to view it as a major competitive advantage. The focus group agreed that the DPP could eventually serve as a far superior, more dynamic, and standardized sales tool than the expensive and static Environmental Product Declarations (EPDs) used today. A well-implemented DPP will allow companies to clearly document eco-design improvements and the use of recycled materials, proving green claims to commercial customers and public procurers without risk of greenwashing accusations.

5 TECHNOLOGY, DATA AND INTEROPERABILITY - assessment of the organization's technology readiness.

5.1 Systems and infrastructure

The technological infrastructure of the Norwegian plastics and composites sector is largely unprepared for cross-company data exchange. Most enterprises operate within closed internal silos with zero interoperability. The absence of clear data requirements has paralyzed investment; companies are hesitant to commit capital to software solutions when they do not know what parameters to collect. Prior piloting attempts from two years ago have failed or been phased out due to this lack of regulatory finality.

Indicated barriers:

Area	Description of the problem
ERP	Internal ERP systems are highly siloed. Large enterprises suffer from fragmented legacy software landscapes (e.g., one major player has 43

Area	Description of the problem
	different ERP systems), making data consolidation a massive bottleneck before any external integration can occur.
PIM	Product Information Management (PIM) systems are rarely utilized for sustainability parameters, lacking fields or structures to manage granular material-level or batch-level environmental data.
MES	Manufacturing Execution Systems (MES) operate locally on factory floors, capturing production data but failing to link material attributes to final product identifiers dynamically.
API / integration	While APIs are acknowledged as essential, no common digital pathway or standardized interface has been agreed upon within the national plastics sector, preventing machine-readable data sharing.
Traceability	Existing product marking is inadequate for long-term tracking. QR codes and physical labels are common for short-term logistics but cannot survive the 20-100 year lifespan of industrial plastic products in harsh external or marine environments.
ESG data	Environmental, Social, and Governance (ESG) data is manually compiled, static, and disjointed from product-specific structures. Calculating real-time LCAs or dynamic EPD parameters is currently unfeasible for most firms.

5.2 Data management

Data management within the sector is heavily fragmented. Product specifications, material safety sheets, and environmental metrics are scattered across various formats (including manual Excel sheets, static PDF certificates, and paper documents). The industry lacks clear data governance models, meaning there is no defined ownership of who inputs, updates, and verifies data along the lifecycle. Standardized data schemas are non-existent, creating a high risk of data dispersion and quality degradation as information moves down the supply chain.

5.3 Supply chain

Supplier observations reveal deep structural opacity. Norwegian plastics and composites manufacturers are heavily dependent on global chemical and polymer distributors. These distributors frequently swap their upstream chemical suppliers based on global market price fluctuations. As a

result, the chemical composition of raw resins can vary batch-by-batch, and manufacturers have no practical way of establishing continuous traceability back to the original polymer synthesis.

5.4 Most frequently reported problems:

The most critical supply chain and technological problems reported during the session include:

- Severe lack of standardized digital data from global suppliers, who are often not legally required or technically ready to share granular composition metrics.
- Proprietary restrictions related to trade secrets, where upstream resin and additive producers refuse to disclose exact chemical compositions due to intellectual property concerns.
- Low level of digitization among smaller supply chain partners and local waste collectors, preventing any closed-loop data tracking.
- The physical breakdown of product identifiers: QR codes and labels applied to industrial items (like maritime buoys or utility pipes) are deteriorated long before the product's 20-100 year lifecycle ends.

6 COMPETENCIES AND TRAINING NEEDS - Identification of competency gaps related to DPP.

6.1 The most important competency gaps:

The qualitative assessment indicates that while basic digital awareness exists, specialized competencies in data governance, material compliance, and interoperability protocols are highly deficient. The table below outlines the evaluated gap levels across key competency areas:

About the area	Gap level
Data management	High
Literacy date	High
ESG	Medium
Interoperability	High
Cybersecurity	Medium
Traceability	High

6.2 Competencies by role

The focus group highlighted that competence requirements must be strictly segmented by corporate roles to ensure effective skill-building.

Management Staff

Needs strategic competencies to understand the business implications of the ESPR and DPP, allocate appropriate budgets, provide organizational mandates, and frame the passport as part of an overall digital transformation rather than an isolated compliance task.

IT / Digitalization Staff

Needs technical skills in standard API development, data structuring, and ERP consolidation. They must understand machine-readable data structures and prepare internal software architectures for seamless external connectivity.

Production / Logistics Staff

Needs practical knowledge of physical tracing technologies (RFID, barcodes, QR codes, and embedded physical markers). They must understand how to maintain batch-level traceability throughout the manufacturing and shipping phases.

Marketing / ESG / Sales Staff

Needs competence in converting validated LCA and environmental product data into active sales and marketing tools, leveraging the DPP as a competitive mechanism in B2B markets and public procurement.

6.3 DigComp 2.2 Mapping

Competence	Observations
Data management	Currently very weak in cross-firm scenarios. Companies struggle to organize and structure product-specific parameters into standardized schemas suitable for external registry uploads.
Critical evaluation of data	Highly deficient. Competence in validating and auditing the truthfulness of upstream environmental and chemical declarations from foreign suppliers is virtually non-existent in SMEs.
Digital collaboration	Minimal inter-company digital collaboration. Most business communication regarding material certificates is manual (PDF/email), with no automated, secure, or API-driven data sharing.

Competence	Observations
Cybersecurity	Strong awareness of information security regarding proprietary chemical formulations. However, there is a lack of skill in executing secure encryption or selective data-masking protocols.
Troubleshooting	High levels of confusion and paralysis due to regulatory ambiguity. Companies struggle to solve basic data gaps and are 'waiting on the fence' for finished EU templates before acting.

7 SECTOR SPECIFICITY - description of challenges specific to the sector represented by the participants.

The implementation of the Digital Product Passport presents highly unique, sector-specific challenges for the plastics and composites industry compared to other heavily regulated sectors like electronics or textiles. The qualitative data from the Norwegian reference group reveals that the physical properties of plastics, the structure of its supply chains, and its varied end-of-life scenarios require bespoke technological and regulatory solutions.

The Lifespan Paradox and Tracking Technology Durability

A central challenge discussed for the plastics and composite sector is the extreme longevity of its products. While consumer packaging may have a short lifespan, industrial plastic products—such as maritime aquaculture buoys, underground pipes, and high-rise basins—are designed to last 20 to 100 years. The traceability technology must be as durable as the product itself. Participants noted that traditional QR codes, which require physical labels, will likely not survive the harsh environments or the lifespan of long-lived plastic products. While RFID tags and barcodes are currently used to track assets like aquaculture buoys, their long-term viability over several decades remains unproven.

An exciting proposal emerging from NCMT's collaboration with the recycling firm Replast is to mold or stamp a standardized 'R' mark directly into the physical structure of plastic materials, combined with AI-based machine vision systems at recycling sorting plants to automatically identify polymer types at end-of-life.

Value Chain Opacity and Raw Material Formulations

The plastics supply chain is exceptionally deep and opaque. Production companies often purchase raw materials (resins, polymers, additives) from suppliers who frequently change their own upstream suppliers based on global market fluctuations. This creates a scenario where the exact chemical composition of a plastic batch can be highly complex to trace back to its origin. The validation of this upstream data is currently viewed as an insurmountable barrier; an SME producing a final plastic product has no practical ability to verify the environmental or chemical claims made by a raw material supplier three steps back in the chain, especially if that supplier is located outside the EU.

Trade Secrets vs. Transparency Requirements

Compounding the opacity of the supply chain is the fierce protection of intellectual property within the plastics and composites sector. The specific chemical formulations, additives, and mixtures used to give plastics their unique properties (durability, flexibility, heat resistance) are heavily guarded trade secrets, often referred to in the industry as the 'secret sauce'. Participants expressed deep concern that the stringent transparency requirements of the DPP could force them to expose proprietary formulations to competitors and downstream actors. The balance between providing sufficient data for safe recycling and protecting corporate IP is a primary point of friction that remains unresolved.

Stringent Regulatory Environments and Positive Lists

The sector also operates under highly specialized regulatory frameworks depending on the product's end-use. For example, plastic materials intended for contact with drinking water are subject to incredibly strict regulations. It is not enough for manufacturers to simply document that they do not use certain banned hazardous substances; they must prove that absolutely every substance present in the product is included on a legal EU 'positive list'. The data-sharing demands to prove this level of compliance across multiple borders and suppliers are immense, and participants noted that virtually no raw material producers are currently capable of delivering this level of granular data through a digital pathway.

Eco-design, EPDs, and Competitive Advantage

Despite these massive hurdles, the sector recognizes the strategic upside of the DPP. For plastics manufacturers, documenting the inclusion of recycled materials and proving product circularity is a 'make or break' competitive factor. The industry heavily relies on Environmental Product Declarations (EPDs), which require complex Life Cycle Assessments (LCAs). However, without standardized value chain data, companies making genuine eco-design improvements cannot receive the economic incentives or market recognition they deserve, risking that their efforts are dismissed as greenwashing. The DPP is viewed by sector experts as a potentially superior, more standardized tool than EPDs for documenting environmental performance. If the plastics sector can overcome the technical barriers of interoperability and data sharing, the DPP will transition from a regulatory burden into a powerful sales advantage, rewarding companies that compete on genuine environmental profiles.

8 DPP ORGANIZATIONAL MATURITY ASSESSMENT

Based on the qualitative findings from the focus group and validation workshop, the overall maturity level of the Norwegian plastics and composites sector has been evaluated across five key readiness areas:

Area	Rating 1–5	Comment
Regulatory awareness	2.5	High initial interest has faded into regulatory confusion. While companies are aware of the ESPR, they lack clarity on specific timelines and internal compliance ownership.

Area	Rating 1–5	Comment
Data and interoperability	1.5	Siloed systems dominate. There are no unified data schemas, and the industry suffers from a lack of integrated digital pathways or standard API interfaces.
Competencies	2.0	Severe skill shortages in data validation and quality auditing. Uptake of formal academic training is low due to significant time barriers for working professionals.
ESG and circularity	3.5	High strategic relevance. Circularity, traceability, and end-of-life systems are actively integrated into corporate strategies, though not yet digitally linked to DPP metrics.
Supply chain	1.5	Upstream global supply chains are opaque and highly volatile. Raw material producers are currently unable or unwilling to share chemical composition data.

Final result

Average rating: 2.2

Interpretation of readiness level:

Result	Interpretation
1.0–1.9	Very low level of readiness
2.0–2.9	Early stage of preparations
3.0–3.9	An organization in transition
4.0–4.5	Advanced preparation
4.6–5.0	High DPP maturity

The sector is currently in the early stages of preparation. While aware of upcoming obligations, Norwegian plastics and composites firms face significant hesitation due to complex technological hurdles and gaps in upstream data. This hesitant approach is further intensified by the substantial pressure of navigating a rapidly evolving landscape of new requirements and regulations.

9 TRAINING PRIORITIES

Key recommended training areas:

The following table details the recommended training topics to bridge the documented competence gaps in Norwegian plastics and composites SMEs:

No.	Training topic	Target group	Justification
1.	Introduction to ESPR and EU Regulatory Landscape	Management Staff, Compliance Officers	Resolves widespread regulatory confusion and explains upcoming rollout timelines for related sectors (textiles, furniture, plastics).
2.	Internal Digital Hygiene and Data Infrastructure Mapping	IT / Digitalization, Administration	Provides strategies to consolidate siloed databases and clean fragmented legacy systems (e.g., 43 ERP systems) before external connectivity.
3.	Standardization and Interoperability Protocols	IT / Digitalization, Systems Engineers	Hands-on training on upcoming CEN/CENELEC standards, the GS1 framework, and machine-readable API protocols for cross-company data sharing.
4.	Physical Product Identification and Marking Technologies	Production Staff, Logistics, R&D	Evaluates the durability and cost of QR codes, RFID, barcodes, and advanced solutions (e.g., embedded material markers) for long-lived products.
5.	Data Quality Verification and Supplier Auditing	Procurement Staff, Quality Managers	Addresses the weakness in auditing and validating material environmental claims received from multi-tiered upstream suppliers.
6.	IP Protection and Selective Data Sharing	Management, Legal, R&D Staff	Teaches selective data-masking and secure contract templates to share compliance data without exposing proprietary trade secrets ('secret sauce').
7.	Circular Data Management and EOL Strategies	ESG / Compliance, Production	Identifies specific data points required to optimize product lifespan, prove regulatory compliance, enable

No.	Training topic	Target group	Justification
			repairability, and support end-of-life circularity/recycling.
8.	Leadership Alignment and Digital Transformation Mandates	Executive Management, Directors	Instructs leaders on how to anchor DPP strategically, provide necessary mandates and resources, and view it as part of overall digital growth.
9.	The DPP as a Strategic Sales and Marketing Tool	Marketing & Sales Teams	Teaches sales teams to convert validated LCA and EPD data into a commercial sales advantage in B2B and B2C markets and public procurement.
10.	Sector-Specific Compliance: Drinking Water Regulations	Quality Managers, Compliance	Addresses the extreme complexity of documenting positive-list compliance for plastic materials in contact with drinking water.

10 RECOMMENDATIONS FOR WP2

To maximize the impact of the upcoming DIGITRACE educational curricula, the following pedagogical strategies are recommended for Work Package 2 (WP2):

Prioritize Informal and Experience-Based Learning

The barrier to sending busy SME employees back to formal academic courses is too high. Training should be delivered through short, on-site workshops, practical demonstrations, and experience-based 'learning by doing' formats.

Utilize Micro-learning Modules

Segment the training into bite-sized, digestible modules (e.g., 15-to-30-minute interactive webinars or video guides) focusing on singular topics like 'How to generate a standard API request' or 'Understanding the GS1 framework.'

Incorporate Practical Exercises and Simulations

Curricula should include mock data-entry exercises and software simulations where participants walk through the process of compiling and uploading a mock product passport into a test registry, exposing them directly to data validation and format requirements.

Leverage Existing Free Resources

Partner with organizations like Digital Norway to utilize their existing, free digital competence courses as introductory prerequisites before entering specialized DPP modules.

Offer Micro-credentials

While industry stakeholders prefer informal training, establishing digital badges or micro-credentials will incentivize long-term participation and provide formal recognition of competence for career development.

11 GOOD PRACTICES AND QUICK WINS

Good Practices Identified

Proactive Value Chain Mobilization (The Vestre Case): The Norwegian furniture manufacturer Vestre represents an outstanding model of organizational readiness. Rather than waiting on finalized EU mandates, Vestre proactively went out to its entire supplier network, demanding detailed material and environmental carbon footprint data. By establishing an internal competition among suppliers for the highest data quality and lowest environmental impact, Vestre turned regulatory documentation and sustainability data into a clear market advantage.

Accessible Competence Networks: Leveraging public-private entities like Digital Norway, which distributes free, high-quality digital courses, provides a proven method for lifting the baseline digital hygiene of SMEs without exhausting company budgets.

Solutions That Can Be Quickly Implemented (Quick Wins)

Initiate Internal 'Digital Hygiene' Audits: SMEs do not need to wait for finalized EU technical schemas to act. A major quick win is to clean existing internal product databases, digitalizing manual Excel logs or paper material certificates into structured, machine-readable tables.

Participate in National Standardization Groups: Actively monitoring or joining committees like Standard Norge's SNK 624 ensures that plastic and composite companies obtain early access to finished data models, allowing them to shape internal system architectures ahead of competitors.

Start Supplier Traceability Dialogues: Companies should hold informal, low-stakes discussions with their direct raw material distributors to map what data is currently available and test basic cross-company sharing, identifying future bottlenecks early.

12 FINAL CONCLUSIONS

Most important observations

The qualitative data from Norway confirms that the transition to the Digital Product Passport (DPP) represents a fundamental cultural and technological shift in data sharing. While the conceptual awareness is high, there is a deep operational gap. However, the DPP is increasingly recognized not merely as a bureaucratic compliance burden, but as a strategic mechanism to eliminate greenwashing and reward genuine circular design improvements.

The biggest barriers

1. System silos and highly fragmented internal IT landscapes (e.g., legacy ERP systems) that prevent seamless integration.
2. Extreme product lifespans (20 to 100 years) for industrial plastics, which outlast physical barcodes or QR labels.

3. Intellectual property concerns, specifically the fear of exposing proprietary chemical additives and blends ('secret sauce').
4. Upstream supply chain volatility, where distributors frequently change sources, making continuous traceability practically impossible.

The most important needs of the organization

To move forward, organizations urgently require standardized, open-access digital pathways and standard interfaces (APIs) to prevent fragmentation. Strategically, there is a critical need for executive management to provide a clear mandate and view DPP preparation as a core digital transformation project. Finally, the workforce needs targeted, practical, on-site, and experience-based training to build data literacy and quality auditing capabilities.